

Energy Efficiency Portfolio Standard Program Administrator Proposal

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Proceeding on Motion of the Commission

Regarding an Energy Efficiency Portfolio Standard



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I. INTRODUCTION

1. BACKGROUND AND PURPOSE OF NYSERDA'S PROGRAM ADMINISTRATOR PROPOSAL

In its June 23, 2008 Order,¹ the New York State Public Service Commission (Commission) established the State's Energy Efficiency Portfolio Standard (EEPS). That Order approved a subset of "fast track" (Fast Track) programs to begin October 1, 2008. On August 22, 2008, NYSERDA filed a Supplemental Revision to its SBC Operating Plan that serves as the vehicle that incorporates the NYSERDA-applicable Fast Track programs into NYSERDA's existing SBC program portfolio. The Order also conditioned NYSERDA's eligibility for additional EEPS funding on the submission of a program plan to implement electric energy efficiency programs designed, at a minimum, to achieve NYSERDA's identified cumulative efficiency target through 2011. This Program Administrator Proposal (Program Proposal) serves to fulfill that condition.

2. PRESENTATION OF NYSERDA'S PROGRAM PROPOSAL

NYSERDA is submitting an extensive Program Portfolio that includes programs that are designed to address electric measures, either as new programs or enhancements of existing, successful programs; or to offer natural gas measures, either as stand-alone programs, or as natural gas components of existing or proposed electric programs. Certain programs apply to multiple energy-using sectors. Given the breadth of NYSERDA's proposal, it is organized into the following sections, as well as supporting appendices.

Section 2: Overview of NYSERDA's Program Proposal

Section 3: Programs for the Commercial and Industrial Sector

Section 4: Programs for the Residential Sector

Section 5: Cross Sector Programs

Section 6: Independent Program Administrator Proposals Submitted for Consideration by NYSERDA

3. SCOPE OF NYSERDA'S PROGRAM PROPOSAL

The goal of the EEPS is to reduce New York's electricity use by 15% from expected levels by 2015. During the first phase, reflected in the Appendix 3, Table 15 of the June 23, 2008 Order, NYSERDA was awarded \$79.8 million to implement its "fast track" programs to achieve a target of 2,348,992 MWh of energy savings. The Order also conditioned NYSERDA's obtaining additional EEPS funding on the submission of a proposal that would achieve, at a minimum, an additional 693,901 MWh of energy savings by 2011. This Program Proposal includes a portfolio of programs that adopts a balanced approach to achieving NYSERDA's energy efficiency savings goal.² The entirety of NYSERDA's

¹ Case 07-M-0548, Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, *Order Establishing Energy Efficiency Portfolio Standard and Approving Programs*, (issued and effective June 23, 2008).

² As identified in the June 23, 2008 Order, NYSERDA's Proposed Plan identifies additional programs that would provide, in the aggregate, for cumulative efficiency savings not lower than 693,901 MWh through 2011. This energy efficiency savings is net after the deduction of NYSERDA Fast Track Programs already approved in the June 23, 2008 Order.

Program Proposal is intended to represent a Statewide blended portfolio that addresses all energy consuming sectors, all regions, and all types of buildings and facilities found in New York.

The program portfolio contains a combination of carefully chosen enhancements to current NYSERDA programs with proven results for which much additional energy savings potential exists, as well as innovative new programs that accomplish the EEPs goals set forth for NYSERDA. In designing its portfolio, NYSERDA contemplated not only the near-term energy reductions, but has built a strategy to incorporate future infrastructure needs in anticipation of the next generation of equipment, systems, and industry requirements.

NYSERDA identified programs, that due to a whole-building approach, result in significant heating fuel savings. Recognizing the need to achieve aggressive electric savings through the EEPs, NYSERDA proposes that these identified programs be allocated gas efficiency funds. Some of these programs already receive gas funding as a result of Public Service Commission proceedings or agreements with gas utilities. NYSERDA seeks to continue and expand integrated electric and gas programs Statewide through 2011. Combined with SBC or EEPs funding, gas funds will enable programs to better address the need for high efficiency heating equipment, serve more customers, and provide significant reductions in energy bills at a time when energy prices make up a greater percentage of a household budget or a business expense. NYSERDA's proposal identifies each proposed program in its portfolio as seeking electric funding, gas funding or electric and gas funding.

NYSERDA continues to pursue greater levels of regional parity in program delivery. Strategies used include using local contractors, who best know their customers, to deliver services within markets, and by adjusting incentive levels within markets to enhance customer interest and increase participation in the programs. NYSERDA also tailors outreach, education and marketing to the region, making program adjustments in response to changing market conditions. To further meet the challenges in achieving regional parity and to better serve and educate consumers, NYSERDA regularly researches ways to increase participation by energy consumers in NYSERDA's programs.

4. NYSERDA'S COLLABORATIVE EFFORTS WITH UTILITIES

NYSERDA places a premium on objective analysis, as well as collaboration, reaching out to solicit multiple perspectives and share information. In order to successfully achieve the 15 by 15 goal, NYSERDA firmly believes that the EEPs must be a joint effort between NYSERDA and all other program administrators. NYSERDA continues to collaborate with utilities on many ongoing energy efficiency efforts always striving for electricity and natural gas savings and enhanced outreach and education of New York's energy consumers. It has been NYSERDA's experience that the response rate for program participation has been the highest in those regions where cooperative arrangements are underway, particularly with regard to cooperative marketing and outreach efforts.

In order for the 15 x 15 effort to succeed, NYSERDA and the utilities will need to collaborate. Since the June 23, 2008 Order, several meetings have occurred with the utilities resulting in many meaningful discussions on potential collaboration. At the request of the Joint Utilities, NYSERDA hosted a joint utility conference call and meeting on August 1, 2008, to discuss collaboration efforts at the State level. This was preceded and followed by individual conversations between certain utilities and NYSERDA regarding the type and nature of programs being considered by the parties.³ In response to utility energy

³ In particular, NYSERDA had meetings or calls with Con Edison, National Grid, NYSEG and RG&E, and Orange and Rockland Utilities.

efficiency proposals through other proceedings, additional conversations have ensued through collaborative discussions that address the relationship and relevance of the proceeding to the EEPs. NYSERDA has had several discussions with gas utilities in particular through that process.

In some program areas, the parties were able to segment the market in a manner that avoids direct competition for the same energy savings, while in other cases the parties identified areas of overlap that need to be addressed more fully. While some utilities clearly articulated that they oppose permitting customers to receive incentives from two entities toward the same energy savings, others felt that this would not pose a problem if the total of the incentive did not exceed the incremental cost of the measure. In addition, NYSERDA and some of the utilities acknowledge that in buildings where NYSERDA and the utility are providing services, there will be a need to determine how savings will be allocated between parties; whether incentive levels require coordination; and to establish processes to ensure customers are not receiving excessive incentives, impacting cost-effectiveness, driving up costs to the ratepayers, and potentially leading to double-counting of savings.

With regard to residential and low-income programs, NYSERDA has an understanding of which programs complement or overlap programs under consideration by Con Edison. The parties have had productive discussions on where additional coordination may be needed. NYSERDA also has a relatively good understanding of programs being considered by National Grid. NYSERDA is less aware of what programs may be considered by other utilities, but stands ready to more fully discuss coordination once program proposals are available. NYSERDA is primarily proposing Statewide programs and there may be overlap of particular programs with some utilities, but not with others.

NYSERDA and some utilities were able to develop a truly collaborative residential power management program that includes roles for both parties. It is unclear, due to the need to evaluate competing priorities, how many of the utilities who considered the program will include it in their proposals, but it exemplifies how a collaborative effort could be designed. The program is described in more detail in this proposal.

The results of NYSERDA's collaborative efforts are mixed, but have resulted in agreements-in-principle between NYSERDA and some utilities about the type of coordination needed on particular programs. From these discussions, NYSERDA believes that potential exists for streamlining the implementation of programs, sharing customer information, simplifying application processes, and coordinating outreach and marketing activities, while minimizing program overlap.

4.1. PROGRAM PORTFOLIO ELEMENTS

NYSERDA has proposed a Program Portfolio that offers energy efficiency savings opportunities for commercial and industrial, residential, multi-family, low-income and a suite of programs that traverse more than one energy-sector. Pursuant to the elements provided in the June 23, 2008 Order, NYSERDA's proposed Program Portfolio includes the following information for each proposed program.

Program Elements that encompass the Narrative Considerations referenced in Appendix 3:

- *A program description* that addresses goals, strategies and mechanics of the effort;
- Plans for measurement, verification and *evaluation* for each program;
- *Demand reduction and system benefits*, including any ancillary savings benefits, if applicable;
- How the program addresses *market segment needs*;
- *Coordination* efforts undertaken by NYSERDA in program design and anticipated for program implementation
- *Cobenefits* readily attributable to each program

- How the program complements other efforts to enhance EEPS *portfolio balance*;
- The *depth of savings* to be achieved through efficient program design;
- How the program will address underserved markets;
- NYSERDA's overall commitment to the program;
- Strategies for customer outreach;
- The collaborative approach taken by NYSERDA in program design and anticipated for program implementation;
- NYSERDA's efforts for fuel integration within individual programs;
- NYSERDA's plan for transparency with regard to the accessibility of program information; and
- The procurement process for those program elements not performed by NYSERDA.
- Program Selection Criteria for each program as set forth in Appendix 3:
- Total Resource Cost Test benefitcost ratio;
- Total Resource Cost Test benefitcost ratio, with carbon externality added, assuming a carbon value of \$15 per ton (TRC plus C);
- MWh saved in 2015 if the program functions for as long as proposed by NYSERDA;
- MW of coincident NYISO peak demand reduction in 2015 if the program functions for as long as proposed by NYSERDA;
- Peak coincidence factor of MWh saved in 2015; and
- Number of participants as a percentage of the number of customers in class, as of 2015 (for select programs).

NYSERDA did not include individual program or portfolio screening metrics related to electric and natural gas rate impacts (Appendix 3, program screening metrics 2, 3, 4, 8, 10 and 11 and portfolio screening metrics 1 and 2). NYSERDA intends to provide screening metrics related to electric and gas rate impacts in a separate supplemental filing. NYSERDA has been working with DPS Staff to obtain information needed to develop these analyses. NYSERDA recently received the information from DPS Staff to conduct the electric rate impact analysis, but the analysis is not yet complete.

For each program, NYSERDA did not include the estimated MWh saved in 2015 assuming the program continues to expand and extends through 2015 (Appendix 3, screening metric 5a), or the estimated MW of coincident NYISO peak saved in 2015 assuming the program continues to expand and extends through 2015 (Appendix 3, screening metric 6a). The estimated MWh and coincident peak MW reductions are affected by many factors. These factors include: changes to Federal appliance and equipment standards and State Energy Code; other programs offered by utilities or independent program administrators and their impacts on energy efficiency measure uptake and remaining potential; the ultimate rate and extent to which market transformation occurs for any specific measures supported by NYSERDA's planned programs; and economic conditions and energy prices. The specific quantifiable impact of these factors, some of which are outside of NYSERDA's direct control, and how they would ultimately affect future program extension and expansion are unclear. Therefore, NYSERDA proposes to formulate these projections once the full slate of EEPS program offerings and administrators is known, and when more complete information is available from program evaluation efforts on early progress and market conditions.

4.2. INDEPENDENT PROGRAM ADMINISTRATOR PROPOSALS

The proposed program portfolio also addresses the process used by NYSERDA to invite and evaluate proposals for independent program administrators to submit proposals to NYSERDA for new program ideas that could be implemented in the 2009–2011 time frame. The Commission directed that all proposals received by NYSERDA and the utilities from independent administrators be give serious consideration for inclusion in their proposed Program Plans. In response, NYSERDA undertook the process that is described in Section 6 of this Program Proposal, along with the results of that technical review.

II. OVERVIEW OF NYSERDA'S PROGRAM PORTFOLIO

1. NYSERDA PROGRAM PORTFOLIO

NYSERDA's Program Portfolio is designed to meet the cumulative efficiency savings target of not less than 693,901 MWh through 2011 as provided in Appendix 3, Table 10 of the June 23, 2008 Order. The portfolio includes programs that are designed to address electric measures, either as a new program or an enhancement of an existing, successful program; or to offer natural gas measures, either as a stand-alone program, or as a natural gas component of an existing or proposed electric program. Certain programs apply to multiple energy-using sectors. These aspects of NYSERDA's proposed portfolio are shown in Table II-1.

The commercial and industrial portion of NYSERDA's portfolio identifies a cost-effective array of 13 programs reflecting a combination of carefully chosen enhancements to proven programs and the establishment of innovative programs that can result in an expeditious accomplishment of the energy savings goals of the EEPS. New program designs have been incorporated to increase participation, avoid customer confusion, and shorten the process for receiving incentives.

The residential and low-income portion of NYSERDA's portfolio is comprised of a portfolio of 15 programs that build on successful programs established through the SBC and new programs and options that focus on maximizing electric savings. This portion of the portfolio identifies opportunities for achieving gas savings through comprehensive, whole-building programs. Of the programs proposed, six explicitly target lower income households (at or below 80 percent of the State Median Income or Area Median Income), accounting for 52% of the requested residential funding.

Three programs in NYSERDA's portfolio cut across sectors, providing reductions in electricity consumption and demand through more efficient electric transportation systems, improving control over energy demand through "Smart Grid" applications, and the development of a trained and competent workforce to deliver energy savings for all program administrators, Statewide. Although energy efficiency in residential and commercial buildings and industrial facilities will provide the bulk of the targeted savings, NYSERDA recognizes that much more energy savings can be achieved by looking at the infrastructure of our communities.

With the funding requested to make commitments through 2011, the Program Portfolio is projected to achieve 751,698 MWh and 8,680,750 MMBtu of savings by 2011, and an additional 272,748 MWh and 1,069,822 MMBtu by 2015.

Throughout the development of this portfolio, NYSERDA continued to collaborate with several of the State's investor-owned electric and gas utilities through joint meetings and conference calls, individual meetings and administrative proceeding forums. These discussions further informed the development of NYSERDA's proposed program portfolio and efforts to streamline program offerings, increase sharing of customer information, and further coordination of outreach and marketing activities.

2. NYSERDA'S PROGRAM PORTFOLIO BUDGET

NYSERDA is proposing a total additional program portfolio budget of \$611.5 million through 2011. Of that, \$190.5 million is allocated to fund programs for the commercial and industrial sector; \$305 million is allocated to the residential and low-income sector (with \$146.2 million allocated to the market rate sector and \$158.8 million to the low-income sector) and \$42.6 million to that portion of the portfolio that addresses multiple sectors. The budget includes \$73.4 million for program administration and evaluation.

Table II-1. NYSERDA Program Portfolio

	Funds Requested			Cumulative Total MWh Savings	Cumulative Total MMBtu Savings
	Electric	Gas	Total		
Commercial and Industrial					
Advanced Burners		\$6,000,000	\$6,000,000		600,000
Benchmarking	\$14,520,000		\$14,520,000	84,000	420,000
Business Partners	\$9,510,000		\$9,510,000	70,533	
Existing Facilities	\$47,080,000	\$10,470,000	\$57,550,000	300,000	1,050,000
Flex Tech Expansion		\$2,633,000	\$2,633,000		658,207
Industrial Process and Efficiency		\$31,071,000	\$31,071,000		3,452,295
Institutional Block RFP (Bidding Program)	\$10,905,840	\$2,558,160	\$13,464,000	60,000	210,000
Loan Fund	\$10,723,152	\$1,420,848	\$12,144,000	23,124	272,562
New Construction		\$11,114,000	\$11,114,000		1,145,742
Solar Thermal	\$300,000	\$600,000	\$900,000	120	1,260
Statewide CHP	\$25,608,000		\$25,608,000	120,000	(810,000)
Waste Energy Recovery	\$3,000,000	\$3,000,000	\$6,000,000	7,884	120,000
Subtotal	\$121,646,992	\$68,867,008	\$190,514,000	665,661	7,120,066
Residential (Low Income)					
Assisted Home Performance		\$48,719,886	\$48,719,886	479	442,194
Electric Reduction in Master –Metered Multifamily Buildings	\$26,892,000		\$26,892,000	51,177	15,207
EmPower		\$27,450,000	\$27,450,000		274,320
Geothermal Heat Pump System Incentives	\$3,960,000		\$3,960,000	18,312	
MFPP Expansion	\$10,216,800	\$37,303,200	\$47,520,000	38,112	475,956
Solar Thermal Incentives	\$4,224,000		\$4,224,000	7,200	
Subtotal	\$45,292,800	\$113,473,086	\$158,765,886	115,280	1,207,677
Residential (Market Rate)					
Electric Reduction in Master-Metered Multifamily Buildings	\$17,928,000		\$17,928,000	34,119	10,137
Energy Star Homes		\$24,110,000	\$24,110,000	1,724	907,969
Geothermal Heat Pump System Incentives	\$3,960,000		\$3,960,000	18,309	
Green Homes	\$613,800	\$6,026,200	\$6,820,000	800	35,290
Home Performance		\$43,155,000	\$43,155,000	969	693,968

	Funds Requested			Cumulative Total MWh Savings	Cumulative Total MMBtu Savings
	Electric	Gas	Total		
MFPP Expansion	\$6,811,200	\$24,868,800	\$31,680,000	44,238	195,465
Power Management	\$3,000,000		\$3,000,000	46,365	
Remodel with Energy Star	\$11,367,000		\$11,367,000	13,311	
Solar Thermal Incentives	\$4,224,000		\$4,224,000	7,200	
Subtotal	\$47,904,000	\$98,340,000	\$146,244,000	167,035	1,842,829
Cross-Cutting Programs					
Enhanced Electrified Rail	\$15,000,000		\$15,000,000	60,000	
Smart Grid	\$11,352,000		\$11,352,000	16,500	
Workforce Development	\$16,255,000		\$16,255,000		
Subtotal	\$42,607,000	\$0	\$42,607,000	76,500	
Program Total	\$257,450,792	\$280,680,094	\$538,130,886	1,024,476	10,170,572
Administration (7% of Total)	\$20,479,040	\$22,326,826	\$42,805,866		
Evaluation (5% of Total)	\$14,627,886	\$15,947,733	\$30,575,619		
Portfolio Total	\$292,557,718	\$318,954,652	\$611,512,370	1,024,476	10,170,572

3. PROJECTED ENERGY EFFICIENCY SAVINGS (MWh AND MMBtu) FROM NYSERDA'S PROGRAM PORTFOLIO

NYSERDA's program portfolio will result in both electricity (MWh) savings, as well as gas savings (MMBtu). The anticipated electricity savings results from NYSERDA's Program Portfolio for the years 2009 through 2015 are shown in Table II-2.

Table II-2. Anticipated Annual MWh Results from NYSERDA's Program Portfolio (2009-2015)

	2009	2010	2011	2012	2013	2014	2015	<i>Cumulative Total</i>
Commercial Industrial								
Benchmarking	14,000	23,240	28,000	14,000	4,760	-		84,000
Business Partners	23,511	23,511	23,511	-	-	-		70,533
Existing Facilities	25,000	50,000	100,000	100,000	25,000	-		300,000
Institutional Block RFP (Bidding Program)	-	24,000	36,000	-	-	-		60,000
Loan Fund	7,708	7,708	7,708	-	-	-		23,124
Solar Thermal	-	20	40	40	20	-		120
Statewide CHP	-	-	13,700	29,700	41,200	26,300	9,100	120,000
Waste Energy Recovery	-	2,628	2,628	2,628	-	-		7,884
<i>Subtotal</i>	<i>70,219</i>	<i>131,077</i>	<i>211,587</i>	<i>146,368</i>	<i>70,980</i>	<i>26,300</i>	<i>9,100</i>	<i>665,661</i>
Residential and Low-Income								
Low-Income								
Assisted Home Performance (Gas)	145	159	175	-	-	-	-	479
Electric Reduction in MM MF Buildings	17,059	17,059	17,059	-	-	-	-	51,177
Geothermal Source Heat Pumps	6,104	6,104	6,104	-	-	-	-	18,312
MFPP Expansion	12,704	12,704	12,704	-	-	-	-	38,112
Solar Thermal Incentives	2,400	2,400	2,400	-	-	-	-	7,200
<i>Subtotal</i>	<i>38,412</i>	<i>38,426</i>	<i>38,442</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>115,280</i>
Market Rate								
Electric Reduction in MM MF Buildings	11,373	11,373	11,373	-	-	-	-	34,119
Energy Star Homes (Gas)	496	546	682					1,724
Geothermal Source Heat Pumps	6,103	6,103	6,103	-	-	-	-	18,309
Green Homes	-	400	400	-	-	-	-	800
Home Performance (Gas)	294	322	353	-	-	-	-	969
MFPP Expansion	14,746	14,746	14,746	-	-	-	-	44,238
Power Management	12,505	15,455	18,405					46,365
Remodel with Energy Star	3,651	4,458	5,202	-	-	-	-	13,311
Solar Thermal Incentives	2,400	2,400	2,400	-	-	-	-	7,200

	2009	2010	2011	2012	2013	2014	2015	<i>Cumulative Total</i>
<i>Subtotal</i>	51,568	55,803	59,664	-	-	-	-	167,035
<i>Residential Subtotal</i>	89,980	94,229	98,106	-	-	-	-	282,315
Cross Cutting Programs								
Enhanced Electrified Rail	-	20,000	20,000	20,000	-	-	-	60,000
Smart Grid	-	6,500	10,000	-	-	-	-	16,500
<i>Subtotal</i>	-	26,500	30,000	20,000	-	-	-	76,500
TOTAL	163,149	251,806	336,743	166,368	70,980	26,300	9,100	1,024,476

The anticipated natural gas savings results from NYSERDA's Program Portfolio for the years 2009 through 2015 are shown in Table II-3.

Table II-3. Anticipated Annual MMBtu Results from Requested Funding (2009 – 2015)

	2009	2010	2011	2012	2013	2014	2015	<i>Cumulative Total</i>
Commercial Industrial								
Advanced Burners	-	200,000	200,000	200,000	-	-	-	600,000
Benchmarking	70,000	116,200	140,000	70,000	23,800			420,000
Existing Facilities	90,000	175,000	350,000	350,000	85,000	-	-	1,050,000
Flex Tech Expansion (Gas)	26,118	73,596	134,111	161,908	139,395	80,103	42,976	658,207
Industrial Process and Efficiency (Gas)	503,460	813,328	1,056,365	876,558	202,284	-	-	3,452,295
Institutional Block RFP (Bidding Program)	-	84,000	126,000	-	-	-	-	210,000
Loan Fund	90,854	90,854	90,854	-	-	-	-	272,562
New Construction (Gas)	103,117	137,489	263,521	297,893	252,063	91,659	-	1,145,742
Solar Thermal	-	210	420	420	210	-	-	1,260
Statewide CHP*	-		(92,475)	(200,475)	(278,100)	(177,525)	(61,425)	(810,000)
Waste Energy Recovery	-	40,000	40,000	40,000	-	-	-	120,000
<i>Subtotal</i>	883,539	1,730,977	2,308,796	1,796,304	424,652	(5,763)	(18,449)	7,120,066
Residential and Low-Income								
Low-Income								
Assisted Home Performance (Gas)	134,111	146,986	161,097	-	-	-	-	442,194
Electric Reduction in MM MF Buildings	5,069	5,069	5,069	-	-	-	-	15,207
EmPower (Gas)	45,720	91,440	91,440	45,720	-	-	-	274,320
MFPP Expansion	158,652	158,652	158,652	-	-	-	-	475,956
<i>Subtotal</i>	343,552	402,147	416,258	45,720	-	-	-	1,207,677
Market Rate								

	2009	2010	2011	2012	2013	2014	2015	<i>Cumulative Total</i>
Electric Reduction in MM MF Buildings	3,379	3,379	3,379	-	-	-	-	10,137
Energy Star Homes (Gas)	259,605	288,162	360,202	-	-	-	-	907,969
Green Homes	-	17,645	17,645	-	-	-	-	35,290
Home Performance (Gas)	210,471	230,676	252,821	-	-	-	-	693,968
MFPP Expansion	65,155	65,155	65,155	-	-	-	-	195,465
<i>Subtotal</i>	<i>538,610</i>	<i>605,017</i>	<i>699,202</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>1,842,829</i>
<i>Residential Subtotal</i>	<i>882,162</i>	<i>1,007,164</i>	<i>1,115,460</i>	<i>45,720</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>3,050,506</i>
TOTAL	2,343,016	2,959,078	3,378,656	895,466	198,568	(5,763)	(18,449)	10,170,572

NOTE: Sums may not total due to rounding.

*Because the electricity saved by the DG/CHP projects replaces electricity previously purchased from the grid, the program has reduced fuel used at central generating stations, for a net decrease statewide due to greater efficiency of the DG/CHP systems at sites where imported fuel is used. The fuel avoided at the central generating plant is determined from the electricity generated by the DG/CHP installations. Furthermore, at additional projects such as waste water treatment plants, electricity generation is powered fully or partially by digester gas produced on site. Such fuel switching achieves natural gas conservation above and beyond what is achieved through efficiency alone.

4. OVERARCHING EVALUATION PLAN FOR NYSERDA PROGRAM PORTFOLIO

The June 23, 2008 EEPS Order called for NYSERDA to file, within 60 days, a Transition Plan identifying steps that will be taken to enhance NYSERDA's program evaluation efforts. The Order specifically directed NYSERDA to describe planned enhancements to evaluation, measurement and verification, including (a) creation of a uniform database allowing more comparable evaluation of programs, and (b) increased detachment of NYSERDA from evaluation contractors, and increased involvement of DPS Staff in oversight of evaluation. The NYSERDA Transition Plan contains a full discussion of these issues which are relevant to the evaluation of programs proposed in this filing.⁴

4.1. EVALUATION REPORTING AND BENEFIT COST ANALYSIS

Each year, NYSERDA and its evaluation contractors will prepare three quarterly reports and one annual report covering both the SBC-funded **New York Energy \$martSM** Program and EEPS portfolio progress to date. NYSERDA will further consult with DPS Staff and the EEPS Evaluation Advisory Group (EAG) to modify the existing format of the SBC Program quarterly and annual reports, as needed, in order to also fulfill reporting needs for EEPS programs. The quarterly and annual reports will show NYSERDA's tracking or allocation of committed funds, spending, and energy savings to both SBC and EEPS.

⁴ NYSERDA, *NYSERDA Transition Plan for Enhancing Program Evaluation*, Prepared for the New York State Public Service Commission, Case 07-M-0548 Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, filed August 22, 2008.

The quarterly and annual reports will include: financial status, program progress indicators, energy savings⁵, peak demand reductions, customer bill savings, and progress toward goals. As available from program-specific evaluation work, recommendations made by NYSERDA's evaluation contractors and NYSERDA's response will also be included. NYSERDA will also make available copies of all detailed reports prepared by evaluation contractors to support the quarterly and annual reports, and will work with DPS Staff, the EAG, and the EEPS evaluation advisor consultant, as needed, on the development of these detailed reports.

Quarterly reports will be provided to the Commission within 60 days of the end of each calendar quarter. The annual report will substitute for the fourth quarterly report, summarizing program and portfolio progress throughout the calendar year. The annual report will be submitted to the Commission within 90 days of the end of the calendar year.

Monthly status "scorecard" reports will also be provided to DPS by NYSERDA. These reports will document key, summary level information on program funding, participants, and energy savings. While NYSERDA will endeavor to provide the most accurate information possible in the scorecard reports, they will not reflect the same adjustments and quality controls as the quarterly and annual evaluation reports.

Detailed reports presenting results from evaluation studies conducted by NYSERDA's evaluation contractors will be provided to DPS and the EAG upon completion. NYSERDA also expects to involve DPS and the EAG in the evaluation process leading up to the delivery of these detailed reports. Final reports will align with requirements set forth in the DPS evaluation guidelines, and will include: methodology, key results, recommendations, summary and conclusions, and appendices with detailed documentation.

Once per year, NYSERDA will update benefit/cost ratios (at a minimum, Total Resource Cost test) for each major program and for the entire portfolio of SBC-funded **New York Energy \$martSM** and EEPS programs. NYSERDA will conduct benefit/cost analysis for its programs in a manner consistent with other program administrators, as appropriate. NYSERDA has worked with its evaluation contractors over the years to conduct benefit/cost analyses on the SBC program, and has knowledgeable staff and a tool in place to accomplish benefit/cost analyses for all of its SBC and EEPS programs. NYSERDA is prepared to make adjustments to its current practice should DPS Staff or the EAG decide that alternative methods, tools, or inputs are superior or would foster greater consistency among program administrators.

4.2. EVALUATION PLANS

Background Information

This filing includes preliminary, specific evaluation plans for each of NYSERDA's proposed programs or program components. Each specific evaluation plan was developed based on NYSERDA's current plans for design and administration of the programs.

These evaluation plans have been prepared using best efforts and allow NYSERDA and its independent evaluation contractors flexibility to adapt the approaches that best suit the program as implemented, the final evaluation protocols, and the ultimate available funding, after accounting for overarching studies and other higher-level evaluation costs. NYSERDA's estimated evaluation budget for each program will

⁵ NYSERDA will report cumulative annual energy savings for each program and the portfolio of programs. Cumulative annual savings will be adjusted to reflect the results of measurement and verification and attribution (net-to-gross) evaluation studies conducted in compliance with the evaluation protocols developed by the DPS Staff. For programs receiving both EEPS and SBC funding, energy savings will be allocated to each funding source.

include a modest set-aside for developing a full evaluation plan with DPS Staff and EEPS EAG involvement. NYSERDA will endeavor to comport with evaluation guidelines and protocols set forth by DPS Staff. NYSERDA will also reference the guidelines put forth by the American Evaluation Association for conducting ethical evaluations.⁶

Budget Considerations

With regard to the evaluation of the proposed programs, NYSERDA arrived at approximate budgets for those efforts based on a consideration of: each program's expected spending and energy savings; possible program participation levels; expected distribution of savings across the population of participants; nature of each program's design and intervention strategies; and, where applicable, prior evaluation methods, results, level of rigor/reliability attained, and remaining uncertainty. Based these considerations, allocations for program-specific evaluation efforts are not necessarily equal to 5% across the proposed programs and program elements. Furthermore, given the current uncertainty about overarching needs for evaluation funding, and without a full picture of future program offerings, the program-specific evaluation plans contained herein are intended to serve as illustrative examples at this early stage in the process. To the extent that the proposed programs represent expansions of current programs, those programs will be evaluated in total (i.e., all funding sources). Therefore, the preliminary, program-specific evaluation plans and budgets for some programs will likely be expanded to address all funding sources in the same manner described, and through a single comprehensive evaluation effort. Program impacts will then be allocated to each funding source.

Staff/Consultant Resources and Ethical/Operational Considerations

In order to provide timely evaluation of the EEPS programs, and to provide for cost-effective integration of the enhanced SBC evaluation with the EEPS program evaluations, NYSERDA plans to utilize its current group of evaluation contractors to the extent possible. Current evaluation contracts will be modified, as necessary, to allow for the conduct of this additional work. Should other evaluation contractor support be necessary to provide for the enhanced level of evaluation, NYSERDA will use its competitive procurement process to obtain these resources. However, selection of new contractors may alter the ultimate timing of evaluations proposed herein.

NYSERDA's current evaluation contractors are organized into three specialty evaluation teams covering: impact evaluation,⁷ process evaluation, and market characterization and assessment. All of the major program-specific evaluation activities covered by the DPS evaluation guidelines are represented by these teams. NYSERDA also currently has a survey data collection contractor that serves the large-scale data collection needs of each of the three specialty evaluation contractor teams. Each of NYSERDA's evaluation contractor teams was competitively selected using NYSERDA's rigorous solicitation process.

Management of evaluation contractors, and overall management of the evaluation effort, will be conducted by NYSERDA's Energy Analysis group. The Energy Analysis group has no program administration or implementation functions, and is organizationally separate from NYSERDA's other groups that perform these functions. NYSERDA and its evaluation contractors follow the American Evaluation Association's Guiding Principles for Evaluators. These principles call for: systematic

⁶ American Evaluation Association (AEA), Guiding Principles for Evaluators, www.eval.org. See source for a full explanation of these guiding principles.

⁷ NYSERDA's current impact evaluation team is responsible for measurement and verification, net-to-gross analysis, research and development impact evaluation, and assisting with benefit/cost analysis.

inquiry, competence, integrity, honesty, respect for people, and responsibility for general and public welfare.

5. INDEPENDENT PROGRAM ADMINISTRATOR PROPOSALS CONSIDERED BY NYSERDA

Section 6 of this Proposal provides information on the independent program administrator proposals received by NYSERDA and the process for their evaluation. NYSERDA issued a Program Opportunity Notice (PON) to provide a vehicle for independent program administrators to submit proposals and for NYSERDA to evaluate any such proposals. The PON was a competitive solicitation that sought proposals for innovative programs that would not duplicate programs currently being offered by NYSERDA, or the utilities, or assigned to NYSERDA or utilities in the June 23, 2008 Order. The selection criteria stated in the PON were adopted from the June 23, 2008 Order as contained in Appendix 3.

In response to the PON, twelve proposals were submitted to NYSERDA and reviewed by a Technical Evaluation Panel (TEP). The TEP recommendations were submitted to NYSERDA's Management Review Process and two proposals, from EnerNoc, Inc. and EnSave, Inc., were found to merit further investigation and are attached as Appendices B and C to this Proposal. NYSERDA has notified all proposers as to their status of inclusion in or omission from this filing. No funding has been included in this Program Proposal to accommodate the two proposals found to merit further investigation.

III. COMMERCIAL AND INDUSTRIAL PROGRAMS

This section of NYSERDA's Program Administrator Proposal Filing identifies a cost-effective portfolio of commercial and industrial (C/I) programs that, based on NYSERDA's longstanding experience, could reasonably result in meeting a significant portion of NYSERDA's mandated MWh reduction goals. The C/I portfolio comprises a combination of carefully chosen enhancements to proven programs and the establishment of innovative programs that can result in an expeditious accomplishment of the energy savings goals of the Energy Efficiency Portfolio Standard. New program designs have been incorporated to increase participation, avoid customer confusion, and shorten the process for receiving incentives.

As stated in the June 23, 2008 EEPS Order, the expansion and enhancement of existing, proven programs is the most reasonable and expeditious way to accomplish the goal of accelerating savings, particularly in light of the substantial period of time that NYSERDA programs have been rigorously and transparently evaluated. The extensive evaluation of NYSERDA's C/I programs provides solid metrics with which to reasonably project the effectiveness and results of NYSERDA's proposed C/I portfolio.

Twelve programs propose a combination of electric-only, gas-only, and a combination electric & gas savings. Five programs are requesting electric and gas funding (Existing Facilities, Loan Fund, Block Bidding for Commercial/Institutional Programs, Solar Thermal for Commercial and Industrial Applications, and Waste Energy Recovery Systems). Three additional programs are requesting electric-only funding (CHP, Benchmarking and Operations Efficiency Program, and Business Partners). Finally, four request gas-funding only programs (Flexible Technical Assistance, Industrial Process, New Construction, and Advanced Burners). Additional funding for gas measures is requested to provide comprehensive, fuel-neutral programs.

The programs provide a multifaceted approach to energy reductions, by targeting vendors, end-use customers, contractors, design professionals, and the financial community. The focus is primarily on achieving energy savings from the more complex, large building and facility projects, using a whole-building approach. Incentive structures for end-users, along with efforts that encourage mid-stream energy product and service providers to sell and install efficient systems are designed to build on NYSERDA's success in transforming markets for efficiency in New York State. New efforts to deploy solar thermal systems, waste energy recovery systems, and advanced burners will determine the viability of these technologies and the contribution their installation can make to energy use reduction goals.

The programs were developed in collaboration with a variety of stakeholders and, in addition to contributing to the State's EEPS goals, also support the public policy objectives as outlined in the Governor's Renewable Energy Task Force Report, and PlaNYC.

1. STATEWIDE COMBINED HEAT AND POWER PERFORMANCE PROGRAM (ELECTRIC)

1.1. DESCRIPTION OF PROGRAM

Performance-based installations of combined heat and power (CHP) systems are proposed as eligible measures in the portfolio of programs administered by NYSERDA to meet the 2015 goals identified in the Order. CHP systems can provide substantial impacts by increasing energy efficiency and relieving stresses on transmission and distribution (T&D) systems. Benefits are achieved by focusing on environmentally clean, energy efficient, cost-effective, and commercially available CHP systems that are properly sized for each specific application. To help achieve these goals, NYSERDA recently expanded statewide the existing CHP Performance Program piloted only in the Con Edison service territory. NYSERDA also increased the incentives for Con Edison customers.

Previously, NYSERDA built upon its successful joint distributed generation (DG) and CHP demonstration program to offer incentives on a first-come, first-served performance basis for CHP systems that provide summer on-peak-demand reduction. This program was a key part of the portfolio of programs that NYSERDA issued to meet the goals for the Con Edison System Wide Program (SWP).

Since program inception in 2006, NYSERDA has offered incentives to 10 CHP projects representing 27 MWs of summer peak-demand reduction and almost 204,000 MWh in energy savings in the Con Edison service territory.

The Statewide Combined Heat and Power Performance Program (Statewide CHP Program) will continue to focus on clean, efficient, cost-effective, commercially available systems that provide the maximum ratepayer benefit. The program requires systems to achieve 60 percent fuel conversion efficiency on an annual basis with considerable incentive reductions for non-performance.

Unlike other energy efficiency measures, CHP projects are large complex projects with long lead times that provide reliably persistent savings. The viability of CHP projects is affected by numerous external variables including the difference between electric and gas prices ("spark spread"), siting and space constraints, adequate fuel supplies, and interconnection issues. The anticipated savings from this program are dependent on the interaction of these variables. However, electric savings can be quite significant over the long term. Table III-2 shows anticipated installed MWh for the CHP Program.

Table III-1 is the anticipated expenditures for the CHP Program. Since this program makes multiple payments based upon actual performance, program expenditures are expected to continue beyond 2015.

1.2. DEMAND REDUCTION AND SYSTEM BENEFITS

CHP systems can help alleviate stress on the T&D system and defer upgrades, especially in load pockets where capacity is strained. The CHP Program will focus on incentives for systems that operate during peak load periods. Systems must operate more than 60 percent of the time from May 1 to October 31 from 12 PM to 6 PM. The CHP Program anticipates 27 MW of demand reduction and 120,000 MWh of savings by 2015.

Table III-1. Statewide Combined Heat and Power Performance Program — Total Program Expenditures (Projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015
	\$0.41M	\$0.58M	\$1.88M	\$3.72M	\$5.97M	\$6.17M	\$4.45M
Outreach / Marketing	\$0.34M	\$0.51M	\$0.51M	\$0.17M	\$0	\$0	\$0
Annual EEPS Spending	2016	2017	Total				
	\$1.90M	\$0.52M	\$25.60M				
Outreach / Marketing	\$0	\$0	\$1.54M				

Table III-2. Statewide Combined Heat and Power Performance Program — Electric Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	0	0	13,700	29,700	41,200	26,300	9,100
Annual Savings Installed in Prior Years	n/a	0	0	13,700	43,400	84,600	110,900
Cumulative Annual Savings	0	0	13,700	43,400	84,600	110,900	120,000

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

1.3. EVALUATION

General Evaluation Approach

Evaluation Goals

The primary goal of the Statewide CHP Program evaluation is to assess the energy and demand savings attributable to program activities. The secondary goal of the evaluation is to foster an understanding of the market to help tailor the program to the needs of the audience and assist in creating an efficient program delivery mechanism.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Statewide CHP Program, and in the absence of complete knowledge

about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding.

To the extent that NYSERDA's original and ongoing SBC-funded Distributed Generation/Combined Heat and Power Program can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional resources from the enhanced SBC3 evaluation funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

This evaluation plan for the Statewide CHP Program emphasizes impact evaluation, including measurement and verification and net-to-gross analysis. The evaluation plan also includes more modest process evaluation and market studies.

Evaluation Budget

NYSERDA expects evaluation budget for the Statewide CHP Program to be approximately equal to 5% of the program funding level, less funds set aside for statewide studies and other overarching costs borne by program administrators. The majority of the Statewide CHP Program evaluation budget will be allocated to impact evaluation (approximately 60%). Process evaluation is expected to require approximately 25% of the program's evaluation budget, and market evaluation is expected to receive the remaining funds (15%).

Evaluation Schedule

Evaluation studies included as part of the Statewide CHP Program evaluation plan are shown in the table below along with the time frame for their anticipated completion. The evaluation plan is expected to include multiple measurement and verification, net-to-gross, and process evaluation studies. One market evaluation is planned for completion in 2009.

Table III-3. Statewide CHP Performance Program Evaluation Schedule

Evaluation Element	Expected Completion					
	2009	2010	2011	2012	2013	2014
Impact - M&V				X		X
Impact - Net-to-Gross		FR-MR	SO, FR-MR			SO
Process Evaluation		X		X		
Market Evaluation	X					

FR = Freeridership MR = Targeted market research for NTG analysis SO = Spillover

Impact Evaluation

Measurement and Verification

The Statewide CHP Performance Program design links incentive payment to performance, and monitoring will be done through an existing web-based central database. This data collected as part of the program design is expected to provide a solid basis for a thorough, balanced measurement and verification of the electricity generated and net thermal benefits experienced by each facility. The initial

step will be to review and assess the quality and comprehensiveness of the metered data. If the data sets are complete, there may be little value gained in spending limited evaluation funds to perform additional metering as the Web site will also record any downtime. M&V work may be largely focused on verification of the baseline assumptions for each project. If needed, strategies will be developed for addressing gaps in the data, including additional metering and on site data collection. In addition, it is possible that additional information from the participants may be needed to interpret the metering data. For example, interviews with participants may shed light on the reasons for a lengthy shut down of the equipment. For projects with complete data, M&V work will focus on the baseline assumptions for each project. Given the long development times for CHP systems, M&V will likely be scheduled for the years 2012 and 2014, but is subject to change to match the pace of installations.

During the more detailed evaluation planning process NYSERDA will assess the benefits versus costs of undertaking a persistence impact evaluation for this program. The Statewide CHP Program requires the site to meet overall system efficiency standards for two (2) years to get the full incentive. There is no evaluation experience as to the level of persistence after this period.

Net-to-Gross

NYSERDA intends to explore participant and non-participant spillover and participant freeridership using an enhanced self-report survey process with multiple decision-makers including building owners, chief financial officers, vendors, technical assistance providers, etc. involved in adopting combined heat and power systems. Sample sizes will be calculated on kWh generated to target 90% confidence and 10% sampling precision at the program level. If budget permits, 90/10 confidence could be achieved at the utility level. Participant population sizes, however, may likely afford census attempts whereby the greatest consideration is in maximizing survey participation and reducing potential respondent bias. The surveys will include alternative inquiries to test and provide construct validity for the NTG estimates. Given the long-term nature of CHP Projects, attribution analysis will be conducted beginning in 2010 for freeridership and will include an analysis of spillover in 2011. If budget permits, this work could be updated in 2014 or at the conclusion of accrual of program benefits. This effort may also leverage a current NYSERDA evaluation that is assessing replications from demonstration projects funded by the Research and Development programs.

Process Evaluation

Process evaluation activities will focus on the participation and decision making process in the Statewide CHP Performance program. The process evaluation is expected to include both participants and non-participants. The program implementation team will track individuals who request information about the program services. Those who do not know of nor participate in the program will form the non-participant population. Areas of inquiry expected for the process evaluation work include:

- Attrition analysis focusing on the reasons for non-participation and drop out at different stages
- Barriers to participation
- Value of services provided to business (non-energy and monetary)
- Overall customer satisfaction with the program services and equipment installed
- Examination of customer decision making, including roles of individuals involved and factors influencing the decision

The process evaluation work is expected to generate actionable recommendations for possible improvements to the program. Given the anticipated small number of program participants, a census survey could be attempted. It is expected that a process evaluation will be conducted at two points in

time: first, approximately a year after the program start date so as to provide early feedback regarding the program processes and participation rates; and second, in approximately the third year to further explore reasons for attrition.

Because the process evaluation will be in the field a year before the impact evaluation starts, the process evaluation contractor will be responsible for conducting an “evaluability assessment” and data review for the program. This exercise will help ensure that data that will ultimately be needed for impact evaluation are being collected and stored appropriately. The evaluability assessment will be undertaken as part of the first process evaluation activity. Recommendations for data collection, validation and organization will be included as part of the first process evaluation report, and feedback to NYSERDA will be transmitted as findings and recommendations are available.

Market Evaluation

Considerable untapped potential exists for CHP in New York State. Given that merely a fraction of that potential has been met to date, market characterization and assessment work will be structured to explore the factors hindering greater market uptake of CHP systems. Primary data collection with key market actor groups will be used to explore market awareness and knowledge of CHP opportunities, perceived market barriers such as first cost, fear of new technology, and lack of expertise, among others; and primary decision making criteria and motivations for installation including reduced operating costs, ability to attract buyers/tenants, mitigating climate change, etc. Secondary data sources will be mined to characterize the market eligible to participate in the program along several dimensions including the size and influence of key market actor groups and the relationships and dynamics among those groups. This work should be completed in the first year of program implementation in the event that training and development of the market delivery infrastructure is warranted.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program needs to be reduced, the Market or Process work would be curtailed in scope and possibly frequency. Conversely, if more of NYSERDA’s total evaluation funding could be allocated to this program, the additional funds could be used for more site-specific data collection as part of the impact evaluation and larger sample sizes, *e.g.*, by utility service territory.

1.4. MARKET SEGMENT NEED

Based on a 2002 study, considerable potential exists for CHP systems in New York State⁸. The study identified approximately 8,500 MW of technical CHP potential in the State and identified sites with both a high load factor and high thermal utilization as good candidates for cost-effective CHP. Potential sites addressed in the study included commercial, industrial, and institutional facilities.

⁸ Energy Nexus Group Onsite Energy Corporation and Pace Energy Project, *Combined Heat and Power Market Potential for New York State*, NYSERDA Report 02-12, October 2002.

1.5. COORDINATION

NYSERDA has met numerous times with representatives of New York utilities to discuss different approaches to meeting MWh goals. Currently, NYSERDA is the only program administrator offering a performance-based, standard offer Statewide CHP Program. Based on these meetings and on a review of program offerings in other states, NYSERDA does not anticipate any utility to propose a CHP performance program in their 90-day filings.

If an independent program administrator or utility were selected by the Commission to offer a CHP program, NYSERDA will continue its tradition of collaboration, work to minimize customer confusion, and seek to ensure that clean, efficient CHP systems are installed.

NYSERDA has worked closely with utilities such as National Grid and Con Edison to host customer meetings to discuss the capabilities and limitations of CHP. NYSERDA will continue this effort.

1.6. CO-BENEFITS

In addition to providing significant energy savings, CHP systems can provide power during grid outages and increase on-site electric reliability.

1.7. PORTFOLIO BALANCE

CHP will contribute to portfolio diversification and provide substantial savings over a long time frame. CHP systems are complex projects with lengthy project development, engineering, and installation times when compared to other energy efficiency projects. To help balance the longer lead times, CHP is included in a portfolio of programs that offer energy efficiency measures with relatively short installation time frames, *e.g.*, lighting and variable speed drives.

1.8. DEPTH OF SAVINGS

NYSERDA recommends that customers explore possible energy efficiency improvements to optimize their load profiles before they install CHP systems. Such optimization may reduce the first cost of CHP systems by decreasing the size of systems and ensuring that systems are correctly sized.

1.9. UNDERSERVED MARKETS

Until 2006, NYSERDA provided incentives only for CHP demonstration projects. These projects focused primarily on innovative CHP systems and not on using CHP for acquisition of energy efficiency savings. Based upon participation rates for the demonstration program and input from various stakeholder groups, the need became apparent for a standard offer program for CHP. As a result, the CHP Performance Program was created to address this need. To date, this program has been well received by the market and continues to grow.

1.10. COMMITMENT

NYSERDA has developed the internal infrastructure necessary to operate the CHP performance program. Expansion statewide is a natural progression of the program. The challenge lies in expanding NYSERDA's network of engineering firms and CHP developers and continually improving the skills of engineering firms and CHP developers who now work with NYSERDA.

1.11. CUSTOMER OUTREACH

NYSERDA will expand its current integrated outreach approach to increase the number of commercial/industrial customers that participate in its programs. Outreach will largely be accomplished through the Energy Smart Focus initiatives that target various sectors of the commercial/industrial market with tailored messages, one-on-one interactions, and other strategies that encourage efficiency practices. Based on experience to date, an additional investment in the Energy Smart Focus initiatives is expected to result in a direct increase in both the quantity and quality of projects entering core incentive programs.

However, due to its site specific nature, CHP is not a fit for every customer or every sector. Unlike other energy efficiency measures, CHP may not be feasible or cost-effective for most facilities. CHP systems are specific applications that require targeted customer outreach. NYSERDA will target sectors providing the best opportunities for successful utilization of CHP systems such as industrial customers and institutional customers such as health care facilities.

NYSERDA will also work with architects and engineering firms and professional organizations to promote the benefits and discuss the challenges of installing CHP systems. Mechanisms will include seminars, case studies, and training.

1.12. COLLABORATIVE APPROACH

Implementation of CHP systems was identified during the planning of the Con Edison Statewide Program as a prime method for reducing energy use and providing demand reductions. The Collaborative Group and the CHP Working Group consisted of interested stakeholders, developers, NYSERDA staff, representatives of the Public Service Commission, and Con Edison staff. The groups determined that CHP systems provide ratepayer and system benefits and CHP was included as a component of the Statewide Program order. Also consulted in this review were developers, utility representatives, members of A&E firms, and end users and their representatives. These relationships are continually maintained and representatives of these groups are consulted when modifications to the program are contemplated.

1.13. FUEL INTEGRATION

The nature of CHP systems requires fuel integration because a CHP system is only efficient if an adequate heat load is coincident with electrical production. Proper sizing and configuration of CHP systems help ensure efficient use of gas and electric generation.

1.14. TRANSPARENCY

NYSERDA has a Data-Integrator Web site used for posting the performance of existing systems in the CHP Performance Program and will continue to post the performance of each new system. Posted information includes fuel conversion efficiencies, runtimes, and generator output. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

1.15. PROCUREMENT

NYSERDA administers the CHP Performance Program and customers participate on a first-come, first-served basis.

1.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Statewide Combined Heat and Power Program (Statewide CHP) required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSEERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table III-4 shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table III-5 shows the present value of the costs and benefits used in the analysis. Table III-7 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-4. Statewide CHP Performance Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	20	120	27	-810,000	38%

Table III-5. Statewide CHP Performance Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
Electric Funding Only	\$26.6	\$80.5	\$63.0*

*\$0.02 per kWh of operations and maintenance costs were subtracted from benefits.

Table III-6. Statewide CHP Performance Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	2.4	0.8

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externalities (Screening Metric 8)

Table III-7 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$3.3 million.

Table III-7. Statewide CHP Performance Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	2.5	0.8

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 120,000 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 27 MW (cumulative) of coincident peak reduction in 2015.⁹

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.51.¹⁰

Number of Participants as a Percentage of the Number of Customers in the Class (Screening Metric 9)

The Statewide CHP Program is intended to reach 30 customers in total.

⁹ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday weekdays.

¹⁰ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

2. BENCHMARKING AND OPERATIONS EFFICIENCY PROGRAM (ELECTRIC)

2.1. PROGRAM DESCRIPTION

The Benchmarking and Operations Efficiency Program (Program) will encourage customers to benchmark their facilities' energy performance, implement low- and no-cost operational improvements, and participate in NYSERDA's incentive programs for capital intensive efficiency measures. The benchmark compares a facility's energy use with other similar facilities, on both a local and national level, and serves as a baseline of energy performance from which improvements in energy efficiency can be measured and tracked over time. The output from building energy performance rating systems, such as Portfolio Manager (available through the U.S. Environmental Protection Agency), provides a whole-building performance assessment, taking into account actual energy consumption, hours of operation, space use, number of occupants, and other unique factors. This information helps determine where the major energy efficiency opportunities lie, which often entails low- and no-cost operational improvements that can be implemented quickly to provide immediate energy savings.

National associations and several state agencies now encourage benchmarking as the first step toward energy performance improvements. The Governor's Renewable Energy Task Force Report and PlaNYC recommend initiatives to require commercial buildings to periodically benchmark their energy use. Additional infrastructure, tools and support are needed to realize the energy efficiency potential of such initiatives. This includes assistance to acquire and load data into benchmarking systems, verify quality data and outputs, and help customers interpret the results and take action.

NYSERDA has begun to provide these types of services through its sector-based Energy Smart Focus program under the **New York Energy \$martSM** program. Based on the results of these efforts, NYSERDA is proposing to use EEPs funds for a major expansion of activities related to energy benchmarking, with particular focus on methods that encourage and support operations and maintenance measures. Under the Program, NYSERDA will develop the critical tools and resources needed to support benchmarking. This includes a web-based portal that links to national benchmarking systems such as the U.S. EPA Portfolio Manager, and a growing database of energy use information from peer buildings in the region and State. The Program will provide assistance to help building owners collect and load data into the appropriate benchmarking system, and provide the necessary quality control. Energy Management "SWAT" Teams will then be available to customers to identify and implement energy savings opportunities from operations and maintenance improvements. Analysis will also point out where major system upgrades are warranted or may require further technical examination. On-going benchmarking will be encouraged so that building owners and managers can periodically assess the overall impact of the implemented measures on their facility's energy use and their utility bills.

The Program will integrate closely with the Workforce Development Program to expand the number of trained professionals with the skills needed to benchmark and implement best-practices energy management. The Program will also integrate with general program marketing strategies to achieve participation goals in NYSERDA's portfolio of programs. Efforts will address the significant efficiency opportunities for existing buildings across the state, with particular focus in New York City to work in concert with the recommendations of PlaNYC. Marketing and deployment of services will align with NYSERDA's priority sectors particularly those where benchmarking has proven to motivate action (commercial real estate, K-12 schools, hospitality, healthcare, and colleges). Estimated annual savings are 28,000 MWh, 140,000 MMBtus, and an increased participation rate in other NYSERDA programs.

2.2. DEMAND REDUCTION AND SYSTEM BENEFITS

The Program presents the first opportunity in the nation to provide detailed monitoring, verification, and evaluation (MV&E) at a 90/10 confidence level for a comprehensive benchmarking, operations,

maintenance, and energy management program. To a limited extent, MV&E of these related services has already begun with the use of energy performance rating tools, and evaluation surveys conducted to date. Early indicators show that at least a 10% energy improvement within a five (5) year period can be attributed to benchmarking and operational improvements distinct from more expensive capital projects. Experience with these activities has developed to the point where implementing the MV&E efforts called for by current PSC Orders is appropriate. Energy reduction indicators from some of the Energy Smart Focus program efforts to date include: 22% energy use reduction per square foot in schools over a four year period; 30 to 50% of savings are achieved without additional assistance from core incentive programs; and 10% to 20% energy use reductions can be achieved in the first three years.

Table III-8. Benchmarking and Operations Efficiency Program – Total Program Expenditures (Projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$5.5M	\$4.5M	\$4.5M	\$0	\$0	\$0	\$0	\$14.50M
Projected Outreach/Marketing costs: \$0.275M in 2009; \$0.225M in 2010; \$0.225M in 2011.								

Table III-9. Benchmarking and Operations Efficiency Program – Electric Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	14,000	23,240	28,000	14,000	4,760	0	0
Annual Savings Installed in Prior Years	n/a	14,000	37,240	65,240	79,240	84,000	84,000
Cumulative Annual Savings	14,000	37,240	65,240	79,240	84,000	84,000	84,000

Table III-10. Benchmarking and Operations Efficiency Program – Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	70,000	116,200	140,000	70,000	23,800	0	0
Annual Savings Installed in Prior Years		70,000	186,200	326,200	396,200	420,000	420,000
Cumulative Annual Savings	70,000	186,200	326,200	396,200	420,000	420,000	420,000
<i>Note:</i> The Program will achieve electric and natural gas savings without additional funding.							

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

2.3. PROGRAM EVALUATION PLAN

General Evaluation Approach

Evaluation Goals

The primary goal of the Program evaluation is to assess the energy and demand savings attributable to program activities. Secondary goals are understanding the market to tailor the program to the needs of the audience and fostering creation of an efficient delivery mechanism.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Program, in the absence of complete knowledge about potential funding set-asides for overarching evaluation projects that would serve the needs of all EEPS program administrators. As such, these plans have been prepared in order to allow NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented, once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects that the evaluation budget for the Program to be approximately equal to 5% of the program funding level, less funds set aside for statewide studies and other overarching costs borne by program administrators. Approximately 60% of the program evaluation budget will be allocated to impact evaluation and the remainder will be approximately equally split between process and market evaluation efforts.

Evaluation Schedule

Evaluation studies included as part of the Program evaluation plan are shown in the table below along with the time frame for their anticipated completion. Initially, in 2009, process and market evaluation efforts will inform program start up. Then, in 2011, the major impact evaluation will be undertaken and process evaluation will be revisited.

Table III-11. Evaluation Schedule for Benchmarking and Operations Program

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
Impact - M&V			X	
Impact - Net-to-Gross			X	
Process Evaluation	X		X	
Market Evaluation	X			

Impact Evaluation

Measurement and Verification

The Program will track numbers of participants that enter into core NYSERDA and utility incentive programs. The program includes components for which indirect estimates of energy savings will be made as well as components for which direct estimates will be made. The specific approaches for each component are discussed below.

- **Benchmarking:** This program component will likely use both indirect and direct energy savings estimation approaches. With its independent evaluation contractors, NYSERDA will develop protocols to quantify the savings that result from benchmarking. The entire program and the benchmarking component, in particular, is expected to function as a significant feeder effort to other NYSERDA and utility programs and also encourage independent adoption of energy efficiency measures by customers. This affects the impact evaluations for the interrelated programs. The savings impacts and the decision making (net-to-gross) evaluations may be planned alongside one another in order to capture savings from each related program and any leveraging or overlap that occurs. The primary evaluation focus will be on electricity savings; however, the evaluation will also include impacts on heating fuels, water, and other non-energy benefits such as avoided/reduced operations and maintenance costs. The evaluation may also involve reviewing, early in the program roll out, the assumptions and algorithms built into the tools and software provided by the program.
- **Energy Manager SWAT team:** This program component will generate recommendations for energy improvements that the customer can implement on their own or with NYSERDA assistance, so savings will likely be estimated using a direct verification method. NYSERDA will perform site visits and net-to-gross surveys with those that implement recommendations without NYSERDA incentives. The approach will follow the model of past evaluations of FlexTech/Technical Assistance and assess the rate of adoption and the accuracy of savings estimates. First, participants will be surveyed on whether any recommended measures or actions were implemented. The survey will be stratified by utility service territory and then the magnitude of potential (recommended) electricity savings within that stratum, targeting sampling to achieve 90/10 confidence/precision by utility service territory. Second, potential projects will be chosen for site visits based upon the results of the telephone surveys. A census of large energy saving sites and a sample (targeting 90/10 confidence/precision levels) of remaining sites in each utility stratum will be selected for verification site visits. The smallest energy savers may be eliminated for site visits, but may be included in a telephone verification survey. Savings will be estimated, using simple engineering models at a

minimum,¹¹ based on reported baseline conditions (or code assumptions) and as-built conditions. Results will be weighted by utility and for the program as a whole. To allow adequate time for recommendations to be implemented, experience has shown that a minimum of one-year following post energy audit is required. Given this, NYSERDA plans to conduct the impact evaluation in 2011. Participants that receive incentives through other implementation programs may be evaluated through those programs.

- **Tools/Resources and Market Research:** Impact from these program components can only be assessed using indirect means. The evaluation will likely consist of self-report measurement using surveys to assess any actions taken as a result of receiving the tools. The surveys will only include actions for which energy savings can be estimated. NYSERDA recognizes that overlap with other EEPs programs is an issue that will need to be considered in evaluating energy savings from this program component.

Net-to-Gross

Following up on the Measurement and Verification work, participants who adopted measure recommendations will be surveyed for the amount of energy savings attributable to NYSERDA's efforts. NYSERDA will perform enhanced self-report surveys with customers, contractors and vendors to assess freeridership and spillover. A representative sample, targeting 90% confidence and 10% precision at the statewide level and the results applied to the savings for the entire program. Freeridership quantifies savings from those participants that would have installed the energy efficiency measure without an incentive, yet received an incentive. Spillover accounts for customer savings that occurred due to their interaction with NYSERDA or market actor allies, yet in the absence of an incentive. Spillover savings will be estimated relative to the savings experienced on participating projects. Attribution studies will be conducted concurrently with the Measurement and Verification in 2011.

Process Evaluation

Process evaluation activities will focus on the participation and decision making process in each of the program elements. Participant samples will be drawn from the program tracking system. The implementation team will also track end users who are contacted or who request information about the program services. Those who do not participate in the program will form the non-participant population. Areas of inquiry expected for the process evaluation work include:

- Attrition analysis focusing on the reasons for non-participation and drop-out at different stages
- Barriers to participation
- Barriers to full-scale implementation
- Value of services provided to business (non-energy and monetary)
- Overall customer satisfaction with the program services
- Examination of customer decision making, including roles of individuals involved and factors influencing the decision

¹¹ More sophisticated methods may be selected for the largest savings' sites and the method selected will depend upon an assessment of the most reliable, and cost-efficient method for the application being examined. For example, a large industrial process measure might best be measured through IPMVP Option B and calibrated DOE-2 modeling (IPMVP Option D) might be most appropriate for a comprehensive large office building application.

The process evaluation work will generate actionable recommendations for improvements to the program. It is expected that process evaluation will be conducted at two points in time: first, approximately a year after the program start date so as to provide early feedback regarding the program processes and participation rates; and second, in approximately the third year to further expand on and explore reasons for attrition.

Because the process evaluation will be in the field a year before the impact evaluation starts, the process evaluation contractor will be responsible for conducting an “evaluability assessment” and data review for the program. This exercise will help ensure that data that will ultimately be needed for impact evaluation are being collected and stored appropriately. The evaluability assessment will be undertaken as part of the first process evaluation activity. Recommendations for data collection, validation and organization will be included as part of the first process evaluation report and feedback to NYSERDA will be transmitted as findings and recommendations are available.

Market Evaluation

An important part of any program evaluation is a thorough understanding of the market environment in which the program is operating. As part of that effort, a program theory and logic model will be developed in the first year of implementation to clarify connections between NYSERDA, customers, contractors and vendors. The program theory and logic model will provide the following information relevant to the Program:

- A high level summary of the market context within which the program operates as well as the other energy efficiency programs it works with to accomplish the overarching EEPs goals
- Key program-specific elements, including the ultimate goals of the program, market barriers, targeted market actors, program activities, inputs, anticipated outputs/outcomes, and potential external influences
- Key programmatic outputs and outcomes, including identification of relevant measurement indicators and potential data collection approaches
- Potential researchable issues for consideration within evaluation planning

The program theory and logic model will guide NYSERDA’s program-specific evaluation activities and assist in the development of a comprehensive research agenda geared toward overcoming any existing gaps in program staff’s knowledge of current market conditions and opportunities. The final prioritized lists of measurement indicators and researchable issues will be translated into discrete research tasks that generate findings that can be clearly related back to the outputs and outcomes anticipated by the program theory and logic model. Measurement of these program-specific indicators and researchable issues, which will likely include metrics related to market awareness and interest in benchmarking activities as well as the size and influence of key market actor groups and the relationships and dynamics among those groups, will enable baseline values to be established to support subsequent longitudinal analyses. Other possible areas of research could include market awareness and interest in benchmarking.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program needs to be reduced, impact evaluation would no longer be able to meet 90/10 at the individual utility level, and process evaluation would likely eliminate the non-participant sample and other potential participant groups in an attempt to focus on only the most relevant samples for achieving the highest priority goals of the evaluation. Conversely, if more

of NYSERDA's total evaluation funding could be allocated to this program, the additional funds would allow for more site-specific data collection as part of the impact evaluation.

2.4. MARKET SEGMENT NEED

Existing buildings consume a significant percent of all energy consumed in New York State, and are responsible for more than 79% of all emissions in New York City. Benchmarking and operations and maintenance improvements can easily deliver 10 - 15% energy use reduction within existing buildings. This program approach focuses on fast-payback measures related to inefficient lighting, heating, cooling, air distribution, pumps, fan systems, and building envelope. These measures can be addressed by building maintenance staff through consistent preventative maintenance practices and well-documented building operating practices. These types of measures are typically overlooked by energy providers who tend to target larger retrofit projects that require design/build services or larger capital investment.

2.5. COORDINATION

The Program is designed to support early adopters and customers ready to commit to continual energy efficiency improvements. Based on experience in Energy Smart Focus programs, customers regularly seek individualized assistance to direct them to appropriate financial, technical, and informational resources. The Program will: improve the cost-effectiveness of efficiency projects, improve use of the most cost-effective measures in core incentive program projects, increase program participation, and achieve significant savings without the need for direct financial assistance. Preliminary findings indicate that 30-60% of Program participants will likely enroll in a core incentive program within 12 months, and anecdotal evidence suggests that many customers will implement higher quality, more cost-effective projects than non-Program participants. NYSERDA staff conduct and will continue to seek out collaborative discussions with representatives of New York's investor-owned utilities to improve coordination of program delivery, maximize resource acquisitions, and minimize costs to rate payers.

2.6. CO-BENEFITS

The Program offers three important co-benefits. The program offers a low-cost way to directly support energy policy initiatives being developed in New York City and by the Governor's Renewable Energy Task Force, and it provides improved budget prediction capabilities and energy master planning for large energy users and other facilities that are constrained by fixed budgets and are sensitive to price fluctuations. In addition, the program will serve the needs of many customers who need to augment their internal staff with experienced and well trained experts to implement comprehensive, cost-effective, long-term energy programs.

2.7. PORTFOLIO BALANCE

The Program is an important part of the overall portfolio of services for the commercial/industrial sector, as it addresses the low- and no-cost efficiency opportunities. The Program also directly supports other EEPs programs by increasing program participation, providing a "feeder" mechanism to technical assistance programs, improving the cost-effectiveness and quality of projects seeking direct financial assistance, and encouraging the use of the best available technologies. The Program can easily be adapted to the needs of its customers and key market stakeholders, especially New York City.

2.8. DEPTH OF SAVINGS

Based on experiences with previous customers, Program staff will advise clients how to implement the most cost-effective energy improvement projects and undertake appropriate measures to meet their

operational needs. Because interactions with customers are ongoing, Program customers can routinely provide timely feedback on project performance that can immediately benefit other customers.

2.9. UNDERSERVED MARKETS

Customers in the industry and institutional sectors have identified the services they most require as technical assistance and initial support for defining and framing projects to help prioritize energy efficiency investments. The commercial sector, particularly in metropolitan New York, has been traditionally underserved due to the split incentives between owner and tenants, an issue that can be addressed through lease-based analysis and other resources proposed under this initiative. The Program responds directly to the specific needs of customers who have begun to make commitments to improved energy performance as directed by the Public Service Commission.

2.10. COMMITMENT

Because the Program is building on Energy Smart Focus programs operated by NYSERDA, program services can be delivered immediately. In many cases, contractors have been competitively selected and have developed or are developing key relationships necessary to deliver services. Basic customer surveys and needs assessments have also taken place and services and tools are being developed.

2.11. CUSTOMER OUTREACH

The Program will support outreach and program participation as customers establish comprehensive energy policies that permit them to enjoy continuous improvement. Key groups, such as the New York City Mayor's Office, associations, and other key stakeholder groups, will be incorporated as partners in program planning and deployment efforts. In essence, the Program is built around these relationships and takes advantage of the partners' communication systems. Specific strategies that NYSERDA will employ are built around the following three methods of outreach and support:

- Most participation with clients will be a direct result of targeted one-on-one and small group interactions through Energy Smart Focus programs. Past experience indicates that broadbased marketing is much less effective than one-on-one technical interactions.
- Staff will actively participate in conferences, planning groups, *e.g.*, the New York City Mayor's Office of Long Term Planning and Sustainability, trade association meetings, and through regularly convened market stakeholder group meetings to obtain feedback and assistance in designing and modifying program elements.
- Limited broadbased marketing, such as advertising and public service messages, will be used to raise general awareness of programs and energy issues.

2.12. COLLABORATIVE APPROACH

NYSERDA will continue to work with organizations, particularly those representing the key sectors to assure that program design and delivery meets the needs of their constituencies. For this effort, collaborators include: the New York City Mayor's Office of Long Term Planning and Sustainability; New York City Economic Development Corporation; Superintendents of Buildings and Grounds Association; the Real Estate Board of New York, and the Manufacturers Association of Central New York; Multiple Intervenors; the New York State Education Department; the New York Power Authority; and New York investor-owned utilities. Representatives of these groups are regularly consulted with respect to desirable services and to provide input on program design. Representatives of most sectors and key stakeholders are asked to participate in formal Technical Review Groups to address ongoing management and program issues at NYSERDA.

NYSERDA staff conduct and will continue to seek out collaborative discussions with representatives of New York's investor-owned utilities to improve coordination of program delivery, maximize resource acquisitions, and minimize costs to rate payers.

2.13. FUEL INTEGRATION

While the Program focuses on cost-effective electric kWh savings, program efforts also include recommendations and information on the ways to conserve other fuels and water. Providing consistent advice and services across issue areas encourage customers to have repeated interactions with single points of contact for all energy issues that may affect their facilities. The single point of entry is one of the most valuable services provided to customers, and increases savings from fossil fuels, water, operations and maintenance, and other sustainability related benefits.

2.14. TRANSPARENCY

Data collected to date is largely sector specific, anecdotal, or geographically based. Once the Program is funded, the following data will be obtained and compiled: detailed lists of customer contacts, the nature of the contacts, changes in energy performance, overlap with core incentive programs, and measures implemented outside of core incentive programs. Improved recommendations for specific equipment efficiency projects and project designs will also be gathered as part of this effort. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

2.15. PROCUREMENT

The Program services will be provided through Energy Smart Focus contractors who are competitively selected, and through Program partners to develop and deploy new tools and resources. Customers may be provided with limited incentives and non-financial rewards to motivate participation.

2.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Benchmarking and Operations Efficiency Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table 1 shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table 2 shows the present value of the costs and benefits used in the analysis. Table 3 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-12. Benchmarking and Operations Efficiency Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	5	84.0	7.1	420,000	46%

Table III-13. Benchmarking and Operations Efficiency Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
Electric Funding Only	\$16.4	\$24.0	\$70.4

Table III-14. Benchmarking and Operations Efficiency Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	4.3	2.9

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table 4 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$3.4 million.

Table III-15. Benchmarking and Operations Efficiency Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	4.5	3.1

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 84,000 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 7.1 MW (cumulative) of coincident peak reduction in 2015.¹²

¹² NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday weekdays.

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 1.35.¹³

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table 5 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table 5. Benchmarking and Operations Efficiency Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class ¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Commercial — Electricity	1,002,856	500	< 0.1%
Commercial — Natural Gas	358,504	500	< 0.1%

¹ Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

¹³ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

3. NEW YORK ENERGY \$MARTSM BUSINESS PARTNERS (ELECTRIC)

NYSERDA continues to work with over 1,100 building and systems contractors, distributors, vendors, designers, energy service providers, and energy companies to increase the availability, promotion, and sale of energy-efficient products and services for the commercial and industrial sector. Mid-stream market development programs were consolidated as part of the SBC III Plan and a new Business Partners initiative was launched that conveys the theme that these businesses are vital to the growth of the energy efficiency industry, and important to the economy of the State. The Small Commercial Lighting, Motors, and Commercial HVAC Programs (components of Business Partners) have built strong ally networks and have encouraged mid-market allies to use customer-incentives and other sales tools for closing deals. Partners use strategies that coincide with their own business models to influence markets towards efficiency. Program evaluations have proven the success of the Business Partners Program including significant market share increases for energy efficient products; changes in a business' core practices; wholesale improvements to operation and maintenance practices, and quality installations.

3.1. PROGRAM DESCRIPTION

NYSERDA will build upon the success of the Business Partners model and expand its efforts to recruit new participants and target technologies and practices that have the highest energy savings potential. Partners will gain access to special training, tools, and performance incentives. NYSERDA will work with the Business Partners to help them differentiate their business in a highly competitive marketplace, while assuring that appropriate quality control mechanisms are in place. The Program will include strategies to help Business Partners market their efficient technologies and services to the end-user to encourage program participation

Heating, Ventilation and Air Conditioning (HVAC) – The HVAC Program will promote the efficient operation of existing unitary air conditioning units, and facilitate the specification, purchase, and installation of high efficiency HVAC equipment for commercial buildings. The Program will expand the qualified service delivery network of HVAC contractors in the commercial sector. Participating contractors (business partners) will be eligible for incentives to diagnose the energy efficiency of small commercial unitary HVAC units, and where applicable complete HVAC Test and Tune services, economizer repairs, and enhanced control strategies for units currently in service. The Program will also incorporate an outreach component targeting new construction. A 2006 survey to HVAC distributors indicated that over one third of packaged commercial HVAC units sold are for new installations, thus, there is a significant opportunity to increase the sales of high efficiency equipment by focusing on this market. These services will dove-tail with other NYSERDA and utility incentive programs, to promote the purchase and installation of high-efficiency equipment for new construction, and the replacement and early retirement of HVAC units within existing facilities. Equipment installations will be installed using industry accepted quality installation procedures.

Effective, Energy-Efficient Lighting - The Commercial Lighting Program will focus on market development program offerings and incentive structures to support the training of lighting practitioners on the benefits and attributes of effective, energy-efficient lighting – **The Right LightSM**. Lighting Business Partners will also be trained to use advanced lighting technologies for greater energy and demand savings, and to design projects that achieve energy savings beyond what the 2007 Energy Conservation Construction Code of New York State requires. Special training for Lighting Business Partners will provide information on comparative lighting technologies and how to design with them. Trainings will be customized to the appropriate types of lighting practitioners for greater impact. Following the new Lighting Business Partners design under SBCIII, recruitment of Lighting Business Partners will be expanded to include energy services companies (ESCOs) and interior designers. An increase in architects and engineers is expected as the eligible space size is increased from 25,000 square feet to address opportunities in the New York City market. The success of the parent program – the Small Commercial

Lighting Program (SCLP) under SBC - was largely due to the use of account managers working with Lighting Business Partners directly. The Program will add account managers to the New York City and Western New York regions to recruit Lighting Business Partners and provide training and support. The Program will expand end-user marketing efforts started under SCLP. The goal is to educate end-users on the benefits of an effective, energy-efficient lighting design and lead them to the Lighting Business Partners trained under the Program. The Program will further engage end-users by participating in regional events such as energy fairs, association-sponsored meetings (such as BOMA, Chambers of Commerce, etc.), trade shows, and seminars.

Energy-Efficient Motors and Drives - The Motors Program will focus on strategies and incentive structures to procure kWh savings through energy efficiency. The Motors program is currently designed to promote energy efficiency through the purchase and use of NEMA Premium® Efficient motors. The Program reaches out to both motor purchasers and vendors and educates them on the advantages of using NEMA Premium® motors. This is achieved by holding training workshops, vendor education, and customer site visits. Participating vendors have the tools to explain to customers what the advantages are to purchasing and installing NEMA Premium® motors. There are currently approximately 70 active and engaged vendors involved in the program. Motor Program expansion will involve midstream incentives to enrolled Business Partners on the sale of qualified, NEMA Premium® horizontal and vertical shaft three-phase motors and qualified variable speed drives (VSD). Incentives will be directly tied to the existing motor inventories and will be targeted at early replacement, normal replacement, and new construction. Vendor incentives will allow NYSERDA to see a documented correlation between motor inventories and the purchase of motors based on those inventories. The new program will build off current goals for the Business Partners Program and will allow for an increased emphasis on markets within NYS that offer the most energy savings potential. New program components will serve to prime the motor market in anticipation of new motor regulations which take effect in late 2011. Attention will be given to working with vendors and distributors to stock motors meeting the new regulations.

3.2. DEMAND REDUCTION AND SYSTEM BENEFITS

Staff anticipate achieving approximately 70,533 MWh savings through 2011.

Table III-16. Business Partners Program – Total Program Expenditures (Projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$3.17M	\$3.17M	\$3.17M	\$0	\$0	\$0	\$0	\$9.51M
Projected Outreach/Marketing costs: \$0.16M in 2009; \$0.16M in year 2010; \$0.16M in 2011.								

Table III-17. Business Partners Program – Electric Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	23,511	23,511	23,511	0	0	0	0
Annual Savings Installed in Prior Years	0	0	0	0	0	0	0
Cumulative Annual Savings	23,511	47,022	70,533	70,533	70,533	70,533	70,533

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

3.3. GENERAL EVALUATION APPROACH

Evaluation Goals

The primary goal of the Business Partners Program evaluation is to assess the energy and demand savings attributable to program activities. The secondary goal will be to conduct process evaluation to improve the program.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Business Partners Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding.

To the extent that NYSERDA's original and ongoing SBC-funded Business Partners Program can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional resources from the enhanced SBC3 evaluation funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects the evaluation budget for the Business Partners Program to be slightly greater than 5% of program funding, less funds set aside for statewide studies and other overarching costs borne by program administrators. These funds will likely be allocated primarily to impact evaluation (80%) with a modest budget for process evaluation (20%).

Evaluation Schedule

Evaluation studies expected to be part of the Business Partners Program evaluation plan are shown in the table below along with the time frame for their anticipated completion. Each year the program is operational, measurement and verification and net-to-gross will be assessed. Process evaluation will occur near the end of the first year in order to identify areas for improvement and help maximize program efficiency and effectiveness.

Table III-18. Business Partners Program Evaluation Schedule

Evaluation Element	Expected Completion		
	2009	2010	2011
Impact - M&V	X (if pre-post design possible)	X	X
Impact - Net-to-Gross	FR-MR	FR-MR, SO	SO-MR
Process Evaluation	X		

FR = Freeridership study R = Targeted market research for net-to-gross analysis (if possible within the evaluation budget) SO = Spillover examination

Impact Evaluation

Measurement and Verification

The Business Partners Program will track numbers of contractors and customers participating, and services rendered. The program includes components for which direct estimates of energy savings will be made. The specific approaches for each component are discussed below.

Heating Ventilation and Air Conditioning - The program design dictates that incentives will be paid to contractors following the performance of certain tasks – diagnosis of energy efficiency of small unitary HVAC units, Test and Tune services, economizer repairs, enhanced control strategies, and the promotion and purchase of high-efficiency equipment. Therefore, to form the population of projects, NYSERDA expects to maintain a record of each task, date performed, name of customer receiving services, and the amount of incentives. The population will be stratified by estimated electricity savings to generate a sample targeting 90/10 confidence and precision levels statewide focused on the largest electricity savers. A sample of projects will receive on-site verification and measurement/monitoring. The stratum with projects saving the smallest amount of electricity may be eliminated from site visits but could possibly be included in a telephone verification survey. The specific evaluation methods to be used for each stratum will be developed after assessment of the population. Savings will be estimated, using simple engineering models at a minimum, based on reported baseline conditions (or code assumptions) and as-built conditions. The strata with the projects savings the largest amounts of electricity will likely be a certainty stratum (census attempt group) and will utilize the most rigorous evaluation methods available within the budget. Full measurement for IPMVP Option B: Retrofit Isolation or calibration with energy use data will be used to the extent possible for the certainty strata evaluation. Where possible, site visits and spot measurements will occur as close to peak system conditions as possible. Propagation of error methods will likely be used to determine the greatest reduction of uncertainty that can be achieved through the affordable site measurement and monitoring strategies to be employed.

The evaluation results of the sample will be applied to the entire population by strata. An assessment for outliers will be conducted and their potential exclusion from the strata realization rate will be evaluated. Should the customer receive an incentive from another NYSERDA implementation program, savings will be evaluated through the other program so as to avoid overlap and double counting.

Effective, Energy-Efficient Lighting – Following the model of NYSERDA’s long-standing Small Commercial Lighting Program (SCLP), this component will expand training of lighting practitioners on the benefits of effective, efficient lighting. Contractors will receive incentives for completing qualifying projects at customer sites. The main goal of the projects is to reduce lighting power densities from the 2007 Energy Conservation Construction Code of New York baseline. Savings are reported as the

reduction in lighting power densities multiplied by operating hours reported by the applicant. The last Measurement and Verification study on SCLP focused on confirming the self-reported operating hours by installing loggers in spaces representing various usage types. Planned M&V will involve site visits at a sample of completed projects to verify installation, lighting densities, and install loggers to verify annual operating hours. The prior M&V study will be carefully assessed during the detailed evaluation planning process to determine how best to design this proposed light logger study so the two sets of data may be combined to create greater reliability and enhanced application of results at more refined stratification levels (such as more usage types, building types and building vintages). Sampling will likely use the stratified approach at the statewide level similar to the method described above for HVAC and as needed to create this combined dataset to derive more strata with reliable operating hours for application to the program population. This evaluation may leverage any overarching commercial/industrial baseline and measure saturation studies if they provide lighting densities for non-participants by area usage type, building type and building vintages.

Motors - Following the model of NYSERDA's long-standing Premium-Efficiency Motors Program, this component will expand education of motor vendors on the benefits of NEMA® Premium motors. Contractors will receive incentives for installing NEMA Premium motors at customer sites that have received a motor inventory indicating candidate motors for early or normal replacement. This may offer a fruitful opportunity to develop a pre-post evaluation design. This opportunity will be explored during the detailed evaluation planning process. Parameters for pre-post on-site measurement are expected to be developed from a propagation of error assessment, determining what measurements can most affordably achieve the greatest reduction in uncertainty in the savings estimates. Sampling will likely use the stratified approach at the statewide level similar to the method described above for HVAC. The evaluation results of the sample will be applied to the entire population by strata. If a pre-post evaluation design is possible, the stratification scheme may need to be estimated from prior participant distributions and the impact evaluation strata adjusted based upon experience from the 1st year evaluation of the program. An assessment for outliers can be conducted and their potential exclusion from the strata realization rate will be evaluated. Another facet of the evaluation may compare the energy savings accrued from the former dealer incentive program to the later program that provided inventories of motors appropriate for replacement through an incentive program.

Measurement and Verification on these three components will be conducted in parallel in late 2010 to allow for enough installations to be completed. Data collection and analysis will be performed by NYSERDA's independent evaluation contractors using accepted protocols. Until the planned M&V studies are complete, NYSERDA's existing realization rates for these program components can be used to adjust program-reported savings.

Net-to-Gross

NYSERDA's independent evaluation contractors will perform enhanced self-report surveys with customers, contractors and vendors to assess freeridership and spillover. Although the focus is on informing mid-market participants, customers may come to the program with existing notions of the levels of energy-efficiency they would like to achieve. A representative sample, targeting 90% confidence with 10% precision, will be calculated and the results applied to the savings for the entire program. Data collection and analysis will be performed by NYSERDA's independent evaluation contractors using accepted protocols.

Freeridership quantifies savings from those participants that would have installed the energy efficiency measure without incentive, yet received an incentive. Partial free-riders are those customers that would have done some portion of the project without NYSERDA assistance and partial savings will be allocated accordingly. Inquiries on decision making are likely to produce the most reliable results when they are conducted close to the point of the decision.

Spillover accounts for customer savings that occurred due to their interaction with NYSERDA, yet in the absence of an incentive. Spillover savings will be estimated relative to the savings experienced in the program-sponsored project(s). Studies on spillover need to be timed properly in order to allow time for spillover to occur. The spillover studies will be conducted following the Measurement and Verification in 2011, until then the spillover rates from NYSERDA's current programs will be considered as a possible means to adjust program-reported savings.

Targeted small-scale market research studies will be considered during the detailed evaluation planning to the extent that this work can fit within the budget. If conducted, these small targeted market studies will need to occur early for input into freeridership and again later to foster the triangulation of spillover estimates. Furthermore, any statewide baseline and market saturation studies that are conducted for other programs or to inform the entire EEPS portfolio could be leveraged to provide information that will be highly beneficial to the evaluation of the Business Partners Program components.

Process Evaluation

Process evaluation activities will focus on the participation and decision making process in each of the Business Partners components. Program participants and non-participants will be interviewed as part of this evaluation effort. The program's tracking of vendors and contractors who are contacted or who request information but do not participate in the program will be one source for the non-participant sample. Areas of inquiry expected for the process evaluation work include:

- Attrition analysis focusing on the reasons for non-participation and drop out at different stages
- Barriers to participation
- Barriers to full-scale implementation
- Value of services provided to business (non-energy and monetary)
- Overall customer satisfaction with the program services
- Examination of customer decision making, including roles of individuals involved and factors influencing the decision

Data collection and analysis will be performed by NYSERDA's independent evaluation contractors using accepted protocols. The process evaluation will generate actionable recommendations for program improvement. It is expected that process evaluation will be conducted approximately a year after the program start date so as to provide early feedback regarding the program processes and participation rates. Approximately 20% of the overall evaluation budget for the Business Partners program will be allocated to process evaluation.

Because the process evaluation will commence before the impact evaluation, the process evaluation will include conducting an Evaluability Assessment and data review for the Business Partners Program, to ensure that the data are available for impact evaluation. Recommendations for data collection, validation and organization will be included as part of the first process evaluation report and feedback to NYSERDA will be transmitted as findings and recommendations are available.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support other areas of evaluation, the evaluation plans presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program needs to be reduced, impact evaluation may not be able to meet 90% confidence level for 10% sampling precision. Conversely, if more of NYSERDA's total evaluation

funding could be allocated to this program, the additional funds could be used for more site-specific data collection as part of the impact evaluation and larger sample sizes, *e.g.*, by program component and utility service territory.

3.4. MARKET SEGMENT NEED

Developing partnerships with manufacturers, distributors, retailers, trade associations, and other organizations involved in supplying equipment and services to the commercial marketplace is critical and will enable NYSERDA to continue supporting only the most highly efficient equipment and practices. The Business Partners Program will focus on all of NYS, with particular attention to the New York City market for the Lighting Program.

3.5. COORDINATION

Through partnerships, NYSERDA is uniquely positioned to work collaboratively with midstream and upstream market allies to bring the most efficient equipment into the market by developing new specifications and deploying new equipment to customers through NYSERDA programs. The Business Partner programs work closely with NYSERDA's core program efforts to support business and trade ally networks.

3.6. CO-BENEFITS

Benefits other than direct cost savings and demand reduction/system benefits include increased stocking and sale of efficient products, and increased mid-market understanding of the multiple benefits of installing efficient equipment.

3.7. PORTFOLIO BALANCE

Since the emphasis is on working with the vendors, the program has the opportunity to service a wide range of customers, offering opportunities to encourage further participation in NYSERDA programs. Motors, HVAC and Lighting are often associated with other critical building functions, offering the opportunity for cross-program participation. The Business Partners trained under this Program will impact projects for customers using NYSERDA's end-user incentive programs. In some cases, such as under the Existing Facilities Program and the New Construction Program, the Lighting Business Partners will be using the design techniques to ensure the customer achieves the greatest savings while receiving a quality lighting design.

3.8. DEPTH OF SAVINGS

The depth of savings depends on the specific Business Partner Program. For instance, the Motors Program will build off existing motor inventories so lost opportunities will be addressed. Incentives will provide motivation for motor replacements as opposed to motor repair. Research reveals that motor replacement provides significantly more energy savings for the customer than motor repair. Addressing O&M practices in the HVAC program will lead to efficient operation of equipment rather than capital improvements through incentives, which will be captured through NYSERDA's Existing Facilities Program. Proper lighting design and operation will also provide significant energy demand savings. Strategies used in the Business Partner's program complement NYSERDA's core programs.

3.9. UNDERSERVED MARKETS

The Business Partner's Program has historically addressed the specific needs of smaller commercial and industrial customers who are often missed through current program efforts. However, since the Program

works through its trained partner base, the range of customer types and sizes addressed are many. Lighting continues to represent a large opportunity for energy savings, especially in New York City office buildings where a large percentage are still lit with antiquated lighting technologies. New energy saving lighting technologies are evolving rapidly, but the training to design with these new technologies is extremely limited. A very real concern exists that without proper training, lighting practitioners may achieve energy savings with these new technologies, but the quality of the light will be unacceptable, resulting in end-user snapback to inefficient technologies. It has been proven that effective, energy-efficient lighting contributes to an improved work environment, and has a direct and powerful impact on building occupants affecting health, safety, mood and the speed and accuracy of task performance. This Program fills the gap by providing training to lighting practitioners on designing with these technologies in a manner appealing to the end-user of the space.

3.10. COMMITMENT

The program will be implemented through 2011. The expansion of the Business Partner's Program can be done fairly quickly making the savings targets very realistic.

3.11. CUSTOMER OUTREACH

NYSERDA will continue to expand its partner base through direct recruitment and will work closely with the Workforce Development initiative to ensure that continued opportunities exist. Specific strategies to attract customers will be used within each program area. For instance, print articles and multi-lingual advertising and radio spots describing **The Right LightSM** have already been used in the New York City markets to promote the Lighting Program. These forms of marketing will be expanded in New York City and used in other parts of the State.

3.12. COLLABORATIVE APPROACH

Mid-stream market training impacts projects in all utility service territories. Historically, several of the New York utilities have supported training and it is anticipated that this same support will exist with the Business Partner's Program. Con Edison and Orange and Rockland provided venues for lighting training and encouraged lighting practitioners in their utility territories to attend. The utilities will also be approached for assistance in distributing end user marketing materials to their customers to encourage further energy-saving projects in their territories.

NYSERDA is an active participant in the Northeast Energy Efficiency Partnership (NEEP), a regional organization working to promote the efficient use of energy in the northeast through regionally coordinated upstream market transformation programs. NEEP serves as a platform for information sharing and coordination among program administrators and utilities and helps ensure a consistent level of knowledge amongst service providers in adjoining service areas. For example, the Lighting Program works with its northeast partners to transform the lighting market to fully embrace high performance T8 lighting systems. The northeast region also worked together to promote efficient packaged commercial HVAC systems, through information and education to installation contractors. The NEEP Lighting and HVAC working groups continue to be a primary source of dialogue relating to coordination of regional program activity and development.

3.13. FUEL INTEGRATION

No fuel integration activity is proposed for the lighting and motors programs because they are market development programs based on electric technologies. The HVAC program will achieve incidental gas savings along with the electric savings attributable to the installation of measures and other programmatic activities.

3.14. TRANSPARENCY

Information regarding Business Partner programs, including program design, benefit/cost analysis, and supporting data, are available for public review and accessible to other program administrators. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

3.15. PROCUREMENT

Program delivery will be accomplished through individual contractors that are procured competitively.

3.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Business Partners Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table III-19 shows the resource savings and average measure life used as inputs for the benefit/cost analysis.

Table III-20 shows the present value of the costs and benefits used in the analysis. Table III-21 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-19. Business Partners Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	15	70.5	13.1	--	38%

Table III-20. Business Partners Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
Electric Funding Only	\$10.2	\$18.1	\$90.6

Table III-21. Business Partners Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	8.9	5.0

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table III-22 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$6.9 million.

Table III-22. Business Partners Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	9.6	5.4

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 70,533 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 13.1 MW (cumulative) of coincident peak reduction in 2015.¹⁴

¹⁴ NYSERDA defines the coincident on-peak period as from 12:00 noon to 6:00 PM on summer non-holiday weekdays.

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.61.¹⁵

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table III-23 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table III-23. Business Partners Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Commercial - Electricity	1,002,856	900	<0.1%

¹ Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

¹⁵ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

4. EXISTING FACILITIES PROGRAM (ELECTRIC AND NATURAL GAS)

4.1. DESCRIPTION OF PROGRAM

The Existing Facilities Program (Program) procures kWh and MMBtu savings by implementing energy efficiency measures through a comprehensive strategy that allows customers to approach their energy projects in an integrated fashion. The expanded program will provide incentives for enabling technologies and measurement tools that allow customers to realize kWh savings through more efficient day-to-day operations in existing facilities. Incentives for the expanded program will be tied to rigorous measurement and verification.

The program focuses on lower cost pre-qualified technology solutions that can be quickly implemented to result in immediate energy savings and on long-term comprehensive performance-based energy projects that require more time to implement but realize higher levels of energy savings over time. The program builds upon the successes of the pre-qualified and performance-based incentives for energy efficiency now offered through the **New York Energy \$martSM** Program.

As a further enhancement, the Program will allow end-use customers to apply for incentives directly rather than through contractors.

In addition to expanding current offerings, an additional module will offer assistance to facilities to install or enhance Building Management Systems (BMS) and monitoring equipment to optimize day-to-day operation of facilities. Incentives will be offered to install data gathering technologies that provide critical data to monitor and alter building operation. Covered technologies include temperature sensors for chilled water supplies, condenser water, flow rates, chilled and condenser water temperatures, and wet and dry bulb temperatures. Vendors who provide services to monitor and optimize building operations will be eligible to receive performance-based incentives for kWh savings.

The expanded program will coordinate with other NYSERDA offerings such as the Loan Fund and the FlexTech and Technical Assistance Programs to maximize technical and financial assistance to customers and to implement strategies that maximize energy savings in existing facilities.

4.2. DEMAND REDUCTION AND SYSTEM BENEFITS

The Program will achieve achieving approximately 100,000 MWh and 350,000 MMBtu savings each year or approximately 300,000 MWh and 1,050,000 MMBtu through 2011.

NYSERDA has demonstrated success in providing critical summer peak-demand reduction throughout the state. As an example, NYSERDA's 150MW goal established by the PSC for the Con Edison System Wide Program was exceeded with the majority of the resources obtained through commercial and industrial facilities participating in the Program. The MWs obtained followed rigorous measurement, verification, and evaluation standards. The Program provides financial incentives to measures such as HVAC chillers that inherently reduce summer peak demand. In addition, recent advances in technology integrate energy efficiency and enable customers to participate in demand reduction. The realized savings benefits from energy efficiency and demand reductions result in reduced capacity requirements for the NYISO and potentially defer utility T&D infrastructure upgrades. The Program does not seek EEPs funding for demand response-only measures but will support integrated energy efficiency and demand response measures.

Table III-24. Existing Facilities Program — Total Program Expenditures (Projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$4.20M	\$8.40M	\$17.80M	\$17.80M	\$7.20M	\$2.15M	0	\$57.55M
Projected Outreach/Marketing costs: \$1.85M in 2009; \$1.05M in 2010; \$553,120 in 2011.								

Table III-25. Existing Facilities Program – MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	25,000	50,000	100,000	100,000	25,000	0	0
Annual Savings Installed in Prior Years	n/a	25,000	75,000	175,000	275,000	300,000	300,000
Cumulative Annual Savings	25,000	75,000	175,000	275,000	300,000	300,000	300,000

Table III-26. Existing Facilities Program — Natural Gas Program Expenditures (Projected and net of evaluation and administration) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$1M	\$1.9M	\$3.6M	\$3.4M	\$5.7M	0	0	\$10.47M
Projected Outreach/Marketing costs: \$100,000 in 2009; \$50,000 in 2010; \$35,260 in 2011.								

Table III-27. Existing Facilities Program — Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	90,000	175,000	350,000	350,000	85,000	0	0
Annual Savings Installed in Prior Years	n/a	90,000	265,000	615,000	965,000	1,050,000	1,050,000
Cumulative Annual Savings	90,000	265,000	615,000	965,000	1,050,000	1,050,000	1,050,000

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation

plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

4.3. EXISTING FACILITIES EVALUATION PLAN (ELECTRIC AND NATURAL GAS)

4.4. GENERAL EVALUATION APPROACH

Evaluation Goals

The primary goal of the Existing Facilities Program evaluation is to assess the energy and demand savings attributable to program activities. Secondary goals are understanding the market for tailoring the program to the needs of the audience and fostering an efficient program delivery mechanism.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Existing Facilities Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding.

To the extent that NYSERDA's original and ongoing SBC-funded Existing Facilities Program can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional resources from the enhanced SBC3 evaluation funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects the evaluation budget for the Existing Facilities Program to be less than 5% of the program funding level, minus funds set aside for statewide studies and other overarching costs borne by program administrators. It is expected that the majority of the Existing Facilities Program evaluation budget will be allocated to Impact Evaluation (approximately 70%). The remaining program evaluation funds will be split approximately equally between Process Evaluation and Market Evaluation.

Evaluation Schedule

Evaluation studies included as part of the Existing Facilities Program evaluation plan are shown in the table below along with the time frame for their anticipated completion.

Table III-28. Existing Facilities Program Evaluation Schedule

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
Impact - M&V	Pre-measurements	X		X
Impact - Net-to-Gross		X		X
Process Evaluation	X		X	
Market Evaluation		X		

Impact Evaluation

Impact evaluation activities will consist of measurement and verification and net-to-gross analysis as described in the following sections.

Measurement and Verification

In general, projected savings for the legacy **New York Energy \$martSM** programs that are the basis for this proposed program use sound engineering calculations and rigorous post-installation verification activities. At the same time, the increased evaluation funding can substantially add to the overall reliability in the independent evaluation savings estimates by funding significant expansions in the M&V methods. More sophisticated methods with greater measurement support can greatly reduce any unknown risks of potential bias that can go unobserved within more simplistic methods.

The planned M&V evaluation will include significant site survey work with a research design that incorporates (where possible) pre- and post-measurement billing analysis of comparative samples of participants and matched non-participants, and post-installation measurement. The M&V evaluation method chosen would likely involve billing analysis for more homogenous groups or follow IPMVP Option B: Retrofit Isolation where complete measurement is possible for more heterogeneous groups. Alternatively, M&V will support the use of IPMVP Option A by undertaking metering/monitoring measurement to mitigate the greatest sources of uncertainty, as appropriate. The projects that participate in the new Building Management System module can provide important post-retrofit monitored data that can be leveraged for evaluation. Efficient sample sizes can be chosen using stratified ratio estimation (SRE) on electricity savings and target a 90/10 confidence/sampling precision level for the statewide program. If budget permits, the sample could be expanded to target 90/10 at the utility territory level. The results will be applied to all of the energy savings reported for the program. As projects have a long timeframe for completion, the first post-installation M&V study will be conducted in 2010, with pre-measurements starting in 2009. Until these planned evaluations are completed, NYSERDA could use the savings-weighted realization rate derived from past evaluation work on the legacy programs to report savings.

Net-to-Gross

NYSERDA intends to explore participant and non-participant spillover and participant freeridership by using an enhanced self-report survey process with multiple decision-makers including building owners,

chief financial officers, vendors, technical assistance providers, etc. involved in adopting energy efficiency measures. Sample sizes will be calculated to target 90% confidence and 10% sampling precision at the program level. If budget permits, 90/10 confidence could be achieved at the utility level. Examinations will be made to assess self-selection bias between the participating and non-participating matched groups. These alternative methods will be used to derive a final triangulated net-to-gross (NTG) ratio to provide a high level of construct validity for the NTG estimates. Given the long-term nature of projects, attribution analysis will not be completed until 2010. If budget permits, this work could be updated in 2012. Until these planned evaluations are completed, NYSERDA could use a savings-weighted NTG ratio derived from past evaluation work on the legacy programs to report savings. Alternatively, a different deemed NTG could be applied as justifiable until the actual program NTG can be determined in 2010.

Process Evaluation

Process evaluation will focus on the participation and decision making processes of the end users and the energy services companies. Those that have not participated in the program or applicants that never installed measures will form the partial participant/non-participant population. Areas of inquiry expected for the process evaluation work include:

- Attrition analysis focusing on the reasons for non-participation and drop out at different stages of the program
- Barriers to participation and program awareness
- Adequacy of the performance incentive to encourage participation
- Overall customer satisfaction with the program participation process
- Role of technical consultants and their management of project process
- Examination of energy service company decision making and expansion plans for upstate and downstate areas
- Examination of customer decision making

The process evaluation work will generate actionable recommendations for improvements to the program. It is expected that process evaluation will be conducted at two points in time, first approximately a year after the program start date so as to provide early feedback regarding the program processes and participation rates and second in approximately the third year to further explore reasons for attrition.

Market Evaluation

In the Supplemental Revision submitted on August 22, 2008¹⁶, NYSERDA proposed that an extensive statewide commercial/industrial baseline and measure saturation study be considered for joint sponsorship by all EEPs program administrators. The proposed study could be based on site visits coupled with surveys of key market actor groups. The purpose of the study would be to fully characterize buildings and facilities in the commercial/industrial sector, including: the end-use equipment in use, vintage and efficiency level; and other factors such as current equipment maintenance and replacement practices, customer and market response to program offerings and external influences, and customer and market decision making processes.

¹⁶ NYSERDA, *System Benefits Charge Supplemental Revision for the New York Energy SmartSM Programs (2008-2011)*, As Amended, August 22, 2008.

If the proposed statewide baseline and measure saturation study is pursued, then it would likely fulfill the market evaluation needs of the Existing Facilities Program, and would also support impact evaluation efforts. If the statewide study is not implemented, then a small amount of funds from the Existing Facilities Program evaluation budget would be used to:

- Characterize the market eligible to participate in the program via reviews of secondary data sources as well as surveys of key market actor groups,
- Continue time-series measurements of key progress indicators and researchable issues examined in prior research efforts conducted for NYSERDA's Commercial and Industrial programs,
- Research current equipment maintenance and replacement practices,
- Explore customer and market response to program offerings and external influences, and
- Examine customer and market decision making processes.

This more limited study, if needed, would be completed in 2010.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program were reduced, NYSERDA would first remove funds from the market and process evaluation work areas. These areas could be limited in terms of their sample sizes and evaluation frequency, if needed. Conversely, if more of NYSERDA's total evaluation funding for could be allocated to this program, the additional funds would be used to expand and increase the rigor of impact evaluation work and to provide for a follow-up market study in 2012.

4.5. MARKET SEGMENT NEED

Historical experience has illustrated that at least 65% of the energy savings are attributable to the commercial and industrial sectors and offer the greatest opportunity for cost-effective savings. The market potential for operational improvements in existing buildings is significant. Many operational improvements through commissioning have been implemented in recent years. The proposed effort is intended to complement and further program goals and objectives through commissioning and specifically to attain persistence of savings and operational optimization.

4.6. COORDINATION

NYSERDA will closely coordinate efforts with each of the investor-owned utilities to eliminate confusion and minimize possible customer conflicts. Efficiency requirements and eligibility standards will be uniform where practical, and a transition plan will be developed so that customers eligible for utility offerings, such as the expedited Small Business Programs, do not overlap with the Program. This program will also be coordinated with trade associations such as the Association of Engineers, REBNY, and BOMA and with NYSERDA's contractors marketing other EEPS programs.

4.7. CO-BENEFITS

The Program will develop employment opportunities in the energy services industry in New York by engaging energy service providers such as energy services companies and HVAC and lighting contractors. In addition, the Program will help develop a new business sector in the energy services industry similar to the New York Independent System Operator demand response markets. Under that

initiative, NYSERDA encouraged more than 30 active private sector businesses to provide demand response services. This effort has the same potential for business development in the building operations optimization marketplace.

4.8. PORTFOLIO BALANCE

NYSERDA offers a portfolio of programs that complement each other and provide customers with a holistic approach to implementing their energy projects. Programs include Technical Assistance, which identifies energy efficiency opportunities, and programs that provide financial incentives to help defray implementation costs of the identical opportunities. By offering a comprehensive range of programs, customers of all classes can determine what opportunities will best suit their needs. Additionally, the efficient operation of facilities has tremendous potential for energy savings. NYSERDA has provided limited building operation services through commissioning services in the past. The expanded Program includes a new service that will require rigorous M&V and program oversight to ensure persistence of savings.

4.9. DEPTH OF SAVINGS

NYSERDA encourages a comprehensive strategic approach to energy projects that enables customers to operate within their budgets. Energy efficiency measures eligible for financial incentives include lighting, energy management systems, and complex HVAC systems. As stated above, tremendous savings potential exists from operational improvements to existing facilities. Savings from operational improvements have been addressed in other program to some degree through commissioning efforts, but persistence of the resulting savings has been questioned. While this effort is similar to commissioning, the program structure will incorporate M&V requirements and service provider commitments that will address persistence of savings.

4.10. UNDERSERVED MARKETS

While the market for these services has been served in the past by providing capital incentives, the enhanced program offers a valuable new energy service to this market. Facility operational optimization using detailed measurement and monitoring technologies has not previously been available to consumers.

4.11. COMMITMENT

The term of the program is through 2011. Customers and contractors are familiar with NYSERDA's programs and can quickly engage NYSERDA in their energy projects. Individual operational projects will require contractual services that extend over a period of from four to six years. This time frame will permit introduction of a structured process to maintain savings and implement new procedures and processes that may yield additional energy savings.

4.12. CUSTOMER OUTREACH

Marketing, outreach, and education activities for the Program will rely upon NYSERDA's marketing and outreach experience and build upon its strong alliance with energy service providers and contractors. NYSERDA's established contacts and relationships with trade associations, key stakeholders and contractor groups such as ASHRAE, the Association of Energy Engineers, the New York Energy Consumers Council, The Real Estate Board of New York, and the New York City Economic Development Corporation will be used to market the program.

NYSERDA's Benchmarking and Operations Management program, which provides outreach and education to diverse customer sectors including education, health care, industry, commercial businesses,

real estate, and water/wastewater management, will provide another path for promoting and encouraging participation in the Program. NYSERDA will closely coordinate with the state's utilities to market and provide outreach on each program administrator's respective programs.

4.13. COLLABORATIVE APPROACH

NYSERDA participated in numerous collaborative meetings with representatives of investor-owned utilities and key stakeholders, such as NYCEDC, to identify a cooperative strategy to serve customers. NYSERDA program staff historically have worked with consultants, contractors, building owners, utility staff, trade associations, and vendors to deliver SBC programs and have established significant expertise in program development. Staff experience plus workshops and seminars, attendance at trade shows, and formal meetings with stakeholders provide the impetus for the concept proposed for the Program.

4.14. FUEL INTEGRATION

The Program proposal would expand performance-based incentives for natural gas improvements statewide and allow customers and energy service providers to address their energy projects in a comprehensive manner. Operational optimization primarily involves electric energy savings, but the technologies used to generate electric savings are easily transferable to non-electric end uses. Gas savings could easily be incorporated into the proposed program.

4.15. TRANSPARENCY

The program description will be available to all interested parties on our Web site and program savings and costs will be available to the public through detailed reports developed by NYSERDA and external evaluators. Current **New York Energy \$martSM** evaluations include Benefit/Cost Analyses, Impact Evaluations, and Year-End Impact Evaluations in keeping with NYSERDA's open governance policy. NYSERDA will work with DPS to develop a uniform tracking system to make results available to the public.

4.16. PROCUREMENT

Services and incentives through the Program are offered first-come, first-served to all entities, customers, and energy services providers who wish to participate in the program. This standard-offer approach enables customers to make financial decisions quickly and to promptly implement their energy projects. The services of the technical quality assurance contractors who support various NYSERDA programs have been competitively procured.

4.17. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Existing Facilities Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. NYSERDA will provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table III-29 shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table III-30 shows the present value of the costs and benefits used in the analysis. Table III-31

shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-29. Existing Facilities Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	16 / 18	300.0	100.0	1,050,000	38%
Electric Funding Only	2009-2011	16	300.0	100.0	--	38%

Table III-30. Existing Facilities Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
With Electric and Gas Funding	\$59.6	\$239.7	\$643.6
Electric Funding Only	\$48.5	195.30	\$481.2

Table III-31. Existing Facilities Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	10.8	2.7
Electric Funding Only	9.9	2.5

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table III-32. shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$36.2 million for gas and electric funding and \$25.9 million with electric funding only.

Table III-32. Existing Facilities Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	11.4	2.8
Electric Funding Only	10.5	2.6

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 300,000 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 100.0 MW (cumulative) of coincident peak reduction in 2015.¹⁷

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.34.¹⁸

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table III-33 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table III-33. Existing Facilities Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Commercial - Electricity	1,002,856	1,530	0.2%
Industrial - Electricity	7,715	270	3.5%
Commercial – Natural Gas	358,504	1,530	0.4%
Industrial – Natural Gas	14,357	270	1.9%

Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

¹⁷ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday weekdays.

¹⁸ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

5. COMMERCIAL LOAN FUND AND FINANCE PROGRAM (ELECTRIC AND NATURAL GAS)

5.1. PROGRAM DESCRIPTION

The Loan Fund and Finance Program (Program) encourages the installation of energy-efficient equipment and process improvements in commercial buildings by increasing the availability of low-interest capital. The Program has developed a network of participating lenders that are able to offer reduced-interest rate financing for their customers. There are currently 150 lenders and leasing companies participating in the program; current interest-rate reductions are 6.5% in Con Edison territory and 4.0% in the remaining utility territories. The subsidy is paid to the lender upon evidence that the customer has received the reduced interest rate on the loan or lease issued by the financial institution. Loans or leases for up to \$1,000,000 are eligible for the subsidy through the Loan Fund. Depending on the terms of the loan, a subsidy typically equates to approximately 26% of the principal financed for Con Edison customers and 18% for non-Con Edison customers. Over 610 commercial/industrial, 2,400 residential, and 180 multifamily customers have received a reduced-rate loan. For the commercial sector, \$27 million in interest-rate subsidies has leveraged over \$172 million in loan activity. The savings associated with these loans is 104,441 MWh, 34 MW, and 216,000 MMBTUs (gas and oil).

NYSERDA proposes to build upon the success of the Program, as it was developed in the **New York Energy \$martSM** program, by identifying new lenders and targeting commercial customers in underserved markets and sectors where energy efficiency opportunities are largely untapped. To date, the Program has allowed customers to receive an interest rate reduction for projects receiving incentives from other NYSERDA programs, as well as “stand-alone” projects. Under EEPS, overlap at the program level will be eliminated for commercial programs. Customers who are installing measures that are deemed eligible, will be guided to apply to either the Loan Fund, or to one of the other commercial programs that provide direct incentives (e.g. High Performance New Construction Program or High Performance Existing Facilities Program). The availability of the Loan Fund as an option will help customers who prefer or need up-front capital to implement efficiency projects, as contrasted with use of the incentive programs that provide reimbursement for a portion of installation cost. The amount of the interest rate reduction will be reviewed to ensure it reflects current market conditions. Other financing opportunities that could benefit commercial customers and encourage investment in energy efficiency measures, such as partnering with other entities on “green bonds ” and loan guarantees, will be explored.

5.2. DEMAND REDUCTION AND SYSTEM BENEFITS

Energy and demand savings of 7,708MWh and 1.6 MW annually are anticipated from commercial projects financed using the Loan Fund. The addition of statewide gas funding will allow the Loan Fund to expand its offering of efficient gas measures. This will increase the opportunities for several sectors - institutions, schools, hotels, and restaurants - across the state to address not only building envelope and central plant efficiencies, but the efficiencies of their commercial kitchens. This additional funding is estimated to result in savings of 90,900 MMBtus annually.

Table III-34. Loan Fund – Total Program Expenditures (Projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$4.05M	\$4.05M	\$4.05M	0	0	0	0	\$12.14M
Projected Outreach/Marketing costs: \$0.24M in 2009; \$0.24M in year 2010; \$0.24M in 2011.								

Table III-35. Loan Fund — Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	7,708	7,708	7,708	0	0	0	0
Annual Savings Installed in Prior Years	0	0	0	0	0	0	0
Cumulative Annual Savings	7,708	15,416	23,124	23,124	23,124	23,124	23,124

Table III-36. Loan Fund – Natural Gas Program Expenditures (Projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$0.47M	\$0.47M	\$0.47M	0	0	0	0	\$1.421M
Projected Outreach/Marketing costs: \$0.03M in 2009; \$0.03M in 2010; \$0.03M in 2011.								

Table III-37. Loan Fund – Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	90,854	90,854	90,854				
Annual Savings Installed in Prior Years	n/a						
Cumulative Annual Savings	90,854	181,708	272,562				

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

5.3. GENERAL EVALUATION APPROACH

Evaluation Goals

The primary goal of the Loan Fund Program evaluation is to assess the energy and demand savings attributable to program activities. Secondary goals are developing an understanding of the market for tailoring the program to the needs of the audience and maintaining an efficient program delivery mechanism.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Loan Fund Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding.

To the extent that NYSERDA's original **New York Energy \$martSM** Loan Fund Program can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional resources from the enhanced SBC3 evaluation funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

To adequately cover the plans described herein, NYSERDA expects the Loan Fund evaluation budget may need to be greater than 5% of program funding minus the set-aside for statewide studies and other overarching costs borne by program administrators. The majority of the Loan Fund Program evaluation budget likely will be allocated to impact evaluation (approximately 70%). The remaining program evaluation funds will be split between process evaluation (20%) and market evaluation (10%).

Evaluation Schedule

Evaluation studies included as part of the Loan Fund Program evaluation plan are shown in the table below along with the time frame for their anticipated completion.

Table III-38, Loan Fund Program Evaluation Schedule

Evaluation Element	Expected Completion		
	2009	2010	2011
Impact - M&V	X (if pre-post design possible)	X (if pre-post design possible)	X
Impact - Net-to-Gross	FR	FR, SO	FR,SO
Process Evaluation	X		
Market Evaluation		X	

FR = Freeridership study SO = Spillover study

Impact Evaluation

Measurement and Verification

The great diversity in types of projects, sectors and technologies expected to be funded through the Loan Fund presents a challenge in terms of conducting a comprehensive, rigorous evaluation with limited evaluation budget. Participation in the existing SBC Loan Fund program will be examined during the detailed evaluation planning process. This examination will be used to determine the likely distribution of future Loan Fund participants by sector and technology. The measurement and verification plans will be developed based upon surveying samples stratified across these distributions. The most efficient and rigorous evaluation design will be to group projects into homogenous groups. And the most efficient and rigorous methods depend upon the availability of usage data, the project type, sector and technology. Those groups with the largest expected savings will be targeted for rigorous evaluation efforts. The process of applying for a loan and waiting for approval may allow collection of pre- and post-installation data to be undertaken if well-coordinated with the program effort. This would allow NYSERDA to conduct billing analyses for each homogeneous group, resulting in a realization rate specific to that group. This could offer the highest rigor evaluation.

Efficient sample sizes will be chosen using stratified ratio estimation (SRE) on electricity savings, targeting a 90/10 confidence / sampling precision level for the statewide program for each targeted homogenous evaluation group. If budget permits, the sample could be expanded to target 90/10 at the utility territory level.

Measurement & Verification will be completed in 2011. Until the planned evaluations are completed, NYSERDA can use the realization rate derived from past Loan Fund evaluation work to report savings.

Net-to-Gross

NYSERDA intends to explore participant and non-participant spillover and participant freeridership by using an enhanced self-report survey process with multiple decision-makers including building owners, chief financial officers, bank officials, etc. involved in adopting energy efficiency measures. Proper examination of the multiple decision-makers, their level of influence and when decisions occur can provide higher quality freeridership estimates. The surveys will include alternative inquiries to test and provide construct validity for the net-to-gross (NTG) estimates. Sample sizes will be calculated to target 90% confidence and 10% sampling precision for the statewide program. If budget permits, 90/10 confidence/precision could be achieved at the utility level.

Inquiries on influences in decision making will likely produce the most reliable recall when they are conducted closer to the point of the decision. Thus, freeridership inquiries will be completed in 2009, 2010 and 2011 for projects completed in each of those three years. Spillover decisions, however, are made after project implementation. The spillover inquiries are planned for 2010 and 2011. The 2012 spillover rate for 2011 participation can be based upon the findings from the 2010 and 2011 spillover studies.

Until the planned evaluations are completed, NYSERDA can use a savings-weighted NTG ratio derived from past Loan Fund evaluation work.

Process Evaluation

Process evaluation will focus on the participation and decision making process of the borrowers and the financial institutions who work with them. Additionally, those who have not participated in the program (but installed measures through a NYSERDA incentive programs) or applicants to the Loan Fund that

never installed measures will form a partial participant population. Those who never applied for a loan will form a non-participant population that will also be part of the process evaluation effort. Areas of inquiry expected for the process evaluation work include:

- Attrition analysis focusing on the reasons for non-participation and drop out at different stages of the program
- Barriers to participation and program awareness
- Effectiveness of loan in reducing barriers to installation of energy efficiency measures
- Overall customer satisfaction with the program participation process
- Role of financial institutions and their management of project process
- Overall satisfaction by financial institutions with the program processes
- Examination of customer decision making
- Comparison of the customer characteristics for participants of the Loan Fund Program versus the participant characteristics among the alternative incentive programs¹⁹
- Comparison of the decision making between these two groups to understand the customer choice between these alternatives

The process evaluation work will generate actionable recommendations for improvements to the program. It is expected that process evaluation will be conducted approximately a year after the program start date so as to provide early feedback regarding the program processes and participation rates.

Market Assessment

The market characterization and assessment evaluation will collect primary data via interviews with key market actor groups, focusing on expected program outputs and outcomes, market indicators, and researchable issues identified in the program theory and logic model. The effort will examine progress made toward achieving the expected outputs and outcomes by comparing current results with baseline measurements developed in prior program evaluations. In addition, the data collection effort will further explore issues raised during the process evaluation (which is scheduled to occur in 2009, one year before the market work), to expand on process-related recommendations for program improvements and provide guidance for program design and targeting. Given the limited evaluation budget, these market assessment inquiries will be a component of the NTG surveys being conducted for the impact evaluation.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program were reduced, NYSERDA would first remove funds from the market and then process evaluation work areas. These areas could be limited in terms of their sample sizes, if needed. Conversely, if more of NYSERDA's total evaluation funding could be allocated to this program, the additional funds would be used to expand and increase the rigor of impact evaluation work.

¹⁹ The evaluation planning and instrument development will be coordinated across program evaluations so the data is available to make these comparisons.

5.4. MARKET SEGMENT NEED

Historically the Loan Fund has been viewed as an enabling program, working with lenders to offer financing at attractive rates to improve the paybacks on energy efficiency projects. The Loan Fund will continue to enable customers to implement energy efficiency projects that might not fit into any other commercial incentive programs. Lenders will continue to work with NYSERDA and recognize the benefits of investing in energy efficiency.

5.5. COORDINATION

The Loan Fund will coordinate with other incentive programs administered by NYSERDA to ensure no overlap. As the EEPs On-Bill Financing model is developed, further coordination with the utilities will be necessary to avoid conflicting financing programs. This coordination has already begun as NYSERDA is a participant in the On-Bill Financing Working Group.

5.6. CO-BENEFITS

The Loan Fund has historically included fuel integration and non-energy benefits in its program design. Certain pre-qualified non-electric measures related to the building envelope and heating have been a part of the Loan Fund since its inception. Additionally the Loan Fund has evaluated the eligibility of custom gas equipment for the reduced interest rate financing. For certain projects that may not meet a 10-year payback strictly on energy savings, other non-energy related criteria could be used to make the project eligible: job creation or retention; health, safety, and environmental benefits; renewable measures; green building measures; and increased capacity or process improvements. The Loan Fund is also used to educate the lending community on how energy efficiency improvements improve building values and their customers' operating income.

5.7. PORTFOLIO BALANCE

The Loan Fund will give customers who require up-front financing an opportunity to obtain low-cost financing. The Loan Fund will also fill the gap in incentive programs for those customers whose project cannot qualify for commercial incentive programs. The Loan Fund may also be able to complement utility financing programs once the components of On-Bill Financing are developed.

5.8. DEPTH OF SAVINGS

The Loan Fund will continue to assist customers in implementing comprehensive energy efficiency projects. With the addition of gas funding, the Loan Fund will also be able to reach customers desiring to improve the efficiencies of commercial kitchens and manufacturing processes. The Loan Fund will allow customers with no other access to financial assistance for their energy project the opportunity to receive low cost financing. The Loan Fund will enable customers to implement recommendations from technical assistance audits.

5.9. UNDERSERVED MARKETS

Local economic development corporations, or LDCs, typically are one of the first organizations contacted by small businesses seeking assistance to locate or expand their companies. Many LDCs can provide loans to small businesses, and some meet the current definition for participation as lenders in the Loan Fund and have chosen not to participate. NYSERDA sees participation by these organizations as means to reach a large underserved population across the state. Staff will make special efforts to recruit LDCs into the Loan Fund and the Loan Fund will revisit its requirements for participation by lenders to permit inclusion of more LDCs.

5.10. COMMITMENT

The Loan Fund already has the momentum, lender network, support contractor, and exposure to quickly incorporate funds under EEPS and assist customers. The design of the Loan Fund and the evaluation criteria would be adjusted to reflect the decision to remove overlapping program incentives.

5.11. CUSTOMER OUTREACH

The Loan Fund support contractor currently works with lenders and economic development organizations to reach out to customers. The contractor will be engaged to expand its outreach, using its network of contacts in the industrial, manufacturing, construction, and finance sectors to reach additional customers and lenders. In addition, NYSERDA will expand its current efforts and use an integrated marketing and outreach approach to increase the number of commercial/industrial customers that participate in its programs. Marketing and outreach will largely be accomplished through the Energy Smart Focus initiatives which target various sectors of the commercial/industrial market with tailored messages, one-on-one interactions, and other strategies that encourage efficiency practices. Based on experience to date, an additional investment in the Energy Smart Focus initiatives is expected to result in a direct increase in both the quantity and quality of projects entering core incentive programs. (Early indicators suggest a 30-60% participation rate after receiving assistance through the Energy Smart Focus initiatives.).

Sectors to be targeted include K-12 schools, healthcare facilities, commercial real estate, the hospitality industry, local governments, state buildings, and water/waste-water facilities. The Focus initiatives will educate customers about advanced technologies and processes that provide the most cost-effective efficiency projects. Additional funding for marketing and outreach will be used to develop new methods that improve a streamlined handoff process to direct incentive programs. In addition to the sector approaches, each of the incentive programs will implement targeted outreach and marketing strategies to disseminate information about the benefits of participation. Marketing and outreach will also occur at the divisional and Authority level to more generally expand understanding of services available from NYSERDA.

5.12. COLLABORATIVE APPROACH

The Loan Fund has engaged consultants, members of the lending community, and consumers in the development of and modifications to the Loan Fund. Discussions with members of Working Group VI (On-Bill Financing) indicate a desire to continue the Loan Fund with a complementary on-bill mechanism. As those details are determined, further adjustments to the Loan Fund may be necessary.

5.13. FUEL INTEGRATION

The Loan Fund has historically been a mechanism for both electric and gas energy-efficiency. As funds have become available, gas measures have been expanded beyond those related to the building envelope to include commercial kitchen equipment. Restaurants and institutions have availed themselves of these offerings to improve the efficiency of food service equipment. The addition of statewide gas funding will allow the Loan Fund to offer reduced-rate financing for these types of measures to a greater range of customers engaging in comprehensive projects that include both electric and gas measures.

5.14. TRANSPARENCY

Evaluations for the Loan Fund are available upon request from NYSERDA and include Market Characterization, Market Assessment, and Causality; Program Cost-Effectiveness Assessment; Logic Model Development; and Process Evaluations. Program results will be made available by NYSERDA on

its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

5.15. PROCUREMENT

Program delivery will be accomplished by a contractor procured competitively.

5.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Loan Fund Program required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table III-39 shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table III-40 shows the present value of the costs and benefits used in the analysis. Table III-41 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-39. Loan Fund Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	16 / 18	23.1	4.8	272,562	12%
Electric Funding Only	2009-2011	16 / 18	23.1	4.8	156,300	12%

Table III-40. Loan Fund Program: Program and Participant Costs (net of administration and evaluation) (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
With Electric and Gas Funding	\$12.6	\$22.5	\$70.8
Electric Funding Only	\$11.4	\$21.6	\$52.8

Table III-41. Loan Fund Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	5.6	3.1
Electric Funding Only	4.6	2.4

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table III-42 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$4.7 million for both electric and gas funding or \$3.5 million for electricity funding alone.

Table III-42. Loan Fund Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	6.0	3.4
Electric Funding Only	4.9	2.6

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 23,124 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 4.8 MW (cumulative) of coincident peak reduction in 2015.²⁰

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.55.²¹

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table III-43 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011 excluding those projects that historically accessed two or more programs.

Table III-43 Loan Fund Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Commercial - Electricity	1,002,856	90	0.0%
Industrial - Electricity	7,715	135	1.7%
Commercial – Natural Gas	358,504	90	0.03%
Industrial – Natural Gas	14,357	135	0.9%

¹ Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

²⁰ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on non-holiday weekdays from June 1 through August 31.

²¹ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

6. BIDDING PROGRAM (ELECTRIC AND NATURAL GAS)

In its June 23, 2008 Order²² (Order), the Commission established the EEPS and approved an expansion of existing energy efficiency programs. Pursuant to the Order, NYSERDA presented a plan in its 60 Day Filing to expand its existing activities in industrial and process efficiency.

As part of the development of and subsequent to the NYSERDA 60 Day Filing, discussions with stakeholders and DPS Staff indicate an interest in enhancing program activities provided for in the Order by developing a new block bidding program for industrial and process efficiency participants. NYSERDA proposes to work with the Commission, DPS Staff, and interested stakeholders to develop a bidding program as an innovative means to help accomplish the MWh goals for the Industrial and Process Efficiency Program as identified in the Order and the NYSERDA 60 Day Filing.

6.1. DESCRIPTION OF PROGRAM

The Bidding Program will be designed based on:

- Bidding programs administered by NYSERDA such as the Aggregated Load Reduction Program, Renewable Portfolio Standard, and the Regional Greenhouse Gas Initiative.
- Past New York State demandside management bidding experience of NYSERDA as bidder and contracted MWh deliverer, utilities as administrators, and PSC and DPS as regulator and manager.
- Other bidding programs such as Con Edison's Targeted Program, Xcel Energy's Custom Efficiency Program, and Connecticut Light and Power's Request for Proposal Program.

Final program design and solicitation release is planned for 2009 based on research described above as well as input from stakeholders, the Commission, and DPS Staff. It is anticipated that customers will be invited to compete on their own or in partnership with third party contractors for performance-based energy efficiency funding. Participants will be required to specify the amount of funding needed to implement specific projects within PSC Order(s) and the subsequent set of program guidelines to be designed. Program design and bid selection criteria will be developed to assure a transparent process that results in technically sound proposals that provide the best return on investment for ratepayer funds.

Selected projects will receive incentives for delivering measured and verified energy efficiency resources. Incentive payments will be performance-based and will be paid over a multi-year performance period. Payments would occur in multiple stages, at project completion, field verification and on a performance basis over the monitoring period.

6.2. DEMAND REDUCTION AND SYSTEM BENEFITS

NYSERDA has demonstrated success in delivering summer peak-demand reductions throughout the state. NYSERDA exceeded the 150MW goal established by the PSC for the System Wide Program in Con Edison's service territory. NYSERDA provides financial incentives for measures such as chiller efficiency improvements that reduce summer peak demand. In addition, NYSERDA promotes recent advances in technology that integrate energy efficiency and demand response.

²² Case 07-M-0548, Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, *Order Establishing Energy Efficiency Portfolio Standard and Approving Programs*, (issued and effective June 23, 2008).

Peak-demand reductions from energy efficiency projects can result in reduced capacity requirements for the New York Independent System Operator (NYISO) and potentially defer utility transmission and distribution infrastructure upgrades. NYSERDA is working with the NYISO and the evaluation task force to ensure that EEPS-funded resources can be used in system planning.

The Bidding Program will provide energy savings by offering:

- Gas savings to Industrial and Process Efficiency Program participants
- Electricity and gas savings to large commercial and institutional participants

The industrial electric MWh for the Bidding Program will be procured within the MWh and funding levels established in the Order and the NYSERDA 60 Day Filing. NYSERDA proposes to allocate a portion of electric budget savings goals from the Industrial and Process Program in the NYSERDA 60 Day Filing based on 33% of the budget and goals from the final two years (2010 and 2011). This allocation of budget and goals between the new proposed bidding program and the previously Ordered program would be subject to appropriate discussion among the PSC, DPS, stakeholders, and NYSERDA.

The industrial natural gas MMBTU and the large commercial and institutional electric MWh and gas MMBTU will be procured in the Industrial and Process Efficiency Program proposed in this NYSERDA 90-day Proposal. Natural gas funds and goals would use the same allocation method as electric funds and goals.

The commercial and institutional electric MWh and natural gas mmBtu savings will be achieved with new funds and resource deliveries not otherwise contained in the June 23, 2008 Order or elsewhere in this proposal.

Table III-44 Commercial and Institutional Segment of the Bidding Program — Total Program Expenditures (projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$403,920	\$5,183,640	\$7,876,440	\$0	\$0	\$0	\$0	\$13,464,000
Projected Outreach/Marketing costs: \$202,500 in 2009; \$202,500 in 2010; \$31,234 in 2011.								

Table III-45. Commercial and Institutional Segment of the Bidding Program — Installed MWh Impacts (projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	0	24,000	36,000	0	0	0	0
Annual Savings installed in prior years	n/a	0	24,000	36,000	60,000	60,000	60,000
Cumulative Annual Savings	0	24,000	60,000	60,000	60,000	60,000	60,000

Table III-46 Commercial and Institutional Segment of the Bidding Program — Natural Gas Expenditures (projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$76,745	\$984,892	\$1,496,524	\$0	\$0	\$0	\$0	\$2,558,160
Projected Outreach/Marketing costs: \$202,500 in 2009; \$202,500 in 2010; \$31,234 in 2011.								

Table III-47. Commercial and Institutional Segment of the Bidding Program — Natural Gas Installed mmBtu Impacts (projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	0	84,000	126,000	0	0	0	0
Annual Savings installed in prior years	N/A	0	84,000	210,000	210,000	210,000	210,000
Cumulative Annual Savings	0	84,000	210,000	210,000	210,000	210,000	210,000

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

6.3. EVALUATION

Projects selected through the Bidding Program will ultimately participate and receive incentives through either the Existing Facilities or Industrial Process and Efficiency programs. The primary goal of the evaluation will be to measure and verify energy savings attributable to the program. A secondary goal will be to assess and provide information to improve program implementation processes for this new offering.

Given the significant amount of energy savings expected from the selected projects, and the stratified sampling approach planned for impact evaluation, NYSERDA expects that each project selected through the Bidding Program will be examined in the overall evaluation of the programs in which they ultimately enroll. NYSERDA further expects that the projects selected through the RFP will have unique process issues and research questions and will ensure that these are sufficiently addressed as part of the overall process evaluation of the incentive programs.

The timing of impact and process evaluation efforts will likely follow the timing outlined for the incentive programs where the selected projects receive their funding. However, as the RFP process and resultant projects are implemented, NYSERDA will more fully assess timing of the evaluation on this program element and refine as necessary.

Evaluation funds associated with the Institutional Bidding Program will be added to the incentive programs in order to ensure projects selected through this mechanism are appropriately represented in the evaluation.

6.4. MARKET SEGMENT NEED

As part of the development of and subsequent to the NYSERDA 60 Day Filing, discussions with stakeholders and DPS Staff indicate an interest in enhancing program activities provided for in the Order by developing a new bidding program for Industrial and Process Efficiency participants. NYSERDA proposes to work with the Commission, DPS Staff and interested stakeholders to develop a bidding program as an alternative procurement approach.

6.5. COORDINATION

NYSERDA will closely coordinate efforts with each of the investor owned utilities to enhance participation. Working with the largest industrial, commercial, and institutional users will be highly site specific and require flexible approaches. NYSERDA is currently engaged in collaborative discussions with utilities to determine how best to coordinate program delivery to maximize resources acquired and minimize confusion. At a minimum, NYSERDA will continue this collaboration.

This effort will also coordinate outreach with trade associations (Multiple Intervenors (MI), the Manufacturers' Association of Central New York (MACNY) and the Business Council of New York State (BCNYS), REBNY, BOMA, ASHRAE, Association of Energy Engineers, the New York Energy Consumers Council, etc.), and NYSERDA's contractors.

6.6. CO-BENEFITS

The benefits of this Program include economic development, improved competition for New York firms as a result of lower operating costs, increased productivity, and increased employment. The industrial sector is highly stressed by global competition. The Bidding Program will assist in retention and growth in New York of industrial and process businesses.

6.7. PORTFOLIO BALANCE

NYSERDA offers a portfolio of complementary programs that provide customers with a holistic approach to their energy projects. By offering a variety of programs, all customer classes can identify opportunities that meet their needs. The Bidding Program will add another component and further balance the EEPs portfolio.

6.8. DEPTH OF SAVINGS

In order to maximize competition and achieved the savings in the bidding program, industrial and commercial customers will be encouraged to participate and include a broad range of cost-effective, technically sound measures into their proposals.

6.9. UNDERSERVED MARKETS

Since the inception of the **New York Energy \$martSM** program, NYSERDA has offered a portfolio of programs for commercial and industrial customers. These programs range from FlexTech, which can identify energy efficiency opportunities, to financial incentives that reduce implementation costs.

NYSERDA has enjoyed working successfully with industrial, commercial, and institutional users but believes that these markets can be served more efficiently and more cost-effectively. The bidding program will provide an opportunity for industrial and commercial participants with a new, flexible and mutually beneficial program option. Eligible participants will be encouraged to propose large, comprehensive energy projects that maximize return on ratepayer investment.

6.10. COMMITMENT

Sufficient time and surety of program availability for an extended timeframe will be a key to program success.

6.11. CUSTOMER OUTREACH

Due to the specific nature of the Bidding Program, outreach²³ to industrial and commercial participants will use a targeted approach emphasizing the bidding program where appropriate within the context of the entire EEPS portfolio. These efforts will utilize and develop strong relationships with key market players. NYSERDA's outreach strategy will focus on direct and continuous customer contact.

NYSERDA will build upon its relationships within the industrial, commercial, and institutional sectors through the use of common stakeholders, industry-specific organizations, civic organizations, and trade associations such as ASHRAE, Association of Energy Engineers, the New York Energy Consumers Council, Multiple Intervenors (MI), the Manufacturers' Association of Central New York (MACNY) and the Business Council of New York State (BCNYS).

6.12. COLLABORATIVE APPROACH

In the fall of 2008 in Syracuse, NYSERDA, with partnership and assistance from the Manufacturer's Association of Central New York (MACNY), will be conducting a meeting of industrial stakeholders. The meeting will review and seek input to strengthen NYSERDA industrial program offerings including the Bidding Program. Promoting industrial process improvements for the purpose of energy-efficient state economic development will be a primary focus. Representatives working in many facets of the manufacturing sector and its energy use have been invited in order to gain a broad perspective. The introduction will be followed by an overview of existing and new program activities. In the second half of the meeting, NYSERDA will solicit perspectives in a roundtable discussion.

NYSERDA has participated in numerous collaborative meetings with representatives of New York's investor-owned utilities and key stakeholders such as the New York City Economic Development Corporation to discuss cooperatively a strategy to best serve customers. NYSERDA program staff have been in contact with consultants, contractors, building owners, utility staff, trade associations, and vendors throughout delivery of the **New York Energy \$martSM** programs and have built an important knowledge base for program development. NYSERDA will build on and continue this collaboration through the EEPS time frame.

6.13. FUEL INTEGRATION

Fuel Integration will be particularly important to the Bidding Program. Limiting this program to electric-only incentives will limit the number of projects eligible and the interest of the target sector. Supporting sophisticated energy users in their decision making process through a fuel neutral bidding program will encourage participants to develop projects that are most cost effective, beneficial and timely regardless of fuel source.

Integrated gas and electric funding is particularly important to the manufacturing sector. Integrated funding will deliver the greatest cost-effective market penetration and maximize the benefits of ratepayer investment. Gas consumption in many manufacturing processes costs more annually than electricity.

Based on NYSERDA's 30-year relationship with industry in New York, the inability of a program to comprehensively address efficiency opportunities in a manufacturing facility will dampen interest in the program and raise the cost to ratepayers of meeting 15 x 15 goals.

HVAC, envelope, and industrial systems generally involve the use of heating and cooling, often in the same system. In order to be objective and effective, customer decisions about the costs and impacts of energy efficiency measures require an integrated approach.

Service providers such as architecture and engineering firms, energy service companies, construction firms, HVAC contractors, and supply houses generally provide integrated services and address all energy sources. They are involved in the same integrated decisions as customers.

Integrated gas and electric funding will deliver the greatest cost-effective market penetration and maximize the benefits of ratepayer investment.

6.14. TRANSPARENCY

Program descriptions are available on NYSERDA's Web site. Historical data on the Industrial Process and Product Innovation Research and Development Program and the Existing Facilities Program are available in past New York Energy \$martSM evaluations. Future evaluations of this program will be available on-line. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

6.15. PROCUREMENT

Final program design and solicitation release is planned for 2009 based on research described above as well as input from stakeholders, the Commission, and DPS Staff. It is anticipated that customers will be invited to compete on their own or in partnership with third party contractors for performance-based energy efficiency funding. Participants will be required to specify the amount of funding needed to implement specific projects, within the bounds of PSC Order(s) and the subsequent set of program guidelines to be designed. Program design and bid selection criteria will be developed to assure a transparent process that results in technically sound proposals that provide the best return on investment for ratepayer funds.

Selected projects will receive incentives for delivering measured and verified energy efficiency resources. Incentive payments will be performance-based and will be paid over a multi-year performance period. Payments would occur in multiple stages, at project completion, field verification and on a performance basis over the monitoring period.

6.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Bidding Program for Institutional projects required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table III-48 shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table III-49 shows the present value of the costs and benefits used in the analysis. Table III-50 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-48. Bidding Program — Commercial and Institutional Segment: Cumulative Annual Savings

	Program Years	Average Life of Electric / Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric and Gas Funding	2009-1020	16-18	60.0	19.8	210,000	38%
Electric Funding Only	2009-2011	16	60.0	19.8	210,000	38%

Table III-49. Bidding Program — Commercial and Institutional Segment: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
Electric and Gas Funding	\$13.9	57.0	\$130.2
Electric Funding Only	\$11.3	\$46.2	\$95.1

Table III-50. Bidding Program — Institutional: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric and Gas Funding	9.9	2.4
Electric Funding Only	8.9	2.2

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table III-51 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$7.6 million for electric and gas savings and \$5.5 million for electric only.

Table III-51. Bidding Program — Commercial and Institutional Segment: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric and Gas Funding	9.9	2.4
Electric Funding Only	8.9	2.2

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 60,000 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 19.8 MW (cumulative) of coincident peak reduction in 2015.²⁴

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.35.²⁵

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table III-52 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table III-52. Bidding Program for Commercial and Institutional Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class ¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Industrial — Electricity	7,715	36	0.5%
Industrial — Natural Gas	14,357	36	0.3%

Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

²⁴ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday weekdays.

²⁵ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

7. SOLAR THERMAL FOR COMMERCIAL AND INDUSTRIAL APPLICATIONS (ELECTRIC AND NATURAL GAS)

7.1. PROGRAM ELEMENTS

Program Description.

The Solar Thermal (ST) Program will achieve savings of grid-supplied electric energy (MWh) and pipeline-delivered natural gas (MMBtu). The Program will deliver permanent installation of equipment in commercial and industrial applications with high hot water use, such as laundries, dairies, and hotels. The equipment applications in this Program will provide the necessary experience to determine optimal scenarios for technology use beyond residential settings. This experience will also identify technology gaps where product improvements could be supported through other programs, coordinating with on-going SBC efforts. The Program will accrue energy savings attributable to displacement of electric and natural gas heating by collected solar energy and aligns with recommendations in the Governor's Renewable Energy Task Force initiative.

Program Goals and Objectives.

The Program will deliver permanent installation of energy-efficient equipment with an anticipated life of 20 years. Electric savings attributable to the Program will alleviate electric grid constraints and preventing losses otherwise attributable to T&D resistance. Each year, the Program will install four systems, three of which are expected to be solar thermal hot water systems, the other a solar wall system.

Program Theory.

The Program will use an annual competitive solicitation, allowing NYSERDA to select the most promising projects to deliver the expected savings, while also providing market intelligence to accelerate adoption rates for various applicable technologies. Milestone-based contracts will be issued, with the majority payment tied to the installation and commissioning of the equipment. Contracts will include rigorous measurement, verification, and data reporting requirements. Program design and administration will be subject to change contingent upon market response (e.g., quantity and quality of proposals received).

Anticipated Spending and Savings.

With an approximate annual program budget of \$322,581 (30% derived from electric funds, 70% derived from natural gas funds), the program will provide about \$300,000 of customer incentives. Of the four anticipated installations, it is expected that one will deliver electric use reduction of 40 MWh/yr, and three will each deliver natural gas savings of 140 MMBtu/yr. Based on those assumptions, the Program will deliver about 40 MWh of electric savings and 420 MMBtu of natural gas savings. Projects will be eligible to receive \$60,000, or 50% of the overall cost of the project, whichever is less.

Program Schedule.

It is expected that the Program will begin in the first quarter of 2009, with an 18-month lag before equipment is operational. The Program will operate for three years, from 2009 through 2011.

7.2. DEMAND REDUCTION AND SYSTEM BENEFITS.

Solar wall systems will likely displace natural gas for heating, unless the distribution fan replaces an existing inefficient ventilation fan which would result in reduced electric load. The impact on peak load

and system load factor by solar thermal hot water system in commercial/industrial applications will vary based on site. Due to the anticipated small number of projects, program results could not be relied upon by T&D system planners.

Table III-53. Solar Thermal Program -- Total Program Expenditures (Projected and net of administration and evaluation) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual EEPS Spending	\$300,000	\$300,000	\$300,000	0	0	0	\$900,000
Note: no marketing.							

Table III-54 Solar Thermal Program -- Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in current year	0	20	40	40	20	0	0
Annual Savings installed in prior years	n/a	0	20	60	100	120	120
Cumulative Annual Savings	0	20	60	100	120	120	120

Table III-55 Solar Thermal Program – Natural Gas Program Expenditures (Projected and net of administration and evaluation) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual EEPS Spending	\$0.2M	\$0.2M	\$0.2M	0	0	0	\$0.6M
Note: no marketing							

Table III-56 Solar Thermal Program – Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in current year	0	210	420	420	210	0	0
Annual Savings installed in prior years		0	210	630	1,050	1,260	1,260
Cumulative Annual Savings		210	630	1,050	1,260	1,260	1,260

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

7.3. EVALUATION.

General Evaluation Approach

Evaluation of early demonstrations of technologies necessitates flexibility: work varies with the technology and project types/stages such as product development/characterization, demonstration, and business model. A technology that saves energy but is not cost effective or is too complicated thwarts market adoption. The presentation of persuasive, solidly compelling data to identify target markets is crucial for commercializing a technology and moving it into new sectors.

Evaluation Goals

The primary goal of the Solar Thermal (ST) Program evaluation is to verify the electricity and natural gas savings resulting from permanently installed energy-efficient equipment while providing evaluation support for this early-stage of market development.

Since a key ST Program goal is to provide substantial data that encourages New York's commercial and industrial sectors to move toward solar thermal hot water systems and solar wall systems for heating air, the evaluation will review knowledge benefits²⁶ garnered from ST projects and the conclusions drawn.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the Solar Thermal Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

The evaluation approach for the ST Program is, first, to conduct an early assessment of the program-collected metering and monitoring data to verify the data quality will allow a low-cost engineering of verified savings. This will then permit the majority of the program evaluation funding to be allocated to process evaluation for a review of the sectors selected to target and the suggested matching of technologies to the target sectors, and an assessment of the knowledge benefits and the proposed method of disseminating that information to foster product and market advances. These elements are critical for the current stage of cost-effectiveness of the technology, its applications, and market preparedness.

Evaluation Budget

NYSERDA expects the evaluation budget for the Solar Thermal Program to exceed 5% of the program funding level, less yet-to-be-determined funds set aside for statewide studies and other overarching costs borne by program administrators. It is expected that the Solar Thermal evaluation budget will be

²⁶ Knowledge benefits are real world learning of placement/performance of systems to determine optimization scenarios for deployment in new settings. In the case of solar thermal technology, knowledge benefits could foster eventual expansion beyond residential settings. Other states have robust solar thermal deployment programs and it is appropriate for New York to pursue more widespread use of this technology.

designed to account for the specific needs of the program, and allocated primarily to Process Evaluation (67%) and the remainder for Impact Evaluation.

Evaluation Schedule

The Solar Thermal evaluation plan consists of two major measurement and verification studies, and one process evaluation study. Their anticipated completion dates are shown in the table below.

Table III-57 Evaluation Schedule for Solar Thermal Program

Evaluation Element	Expected Completion				
	2009	2010	2011	2012	2013
M&V (Impact)	X		X		X
Process Evaluation			X		

Impact Evaluation

Impact evaluation of the Solar Thermal Program will consist of measurement and verification evaluation only. Net-to-gross analysis will not be performed for reasons cited below.

Measurement and Verification

The Solar Thermal Program design includes extensive measurement as part of program requirements and will include sensors and data loggers for measuring energy impacts. For solar thermal water heating systems, Btu meters, flow meters, temperature probes, current transformers (for electric water heating systems), fuel meters (for natural gas fired water heating systems) and run time counters can be installed to measure renewable energy produced, back-up fuel use, and electricity consumption of ancillary components. Installed systems would be monitored for a minimum of twelve months. For SolarWall systems, air temperature probes, fuel meters, run time counters, and periodic spot measurements of airflow can be used to measure renewable energy produced, back-up fuel use, and electricity consumption of ancillary components. Installed systems would be monitored for a minimum of one heating season.

The initial evaluation effort will be an early assessment of the extensive metering and monitoring program data to ensure the collection of evaluation-quality data. This will allow a low-cost engineering review to verify the claimed annual gas (MMBtu), electricity (MWh) and associated demand (MW) savings. The impact evaluation based on the engineering review is expected to be conducted based on all the program data collected in 2011 and 2013.

Sampling will not be necessary as all systems installed under the program are expected to undergo extensive metering/monitoring. Thus, the measurement and verification evaluation effort will be based on a census engineering review evaluation.

The initial evaluation review of the program M&V data collection and QA requirements is expected to occur early in 2009. The impact evaluation based on the engineering review is expected to be conducted based on all the program collected data in 2011.

Net-to-Gross

Freeridership is generally expected to be quite low or non-existent for R&D programs, though independent confirmation of this normally should be considered. The ST program theory, however, states that several cycles of investments will likely be needed before cost-effective technology applications and market readiness can be accomplished. Even if there is some proportion of naturally-occurring market acceleration, rather than full NYSERDA attribution to this technology adoption, the expected need for several cycles creates a low net present value for naturally-occurring adoption. Given the small size of the program and this long-term adoption, NYSERDA suggests it may not be worth spending limited evaluation dollars on confirming a net-to-gross ratio.

Process Evaluation

The purpose of a technology's early demonstration is to assess the technology and its potential. Thus, the process evaluation will focus on assessing technology's potential, and indentifying lessons learned in the final year of the implementation period. This program will provide valuable learning about the barriers to adoption and implementation faced by large scale applications of solar thermal in commercial and industrial facilities,

The process evaluation will review data collected and reports produced by the project contractors, and will help to identify any threats to data reliability in the impact evaluation. Interviews will be conducted with program staff, with the selected contractor(s), and with contacts for the commercial and industrial sites that participate in the demonstration. The evaluation will also develop a program theory and logic model for the program as implemented.

A sampling approach will not be employed due to the small number of expected program participants. Instead, the process evaluation will interview NYSERDA staff and the project contractor(s) as well as contacts at each of the 12 sites that are expected to participate in the demonstration.

Interviews, data collection, and analyses will be conducted based on established protocols and approved evaluation plans. The process evaluation will provide actionable recommendations on the feasibility of the commercial solar thermal technology and will incorporate lessons learned to inform future program development efforts. The process evaluation will be conducted in 2011.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Although measurement and verification of electric savings are critical, evaluation of ST needs to include other assessments (dependent on technology) to judge a technology's viability as a product and its potential for commercialization in various sectors. If evaluation funding were to be reduced, a sample instead of census data collection approach would be employed in the evaluation efforts. Conversely, if more of NYSERDA's total evaluation funding for could be allocated to this program, process evaluation efforts could be expanded to capture qualitative data. Increased funding could also allow for a valuable review of other commercial solar programs in Europe, Asia and North America for comparison of best practices with this program. With the evaluation plan for this program to be determined based on the technologies chosen from yet-to-be-issued solicitations, the specific evaluation resource allocations will be addressed at the time of plan development.

Each installed solar thermal system will include sensors and dataloggers for measuring energy impacts. For solar thermal water heating systems, Btu meters, flow meters, temperature probes, current

transformers (for electric water heating systems), fuel meters (for natural gas fired water heating systems) and run time counters will be installed to measure renewable energy produced, back-up fuel usage, and electric consumptions of ancillary components. Installed systems would be monitored for a minimum of twelve months. For solar wall systems, air temperature probes, fuel meters, run time counters, and periodic spot measurements of airflow would be used to measure renewable energy produced, back-up fuel usage, and electric consumptions of ancillary components. Installed systems would be monitored for a minimum of one heating season.

7.4. MARKET SEGMENT NEED.

The identified markets for solar thermal water heating are large and found throughout New York. It is generally accepted that solar thermal water heaters are most cost-effective in applications with high water usage, and such sites are the most suitable for solar thermal technologies. As all commercial and industrial buildings require ventilation and conditioning of air for ventilating purposes can represent 10-20% of a the heating load, many commercial and industrial buildings throughout New York will be suitable for solar wall systems.

7.5. COORDINATION.

NYSERDA is not aware of any current or proposed solar thermal resources being offered by other program administrators.

7.6. CO-BENEFITS.

Solar wall systems are manufactured in New York and this Program may increase market demand which would likely create new manufacturing jobs in Buffalo.

7.7. PORTFOLIO BALANCE.

The proposed program is complementary to NYSERDA's residential solar thermal program proposal that will focus on providing incentives for solar domestic water heating systems installed in multifamily buildings. Both programs further complement NYSERDA's support for solar domestic water heating systems for single family homes through the Home Performance with Energy Star Program. Together, these programs will provide support for solar thermal applications over a wide range of building types.

7.8. DEPTH OF SAVINGS.

This program will work with a limited number of participants, an estimated four per year, equaling approximately 12 participants through 2011. Participants will be chosen so as to maximize the learning opportunity though technology demonstration and the eligibility of the participant for other measures will not be a limiting factor for participation in this program. Additional programs offered by NYSERDA and other program administrators will be promoted to participants.

7.9. UNDERSERVED MARKETS .

The only known program in New York was established under the SBC R&D program that focused on solar thermal technologies. That program focused on early stage deployment of energy-efficient solar thermal technologies for commercial and industrial sector - those with large hot water or space heating loads - such as dairies, laundries, and industrial and warehouse buildings.

7.10. COMMITMENT.

The time to develop participation in this program will be short given the small number of systems annually installed. This term of the program term will be driven primarily by construction times for systems (up to one year from design inception to operating system) and monitoring periods (six months to one year, depending upon whether a space or water heating system is installed). Several years of program cycle will be necessary to gain sufficient market intelligence so as to advance the technology to a position whereby it will be cost-effectively assessed by a traditional TRC test.

7.11. CUSTOMER OUTREACH.

Program participation will be encouraged by marketing competitive solicitations to stakeholders, such as system installers, contractors, engineering firms, and product manufacturers. Solar trade associations will be contacted to identify members that provide services in New York State. NYSERDA will contract with the equipment installers to design, specify, install, commission, monitor, and report on performance and lessons learned.

7.12. COLLABORATIVE APPROACH.

NYSERDA has increased its activity with solar thermal technologies over the past few years through contacts with solar thermal stakeholders, including product manufacturers, solar equipment installers, engineering firms, solar advocates and industry trade associations. These contacts have lead to increased interactions and exchanges of ideas with solar thermal stakeholders, resulting in the proposed program.

7.13. FUEL INTEGRATION.

A project will either provide electric savings or natural gas savings, and NYSERDA does not expect both electricity and natural gas savings at a single customer site.

7.14. TRANSPARENCY.

Program design, benefit/cost analysis, and supporting data for this program will be available for public review. Program results will be publicly promoted with case studies, periodical articles, conference presentations and final reports. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

7.15. PROCUREMENT.

With the exception of select activities performed directly by NYSERDA, each aspect of the Program will be subject to NYSERDA's competitive process.

7.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Solar Thermal Program required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The following tables show: the resource savings and average measure life used as inputs for the benefit/cost analysis; present value of the costs and benefits used in the analysis; and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-58. Solar Thermal Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	20	0.1	0	1,260	33%
Electric Funding Only	2009-2011	20	0.1	0	--	0%

Table III-59. Solar Thermal Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
With Electric and Gas Funding	\$0.9	\$1.7	\$0.3*
Electric Funding Only	\$0.3	\$0.5	\$0.1

*\$0.02 per kWh of operations and maintenance costs were subtracted from benefits.

Table III-60. Solar Thermal Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	0.3	0.2
Electric Funding Only	0.5	0.2

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table III-61 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of less than \$25,000 for either funding case.

Table III-61. Solar Thermal Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	0.3	0.2
Electric Funding Only	0.5	0.3

Use of a traditional TRC test is not appropriate in the near term as this program addresses technology demonstration at the pre-deployment stage. In addition to achieving savings from permanent installation of energy-efficient equipment, this program is intended to learn about and advance the technology so that, in the near future, it will become cost effective using a traditional TRC test.

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 120 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Three of the four projects planned for the program are expected to displace fuel. The coincident peak savings from the electric project will depend on the type of facility.

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. Given that this program is not expected to save peak demand, the peak coincidence factor for the program is 0.²⁷

Number of Participants as a Percentage of the Number of Customers in the Class (Screening Metric 9)

The Solar Thermal Program is a demonstration program under Research and Development and as such is not intended to have numerous participants.

²⁷ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

8. WASTE ENERGY RECOVERY PROGRAM (ELECTRIC AND NATURAL GAS)

8.1. PROGRAM ELEMENTS

Program Description.

The Waste Energy Recovery Program (Program) is designed to achieve savings of grid-supplied electric energy (MWh), summertime electric grid peak load reduction (MW), and pipeline-delivered natural gas (MMBtu). Waste energy exists in various forms, such as steam system pressure-reducing-valve pressure drop, flared combustible gas, and dissipated heat. Its capture can displace electric-resistance heating, electric-driven cooling, or be used to produce electricity on-site, yielding savings of grid-supplied electric energy. Its capture can also be used to displace natural-gas-driven heating to make hot water or pre-heat boiler feed water, yielding savings of pipeline-delivered natural gas. NYSERDA experience with applicable technologies including backpressure steam turbines, organic rankine cycle systems, heat exchangers, and absorption chillers will help to focus the Program to harvest wasted energy and promote business models and teaming arrangements which offer a full suite of waste energy recovery technologies and services. Success will enhance prospects for integration leading to facility-wide optimization.

Program Goals and Objectives.

The Program will deliver the permanent installation of waste energy recovery equipment with an expected life of installed measures of approximately 20 years. Electric savings attributable to the Program will help alleviate grid constraints and prevent electric losses otherwise attributable to T&D resistance. Annually the Program will install four systems, and will perform “matchmaking” between facilities with available waste energy and purveyors of energy recovery technology to encourage projects that might proceed in the absence of direct financial incentives.

Program Theory.

The Program will use an annual competitive solicitation, allowing NYSERDA to select the most promising projects to deliver the expected savings. These projects will also provide market intelligence to accelerate adoption rates for applicable technologies. Milestone-based contracts will be issued, with the majority payment tied to the installation and commissioning of the equipment. Contracts will include rigorous measurement, verification, and data reporting requirements. Program design and administration will be subject to change upon market response (for example, the quantity and quality of proposals received). The US EPA is required under the Energy Independence and Security Act (EISA) of 2007 to establish a recoverable waste energy inventory with details of quantities and sources (*e.g.* site names). Once available, the inventory will greatly enhance Program marketing. However, NYSERDA is confident that sufficient marketing for program success is not contingent on the availability of the US EPA inventory.

Anticipated Spending and Savings.

With an annual program budget of approximately \$2.15 million (one-half derived from electric funds, one-half derived from natural gas funds) the Program will provide about \$2 million of incentives annually. Each program year, the Program will install four systems, and it is anticipated that two will deliver electric peak load reduction of about 200 kW each and operate at 75% annualized capacity factor. The remaining two will each deliver natural gas savings of 20,000 MMBtu/year. Accordingly, the PROGRAM will deliver 2,628 MWh of electric savings, 0.4 MW of peak load reduction, and 40,000 MMBtu of natural gas savings, annually. Individual projects will be eligible to receive \$500,000 or 50% of the overall cost of the project, whichever is less.

Program Schedule.

The Program will begin in the first quarter of 2009 with a one-year lag before equipment is installed and operational. The Program will operate for the 2009-2011 period.

8.2. DEMAND AND REDUCTION SYSTEM BENEFITS.

Waste Energy Recovery systems will displace electric-resistance heating or electric-driven cooling, or to produce electricity on-site, and thereby yield savings of grid-supplied electric energy and possibly summertime grid demand reduction. Because of the expected small number of projects, program results could not be relied upon by T&D system planners.

Table III-62. Waste Energy Recovery Program -- Total Program Expenditures (Projected and net of administration and evaluation) 2009-2015 []

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$2M	\$2M	\$2M	0	0	0	0	\$6M
Note: Does not include marketing.								

Table III-63. Waste Energy Recovery Program -- Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in current year	0	2,628	2,628	2,628	0	0	0
Annual Savings installed in prior years	n/a	0	2,628	5,256	7,884	7,884	7,884
Cumulative Annual Savings	0	2,628	5,256	7,884	7,884	7,884	7,884

Table III-64 Waste Energy Recovery Program – Natural Gas Program Expenditures (Projected and net of administration and evaluation) 2009-2015

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$1.0M	\$1.0M	\$1.0M	0	0	0	0	\$3.0M
Note: Does not include marketing								

Table III-65 Waste Energy Recovery Program – Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in current year	0	40,000	40,000	40,000	0	0	0
Annual Savings installed in prior years	n/a	0	40,000	80,000	120,000	120,000	120,000
Cumulative Annual Savings	0	40,000	80,000	120,000	120,000	120,000	120,000

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPs Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

8.3. EVALUATION.

Each installed waste energy recovery system will include sensors and dataloggers for measuring energy impacts. As applicable for each system configuration, Btu meters, flow meters, temperature probes, current transformers, fuel meters, and run time counters will be installed to measure available recoverable energy, as well as captured recoverable energy, energy produced, back-up fuel usage, and electric consumptions of ancillary components. Installed systems would be monitored for a minimum of twelve months.

Use of a traditional TRC test is not appropriate in the near term as this program addresses technology demonstration at the pre-deployment stage. In addition to achieving savings from permanent installation of energy-efficient equipment, this program is intended to learn about and advance the technology so in the near future it will become cost-effective using a traditional TRC test.

General Evaluation Approach

Evaluation plans for early demonstrations of technologies necessitate flexibility because evaluation work varies with the technology and project types/stages such as product development/characterization, demonstration, and business development, and with programmatic adjustments.

Evaluation Goals

The primary evaluation goal is to assess the electricity and natural gas savings attributable to the program. A secondary goal is to review and assess detailed lessons learned about the business models and teaming arrangements that spur technology adoption.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the Waste Energy Recovery Program (WER), and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPs program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that

best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

The planned impact evaluation will involve field measurement and verification of claimed savings and an assessment of site replication. A process evaluation will assess feedback on technology applications, information generation, and dissemination and technology transfer of program elements. Consideration is being given to developing evaluation plans tailored to the 12 individual project technologies as they are selected through competitive solicitation.

Evaluation Budget

NYSERDA expects the evaluation budget for the Waste Energy Recovery Program to be somewhat less than 5% of the program funding level, less yet-to-be-determined funds set aside for statewide studies and other overarching costs borne by program administrators. It is expected that the Waste Energy Recovery evaluation budget will be designed to account for the specific needs of the program, and allocated primarily to Impact Evaluation (approximately 65%) and the remainder for Process evaluation.

Evaluation Schedule

The anticipated completion dates of planned evaluations are shown in the table below. More information on the M&V and process evaluation schedules are contained those respective sections.

Table III-66 Evaluation Schedule for the Waste Energy Recovery Program

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)	X		X	X (Replication assessment & attribution)
Process Evaluation			X	

Impact Evaluation

In addition to measurement and verification of demonstrations, the impact evaluation may review the extent, type, and attribution of replications.

Measurement and Verification

The WER Program is planning extensive measurement as part of program requirements including sensors and data loggers for measuring energy impacts. Then, depending upon system configuration, Btu meters, flow meters, temperature probes, current transformers, fuel meters, and run time counters will be installed to measure potentially available recoverable energy as well as actually captured recoverable energy, energy produced, back-up fuel use, and electricity consumption of ancillary components for a minimum of 12 months.

The impact evaluation will include an early review and assessment of the quality and comprehensiveness of the Program metering and monitoring data. If the data sets are complete, there may be little value gained in performing additional near-term metering/monitoring. Therefore, M&V work will focus on the baseline assumptions for each project. If needed, strategies will be developed for addressing gaps in the

data, including additional metering and on-site data collection. In addition, it is possible that additional data from the participants may be needed to interpret the metering data.

Site-specific evaluation plans may be designed as part of the detailed evaluation plan development. It is likely that these will include calibrated IPMVP Option B process modeling or full retrofit isolation measurement (but could also utilize IPMVP Option C) depending on pre-post usage data availability and specificity and evaluation cost efficiency by doing so. Evaluating replications will be considered to the extent that they occur and are envisioned in the program design; however, due to funding limitations this element may need to be accomplished via engineering algorithms without field measurements, but based upon the findings from the direct demonstration projects.

Data collection and analyses will be conducted by NYSERDA's independent contractors based on established evaluation protocols and the approved detailed evaluation plan for the direct demonstration projects and their replications. Engineering analysis of performance for each technology application will be conducted as required for its assessment. Sampling will not be necessary as all systems installed under the program are expected to undergo extensive metering/monitoring. Thus, the measurement and verification evaluation effort is anticipated to be based on a census engineering review evaluation.

The initial assessment and any pre-retrofit on-site visits will be in 2009. Since these projects can take up to a year to complete and Program metering/monitoring is scheduled for twelve months, impact evaluation is scheduled for 2011 and 2012 (particularly for any evaluation of replication projects).

Net-to-Gross

Freeridership is generally expected to be quite low for early demonstrations of technologies, though independent confirmation of this should be considered in the detailed evaluation planning process. Replication of technology is part of the program design and intent and included in impact evaluation. Although the concept of replication is similar to spillover, it is not as widely applicable to the market at large due to the early phase of the technologies. Given these circumstances, NYSERDA proposes that it would not be cost-effective to spend limited evaluation funding to perform a net-to-gross analysis.

Process Evaluation

The purpose of an early demonstration R&D program is to assess a technology and its potential. Consequently, the process evaluation will be conducted in the last year of implementation and will assess the technology progress or performance, and identify lessons learned to inform future program implementation. The evaluation will examine the business models and teaming arrangements recommended by the project contractor.

The overall approach will include a review of data collected and reports produced by the project contractor(s), and interviews with program staff, the selected contractor(s), and representatives of each of the sites where the waste energy equipment is installed and tested. The process evaluation will also develop a program theory and logic model for the program as implemented and will identify issues of data reliability for the impact evaluation.

Final process evaluation assessments and reports will be produced based on interviews, data collection, and analyses conducted by NYSERDA's independent evaluation contractors according to the approved evaluation plan and established protocols. The evaluation will also provide actionable recommendations on the feasibility of the technology and will incorporate lessons learned to inform future program development efforts.

A sampling approach will not be employed due to the small number of expected program participants; instead, a census approach will be taken that involves the evaluation of all 12 sites. Evaluation plans will be developed and tailored to the individual technologies as they are selected.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Although measurement and verification of reduced usage of electricity and gas are critical, the evaluation needs to conduct other assessments (dependent on technology) to judge a technology's viability as a product and its potential for commercialization. If evaluation funding for this proposed program were to be reduced, a sample instead of census data collection would be employed. Conversely, an increase in funding would allow for expansion of the research methods and areas that can be evaluated, such as more extensive evaluation of the demonstration communications, replication decision making, technology transfer elements and network analyses. Also, persistence studies for after the required program monitoring period could be considered. With the evaluation plan for this program to be determined based on the technologies chosen from yet-to-be-issued solicitations, the specific evaluation resource allocations will be addressed at the time of plan development.

8.4. MARKET SEGMENT NEED.

The large New York market for waste energy recovery systems is readily identified and include: steam system pressure-reducing-valve pressure drop at paper mills; school and hospital campuses; industrial boilers and district steam systems; flared combustible gas from landfills, wastewater treatment plants; industrial processes; dissipated heat at high temperatures from glass factory furnaces, metal foundry furnaces, and industrial process heating; and low temperature from industrial process ventilation, power plant cooling towers, and steam condensate tempering discharges.

8.5. COORDINATION:

Certain aspects of waste energy recovery technologies, such as use of efficient heat exchanges in industrial settings, may be eligible for incentives under NYSERDA's existing Industrial Process and Product Innovation Program. This Program focus on harvesting wasted energy and promoting business models and teaming arrangements which offer a full suite of waste energy recovery technologies and services. These efforts will enhance the prospects for integration yielding facility-wide optimization.

8.6. CO-BENEFITS.

Some equipment may be manufactured in New York State. Supporting demonstration of this and other waste energy recovery technologies may increase market demand which, in turn, may create or retain manufacturing jobs in New York State.

8.7. PORTFOLIO BALANCE:

The proposed program complements NYSERDA's existing Industrial Process and Product Innovation program, Existing Facilities Program, and Statewide CHP Programs. These existing programs support certain aspects of waste energy recovery technologies, such as efficient heat exchanges in industrial settings, steam backpressure turbines, organic rankine cycle systems, etc. Together, these programs will provide additional support for waste energy recovery applications over a wide range of technologies and provide further guidance to ensure program participants consider the full suite of waste energy recovery technologies and services.

8.8. DEPTH OF SAVINGS.

This program will work with a limited number of participants, an estimated four per year, equaling approximately 12 participants through 2011. Participants will be chosen so as to maximize the learning opportunity through technology demonstration and the eligibility of the participant for other measures will not be a limiting factor for participation in this program. Additional programs offered by NYSERDA and other program administrators will be promoted to participants.

8.9. UNDERSERVED MARKETS.

Not applicable.

8.10. COMMITMENT.

The time to develop participation in this program is likely to be short given the small number of systems annually installed. This program's term will be driven mostly by construction times for systems (sometimes up to one year from design inception to an installed and operating system) and monitoring periods (six months to one year depending upon the seasonality of the available waste energy). Several years of program cycle will be necessary to gain the marketplace intelligence that is being sought so as to advance the technology to being cost-effective as assessed by a traditional TRC test.

8.11. CUSTOMER OUTREACH.

Program participation will be encouraged by marketing the competitive solicitations to stakeholders such as system installers, contractors, engineering firms, and product manufacturers. NYSERDA intends to contract with the equipment installers or host sites to design, specify, install, commission, monitor, and report on performance and lessons learned.

8.12. COLLABORATIVE APPROACH.

Recently, NYSERDA has significantly increased its contacts in industrial settings (such as waste energy recovery stakeholders, product manufacturers, equipment installers, engineering firms, advocates and industry trade associations) and with CHP candidates. It is as a result of the exchange of ideas with stakeholders and the knowledge and experience gained by NYSERDA that this Program is proposed.

8.13. FUEL INTEGRATION.

A project will either provide electric savings or natural gas savings. NYSERDA does not anticipate both electricity and natural gas savings from a project at a single customer site.

8.14. TRANSPARENCY.

Program design, benefit/cost analysis, and supporting data for this program will be available for public review. Program results will be publicly promoted with case studies, periodical articles, conference presentations and final reports. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

8.15. PROCUREMENT.

With the exception of select activities performed directly by NYSERDA, each aspect of the Program will be subject to NYSERDA's competitive process.

8.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Waste Energy Recovery Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table 1 shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table 2 shows the present value of the costs and benefits used in the analysis. Table 3 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-67 Waste Energy Recovery Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	20	7.9	1.2	120,000	0%
Electric Funding Only	2009-2011	20	7.9	1.2	--	0%

Table III-68. Waste Energy Recovery Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
With Electric and Gas Funding	\$6.2	\$11.6	\$24.6
Electric Funding Only	\$3.1	\$5.8	\$9.6

Table III-69. Waste Energy Recovery Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	4.0	2.1
Electric Funding Only	3.1	1.7

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table 4 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$1.3 – 2.0 million, depending upon whether electric funding only or the combined funding is considered.

Table III-70. Waste Energy Recovery Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	4.3	2.3
Electric Funding Only	3.3	1.8

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 7,884 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 1.2 MW (cumulative) of coincident peak reduction in 2015.²⁸

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.75.²⁹

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

As a demonstration program, the Waste Energy Recovery Program is not intended to reach large numbers of participants.

²⁸ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday weekdays.

²⁹ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

9. FLEXTech PROGRAM (NATURAL GAS)

9.1. DESCRIPTION OF PROGRAM

In this proposal, NYSERDA is seeking gas ratepayer funding to complement the electric funding previously provided by the Commission under the **New York Energy \$martSM** program and the Fast Track order for the Flexible Technical (FlexTech) Program. FlexTech provides customers with objective and customized information to facilitate informed energy efficiency, procurement, productivity, and financing decisions. Cost-shared technical assistance is provided for detailed studies from energy engineers and other experts. The program is designed to evaluate all energy resources while providing objective analysis of energy resource trade-offs and switching options. Program participants receive customized energy studies targeting their particular needs and objectives. This program requests gas funding to secure gas energy efficiency savings.

Eligible participants for the FlexTech Program include commercial, industrial, institutional, municipal, not-for-profits organizations, and K-12 schools. Participants may use NYSERDA's contractors or select their own. The Program is currently offered statewide with special emphasis on customers in the Con Edison service territory.

NYSERDA will enhance the FlexTech Program by increasing the number of service providers, introducing new initiatives, and expanding ongoing activities. To increase the number of service providers, NYSERDA will issue a Request for Proposals (RFP) to select qualified firms in specific geographic areas, such as New York City, and technical fields, such as industrial and data center processes. New and expanded initiatives with significant potential for gas savings include: industrial process efficiency, retro-commissioning, carbon reduction analysis, and sustainability planning and practices.

The addition of gas efficiency funds will allow the program to move from a model primarily focused on electric opportunities to a more holistic analysis focused on the needs of rate payers. This approach will result in a more cost-effective program with deeper market penetration for gas and electric efficiency.

9.2. DEMAND REDUCTION AND SYSTEM BENEFITS

Natural gas efficiency measures that deliver savings during peak periods help utilities defer investments in natural gas transmission and distribution and storage capacity infrastructure.³⁰

Table III-71. FlexTech Program – Natural Gas Program Expenditures (Projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$0.26M	\$0.54M	\$0.81M	\$0.68M	\$0.35M	\$0	\$0	\$2.63M
Outreach / Marketing	\$0.03M	\$0.04M	\$0.04M	\$0.02M	\$0	\$0	\$0	\$0.13M

³⁰ Optimal Energy, Inc., American Council for an Energy-Efficient Economy, Vermont Energy Investment Corporation, Resource Insight, Inc., Energy and Environmental Analysis, Inc., *Natural Gas Energy Efficiency Resource Development Potential in New York*, October 2006.

Table III-72. FlexTech Program – Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	26,118	73,596	134,111	161,908	139,395	80,103	42,976
Annual Savings Installed in Prior Years	n/a	26,118	99,714	233,825	395,733	535,128	615,231
Cumulative Annual Savings	26,118	99,714	233,825	395,733	535,128	615,231	658,207

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

9.3. EVALUATION

General Evaluation Approach

Evaluation Goals

The primary goal of the FlexTech Program evaluation effort is to measure and verify the savings attributable to the program.

Brief Overview of the Evaluation Approach

NYSERDA's *Supplemental Revision for New York Energy \$martSM Programs* (Supplemental Revision), filed with New York State Public Service Commission on August 22, 2008, provides details regarding proposed evaluation plans for the electricity-focused "fast track" FlexTech Program.³¹ NYSERDA expects that evaluation plans described in the Supplemental Revision can also apply to the FlexTech Program gas funding being requested herein, and that the electric and gas program components will be evaluated in a coordinated fashion. NYSERDA anticipates that the approach, implementation, rigor level, and timing of evaluating gas savings associated with this filing will be similar to that described for the FlexTech Program electric savings in the August 22, 2008 filing and described within this section. Funds earmarked for evaluating the gas portion will be added to the existing electricity-focused evaluation budget to accomplish this cost-effective coordinated evaluation. To the extent that NYSERDA's original SBC-funded FlexTech Program can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional funding from the enhanced SBC III evaluation funding. NYSERDA's estimated evaluation budget for this program includes a small set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

³¹ NYSERDA, *System Benefits Charge Supplemental Revision for the New York Energy \$martSM Programs* (2008-2011) , As Amended, August 22, 2008.

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the FlexTech Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent evaluation contractors flexibility to adapt the approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and other evaluation projects for which funding will need to be allocated.

Evaluation Budget

NYSERDA expects the evaluation budget for the gas portion of the FlexTech Program to be approximately 5% of gas program funding, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. NYSERDA expects that approximately 60% of the evaluation funding will be allocated to impact evaluation. Process evaluation will be allocated approximately 25% of the evaluation budget, and market evaluation will receive the remainder.

Evaluation Schedule

Evaluation studies expected to be part of the FlexTech Program evaluation plan are shown in the table below along with the time frame for their anticipated completion.

Table III-73. Evaluation Schedule for FlexTech Program

Evaluation Element	Expected Completion				
	2009	2010	2011	2012	2013
M&V (Impact)			X		X
Net-to-Gross (Impact)			X		X
Process Evaluation		X	X		
Market Evaluation	X				

Impact Evaluation

Measurement and Verification

Measurement and verification (M&V) will involve site visits and simple engineering modeling of installed measures, as well as an analysis of energy use data for all participants (those that received studies). Because of the potential lag in savings between participation and implementation, no impact evaluation is anticipated in the first year of the expansion.

The FlexTech Expansion Program M&V methodology is designed to address the unique nature of the program, whereby NYSERDA cost shares an investigation and a report of a facility's energy operations, but no action is required by the facility. The realization rate will reflect both the percent of savings from measures recommended in completed studies that have been implemented, and the percent of estimated savings for implemented measures that is actually achieved, as determined by a site visit. A sub-sample of site visits may involve monitoring and/or measurement (meeting as a minimum the standards of IPMVP Option A including the use of direct measurement). The impact evaluation methodology will involve a major direct, on-site verification component that will provide the data necessary for these calculations.

First, participants will be surveyed to determine whether any recommended measures or actions were implemented. The survey sample will be stratified by utility service territory and then the magnitude of potential (recommended) savings within that stratum. Due to the relatively small number of anticipated program participants, it is expected that a 90/10 confidence/precision level by utility service territory can be achieved, even given the smaller overall dollar value allocated to this program evaluation effort. Second, potential site visits will be selected based upon the results of the telephone surveys. A census of large energy-saving sites and a sample (meeting 90/10 confidence/precision levels) of remaining sites in each utility stratum will be selected for verification site visits. The smallest savers may be eliminated as site visit candidates. Savings will be estimated, using simple engineering models at a minimum³², based on reported baseline conditions (or code assumptions) and as-built conditions. Results will be weighted by utility and for the program as a whole.

Due to the lag time in the implementation of measures for this type of program, impact evaluations would be conducted in 2011 for measures installed/implemented through 2010, and again in 2013 for installation and implementation completed through 2012. Savings are expected to accrue past 2012, but these projects are not expected to differ markedly from those examined in the first two impact evaluations, so follow up will be significantly less intensive. The process evaluation will include conducting calls with participants in 2010 and 2011 as part of the attrition analysis. These calls will also be leveraged to identify sites available for M&V activities.

Net-to-Gross

Net savings will be estimated at the 90/10 confidence/precision level via an enhanced self-report survey method with key decision-makers (customers, service providers, etc.) for specific measures, using state of the art survey instruments. Savings-weighted freeridership and spillover will be estimated using these data. Non-participant spillover will be estimated using similar surveys, but these will be implemented as part of the process and market studies. Initially, the survey instruments will be based upon NYSERDA's long-term refinement of these questions, including additions to ensure construct validity and other potential reliability issues to achieve the highest cost-efficient rigor levels. Net to gross evaluations will be conducted on adopters found through the M&V analysis in the years 2011 and 2013.

Process Evaluation

A full process evaluation of the FlexTech Expansion Program is warranted. Process evaluation activities will include interviews with NYSERDA staff, service providers, and surveys of customers that have participated in the program. A sample of non-participants, matched to the NAICS characteristics of participants, should be surveyed as well. Customers who participated in the program but did not adopt recommendations will also be examined. Specific objectives of the process evaluation could include further examination of the program processes; database adequacy; allocation of resources between program overhead versus direct services to customers; serving both large and small customer needs; an investigation of customer linkages between participation in this program and other implementation programs; and an examination of measure adoption rates by customer type, customer needs, and potential differential marketing and informational approaches.

³² More sophisticated methods may be selected for the largest energy-saving sites and the method selected will depend upon an assessment of the most reliable, and cost-efficient method for the application being examined. For example, a large industrial process measure might best be measured through IPMVP Option B and calibrated DOE-2 modeling (IPMVP Option D) might be most appropriate for a comprehensive large office building application.

This process evaluation is expected to be conducted at two points in time. The first study will occur approximately a year after the program start date so as to provide early feedback regarding the program processes and participation rates. The second study will occur in the third year of program implementation to further expand on and explore reasons for attrition. Typically, past process evaluation work has achieved 90/10 confidence and precision levels, thus it is expected that future planned process evaluations will attain these levels. Efforts will also be made to eliminate, reduce, or mitigate bias in the research design.

Market Evaluation

An important part of any program evaluation is a thorough understanding of the market environment in which it is operating. NYSERDA believes that the best approach to fully characterize the target market for this and other commercial/industrial sector programs includes a large-scale baseline and measure saturation study, coupled with surveys of various market actors such as engineering firms, manufacturers, and specialty contractors.

The large-scale baseline and measure saturation study would be conducted through site visits to fully characterize buildings and facilities in these sectors, the equipment in use, vintage and efficiency levels of motors, HVAC, lighting, etc., to establish an understanding of equipment holding in the sector, and other factors. The survey element should focus on current practice, customer and market response, and decision making processes.

NYSERDA believes this type of study would benefit all EEPs program administrators, and therefore proposes that it be undertaken in a joint-funded manner with all parties contributing. The full study, including both the site visit and survey components, cannot be conducted by NYSERDA alone as part of the evaluation budget for the FlexTech Expansion Program. However, if it is decided that this type of joint study is not worthy of support by all potential program administrators, NYSERDA plans to conduct the survey component only, in 2009. Although the full value of this effort will be highly diminished, the survey component will still provide valuable information to assist NYSERDA in targeting this program to better serve the industrial market and meet overall electricity savings goals.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support other overarching evaluation activities, the evaluation plans presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program needs to be reduced, impact evaluation would no longer be able to meet 90/10 at the individual utility level and process evaluation would likely eliminate the non-participant sample and other potential participant groups in an attempt to focus on only the most relevant samples for achieving the highest priority goals of the evaluation. Conversely, if more of NYSERDA's total evaluation funding could be allocated to this program, the additional funds would allow for more site-specific data collection as part of the impact evaluation.

9.4. MARKET SEGMENT NEED

Heating, ventilating, and air conditioning (HVAC) systems, envelope improvements, and the operation and modification of industrial systems require the use of integrated heating and cooling equipment and systems. Customer decisions with respect to the costs and impacts of energy efficiency measures require integrated analyses. Service providers, such as architecture and engineering firms, energy service companies, HVAC contractors, and supply houses, provide integrated services that address all energy resources.

9.5. COORDINATION

NYSERDA conducts customer outreach events targeting a variety of stakeholders, including utility account executives, throughout New York and expects to continue this practice. In addition, NYSERDA is in collaborative discussions with representatives of New York's investor-owned utilities to improve coordination of program delivery, maximize resource acquisitions, and minimize costs to rate payer.

9.6. CO-BENEFITS

Co-benefits include productivity improvements, more reliable energy supplies, economic development through reduced fuel costs, water savings, and fuel oil savings. In addition, FlexTech continually seeks to increase the number and quality of professional energy efficiency services providers throughout New York.

9.7. PORTFOLIO BALANCE

Detailed studies are often the first and only assistance necessary to enable customers to implement energy efficiency improvements. FlexTech provides cost-shared, objective analyses to customers for this important phase of energy projects.

9.8. DEPTH OF SAVINGS

FlexTech projects are site-specific and developed collaboratively among customers, FlexTech consultants, and NYSERDA staff. To meet the needs of individual customers, projects may focus on specific systems or develop comprehensive strategic energy and carbon reduction plans.

9.9. UNDERSERVED MARKETS

This program serves the entire Commercial and Industrial end-user market.

9.10. COMMITMENT

Sufficient time and reliable funding are keys to the successful delivery of the program.

9.11. CUSTOMER OUTREACH

NYSERDA will increase and expand its outreach efforts, focusing on direct and continual customer contact. Engagement by participants at all management levels including facility managers and senior management will be encouraged. NYSERDA will engage its network of FlexTech service providers to develop marketing materials highlighting their specific experience and expertise to encourage FlexTech providers to actively market the program to the target audience. NYSERDA will enhance partnerships and work collaboratively with representatives of New York's investor-owned utilities to market the program and increase its exposure at energy and sustainability conferences and through direct customer interactions.

Outreach to industrial and process customers will use a targeted approach emphasizing the benefits of the entire NYSERDA program portfolio coupled with development of strong relationships with key market players and guidance in accessing local, state, regional, and national funding and assistance. As the implementation of industrial projects often takes a considerable amount of time, NYSERDA's outreach strategy will focus on direct and continual customer contact.

NYSERDA will build upon its relationships within the industrial sector and conduct frequent meetings with rate payers, customer service providers, professional and business organizations, stakeholders, sector-specific organizations, civic organizations, and trade associations across New York including:

- Consumer groups — Multiple Intervenors, the Manufacturers Association of Central New York, the Business Council of New York State
- Trade associations — American Institute of Chemical Engineers, the Empire State Forest Products Association
- Vendors — manufacturers of custom built process equipment, large process support equipment, industrial motors and compressors
- Complementary organizations — water and wastewater, utility companies, economic development agencies, climate change organizations

While NYSERDA emphasizes identifying and implementing energy-related productivity projects, outreach efforts will specifically target additional opportunities for industrial process customers. For example, NYSERDA's Energy \$martSM Industrial Focus Program enhances outreach to the industrial market segment. Currently funded through SBC III, this outreach activity will be expanded to accomplish the additional goals established in the Fast Track effort. Expansion will include outreach to the growing data center market segment, which has tremendous potential to achieve efficiency savings. The Industrial Focus program promotes the education and training of facility technical staff in energy efficient operations, accessing technical assistance and available services through state, regional, national, and international programs, and in identifying, prioritizing, and implementing efficiency projects and strategies.

9.12. COLLABORATIVE APPROACH

NYSERDA emphasizes stakeholder collaboration and regularly meets with groups of customers and contractors to discuss program evolution.

9.13. FUEL INTEGRATION

The addition of a gas component will shift the program focus from electric energy efficiency improvements with minimal incidental gas savings to an holistic focus on the needs of rate payers. Funding for integrated measures will facilitate program delivery, increase the penetration of electric and gas energy efficiency improvements, reduce ratepayer costs, and reduce confusion. To be effective, program staff recognize that customers and service providers must operate and serve entire facilities with integrated electric and gas strategies.

9.14. TRANSPARENCY

The program description is currently available on NYSERDA's Web site. Historical data on NYSERDA's Industrial Process and Product Improvement Research and Development Programs are available in **New York Energy \$martSM** evaluations. As evaluations are conducted for this expanded effort, information will be transparent and available. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

9.15. PROCUREMENT

NYSERDA issues an RFP for FlexTech contractors every three years. Services are offered to customers on a first-come first-served basis. Customers can participate using their own contractors through a companion open enrollment program.

9.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Flexible Technical Assistance Expansion Program (FlexTech Expansion) required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table 1 shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table 2 shows the present value of the costs and benefits used in the analysis. Table 3 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs. The FlexTech Expansion benefit/cost analysis was based on the combined electric fast track funding and gas funding requested in this proposal.

Table III-74. FlexTech Expansion Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	16 / 18	267.1	49.4	658,000	38%

Table III-75. FlexTech Expansion: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
With Electric and Gas Funding	\$18.1	\$178.9	\$452.0

Table III-76. FlexTech Expansion Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	25.0	2.5

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table 4 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$28.9 million.

Table 4. FlexTech Expansion Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	26.6	2.7

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 267,100 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 49.4 MW (cumulative) of coincident peak reduction in 2015.³³

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.62.³⁴

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table 5 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current additional gas funding request through 2011.

³³ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday weekdays.

³⁴ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

Table 5. FlexTech Expansion Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Commercial - Electricity	1,002,856	70	< 0.1%
Industrial - Electricity	7,715	35	0.3%
Commercial – Natural Gas	358,504	35	< 0.1%
Industrial – Natural Gas	14,357	35	0.2%

¹ Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as “non-residential”. Commercial and industrial customers estimated by NYSERDA.

10. INDUSTRIAL AND PROCESS EFFICIENCY (NATURAL GAS)

10.1. DESCRIPTION OF PROGRAM COMPONENT

Through the **New York Energy \$martSM** Enhanced Commercial and Industrial Performance and Peak Load Reduction Programs, NYSERDA offered incentives for process efficiency projects. While substantial industrial participation has existed to date, process efficiency projects have been limited and considerable opportunity remains for gas efficiency gains in the industrial, data center, municipal water and wastewater, agriculture, and mining and extraction sectors. Industrial and process improvements are complex projects with significant energy, economic development, and productivity benefits. Process improvement projects are expected to predominate in the industrial facilities and data center sectors. The program requests gas funding to secure gas efficiency savings.

In response to market feedback and increased funding, NYSERDA developed an additional component to its Existing Facilities Program that will provide performance-based incentives for cost-effective process improvements that reduce energy use per unit of production. This component constitutes the implementation path for process improvement projects developed through the FlexTech Program and brought to the program independently.

The process efficiency component will focus on key manufacturing sectors in New York such as chemicals and pharmaceuticals, printing and publishing, automotive, food processing, and forest products. Data centers are included because their energy use profile is similar to manufacturing paralleling manufacturing's load shape, process oriented characteristics, economic development impacts, power quality requirements, mission critical nature, and load growth potential. In addition, agriculture, mining, extraction, and water and wastewater facilities also have similar process-oriented missions and expectations. Incentives will be offered for energy efficiency projects in all of these sectors that reduce energy use per unit of production.

Industrial processes require customized approaches to achieve energy efficiency improvements. Production lines and manufacturing processes often have unique characteristics and functions. Site- and sector-specific approaches will be used to ensure that optimum energy efficiency opportunities are identified and addressed to maximize reliability, productivity, and energy savings. NYSERDA will increase its engagement of service providers who are experts in particular industrial processes and types of data centers. Credibility, experience, and excellence are essential attributes for technical assistance contractors to contribute to program success. Customer and stakeholder engagement are also key to achieving successful projects.

10.2. DEMAND REDUCTION AND SYSTEM BENEFITS

Natural gas efficiency measures that deliver savings during the peak periods help New York's investor-owned utilities defer investments in natural gas transmission and distribution infrastructure and avoid the need for additional storage capacity.³⁵

³⁵ Optimal Energy, Inc., American Council for an Energy-Efficient Economy, Vermont Energy Investment Corporation, Resource Insight, Inc., Energy and Environmental Analysis, Inc., *Natural Gas Energy Efficiency Resource Development Potential in New York*, October 2006.

Table III-77. Industrial and Process Efficiency Program – Natural Gas Program Expenditures (Projected and net of administration and evaluation) 2009-2015

Annual EEPS Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$1.79M	\$4.69M	\$7.57M	\$8.42M	\$5.85M	\$2.36M	\$0.38M	\$31.10M
Outreach/ Marketing	\$0.35M	\$0.52M	\$0.52M	\$0.17M	\$0	\$0	\$0	\$1.55M

Table III-78. Industrial and Process Efficiency Program — Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	503,460	813,628	1,056,365	876,558	202,284	0	0
Annual Savings Installed in Prior Years	n/a	503,460	1,317,088	2,373,453	3,250,011	3,452,295	3,452,295
Cumulative Annual Savings	503,460	1,317,088	2,373,453	3,250,011	3,452,295	3,452,295	3,452,295

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

10.3. EVALUATION

General Evaluation Approach

Evaluation Goals

The primary goal of the Industrial and Process Efficiency Program evaluation effort is to measure and verify the savings attributable to the program.

Brief Overview of the Evaluation Approach

NYSERDA's *Supplemental Revision for New York Energy \$martSM Programs* (Supplemental Revision), filed with New York State Public Service Commission on August 22, 2008, provides details regarding proposed evaluation plans for the electricity-focused "fast track" Industrial and Process Efficiency

Program.³⁶ NYSERDA expects that evaluation plans described in the Supplemental Revision can also apply to the Industrial and Process Efficiency Program gas funding being requested herein, and that the electric and gas program components will be evaluated in a coordinated fashion. NYSERDA anticipates that the approach, implementation, rigor level, and timing of evaluating gas savings associated with this filing will be similar to that described for the Industrial and Process Efficiency Program electric savings in the August 22, 2008 filing and described within this section. Funds earmarked for evaluating the gas portion will be added to the existing electricity-focused evaluation budget to accomplish this cost-effective coordinated evaluation. NYSERDA's estimated evaluation budget for this program includes a small set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the Industrial and Process Efficiency Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent evaluation contractors flexibility to adapt the approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and other evaluation projects for which funding will need to be allocated.

Evaluation Budget

NYSERDA expects the evaluation budget for the gas portion of the Industrial and Process Efficiency Program to be approximately 5% of gas program funding, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. NYSERDA expects that approximately 70% of the evaluation funding will be allocated to impact evaluation. The remainder will be roughly equally split between process and market evaluation.

Evaluation Schedule

Evaluation studies expected to be part of the Industrial and Process Efficiency Program evaluation plan are shown in the table below along with the time frame for their anticipated completion.

Table III-79. Evaluation Schedule for the Industrial and Process Efficiency Program

Evaluation Element	Expected Completion				
	2009	2010	2011	2012	2013
M&V (Impact)			X		X
Net-to-Gross (Impact)			X (possibly with process survey)		X
Process Evaluation		X	X		
Market Evaluation	X				

³⁶ NYSERDA, *System Benefits Charge Supplemental Revision for the New York Energy \$martSM Programs (2008-2011)*, As Amended, August 22, 2008.

Impact Evaluation

Measurement and Verification

A full evaluation of industrial energy and demand savings will produce estimates of gross and net savings using a variety of methodologies varying in complexity related to the magnitude of predicted savings. Savings will be estimated for the time period or periods that the measures are expected to provide significant savings. Post-retrofit conditions will be established using on-site data collection of the as-built-conditions. Post-implementation direct metering will likely be used, following standard IPMVP Option B protocols.

Baseline conditions will be assessed from program data, which could include design reports, pre-metering and program forms required by NYSERDA. If these sources are not available or not adequate, baseline conditions will be established based on existing equipment, production volume, and operating schedule. Where possible, NYSERDA's independent evaluation contractors will be involved in developing requirements for baseline measurement and data collection, and supplemental baseline measurement and metering of a sample of installations.³⁷

Process measures such as chillers, adjustable frequency drives, compressed air systems and combustion systems will be evaluated using a combination of short-term measurement and modeling of baseline and as-built systems. In many cases the most reliable measurement and verification methods for process improvements are to measure and provide savings estimates according to IPMVP Option B recommendations. This method will likely be used for the largest sites where equipment and metering configurations allow for it.

Assessing the impacts of lighting measures is expected to involve standard engineering calculations, supplemented by direct time-of-use logging, including current transformer loggers. For HVAC measures, the evaluation will likely involve an initial simple engineering estimate (bin model), accessing on-site energy management or process control systems, or multi-channel loggers recording hourly true power. Depending on the complexity of the facility, DOE-2 or similar simulation modeling might be used.

Sampling for the evaluation will likely be based on stratified ratio estimates, with sample sizes calculated at a relative precision of 90%, using an error ratio derived from previous or related studies. Annual cohorts will be stratified according to projected savings and sampled by strata, with the largest savers being sampled in their entirety (census), which may exclude the very smallest savers from sampling entirely.

Due to the lag time in the implementation of measures for this type of program, impact evaluations are expected to be conducted in 2011 for measures installed/implemented through 2010, and again in 2013 for installation and implementation completed through 2012. Savings are expected to accrue past 2012, but these projects are not expected to differ markedly from those examined in the first two impact evaluations, so follow up will be significantly less intensive. The process evaluation work will be leveraged to the extent possible to conduct calls with participants as part of the attrition analysis. These calls will also be used to identify sites available for measurement and verification (M&V) activities.

³⁷ Evaluation contractors will also work with program staff to determine if a pre-post evaluation measurement study can be designed to work alongside program operations, allowing both more reliable independent savings estimates and ensuring not to hamper program achievements or significantly affect customer satisfaction.

Net-to-Gross

Net savings will be estimated at 90/10 confidence/precision statewide using an enhanced self-report survey method with key decision-makers (customers, service providers, etc.) for specific measures, using state of the art survey instruments. Savings-weighted freeridership and spillover will be estimated using these data. If the budget allows, the sample will be expanded to reach 90/10 confidence/precision at the utility territory level. Non-participant spillover will be estimated using similar surveys, and could possibly be combined with market and process survey activities. Initially, the survey instruments will be based upon NYSERDA's long-term examination of refinement of these questionnaires for the SBC programs, including additions to ensure construct validity and other potential reliability issues to best ensure the highest, most cost-efficient rigor levels. This work will be conducted as a part of the 2011 process evaluation work and then repeated in 2013 in order to capture the maximum amount of spillover.

Process Evaluation

Process evaluation will focus on the participation and decision making process in the industrial sector. Those that have not participated in the program or applicants that never installed measures will form the non-participant population. Partial participants (those that implemented some but not all measures) will also likely be interviewed. Areas of inquiry expected for the process evaluation work include:

- Attrition analysis focusing on the reasons for non-participation and drop out at different stages, which will also help identify sites for impact evaluation M&V
- Barriers to participation
- Adequacy of the performance incentive to prompt participation
- Overall customer satisfaction with the program participation process
- Examination of customer decision making

The process evaluation work will generate actionable recommendations for improvements to the program. It is expected that process evaluation will be conducted at two points in time. The first evaluation will occur approximately a year after the program start date so as to provide early feedback regarding the program processes and participation rates, and the second evaluation will be in approximately the third year to further expand on and explore reasons for attrition.

Typically, past process evaluation work has achieved 90/10 confidence and precision levels, thus it is anticipated that future planned process studies will attain these levels. Efforts will also be made to eliminate, reduce, or mitigate bias in the research design.

Market Evaluation

An important part of any program evaluation is a thorough understanding of the market environment in which it is operating. NYSERDA believes that the best approach to fully characterize the target market for this and other commercial/industrial sector programs consists of a large-scale baseline and measure saturation study, coupled with surveys of various market actors such as engineering firms, manufacturers, and specialty contractors.

The large-scale baseline and measure saturation study would be conducted through site visits to fully characterize buildings and facilities in these sectors, the end-use equipment in use, vintage and efficiency levels, and other factors. The survey element should focus on current practice, customer and market response, and decision making processes.

NYSERDA believes this type of study would benefit all EEPS program administrators, and therefore proposes that it be jointly-funded with all program administrators contributing. The full study, including both the site visit and survey components, cannot be conducted by NYSERDA alone as part of the evaluation budget for the Industrial and Process Efficiency Program. However, if it is decided that this type of joint study is not worthy of support by all potential program administrators, NYSERDA may conduct the survey component only, in 2009. Although the full value of this effort will be highly diminished, the survey component could still provide valuable information to assist NYSERDA in targeting this program to better serve the industrial market and meet overall electricity savings goals.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support other overarching evaluation activities, the evaluation plans presented in this section should be viewed as scalable and flexible. Specifically, if the evaluation budget for this program needs to be reduced, NYSERDA would first remove funds from the market and process evaluation work areas. These areas could be limited in terms of their sample sizes and evaluation frequency if needed. Conversely, if more of NYSERDA's total evaluation funding for could be allocated to this program, the additional funds would be allocated to the market and process evaluation work. Specifically, the second process evaluation could be expanded to address progress in improving program processes and the market characterization surveys could be expanded to include more market actors.

10.4. MARKET SEGMENT NEED

The EEPS Order identified the potential inherent in the industrial sector for immediate expansion and specifically identified process improvements for attention. Purchasing of natural gas is a major cost of many manufacturing processes. Over the years NYSERDA received numerous requests from customers and contractors for assistance with process efficiency projects that have substantial impacts on energy use and economic vitality such as furnace and mill replacements with . At this time, the approval of gas efficiency funding for large manufacturers is limited to firm gas customers of Con Edison.

10.5. COORDINATION

Industrial process efficiency projects are individual and site specific. They require flexible, customized approaches. NYSERDA staff are currently engaged with other potential program administrators in collaborative discussions to identify how to deliver coordinated services, maximize resources, and minimize confusion. Collaborations among NYSERDA, utility programs, and program administrators are expected to continue.

10.6. CO-BENEFITS

The benefits of this Program include economic development, improved competition for New York firms as a result of lower operating costs, increased productivity, and increased employment. The industrial sector is highly stressed by global competition. The Bidding Program will assist in retention and growth in New York of industrial and process businesses.

10.7. PORTFOLIO BALANCE

This program targets facilities whose participation has been limited in the past due to insufficient funding for natural gas improvements.

10.8. DEPTH OF SAVINGS

Although the emphasis of this program is on process improvements, NYSERDA routinely explores other energy efficiency measures with participating customers.

10.9. UNDERSERVED MARKETS

This program targets facilities whose participation has been limited in the past due to insufficient funding for natural gas improvements.

10.10. COMMITMENT

Sufficient time and reliable funding are keys to the successful delivery of the program.

10.11. CUSTOMER OUTREACH

NYSERDA will increase and expand its outreach efforts, focusing on direct and continual customer contact. Engagement by participants at all management levels including facility managers and senior management will be encouraged. NYSERDA will engage its network of FlexTech service providers to actively market the program to the target audience. NYSERDA will enhance partnerships and work collaboratively with representatives of New York's investor-owned utilities to market the program and increase its exposure at energy and sustainability conferences and through direct customer interactions.

Outreach to industrial and process customers will use a targeted approach emphasizing the benefits of the entire NYSERDA program portfolio coupled with development of strong relationships with key market players and guidance in accessing local, state, regional, and national funding and assistance. As the implementation of industrial projects often takes a considerable amount of time, NYSERDA's outreach strategy will focus on direct and continual customer contact.

NYSERDA will build upon its relationships within the industrial sector and conduct frequent meetings with rate payers, customer service providers, professional and business organizations, stakeholders, sector-specific organizations, civic organizations, and trade associations across New York including:

- Consumer groups — Multiple Intervenors, the Manufacturers Association of Central New York, the Business Council of New York State
- Trade associations — American Institute of Chemical Engineers, the Empire State Forest Products Association
- Vendors — manufacturers of custom built process equipment, large process support equipment, industrial motors and compressors
- Complementary organizations — water and wastewater, utility companies, economic development agencies, climate change organizations

While NYSERDA emphasizes identifying and implementing energy-related productivity projects, outreach efforts will specifically target additional opportunities for industrial process customers. For example, NYSERDA's Energy SmartSM Industrial Focus Program enhances outreach to the industrial market segment. Currently funded through SBC III, this outreach activity will be expanded to accomplish the additional goals established in the Fast Track effort. Expansion will include outreach to the growing data center market segment, which has tremendous potential to achieve efficiency savings. The Industrial Focus program promotes the education and training of facility technical staff in energy efficient operations, accessing technical assistance and available services through state, regional, national,

and international programs, and in identifying, prioritizing, and implementing efficiency projects and strategies.

10.12. COLLABORATIVE APPROACH

In the fall of 2008 in Syracuse, NYSERDA, with partnership and assistance from the Manufacturer's Association of Central New York (MACNY), will be conducting a meeting of industrial stakeholders. The meeting will review and seek input to strengthen NYSERDA industrial program offerings including the Industrial and Process Efficiency Program. Promoting industrial process improvements for the purpose of energy-efficient state economic development will be a primary focus. Representatives working in many facets of the manufacturing sector and its energy use have been invited in order to gain a broad perspective. The introduction will be followed by an overview of existing and new program activities. In the second half of the meeting, NYSERDA will solicit perspectives in a roundtable discussion. NYSERDA will build on and continue this collaboration through the EEPS timeframe.

10.13. FUEL INTEGRATION

Integrated gas and electric improvements are particularly important in the manufacturing sector since they enable owners and managers to cost effectively optimize their process operations and maximize cost-effective market penetration on the part of the Industrial and Process Efficiency Program. Natural gas used in many manufacturing processes costs more annually than electricity. Lacking the ability to comprehensively address efficiency opportunities in the industrial and manufacturing sectors will dampen interest in the Program and hinder achievement of 15 x 15 goals.

10.14. TRANSPARENCY

Program descriptions are available on NYSERDA's Web site. Historical data on this program are available in past **New York Energy \$martSM** evaluations. Future evaluations of this program will be available on-line. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

10.15. PROCUREMENT

NYSERDA administers Industrial and Process Efficiency incentives offered to customers on a first-come, first-served basis.

10.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Industrial Process and Efficiency Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The following tables show the resource savings and average measure life used as inputs for the benefit/cost analysis; the present value of the costs and benefits used in the analysis; and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional

information on benefit/cost definitions and inputs. The Industrial Process benefit/cost analysis was based on the combined electric fast track funding and gas funding requested in this proposal.

Table III-80.. Industrial Process and Efficiency Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	16 / 18	840.0	126.0	3,452,300	38%

Table III-81. Industrial Process and Efficiency Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
With Electric and Gas Funding	\$128.8	\$328.7	\$1,725.8

Table III-82. Industrial Process and Efficiency Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	13.4	5.3

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table III-83 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$106.6 million.

Table III-83. Industrial Process and Efficiency Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	14.2	5.6

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 840,000 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 126.0 MW (cumulative) of coincident peak reduction in 2015.³⁸

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.76.³⁹

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table III-84 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table III-84. Industrial Process and Efficiency Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class ¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Industrial - Electricity	7,715	75	1.0%
Industrial – Natural Gas	14,357	75	0.5%

Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

³⁸ NYSERDA defines coincident on-peak period as between 12:00 noon and 6:00 PM on summer non-holiday weekdays.

³⁹ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

11. HIGH PERFORMANCE NEW CONSTRUCTION PROGRAM (NATURAL GAS)

11.1. DESCRIPTION OF PROGRAM

NYSERDA submitted a 60-day plan in response to the Energy Efficiency Portfolio Standard (Case 07-M-0548) (EEPS) order to achieve kWh savings through the New Construction Program (Program). In addition to procuring these electric energy savings, the Program also proposes to provide services to achieve natural gas MMBtu savings through the EEPS 90 Day Program Administrator filing.

The Program provides customers with technical assistance services and financial incentives for energy efficiency improvements in new construction and substantially renovated buildings. First, cost-shared technical assistance is provided to customers and their design teams to identify energy efficient electric and gas improvements for their facilities. Second, financial incentives are offered to offset the cost of energy efficient natural gas improvements. Incentive tiers provide increasing incentives for projects tied to higher levels of energy performance.

Additional technical assistance is provided to interested customers for green buildings. Services include computer modeling, materials analysis, and guidance in complying with LEED^{®40} guidelines.

Several enhancements in the Program will increase the number of participants in the program and enable NYSERDA to meet kWh and MMBtu goals. The network of consulting services will be expanded, and, to meet this need, NYSERDA will encourage its existing contractors to expand their capabilities. In addition, NYSERDA will issue a new solicitation to increase the number of technical assistance providers. The new technical assistance providers will be required to demonstrate expertise in computer simulation modeling and green building services. To meet the increased need for services in the Con Edison and National Grid service territories, NYSERDA will contract with firms capable of meeting the needs of projects in these geographic areas.

As the whole building design approach is the preferred method of maximizing the energy efficiency of all electric and gas systems within buildings, NYSERDA will increase its capabilities to support and deliver this approach, to provide electric and gas incentives for these projects.

Sophisticated energy modeling is typically not cost effective for buildings smaller than 25,000 sq. ft. To serve these projects, a comprehensive custom analysis tool has been developed to identify and tailor gas energy efficiency improvements. For these smaller projects, NYSERDA will explore alternative strategies (*e.g.*, enhancing the custom tool, using the Advance Buildings Core Performance Guide, expanding the Program list of prescriptive measures to include new gas energy efficiency measures) to assist with the identification of efficiency opportunities.

11.2. DEMAND REDUCTION AND SYSTEM BENEFITS

The annual estimated Program budget for gas savings is \$3,963,890, and NYSERDA anticipates achieving annual gas savings of approximately 1,145,743 MMBtu.

⁴⁰ Leadership in Energy and Environmental Design, the rating system developed by the U.S. Green Building Council.

Table III-85. High Performance New Construction Program — Natural Gas Program Expenditures (Projected and net of administration and evaluation) 2009-2015

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$1.14M	\$1.47M	\$2.58M	\$2.75M	\$2.32M	\$0.85M	\$0	\$11.11M
Outreach / Marketing	\$0.19M	\$0.21M	\$0.16M	\$0	\$0	\$0	\$0	\$0.56M

Table III-86. High Performance New Construction Program — Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	103,117	137,489	263,521	297,893	252,063	91,659	
Annual Savings Installed in Prior Years	n/a	103,117	240,606	504,127	802,020	1,054,083	
Cumulative Annual Savings	103,117	240,606	504,127	802,020	1,054,083	1,145,742	

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

11.3. EVALUATION

General Evaluation Approach

Evaluation Goals

The primary goal of the Program evaluation effort is to measure and verify the savings attributable to the program.

Brief Overview of the Evaluation Approach

NYSERDA's *Supplemental Revision for New York Energy \$martSM Programs* (Supplemental Revision), filed with New York State Public Service Commission on August 22, 2008, provides details regarding proposed evaluation plans for the electricity-focused "fast track" NCP.⁴¹ NYSERDA expects that evaluation plans described in the Supplemental Revision can also apply to the Program gas funding being requested herein, and that the electric and gas program components will be evaluated in a coordinated fashion. NYSERDA anticipates that the approach, implementation, rigor level, and timing of evaluating

⁴¹ NYSERDA, *System Benefits Charge Supplemental Revision for the New York Energy \$martSM Programs* (2008-2011), As Amended, August 22, 2008.

gas savings associated with this filing will be similar to that described for the Program electric savings in the August 22, 2008 filing and described within this section. Funds earmarked for evaluating the gas portion will be added to the existing electricity-focused evaluation budget to accomplish this cost-effective coordinated evaluation. To the extent that NYSERDA's original SBC-funded NCP can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional funding from the enhanced SBC III evaluation funding. NYSERDA's estimated evaluation budget for this program includes a small set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent evaluation contractors flexibility to adapt the approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and other evaluation projects for which funding will need to be allocated.

Evaluation Budget

NYSERDA expects the evaluation budget for the gas portion of the Program to be approximately 5% of gas program funding, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. NYSERDA expects that approximately 80% of NCP evaluation funding will be allocated to impact evaluation. The remaining funds will be approximately equally split between process and market evaluation.

Evaluation Schedule

Evaluation studies expected to be part of the Program evaluation plan are shown in the table below along with the time frame for their anticipated completion.

Table III-87. Evaluation Schedule for New Construction Program

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)			X	X
Net-to-Gross (Impact)			X	X
Process Evaluation	X		X	
Market Evaluation	X			

Impact Evaluation

A primary activity will be site work for measurement and verification to support high rigor impact evaluation methods. NYSERDA and its contractors have been working, on an ongoing basis, to expand and improve database tracking to better serve the needs of both NCP implementation and evaluation. As the potential EEPS-funded NCP does not differ greatly in terms of program procedures from the current SBC program, NYSERDA does not anticipate significant change to the current suite of metrics that have been collected and improved over time.

Measurement and Verification

In general, under the SBC program, NCP reported savings have historically been found to be based on sound engineering calculations and sufficient post-installation verification activities. At the same time, the increased evaluation funding and call for higher rigor can significantly add to the overall reliability in the evaluation of savings estimates by supporting significant expansions in the M&V methods. More sophisticated methods with greater measurement support can significantly reduce any risks of potential bias that can be unobserved within more simplistic methods.

The planned impact evaluation will include significant site survey work on comparative samples of participants and matched non-participants. These measurement and verification efforts would then serve as input for the creation of calibrated DOE-2 models for these comparative samples (an expansion on International Performance Measurement and Verification Protocol [IPMVP] Option D). Efficient sample sizes will be chosen using stratified ratio estimation (SRE) to meet a 90/10 confidence/precision level for the statewide program over the entire evaluation cycle. If budget permits, the sample could be expanded to meet 90/10 at the utility territory level. Site visits are planned and utility usage data for participants will be needed to calibrate whole building models. As new construction projects have a long timeframe for project completion, M&V would be completed in 2011 and then repeated in 2012 to capture additional program benefits. Savings are expected to accrue past 2012, but these projects are not expected to differ markedly from those examined in the first two impact evaluations, so follow-up will be significantly less intensive.

Net-to-Gross

NYSERDA intends to explore participant and non-participant spillover and participant freeridership by using an enhanced self-report survey process with multiple decision-makers including building owners, chief financial officers, vendors, technical assistance providers, etc. involved in adopting energy efficiency and green building measures. Sample sizes will be calculated to meet 90% confidence and 10% precision statewide. If budget permits, 90/10 confidence could be achieved at the utility level. These results will be compared against the participant and non-participant models conducted for the modeling effort. Examinations will be made to assess self-selection bias between the participating and non-participating matched groups. These alternative methods will be used to derive a final triangulated net-to-gross (NTG) ratio which will provide a high level of construct validity for the NTG estimates. Given the long-term nature of new construction projects, the first attribution analysis will be conducted in 2011 and updated in 2012.

Process Evaluation

Previous process evaluations on the SBC-funded NCP have explored opportunities to streamline program processes, benchmarked the Program to other programs in North America and assessed opportunities for enhancing marketing efforts. Process evaluations will explore the effectiveness of program outreach to assess how well the program is reaching the right decision makers in the marketplace. Planned activities will likely include interviews with NYSERDA Staff, service providers, and both, participants and non-participants. To the extent possible, the results will be differentiated by downstate and upstate activities.

The initial process evaluation will be conducted approximately six months following the beginning of outreach activities to ensure that the evaluation effort can be effective in both identifying opportunities for improvement and documenting progress made in expanding outreach. A second process evaluation could be performed in the third year to further expand on and explore reasons for attrition.

Market Evaluation

An important evaluation element for the Program, supporting both market and impact evaluation efforts, is a baseline study of current new construction practices in New York for both participants and non-participants. It is assumed that all new buildings are constructed to the current Energy Code when calculating savings. However, given the pace and rigor of increases to ASHRAE standards, this assumption should be verified as an accurate baseline.

The McGraw-Hill Dodge databases can provide recently constructed buildings to serve as a sample. Interviews could then be done with a sample of new building owners to assess common practices on a number of specific energy measures. Then, a sample of those interviewed could be selected to do site visits and assess whether the building is performing as expected. NYSERDA believes this type of baseline study would benefit all EEPs program administrators and therefore proposes that it be undertaken in a jointly-funded manner with all program administrators contributing. The full study, including both the site visit and survey components, cannot be conducted by NYSERDA alone within the evaluation budget for the Program.

If the new construction baseline is not ultimately selected as one of the statewide studies to be funded by all program administrators, then NYSERDA could conduct the phone interview component described above, but not the site visits. Additional funding from NYSERDA's set aside for overarching evaluation studies could be used to support a statewide baseline study. NYSERDA expects this work to be completed in 2009.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support other overarching evaluation activities, the evaluation plans presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program needs to be reduced, NYSERDA would first remove funds from the market and process evaluation work areas. These areas could be limited in terms of their sample sizes and evaluation frequency, if needed. Conversely, if more of NYSERDA's total evaluation funding could be allocated to this program, the additional funds would be allocated to expand and increase the rigor of impact evaluation work.

11.4. MARKET SEGMENT NEED

Sectors with specific demand for Program services and market segments that will yield the greatest opportunities for accrued energy savings have been identified through surveys and analysis conducted by NYSERDA's staff and consultants.

11.5. COORDINATION

Staff will coordinate Program services with other NYSERDA programs and with programs offered by New York's investor-owned utilities and New York State agencies.

11.6. CO-BENEFITS

Benefits of services provided through the Program include environmental benefits, employment and economic development opportunities, and public awareness of the value and benefits of energy efficient and green building construction practices.

11.7. PORTFOLIO BALANCE

NCP delivers services for customers seeking assistance with new construction and substantial renovation projects. NYSERDA's Existing Facilities Program targets efficiency projects in existing buildings.

11.8. DEPTH OF SAVINGS

The aim of the Program is to maximize energy efficiency and sustainable design opportunities for program participants.

11.9. UNDERSERVED MARKETS

The Program will serve all sectors of the new construction and substantial renovation markets. Although the program will target large projects with substantial savings, services will be provided to small, typically underserved customers who do not benefit from sophisticated whole-building modeling.

11.10. COMMITMENT

The program will begin providing services and capturing kWh and mmBtu savings on October 1, 2008 and continue through 2014.

11.11. CUSTOMER OUTREACH

The Program has a robust customer outreach strategy in place for its existing program. The commercial new construction industry presents a unique challenge since most projects offer a narrow window of opportunity for the incorporating energy efficient design options and technologies. NYSERDA is expanding its consultant network to address this challenge. Marketing and outreach strategies include:

- Direct outreach through telephone calls and meetings
- Networking at breakfast meetings, brownbag workshops, and other small scale informal events
- Attendance at trade shows and construction showcases designed to publicize program benefits and gather contact information
- Increased participation in project press events to promote successes and showcase projects that achieve the highest levels of energy performance
- Training and education, including computer modeling training and continuing education credits, in partnership with allied businesses, universities, and key professional organizations
- Instituting an awards program to draw attention to successful designers and their projects
- Expanding partnerships with key industry allies and professional associations (e.g., American Institute of Architects)
- Developing project case studies that highlight successes in many different market actors
- Posting advertisements in trade journals and magazines
- Web site enhancements and conducting Webinars
- Leveraging trade ally opportunities, trade association trainings, and annual meetings
- Targeting the planning and permitting departments of local governments to identify potential projects early in the design process

11.12. COLLABORATIVE APPROACH

In addition to coordination with internal NYSERDA programs, in June 2007, NYSERDA conducted a best practices review of New Construction Programs offered across the United States. This study identified several successful improvements that have been implemented by other utility and energy services companies that offer new construction programs across the country. Many of the best practices that were identified have been implemented in NYSERDA's NCP.

NYSERDA staff conduct and will continue to seek out collaborative discussions with representatives of New York's investor-owned utilities to improve coordination of program delivery, maximize resource acquisitions, and minimize costs to rate payers.

11.13. FUEL INTEGRATION

Program staff will partner with all parties involved in the design and development of new building projects, particularly whole-building design projects, to identify gas and electric energy efficiency opportunities during early design stages.

11.14. TRANSPARENCY

Detailed program descriptions, benefit/cost analyses, and supporting data are available for public review. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

11.15. PROCUREMENT

The Program is a standard offer, first-come, first-served program.

11.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the New Construction Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, estimated MWh and coincident peak MW reductions in 2015 if the Program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table 1 shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table 2 shows the present value of the costs and benefits used in the analysis. Table 3 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs. New Construction benefit/cost analysis was based on the combined electric fast track funding and gas funding requested in this proposal.

Table III-88. New Construction Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	16 / 18	278.9	75.0	1,145,700	38%

Table III-89. New Construction Program : Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
With Electric and Gas Funding	\$77.2	\$149.4	\$588.3

Table III-90. New Construction Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	7.6	3.9

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table 4 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$35.1 million.

Table III-91. New Construction Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	8.1	4.2

MWh Saved in 2015 (Screening Metric 5b)

Assuming the Program functions only for as long as proposed, the Program is expected to achieve 277,700 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the Program functions only for as long as proposed, the Program is expected to achieve 75.0 MW (cumulative) of coincident peak reduction in 2015.⁴²

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the Program is 0.42.⁴³

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table III-92 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current additional gas funding request through 2011.

Table III-92. New Construction Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Commercial - Electricity	1,002,856	140	Negligible
Industrial - Electricity	7,715	25	0.3%
Commercial – Natural Gas	358,504	140	Negligible
Industrial – Natural Gas	14,357	25	0.2%

¹ Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

⁴² NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday weekdays.

⁴³ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

12. ADVANCED BURNERS PROGRAM (NATURAL GAS)

12.1. PROGRAM ELEMENTS

Program Description.

The Advanced Burners Program (Program) is designed to achieve savings of pipeline-delivered natural gas (MMBtu). Advanced burners will predominantly be oxy-gas combustion configurations, which use pure bottled oxygen to support combustion (rather than using oxygen available in ambient air). As ambient air is comprised of 22% oxygen and 78% nitrogen, when used for combustion a significant amount of extra natural gas is burned to warm all of the nitrogen to the flame temperature. In addition, under those conditions, hot nitrogen can react to form oxides of nitrogen (NOx) -- a criteria air pollutant. NYSERDA has previous experience with the applicable technology, and experience has shown that despite the new expense of purchasing bottled oxygen, the significant reduction in the purchase of natural gas yields a net financial savings. The Program will acquire real world learning of applicability and performance of systems to determine key niche markets, such as glassmaking and industrial furnace operations, and optimization scenarios.

Program Goals and Objectives.

The Program will deliver permanent installation of energy-efficient equipment with an expected life of installed measures equal to 20 years. Annually, the Program will involve the installation of four systems. The Program will validate the performance of the single furnace installation for which incentives are provided with the intention of proceeding with additional retrofits of similar furnaces in the absence of incentive funding.

Program Theory.

The Program will use an annual competitive solicitation, allowing NYSERDA to select the most promising projects to deliver the expected savings. The Program will also result in new market intelligence to accelerate adoption rates for applicable technologies. Milestone-based contracts will be issued, with the majority payment tied to the installation and commissioning of equipment. Contracts will include rigorous measurement, verification, and data reporting requirements. Program design and administration will be subject to change contingent upon marketplace response (for example, the quantity and quality of proposals received).

Anticipated Spending and Savings.

With an annual program budget of approximately \$2.15 million (natural gas funds), about \$2 million of incentives, each year the Program will install four systems. It is anticipated that each of these systems will deliver natural gas savings of approximately 50,000 MMBtu/year resulting in about 200,000 MMBtu of natural gas savings annually. Projects will be eligible to receive \$500,000 or 50% of the overall cost of the project, whichever is less.

Program Schedule.

The Program will launch in the first quarter of 2009, with a one-year lag before equipment is installed and operational. The Program will operate for the 2009-2011 period.

12.2. DEMAND REDUCTION AND SYSTEM BENEFITS.

Advanced Burner systems will displace natural gas for heating.

Table III-93. Advanced Burners Program -- Natural Gas Program Expenditures (Projected and net of administration and evaluation) 2009-2015

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$2.0M	\$2.0M	\$2.0M	0	0	0	0	\$6.0M
Note: no marketing.								

Table III-94 Advanced Burners Program -- Natural Gas Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in current year	0	200,000	200,000	200,000	0	0	0
Annual Savings installed in prior years	n/a	0	200,000	400,000	600,000	600,000	600,000
Cumulative Annual Savings	0	200,000	400,000	600,000	600,000	600,000	600,000

NYSERDA has developed initial evaluation plans with the intention of providing the necessary rigor and reliability for metrics used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

12.3. EVALUATION.

General Evaluation Approach

The Advanced Burner (AB) Program is a demonstration of advanced burners that use pure, bottled oxygen rather than drawing oxygen from ambient air, and it also seeks to acquire real on-site experience of applicability and system performance to determine key markets for the technology. Program design and administration will be subject to change contingent upon quantity and quality of proposals received. Several years of program cycle will be necessary to gain the marketplace intelligence that is being sought. The suggested evaluation approach for this program will involve impact and process evaluations. However, evaluation plans for early demonstrations of technologies necessitate flexibility because evaluation work varies with the technology and project types/stages such as product development/characterization, demonstration, and business development, and with programmatic adjustments.

Evaluation Goals

The primary evaluation goal for the Advanced Burner (AB) Program is measurement and verification of the claimed natural gas (MMBtu) savings. The evaluation will also review and evaluate the methodology of marketplace intelligence research. Since this application is in an early-stage of market development

requiring several cycles to achieve a cost-effective product and ready market, the evaluation will also review Knowledge Benefits⁴⁴ garnered from these projects and the conclusions drawn.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the Advanced Burners Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the Program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

The evaluation approach for the Advanced Burners Program is to verify annual gas savings and review the research methodology for niche markets. Although several years of program operation will be necessary to gain the marketplace intelligence that is being sought, there will be a process evaluation of the methodology employed by the Program in gathering the marketplace information.

Evaluation Budget

NYSERDA expects the evaluation budget for the Advanced Burners Program to be slightly less than 5% of the Program funding level, less yet-to-be-determined funds set aside for statewide studies and other overarching costs borne by program administrators. It is expected that the Advanced Burners evaluation budget will be designed to account for the specific needs of the Program, and allocated primarily to Impact Evaluation (65%) and the remainder for Process evaluation.

Evaluation Schedule

The initial M&V assessment and any pre-retrofit on-sites will take place in 2009. However, the majority of the impact evaluation work will not occur until 2011 since projects may take up to a year for completion, and program metering/monitoring is expected to be conducted for at least twelve months following completion.

Table III-95. Evaluation Schedule for Advanced Burners Program

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)	X		X	X
Process Evaluation			X	

⁴⁴ Knowledge Benefits are real world learning of placement/performance of systems to determine optimization scenarios for deployment in new settings.

Impact Evaluation

Measurement and Verification

The Advanced Burners Program design includes extensive measurement, with monitoring to be conducted for a minimum of 12 months. An assessment by NYSERDA's independent evaluation contractors of program metering and monitoring, and whether it has independent quality assurance, will inform the need for pre-installation site visits and measurement. Each installed Advanced Burner system will include sensors and data loggers for measuring energy impacts. As applicable for each system configuration, Btu meters, flow meters, temperature probes, current transformers, fuel meters, and run time counters will be installed to measure efficiency of advanced burners, and electric consumptions of ancillary components for a minimum of twelve months. Thus, the initial impact evaluation will review and assess the quality and comprehensiveness of the program-collected data. If the data sets are complete, little value may be gained from performing additional near-term metering. Therefore, M&V work will likely focus on verifying the baseline assumptions for each project.

If needed, strategies will be developed for addressing gaps in the data, including long-term on-site data collection for pre-installation metering and additional post-installation metering for the long term. Also to be considered is possible input from the participants to interpret the metering data; for example, interviews with participants may shed light on the reasons for a lengthy shut down of the equipment or variations in operating parameters.

The program-collected data must first be assessed for its potential role in the evaluation effort, and site-specific evaluation plans will then be designed. It is likely that these will include calibrated IPMVP Option B process modeling or full retrofit isolation measurement (but could also utilize IPMVP Option C depending on pre-post usage data availability and specificity and evaluation cost efficiency by doing so). The evaluation plan development process will include this assessment as well as ascertaining the extent and research methods needed to conduct the performance assessment of the technology. Data to be collected and the methodology will be determined by NYSERDA's independent evaluation contractors using established protocols as outlined in a detailed evaluation plan. Engineering analysis of performance for each technology application will be conducted. Since the savings are attributable to a newly-adopted technology, consistency and reliability of equipment performance under varied conditions may also be assessed.

Sampling will not be necessary as all systems installed under the program are expected to undergo extensive metering/monitoring. Thus, the measurement and verification evaluation effort are anticipated to be based on a census engineering review evaluation.

Net-to-Gross

Freeridership is generally expected to be quite low or non-existent for early demonstrations of technologies, though independent confirmation of this normally should be considered. This program theory, however, expects several cycles of investments will likely be needed before cost-effective technology applications and market readiness can be accomplished. Even if there is some proportion of naturally-occurring market acceleration, rather than full NYSERDA attribution to this technology adoption, the expected need for several cycles creates a low net present value of naturally-occurring adoption. Given the long-term adoption, NYSERDA suggests it may not be worth spending limited evaluation dollars on confirming a net-to-gross.

Process Evaluation

The purpose of an early demonstration of technologies is to assess a technology and its potential. Consequently, the process evaluation will be conducted in the last year of implementation and will assess the technology progress or performance, and identify lessons learned to inform future program implementation. The evaluation will examine the learning that has occurred and efficacy of providing this information for continued product and market development.

The overall approach will include a review of data collected and reports produced by the project contractor(s), interviews with program staff, with the selected contractor(s) and with representatives of each of the sites where the advanced burner equipment is installed and tested.

A sampling approach will not be employed due to the small number of expected program participants, but rather a census survey will attempt to reach all key individuals involved in the product demonstration. NYSERDA's independent evaluation contractors will conduct interviews and collect data based on established protocols and approved evaluation plans. Analyses will be conducted and reported according to the approved evaluation plan and established protocols and will provide actionable recommendations and lessons learned to inform future program development efforts. The process evaluation will also develop a program theory and logic model for the program as implemented and will identify issues of data reliability for the impact evaluation.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Although measurement and verification of gas savings are critical, this evaluation needs to conduct other assessments to evaluate the methodologies employed to gain the marketplace intelligence that is being sought. With the evaluation plan for this program to be determined based on the technologies chosen from yet-to-be-issued solicitations, the scaling up or down due to a change in resources will be addressed at the time of plan development. More resources would provide possibly allow for an assessment of the market potential for this technology application.

12.4. MARKET SEGMENT NEED.

The identified markets for this Program are glass melting furnaces, metal foundry furnaces, other industrial sites with furnaces and large boilers. This market segment is large throughout New York, making them highly suitable for advanced burner technologies.

12.5. COORDINATION:

Individual projects supporting advanced burners technologies in industrial settings may be eligible for incentives under other NYSERDA programs (*e.g.*, NYSERDA's Industrial Process and Product Innovation Program). The Program will result in applicability and performance data of systems to further identify key niche markets and develop and refine optimization scenarios.

NYSERDA staff conduct and will continue to seek out collaborative discussions with representatives of New York's investor-owned utilities to improve coordination of program delivery, maximize resource acquisitions, and minimize costs to rate payers.

12.6. CO-BENEFITS.

Some equipment may be manufactured in New York State and bottled oxygen is likely to be supplied by New York suppliers. Supporting demonstration of this and other advanced burner technologies may increase market demand which could lead to the creation or retention of manufacturing jobs in New York.

12.7. PORTFOLIO BALANCE.

The proposed program complements NYSERDA's existing Industrial Process and Product Innovation program and Existing Facilities Program, as the currently existing program can provide additional support for individual advanced burner projects. The learning opportunities delivered through the advance burners program will guide future administration of NYSERDA programs by ensuring participants consider applicability and performance of systems in key niche markets (such as glassmaking and industrial furnace operations), as well as optimization scenarios.

12.8. DEPTH OF SAVINGS.

This program will work with a limited number of participants (an estimated four per year, equaling approximately 12 participants through 2011). Participants will be chosen so as to maximize the learning opportunity through technology demonstration and the eligibility of the participant for other measures will not be a limiting factor for participation in this program. Additional programs offered by NYSERDA and other program administrators will be promoted to participants.

12.9. UNDERSERVED MARKETS.

Not applicable.

12.10. COMMITMENT.

The time to develop participation in this program is likely to be short given the small number of systems annually installed. The program term will be driven by construction times for systems (up to one year from design inception to an operating system) and monitoring periods (6 to twelve months, depending upon the level of heating activity). A certain amount of program experience will be necessary to gain market intelligence so as to advance the technology to being cost-effective as assessed by a traditional TRC test.

12.11. CUSTOMER OUTREACH.

Program participation will be encouraged by marketing competitive solicitations to stakeholders such as system installers, contractors, engineering firms, and product manufacturers. NYSERDA intends to contract with the equipment installers or host sites to design, specify, install, commission, monitor, and report on performance and lessons learned.

12.12. COLLABORATIVE APPROACH.

NYSERDA has significantly increased its contacts in industrial settings in recent years resulting in more professional relationships with advanced burner stakeholders, including product manufacturers, equipment installers, engineering firms, advocates and industry trade associations. It is as a result of the exchange of ideas with stakeholders and the knowledge and experience gained by NYSERDA that this Program is proposed.

12.13. FUEL INTEGRATION.

Not applicable.

12.14. TRANSPARENCY.

Program design, benefit/cost analysis, and supporting data for this program will be available for public review. Program results will be publicly promoted with case studies, periodical articles, conference presentations and final reports. Program results will be made available by NYSERDA on its Web site. NYSERDA is also working with DPS Staff toward development of a uniform tracking system to increase transparency of program results.

12.15. PROCUREMENT.

The services of all contractors who support various NYSERDA programs are competitively procured.

12.16. APPENDIX 3 EFFICIENCY PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Advanced Burners Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included. Furthermore, as the Advanced Burner program is intended to save gas only, Screening Metrics 5b, 6b and 7 are not applicable.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

Table III-96. Advanced Burners Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Gas Funding Only	2009-2011	20	--	--	600,000	0%

shows the resource savings and average measure life used as inputs for the benefit/cost analysis. Table III-97 shows the present value of the costs and benefits used in the analysis. Table III-98 shows the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table III-96. Advanced Burners Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Gas Funding Only	2009-2011	20	--	--	600,000	0%

Table III-97. Advanced Burners Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$millions)	Present Value of Program and Participant Costs (\$millions)	Present Value of Resource Benefits (\$millions)
Gas Funding Only	\$6.2	\$11.6	\$85.0

Table III-98. Advanced Burners Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Gas Funding Only	13.7	7.3

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table III-99 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, as directed by DPS in the Order, resulting in a total present value of carbon benefits of \$9.4 million.

Table III-99. Advanced Burners Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Gas Funding Only	14.7	7.9

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9) Table III-100 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011. Note that this is a Research and Development demonstration program that is not intended to have large numbers of participants.

Table III-100. Advanced Burners Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Industrial – Natural Gas	14,357	8	<0.01%

Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as “non-residential”. Commercial and industrial customers estimated by NYSERDA.

IV. PROGRAMS FOR THE RESIDENTIAL AND LOW-INCOME SECTOR

1. OVERVIEW

The proposed Residential and Low-Income program portfolio builds on successful programs established through the SBC and offers new programs and options that focus on maximizing electric savings. In addition, the portfolio identifies opportunities for achieving gas savings through comprehensive, whole building programs and the proposal seeks gas funding to achieve the gas savings. Of the programs proposed, six explicitly target lower income households (at or below 80 percent of the State Median Income or Area Median Income), accounting for approximately 51% of the requested funding.

NYSERDA's residential and low-income sector programs are designed to achieve significant deep energy savings, to permanently transform the market for delivering such savings, and to ensure home construction and renovation, as well as product purchasing patterns and consumer behaviors, continue to provide energy savings long after these programs reach their targets. These innovative programs partner with the private sector for delivery of services and products, and use marketing and education to build sustainable consumer demand. They support economic growth by creating permanent jobs and reducing household energy cost burden. They provide additional benefits to the households served and to their local communities through water savings, health and safety benefits, and reduced site emissions. Combined with an aggressive workforce development initiative, consumer outreach and education, and creative and reliable financing options, these programs will continue to have spillover and market transformation effects that will last long into the future. Additionally, these programs include third-party quality assurance to ensure that homes are left in a healthy and safe condition, and installed measures will achieve expected savings and be durable for their expected life time.

Programs serving the low-income sector, like all NYSERDA residential programs, ensure participants receive high-quality services from a trained and competent workforce, while also providing additional resources to enable work to go forward. NYSERDA provides grants to income-eligible customers, and is working with financing organizations that specialize in providing secure, reliable financing options to lower-income households. The low-income sector portfolio is intended to complement the Weatherization Assistance Program (WAP), addressing service gaps, and to also serve households ineligible for WAP, up to 80 percent of the State or Area Median Income.

NYSERDA is requesting both electric and gas funding through this proposal. Our current portfolio of programs uses a whole-building approach for multifamily and one-to-four family buildings, for all income levels. NYSERDA is currently administering gas funds through some of these programs on behalf of certain utilities, and targeted at certain sectors. These initiatives have enabled NYSERDA to increase energy savings and the number of households served. The budgets included in this proposal for gas funding represent total statewide budgets, and should not be interpreted to mean "over and above" funding NYSERDA may already be administering through specific gas proceedings or agreements with utilities, some of which were in progress at the time of proposal submission.

While these programs are comprehensive in nature, they are not intended to compete with utility rebates, but instead ensure that households who desire a comprehensive approach to reducing their energy costs, including financing options and health and safety checks, have ready access to programs. They also provide a platform for the growth of the energy services industry in New York State, and an avenue for market transformation.

2. MULTIFAMILY PERFORMANCE PROGRAM (MPP) EXPANSION (ELECTRIC AND GAS)

2.1. PROGRAM ELEMENTS

Program Description. This Program offers incentives to reduce energy use in new and existing low-income and market rate multifamily buildings by a minimum of 20%. The Multifamily Performance Program (MPP) began in 2007 and combined other multifamily programs offered by NYSERDA beginning in 1998 to better serve the market by simplifying and providing building owners with a single portal into energy efficiency programs.⁴⁵ The MPP Expansion Program proposed here would allow continuation of this market-based, whole-building approach to reducing energy use in buildings.

The Program serves all multifamily buildings (defined as buildings with 5 or more units) in the SBC territory. Building owners can visit NYSERDA's website or retain a program Partner to assist. Partners use the Program's benchmarking tools, Energy Reduction Plan templates and various auditing software packages to determine what measures are cost effective, expected energy savings and the costs to install the measures. The Energy Reduction Plans identify the measures needed to reduce the energy use by at least 20% and develops a financing plan to identify sources of funding to pay for the measures. NYSERDA provides incentives (per unit for existing buildings and per square foot for new construction) to the building owner for measure installation. The incentive is paid in four installments⁴⁶, with the final incentive paid when the Program Partner verifies the 20% energy reduction target has been reached.

For current projects with approved Energy Reduction Plans, electricity savings total 22,113 MWhs, fuel savings total 299,500 MMBtus, water savings total 22.5 million gallons with bill savings of over \$7.6 million are being realized. The current program has encumbered over 80 percent of the five-year allocation of SBC dollars since May 2007, assuming no future attrition. Due to the success of the program -- NYSERDA is accepting an average of 211 units into the program per day -- program funds allotted for this Program through the SBC will be fully encumbered by mid-2009. Without further allocations under the EEPS, the program will be curtailed or incentive payments severely reduced, resulting in program service interruption.

Demand Reduction and System Benefits. Peak demand savings in 2011 are estimated to be approximately 11,091 kW for installed measures, with total cumulative MWh reductions of about 82,350 per year.

⁴⁵ NYSERDA worked with Oak Ridge National Lab (ORNL) and US EPA to develop the computer programs and software packages needed to stream line participation and allow better program management. The program is open enrollment for the building owners and the service providers. The program uses energy consulting firms (currently 56) to assist building owners in determining the most cost-effective measures that can be installed to help reduce energy use. The service providers (called "Partners") help the building owners with each aspect of project implementation beginning with initial energy audits, through preparation of construction documents, construction, commissioning, and through savings verification one year after the measures are installed. Through June 2008, the program has accepted over 90,000 units into the program.

⁴⁶ The first installment is paid upon approval of the Energy Reduction Plan; the second at 50% of completed construction; the third at 90% of construction; and the fourth at one year after the measures.

Table IV-1. Multifamily Performance Program Expansion: Total Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

		2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending		\$26.4M	\$26.4M	\$26.4M	\$0	\$0	\$0	\$0	\$79.2M
Low-Income (\$15.84 M)	Electric	\$3.4 M	\$3.4M	\$3.4M	\$0	\$0	\$0	\$0	\$10.2M
	Gas	\$12.4M	\$12.4M	\$12.4M	\$0	\$0	\$0	\$0	\$37.2M
Market Rate (\$10.56 M)	Electric	\$2.27M	\$2.27M	\$2.27M	\$0	\$0	\$0	\$0	\$6.81M
	Gas	\$8.29M	\$8.29M	\$8.29M	\$0	\$0	\$0	\$0	\$24.87M
Projected Outreach/Marketing costs: \$750,000, in 2009, 2010 and 2011.									

Table IV-2. Multifamily Performance Program Expansion: Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	27,450	27,450	27,450	0	0	0	0
Annual Savings installed in prior years	n/a	27,450	54,900	82,350	82,350	82,350	82,350
Cumulative Annual Savings	27,450	54,900	82,350	82,350	82,350	82,350	82,350

Table IV-3. Multifamily Performance Program Expansion: Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	223,807	223,807	223,807	0	0	0	0
Annual Savings installed in prior years	n/a	223,807	447,614	671,421	671,421	671,421	671,421
Cumulative Annual Savings	223,807	447,614	671,421	671,421	671,421	671,421	671,421

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise

final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need: The success of the MPP is a strong indication of the current market needs. More than 60% of the buildings participating in the program are low-income or affordable housing. As the MPP Program targets all types of multifamily building ownership, increased penetration is expected in the rental, cooperative and condominium markets.

Coordination: NYSERDA currently administers a gas measures program in conjunction with the MPP in the Con Edison service territory that provides additional incentives for higher efficiency space heating and water heating measures, provided a building owner commits to achieve additional energy savings above the minimum required 20% level. This proposal will ensure that gas customers of Con Edison will continue to receive program services after the current program agreement expires, and will also extend services to multifamily buildings in other gas service territories. NYSERDA will work with utilities on common advertising to their customers, as well as collaborate on joint press releases and events for building openings and other major project milestones. A common application used by both NYSERDA and utilities will deter the potential for duplicate incentives for the same measure. Metrics will be tracked by specific measures installed by a particular program implementer. NYSERDA also coordinates with the NYS Division of Housing and Community Renewal's Weatherization Assistance Program (WAP) and NYC Housing Preservation and Development (HPD).

Co-Benefits. The whole-building approach provides opportunities to improve New York building stock, reduce water use, and improve health and safety. This Program provides one stop shopping for building owners, the technical expertise needed to assist building owners, and incentives to help pay for and finance the measures. The program assesses all sources of energy used in the building and determines how to best reduce energy bills, as well as the environmental impacts. NYSERDA is able to track energy and cost savings by energy type which further enables collaboration with utilities for electric and gas programs. Also, 60% of the Program funds are targeted at the affordable housing market, improving the housing conditions of low-income tenants throughout the State.

The Program will provide incentives for about 16,600 units per year (including both low-income and market rate buildings) resulting in electric energy savings of 82,350 MWh and fuel savings of 1,116,609 MMBtu per year (including 402,729 MMBtus in oil savings; 42, 458 MMBtus in steam savings), and an additional 65.4 million gallons in water savings by 2011.

Portfolio Balance. The Programs serves as an umbrella for the multifamily market and has proved effective in the coordination of utility gas funding to achieve deeper energy savings. The Program also works in conjunction with the solar thermal and geothermal incentive initiatives proposed to ensure all in-unit and common area efficiency measures are installed prior to installation of these renewable technologies.

Depth of Savings. Taking the whole-building approach to energy efficiency affords greater opportunities to identify energy efficiency measures to reduce heating and cooling fuel uses, as well as water consumption and to install health and safety measures.

Underserved Markets. About 60% of Program funding is allocated for the low-income market. Due to funding limitations placed upon the federally-funded Weatherization Assistance Program (WAP) for many upstate subgrantees, the Program provides needed resources to address energy efficiency projects in these communities.

Commitment. The Program will be offered through December 2011, and all measures will be installed by that date. Program savings are expected to be constant for each of the three years.

Customer Outreach. The Program Partners will garner most of the participants, although energy efficiency vendors and suppliers, and metering vendors will market the program to their client. Overall marketing activities will be coordinated by NYSERDA, in collaboration with utilities.

Collaborative Approach. As the Program was launched in 2007 to better serve the market by simplifying and providing building owners with a single portal into energy efficiency programs, this Program proposal was designed as a result of significant input from a wide variety of service providers, building owners, property managers, other program administrators, and was informed by process evaluation work conducted by NYSERDA's evaluation contractors.

Fuel Integration. The Program will result in electric, gas and oil savings.

Transparency. The installation of energy savings measures will be verified by the Program Partners (prior to receiving the forth incentive installment), and by NYSERDA's quality control contractor. For submetered buildings, electricity savings will be verified by direct meter readings. Program results will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Building participation is on a first-come basis and new Partners can apply to participate on an on-going basis.

Evaluation.

Evaluation Goals

The primary evaluation goal for the Multifamily Performance Program is to verify anticipated program savings and assess the presence of freeridership and spillover. Secondary evaluation goals include investigating participant awareness, satisfaction, barriers and decision-making associated with the program. Establishing a baseline of both the multifamily new construction and existing buildings markets and conducting a measure saturation study for the existing multifamily buildings market is expected to support both goals.

This MPP evaluation also includes assessing impacts related to the MPP incentive offerings for ground source heat pumps and solar thermal systems, as well as the electric reduction in master metered buildings.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Multifamily Performance Program and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented, once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

To the extent that NYSERDA's original and ongoing SBC-funded Multifamily Performance Program can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional resources from the enhanced SBC3 evaluation funding. This plan presents anticipated evaluation activities that, with the addition of SBC funding, would result in a

more comprehensive evaluation effort on the program. Expected benefits of the comprehensive evaluation effort include availability of larger samples, increased rigor, and greater resources. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPs Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects the evaluation budget for the Multifamily Performance Program to be approximately equal to 5% of the program funding, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. It is expected that the Multifamily Performance Program evaluation budget will be designed to account for the specific needs of the program, and allocated largely to impact evaluation (45%) and market evaluation (45%), followed by process evaluation (10%). However, this allocation is subject to change based on ultimate decisions regarding statewide studies that might help support the evaluation of the MPP.

Evaluation Schedule

Evaluation studies included as part of the Multifamily Performance Program evaluation plan are shown in the table below along with the time frame for their anticipated completion. M&V and Net-to-Gross evaluation will be conducted in 2012, while market and process evaluations will be conducted earlier in the program time line. The timing of these evaluations is discussed in greater detail in the following sections.

Table IV-4: Multifamily Performance Program Expansion: Evaluation Schedule

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)				X
Net-to-Gross (Impact)				X
Process Evaluation		X	X	
Market Evaluation	X	X		

Impact Evaluation

Measurement and Verification

M&V for the new construction component of the program is expected to include site visits at participating buildings, partial participating buildings (i.e., buildings that have used program partners but have not participated) and a matched set of nonparticipating multifamily buildings. Specifically, the proposed evaluation will:

Conduct detailed on-site surveys and build DOE-2 models of each partial participant and nonparticipant building in the sample. (DOE-2 models will already be available for full participant buildings)

Conduct focused end-use metering, to establish peak load operating conditions for measures with large demand savings. The metered data may also be used to calibrate analysis simulation models.

Track specific building and equipment characteristics (e.g., types of glazing, types of lamps, ballasts and light fixtures, HVAC system types, etc.).

Develop deemed savings, incremental cost, and measure life data for individual measures.

Calculate gross energy savings and demand reduction by end use and for whole buildings, as the difference between participant and matched nonparticipant (baseline) energy efficiencies.

Calculate the “whole-building” net impacts on electric and gas consumption (positive and negative). Provide 8,760-hour simulation output load shapes for the whole building and selected end-uses.

For the existing buildings component, the evaluation is expected to employ billing analysis to assess pre- and post-participation energy use to statistically analyze average energy savings at the whole building level and for end uses with the greatest savings. For end uses with less estimated savings, the evaluation could rely on engineering estimates and deemed savings. NYSERDA already requires existing buildings participating in the program to provide billing data.

For both the new construction and existing building components, sample sizes will be chosen to meet 90/10 confidence/precision statewide. If budget permits, the sample could be increased to meet 90/10 for the low-income and market rate portions of both the new construction and existing building components, or for upstate and downstate regions. At this point, NYSERDA does not envision achieving this level of precision for individual utility service territories for the new construction component, although it may be possible with the existing building component where billing analysis is employed. Evaluation funding within the current SBC program can further supplement this proposed approach and result in a more comprehensive evaluation.

Special incentive offerings for multifamily buildings—specifically ground-source heat pumps, solar thermal panels, and the sub-metering program component—will be addressed in these same analyses and will be tracked over time to assess increasing acceptance of these technologies. NYSERDA will augment the new construction sample to allow for separate analysis of ground-source heat pumps and solar thermal panels; for existing buildings, as many buildings with these incentives measures as are available will be included in the billing analysis, and their effect on energy use analyzed.

Data will be collected and analyzed by NYSERDA’s independent evaluation contractors following established evaluation protocols. Site visits and DOE-2 modeling for new multifamily buildings will be conducted as they are completed throughout the program cycle, and will estimate gross savings at a program component level (new and existing buildings) at the end of the cycle. For existing multifamily buildings, the billing analysis will occur at the end of the program period, as a full year of post-participation (as well as pre-participation) billing data will be required.

Net-to-Gross

NYSERDA will examine participant and non-participant spillover and participant freeridership through an enhanced self-report survey process with multiple decision-makers including building owners, architects/engineers, vendors, and technical assistance providers involved in adopting energy efficiency and green building measures. For new multifamily buildings, NYSERDA will compare these findings with observed conditions in the buildings, and will examine self-selection bias between the participating and non-participating matched groups. These alternative methods will be used to derive a final triangulated net-to-gross (NTG) ratio that is expected to provide a high level of construct validity. In addition, analyses will be conducted on a sample of partial participant buildings (i.e., those buildings that received guidance from program business partners but did not pursue or receive NYSERDA funding) in order to determine the extent of additional outside spillover or freeridership. Evaluation funding within the current SBC program can further supplement this proposed approach and result in a more comprehensive evaluation.

The sample for assessing freeridership and spillover for the new construction component will likely mirror the M&V onsite sample, with similar confidence/precision levels (similar confidence/precision will also be sought for the partial participant sample). The sample for assessing freeridership and spillover for the existing building component will likely be a subset of the buildings included in the billing analysis. Sample sizes will be calculated to meet 90/10 confidence/precision at the program

component level (i.e., new construction and existing buildings), as well as for low-income and market-rate buildings, and downstate and upstate project location. If budget permits, the sample could possibly be expanded to meet 90/10 at the utility territory level.

Data will be collected and analyzed by NYSERDA's independent evaluation contractors following established evaluation protocols. To ensure the most accurate recollection of the decision-making processes by respondents, NTG evaluation will be conducted as projects are completed. In order to achieve greater cost-effectiveness for the overall evaluation effort and in an attempt to gather respondent data close to the decision-making point, NTG interviews may be coordinated with other planned evaluation activities prior to the 2012 NTG analysis (participant interviews may be conducted with process evaluation interviews, and nonparticipant interviews may be conducted with market evaluation interviews during 2010).

Process Evaluation

Process evaluations conducted on the existing SBC-funded MPP have highlighted potential issues to address (e.g., expanding training, recruiting additional partners, streamlining the payment approval process). Future process evaluations on MPP could re-assess these issues.

The process evaluation approach will likely include interviews with NYSERDA staff, program implementation contractor staff, participating and nonparticipating building owners, service providers and energy consulting firms.⁴⁷ The 2010 process evaluation effort will target the ramp up activities of the program and build on the SBC evaluation learning. The 2011 process evaluation will investigate additional opportunities for improving program effectiveness. Evaluation funding associated with the existing SBC program could further supplement this proposed approach and result in a more comprehensive evaluation.

Typically, past process evaluation has achieved 90/10 confidence and precision for relatively large groups such as building owners, architects/engineers, and vendors; future process evaluations will endeavor to attain similar sampling precision at the program component level (new and existing buildings) as well as regionally (update and downstate), and for low income vs. market rate buildings. To reduce potential bias in the building owner sample, the sample could be stratified by building size (number of units) and type (e.g., low income, market-rate rental, condo, coop) and by geography to ensure representativeness. In addition, the evaluation will aim to achieve a high response rate to reduce potential non-response bias. For smaller groups—such as program staff and implementation contractors—the evaluation will likely focus on qualitative, in-depth interviews with a census, which allow for exploration of ideas and generation (rather than confirmation) of hypotheses; in this case calculating confidence/precision levels is not appropriate.

Data will be collected and analyzed by NYSERDA's independent evaluation contractors following established evaluation protocols. Issues identified during the process evaluation will be generated into actionable recommendations and provided to NYSERDA. Follow-up will occur with program staff to address the recommendations. In order to provide feedback on program design, delivery, and implementation, the process evaluation will be completed in 2010. If specific issues are identified that warrant follow up, additional evaluation could occur in 2011.

⁴⁷ As noted earlier, for 2010 and 2011 process interviews with participating building owners, architects/engineers, and vendors are expected to help address freeridership and spillover; after that, freeridership and spillover (net-to-gross) interviews will likely be conducted separately as part of the impact evaluation effort.

Market Evaluation

An initial task in the market evaluation is to develop a new program theory and logic model that will take into account the changing market in relation to the program's higher savings goals and, potentially, new program partners or choices among programs for potential participants. The program theory/logic model will define expected program outcomes and the indicators and will help guide future evaluations.

Another important part of any program evaluation is a thorough understanding of the market environment in which the program is operating. The optimal approach is a baseline study of new construction and a baseline and measure saturation study for existing buildings. These major studies, briefly described below, are likely to be of interest and require funding from all or most EEPS program administrators. These studies, along with development of the program theory and logic model, should be completed in 2009, or as early as possible, in order to inform program design and development.

For new construction, a statewide study could be conducted via onsite data collection with a sample of nonparticipating buildings. The results could be combined with results from participant impact evaluations to characterize current multifamily new construction practices, estimate building efficiency levels, and identify the key market actors with significant influence and involvement. In addition to examining practices and efficiency levels, survey work could establish a baseline of market actor capacity and work.

For existing buildings, a statewide baseline and market saturation study would involve site visits to fully characterize buildings in the multifamily sector (*e.g.*, equipment in use, vintage and efficiency levels of motors, HVAC, lighting, etc) as well as survey work to define key market actors with significant influence and involvement in the market. In addition to examining equipment and efficiency levels, a survey could establish a baseline of market actor capacity and work.

In 2010, NYSERDA proposes to further characterize and assess the multifamily building market using several approaches. Secondary data sources will be mined to characterize the market eligible to participate in the program; the number of multifamily buildings and apartment units; volumetric trends in new construction and renovation activity; the size and influence of key market actor groups; and the relationships and dynamics among those groups. Primary data can be collected via interviews with key market actor groups, focusing on expected program outcomes, market indicators, and researchable issues identified in the program theory and logic model discussed previously. A particular focus could be on the split incentive issue in rental housing and master-metered buildings. In addition, attention will be given to assessing the program's influence in the market and how the program's marketing and outreach activities, coupled with the program's relationships with its partners, have increased participation in the program, and efficiency levels outside the program. Lastly, the influence of incentives on measure installations – particularly for solar thermal systems and ground source heat pumps – can be assessed through this primary data collection and tracked over time.

Survey data collection and analysis can be conducted by NYSERDA's independent contractors following established evaluation protocols. NYSERDA will aim for 90/10 confidence/precision at the program component level (new construction and existing buildings), on an upstate vs. downstate regional basis, and at the low income vs. market rate level. To reduce potential bias in the building owner sample, NYSERDA will stratify by building size (number of units) and type (*e.g.*, low income, market-rate rental, condo, coop) and by geography to ensure the final sample is representative. In addition, NYSERDA will strive to achieve a high response rate to reduce potential non-response bias. In 2009 and 2010, the market evaluation surveys will address spillover among nonparticipants; after that attribution surveys will be conducted as part of the impact evaluation. The new building nonparticipant sample frame will include the matched nonparticipants discussed under impact evaluation, and will include other nonparticipants to be representative of the market as a whole. The existing building sample will be designed to represent all nonparticipants.

NYSERDA proposes to conduct the market characterization and assessment work in 2009 and 2010 in order to provide guidance for program design and targeting.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Should the amount of evaluation funding dedicated to this program need to be decreased, NYSERDA would aim to achieve a 90/10 confidence/precision level at the program component level—i.e., new buildings and existing buildings—but not separately for market-rate and low-income buildings, or for upstate and downstate, and the level of detail sought through the interviews and surveys would be reduced. If more of the evaluation funding for NYSERDA programs could be made available to the MPP, NYSERDA could aim to achieve a 90/10 confidence/precision level by utility territory for low-income and market-rate buildings within each program component. In addition, with an increased budget, NYSERDA could complete baseline studies of new and existing multifamily buildings in 2009, and a follow-up market assessment could be conducted in the fourth year of the program.

2.2. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Multifamily Performance Program Expansion required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show: the resource savings and average measure life used as inputs for the benefit/cost analysis; the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table IV-5. Multifamily Performance Program Expansion: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	15/18	82.4	11.1	671,400	73%

Table IV-6. Multifamily Performance Program Expansion: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
With Electric and Gas Funding	\$81.7	\$198.1	\$275.6

Table IV-7. Multifamily Performance Program Expansion: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	3.4	1.4

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$19.3 million.

Table IV-8. Multifamily Performance Program Expansion: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	3.6	1.5

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 82,350 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 11.1 MW (cumulative) of coincident peak reduction in 2015.⁴⁸

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.85.⁴⁹

⁴⁸ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁴⁹ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

In master metered buildings, the customer class is 'commercial', however, program planning is done on a per unit basis without assuming the number of buildings targeted. Therefore, the percentage of customers reached is unknown. The program is targeting 49,800 housing units.

3. SOLAR THERMAL INCENTIVES (ELECTRIC)

Program Elements

Program Description. This initiative offers incentives for the installation of solar thermal hot water systems⁵⁰ in multifamily buildings currently using electricity for domestic hot water (DHW). The potential energy savings from solar thermal technology is significant in the multifamily building sector in New York. This Program will offer additional measure incentives for solar thermal hot water systems installed in eligible buildings that also participate in the NYSERDA Multifamily Performance Program (MPP). Multifamily buildings participating in the MPP will be eligible to receive solar thermal advanced measure incentives equal to \$30 per square foot of collector area for closed loop (indirect) systems. Participants must install all cost effective energy efficiency measures to be eligible for the solar thermal advanced measure incentives. This approach ensures that solar thermal systems are not being installed in buildings that are otherwise energy inefficient.

Solar thermal systems can be used for both space and hot water heating. Currently, less than 1% of residential buildings use solar thermal systems, as the initial capital costs remain a significant barrier.⁵¹ There is also the lack of a qualified network of designers and installers. In comparison to solar photovoltaic systems, the payback period for solar thermal hot water systems is shorter, more so if it is installed in buildings that have electric DHW, with a payback of less than 10 years. Solar thermal hot water systems can achieve significant energy savings. For example, a solar thermal hot water system installed in a 100-unit multifamily building with an electric DHW system could save about 240,000 kWh per year.

The estimated total installed cost for a solar thermal hot water system on a 100 unit building is approximately \$420,000. The proposed solar thermal advanced measures incentive would provide \$115,000, or approximately 27% of the installed cost. Combined with federal tax credits⁵², advanced measures incentives would help to reduce the owner contribution to \$156,000. The simple payback would be 4 years for a building with an electric DHW system. The use of a solar thermal hot water system in an all electric building would also reduce peak demand. U.S. market growth in the solar thermal sector could have a significant impact on reducing installed costs, stimulate demand in the market, and create green collar jobs. It is estimated that installed panel costs could be reduced by up to 50% with increased production and installation experience.

In addition to cost savings, solar thermal systems are a renewable technology that reduces emissions in proportion to the amount of fuel saved. For example, 4,800 MWh in lifetime energy savings could be realized over a 20-year period for 120 panels installed on a 100-unit building.

⁵⁰ Solar thermal hot water systems absorb energy from the sun as heat using a solar collector, which is then used to pre-heat the domestic hot water supply. A typical solar water heating system consists of a series of flat plate collectors, usually installed on the roof, a storage tank, and an active or passive circulation system.

⁵¹ While U.S. market penetration is low, European capacity doubled from 5GWth to 10GWth between 1997 and 2004, and another 5GWth of additional capacity is expected to be installed by the end of 2008. Over 1 million European households currently employ solar thermal energy. In the U.S. there are several states with incentives for solar thermal technologies including California, Florida and Oregon. Other countries also offer incentives for installing solar thermal collectors, including Canada and most countries in Europe.

⁵² To be eligible for the federal tax incentive, the building in this example would have to be a condominium or co-operative.

Demand Reduction and System Benefits. Peak demand savings are estimated to be approximately 3,000 kW for installed measures, with total cumulative MWh reductions of about 14,400.

Table IV-9. Solar Thermal Incentives: Total Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$2.816M	\$2.816M	\$2.816M	0	0	0	0	\$8.448M
Low-Income	\$1.408 M	\$1.408 M	\$1.408 M	0	0	0	0	\$4.224 M
Market Rate	\$1.408M	\$1.408M	\$1.408M	0	0	0	0	\$4.224 M
Projected Outreach/Marketing costs: \$80,000 in 2009, 2010 and 2011.								

Table IV-10. Solar Thermal Incentives: Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	4,800	4,800	4,800	0	0	0	0
Annual Savings installed in prior years	n/a	4,800	9,600	14,400	14,400	14,400	14,400
Cumulative Annual Savings	4,800	9,600	14,400	14,400	14,400	14,400	14,400

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. These incentives build on the success of the MPP that targets all types of multifamily buildings thereby increasing penetration in rental, cooperative and condominium markets.

Coordination: New participants will avail themselves of the 56 Partners established under the MPP. In service territories where utilities may offer rebates on equipment typically included in a MPP workscope, a common application used by both NYSERDA and utilities will deter the potential for duplicate incentives for the same measure. Metrics can be tracked by measures installed based on which program implementer installed the measure.

Co-Benefits. These incentives shift energy consumption from the electric grid in addition to reducing consumption through energy efficiency. Providing incentives for this technology will help develop a market in New York, leading to job and business growth. Success in this sector will lead to increasing solar thermal system installations in other sectors. The whole-building approach provides opportunities to improve New York building stock, reduce water use, and improve health and safety. The Program

provides “one-stop shopping” for building owners, with technical expertise and incentives finance the measures. The program considers all sources of energy, determines how to best reduce energy bills, and considers the environmental impacts of energy production and use. NYSERDA tracks energy savings and cost savings by energy type, enabling collaboration with utilities for both electric and gas programs.

Portfolio Balance. This initiative is fully integrated with the MPP which targets all types of multifamily buildings thereby increasing penetration of this technology in the rental, cooperative, and condominium markets.

Depth of Savings. As this initiative is fully integrated with the MPP, incentives for solar thermal systems will not be provided unless all cost-effective energy efficiency measures are installed in the building thereby eliminating lost opportunities and maximizing the measures implemented per customer contact. MPP reflects a whole-building approach to energy efficiency savings, addressing opportunities to reduce electricity, heating fuel, water use, and to install health and safety measures.

Underserved Markets. Half of the funding (50%) has been allocated for the low-income market.

Commitment. Incentives will be in effect through December 2011, and all measures will be installed by that date. Savings are expected to be constant for the three years, based on program intake. Since the program builds on an existing network of energy service providers, significant ramp up time is not anticipated. As the program grows, it will depend on the Workforce Development initiative to ensure an adequate supply of qualified systems designers and installers.

Customer Outreach. The Program Partners will garner most of the participants, although energy efficiency vendors and suppliers, and metering vendors will market the program to their clients. Overall marketing activities will be coordinated by NYSERDA, in collaboration with utilities. NYSERDA will work with Con Edison to target the program to load pockets as appropriate.

Collaborative Approach. NYSERDA will work with utilities on cooperative advertising to their customers, as well as collaborate on joint press releases and events for building openings and other major project milestones. NYSERDA will develop case studies that can be used by utilities to promote the program.

Fuel Integration. The MPP uses a whole-building, all-fuels approach, however solar thermal incentives will target buildings with electric hot water heating systems.

Transparency. The installation of energy savings measures will be verified by the Program Partners (prior to receiving the forth incentive installment), and by NYSERDA’s quality control contractor. For submetered buildings, electricity savings will be verified by direct meter readings. Program results will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Participation is on a first-come basis. Qualifications for installers of solar thermal hot water systems will be established in coordination with the Workforce Development Team.

Evaluation.

As described in this plan, evaluation funding allocated to solar thermal systems incentives will be used to assess impacts related to the incentive offering.

Evaluation Goals

As described in the overarching MPP Expansion Program evaluation plan, the primary evaluation goal is to verify anticipated program savings and assess freeridership and spillover. Secondary goals will be to investigate participant awareness, satisfaction, barriers and decision-making associated with the program; and, should funds permit, to establish a baseline of both the multifamily new construction and existing buildings markets and conduct a measure saturation study for the existing multifamily buildings market.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the solar thermal incentive element of the Multifamily Performance Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented, once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group

Evaluation Budget

The evaluation budget for MPP solar thermal system incentives is included in the overarching MPP Expansion evaluation plan. As noted in the overarching MPP plan, in order to effectively evaluate the MPP program, as well as additional offerings, such as the solar thermal incentive component, it is anticipated that approximately 45% of MPP evaluation funding will be allocated to impact evaluation, 10% for process evaluation and 45% for markets evaluation. However, this allocation is subject to change based on ultimate decisions regarding statewide studies that might help support the evaluation of the MPP.

Evaluation Schedule

NYSERDA expects the evaluation of the solar thermal component to be conducted as a coordinated effort with the Multifamily Performance Program evaluation. Refer to the Multifamily Performance Program evaluation plan for details on the timing of these efforts.

Impact Evaluation

Measurement and Verification

As described in the overarching MPP Expansion evaluation plan, M&V activities include site visits of participating, partial participating, and nonparticipating new multifamily buildings as well as billing analysis of participating existing multifamily buildings. NYSERDA expects that the evaluation will provide measure-specific savings results at 90/10 confidence and precision for solar thermal hot water systems using the methodology outlined in the MFPP plan. NYSERDA expects to augment the new construction sample to allow for separate analysis of solar thermal panels; for existing buildings, as many buildings with these incentives measures as are available will be included in the billing analysis, and their effect on energy use analyzed. Refer to the MPP Expansion evaluation plan for additional details on methodology, sampling, and timing of M&V activities.

Net-to-Gross

NYSERDA will estimate participant and nonparticipant spillover and participant freeridership using an enhanced self-report survey method with multiple key decision makers (*e.g.*, building owners, architects/engineers, vendors, etc.) in conjunction with the broader Multifamily Performance Program net-to-gross effort. The enhanced self-report method of obtaining estimates from multiple decision makers is expected to mitigate bias. In addition, a sample of partial participants will be surveyed to identify any additional freeridership or spillover. It is anticipated that this effort will attain 90/10 confidence and precision for solar thermal hot water systems. Refer to the MPP Expansion evaluation plan for additional details on methodology, sampling, and timing of net-to-gross evaluation activities.

Process Evaluation

NYSERDA expects the process evaluation of the ground source heat pump component to be conducted as a coordinated effort with the Multifamily Performance Program evaluation. Refer to the Multifamily Performance Program evaluation plan for details on the approach, sampling and timing of these efforts.

Additional questions and analysis will likely be conducted to probe for perspectives and opinions about solar thermal systems among participating building owners as well as managers of other solar thermal water heater programs (or programs that include them in multifamily building programs). Key process issues will include exploring the value of solar systems and how the solar systems are integrated into the design process.

Market Evaluation

NYSERDA expects the market evaluation of the solar thermal component to be conducted as a coordinated effort with the Multifamily Performance Program evaluation. Refer to the Multifamily Performance Program evaluation plan for details on the approach, sampling and timing of these efforts. Using evaluation funding from the solar thermal incentive component, the influence of incentives on solar thermal system installations will be assessed through this primary data collection and be tracked over time.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Should the amount of evaluation funding dedicated to this program component need to be decreased, NYSERDA would eliminate the specific solar thermal process and market portions of the evaluation. With an increased budget, NYSERDA would aim for 90/10 confidence/precision for additional market segments (*e.g.*, upstate/downstate, low-income/market-rate buildings, and/or for individual utility service territories) and a follow-up market assessment could be conducted at the scheduled end of the program.

Program Selection Criteria

This section provides screening metrics for the Multifamily Performance Program Advanced Measure Incentives for Solar Heat Pump Systems (MPP – Solar Thermal Incentives) required per Appendix 3 of the Commission’s June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show: the resource savings and average measure life used as inputs for the benefit/cost analysis; the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table IV-11. Solar Thermal Incentives: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	20	14.4	3.0	--	73%

Table IV-12. Solar Thermal Incentives: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
Electric Funding Only	\$8.8	\$25.1	\$25.1

Table IV-13. Solar Thermal Incentives: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	2.9	1.0

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$1.5 Million.

Table IV-14. Solar Thermal Incentives: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	3.0	1.1

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 14,400 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 3.0 MW (cumulative) of coincident peak reduction in 2015.⁵³

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.55.⁵⁴

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

In master metered buildings, the customer class is 'commercial', however, program planning is done on a per unit basis without assuming the number of buildings targeted. Therefore, the percentage of customers reached is unknown. The program is targeting the installation of 6,000 solar system units.

⁵³ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁵⁴ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

4. GEOTHERMAL HEAT PUMP SYSTEMS INCENTIVES (ELECTRIC)

Program Description. This initiative offers additional incentives for the installation of geothermal heat pump (GHP) systems⁵⁵ in multifamily buildings that participate in the Multifamily Performance Program (MPP). The potential for energy savings through GHP systems is significant in New York's multifamily building stock. For example, a GHP system installed in a 100-unit electrically-heated multifamily building could save 1,020 MWh in heating and cooling, and additional 166 MWh savings associated with the electric heating of water.

GHP systems can be used for space heating and cooling in residential buildings, and excess heat from the system in the summer months can be used for hot water heating. These technologies currently have very small market penetration, about 2% of buildings in the U.S., though they are one of the fastest growing renewable energy applications in the world.⁵⁶ Initial capital costs remain a significant barrier, as they can cost several times more than that of a conventional system. Due to complex engineering design requirements, experienced geothermal designers are essential to the success of a project. The lack of a qualified network of designers and installers is also a barrier to market growth.

The estimated total installed cost of a GHP system for a 100-unit building is \$875,000. The proposed GHP advanced measures incentive would provide \$210,000 (\$1,200/ton x 175 tons) or approximately 24% of the installed cost. Combined with tax credits, advanced measures incentives would help to reduce the owner's contribution to \$621,000. In a building with an electric heating and hot water system, the simple payback would be less than 4 years.

In addition to cost savings, GHP systems are a renewable technology that reduces emissions in proportion to the amount of fuel saved. The EPA estimates that over an average 20-year lifespan, every 100,000 units of nominally sized residential geothermal heat pumps will save more than 24 trillion Btus of electrical energy, and save consumers approximately \$500 million in heating and cooling costs at current prices. Over the same period, the EPA estimates these 100,000 units reduce greenhouse gas emissions by almost 1.1 million metric tons of carbon equivalents.

U.S. market growth in the GHP sector could have a significant impact on reducing installed costs. GHP incentives will stimulate demand in the market while also creating green collar jobs. Increased market penetration for GHPs will also help to reduce design and installation costs.

Demand Reduction and System Benefits. Peak demand savings in 2011 are estimated to be approximately 14,397 kW for installed measures, with total cumulative MWh reductions of about 36,621.

⁵⁵ A typical GHP system includes an exterior ground loop, along with a heat pump and control system inside the building. Using relatively constant ground temperatures, GHPs function as heat exchangers, discharging excess heat in the summer to cool the building and collecting heat from the ground in the winter for heating. The largest and most expensive component of a GHP system is the exterior loop. Closed loop systems are constructed using a horizontal trenching system or vertical wells. Average payback periods for GHP systems can range from 5 to 15 years.

⁵⁶ GHPs are one of the fastest growing renewable energy technologies, with an annual growth rate of 10% in many countries. Over 1 million GHP systems have been installed worldwide, with a total capacity estimated at 12,000 MWh in 2004. The largest market penetrations are in Sweden and Switzerland. In the U.S. there are several states with incentives for GHPs including Delaware, Maryland, New Jersey, and Oregon. Incentives typically range from \$300 to \$1,000 per ton of capacity.

Table IV-15. Geothermal Heat Pump Incentives: Total Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$2.64M	\$2.64M	\$2.64M	0	0	0	0	\$7.92M
Low-Income	\$1.32M	\$1.32M	\$1.32M	0	0	0	0	\$3.96M
Market Rate	\$1.32M	\$1.32M	\$1.32M	0	0	0	0	\$3.96M

Projected Outreach/Marketing costs: \$75,000 in 2009, 2010, and 2011.

Table IV-16. Geothermal Heat Pump Incentives: Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	12,207	12,207	12,207	0	0	0	0
Annual Savings installed in prior years	n/a	12,207	24,414	36,621	36,621	36,621	36,621
Cumulative Annual Savings	12,207	24,414	36,621	36,621	36,621	36,621	36,621

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. This program will build upon the success of the MPP and targets all types of multifamily buildings and would penetrate the rental market, cooperative and condominium market.

Coordination. New participants will avail themselves of the 56 Partners established under the MPP. Added utility incentives for GHP systems could provide additional energy savings. A common application used by both NYSERDA and utilities will deter the potential for duplicate incentives for the same measure. Metrics will be can be tracked by measures installed by a particular program implementer.

Co-Benefits. The whole-building approach provides opportunities to improve New York building stock in New York, reduce water use, and improve health and safety. The Program provides “one-stop shopping” for the building owners, technical expertise to assist building owners, and incentives to help finance the measures. The program considers all energy sources and determines how to best reduce energy bills and improve the environmental impacts of energy production and use. NYSERDA will track energy and cost savings, enabling collaboration with utilities for both electric and gas programs.

Incentives will be provided for 1,250 units per year. Incentives will be \$1,200 per ton of capacity, resulting in an average incentive of \$1,800 per unit. The program will also include training to assist Program Partners to assess the potential for installing a GHP system in a multifamily building.

Portfolio Balance. This initiative is fully integrated with the MPP which targets all types of multifamily buildings thereby increasing penetration of this technology in the rental, cooperative and condominium markets.

Depth of Savings. As this initiative is fully integrated with MP, incentives for geothermal heat pump systems will not be provided unless all cost-effective energy efficiency measures are installed in the building thereby eliminating lost opportunities and maximizing the measures implemented per customer contact. MPP reflects a whole-building approach to energy efficiency savings, addressing opportunities to reduce electricity, heating fuel, water use, and to install health and safety measures.

Underserved Markets: Half of the funding (50%) has been allocated for the low-income market. These incentives will provide opportunities for this market segment to consider this renewable energy technology. Participants must install all cost effective energy efficiency measures to be eligible for the GHP advanced measure incentives. This ensures that in-unit and common area measures that improve the overall housing condition of the buildings' tenants are installed.

Commitment: Incentives will be provided through December 2011, and all measures will be installed by that date. Each of the three years should result in savings, estimated to be constant for the three years, based on expected program intake. Since the program builds on an existing network of energy services providers, significant ramp-up time is not anticipated. However, as the program grows, it will necessarily depend on the Workforce Development initiative to ensure an adequate supply of quality systems designers and installers.

Customer Outreach. Although Program Partners will refer most of the participant buildings, heat pump vendors and suppliers will also market the program to their clients. Overall marketing will be done by NYSERDA, in coordination with any participating utilities.

Collaborative Approach. NYSERDA will work with utilities on cooperative advertising to their customers, as well as collaborate on joint press releases and events for building openings and other major project milestones. NYSERDA will develop case studies that can be used by utilities to promote the program.

Fuel Integration. The MPP uses a whole-building, all-fuels approach. However, GHP incentives will target buildings with electric hot water heating systems and central air-conditioning units. GHP can also replace fossil-fueled heating systems, with appropriate funding.

Transparency. Energy savings resulting from the installation of measures will be verified by NYSERDA's Program Partners and quality assurance contractor. Program results will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Participant buildings will be on a first-come basis. Qualifications for systems installers will be established. The program administrator and quality assurance contractors for this Program were chosen through NYSERDA's standard procurement process.

Evaluation.

As described in this plan, evaluation funding allocated to GHP incentives will be used to assess impacts related to the incentive offering.

Evaluation Goals

As described in the over-arching MPP Expansion Program evaluation plan, the primary evaluation goal is to verify anticipated program savings and assess freeridership and spillover. Secondary goals will be to investigate participant awareness, satisfaction, barriers and decision-making associated with the program; and, should funds permit, to establish a baseline of both the multifamily new construction and existing buildings markets and conduct a measure saturation study for the existing multifamily buildings market.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the GHP incentive element of the Multifamily Performance Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented, once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group

Evaluation Budget

The evaluation budget for MPP GHP incentives is included in the overarching MPP Expansion evaluation plan. As noted in the overarching MPP plan, in order to effectively evaluate the MPP program, as well as additional offerings, such as the ground source heat pump component, it is anticipated that approximately 45% of MPP evaluation funding will be allocated to impact evaluation, 10% for process evaluation and 45% for markets evaluation. However, this allocation is subject to change based on ultimate decisions regarding statewide studies that might help support the evaluation of the MPP.

Evaluation Schedule

NYSERDA expects the evaluation of the GHP component to be conducted as a coordinated effort with the Multifamily Performance Program evaluation. Refer to the Multifamily Performance Program evaluation plan for details on the timing of these efforts.

Impact Evaluation

Measurement and Verification

As described in the overarching MPP Expansion evaluation plan, M&V activities include site visits to participating and nonparticipating new multifamily buildings as well as billing analysis of participating existing multifamily buildings. NYSERDA expects that the evaluation will provide measure-specific savings results at 90/10 confidence and precision for GHPs using the methodology outlined in the MPP plan. NYSERDA will augment the new construction sample to allow for separate analysis of GHPs. Refer to the MPP Expansion evaluation plan for additional details on methodology, sampling, and timing of M&V activities.

Net-to-Gross

NYSERDA will estimate participant and nonparticipant spillover and participant freeridership using an enhanced self-report survey method with multiple key decision makers (*e.g.*, building owners, architects/engineers, vendors, etc.) in conjunction with the broader Multifamily Performance Program net-to-gross effort. The enhanced self-report method of obtaining estimates from multiple decision makers is expected to mitigate bias. In addition, a sample of partial participants will be surveyed to identify any additional freeridership or spillover. It is anticipated that this effort will attain 90/10 confidence and precision for GHPs. Refer to the MPP Expansion evaluation plan for additional details on methodology, sampling, and timing of net-to-gross evaluation activities.

Process Evaluation

NYSERDA expects the process evaluation of the GHP component to be conducted as a coordinated effort with the Multifamily Performance Program evaluation. Refer to the Multifamily Performance Program evaluation plan for details on the approach, sampling and timing of these efforts.

Additional questions and analysis will likely be conducted to probe for perspectives and opinions about GHP systems among participating building owners as well as managers of other ground source heat pump programs (or programs that include them in multifamily building programs). Key process issues will include exploring the value of GHP systems and how the GHP systems are integrated into the design process.

Market Evaluation

NYSERDA expects the market evaluation of the GHP component to be conducted as a coordinated effort with the Multifamily Performance Program evaluation. Refer to the Multifamily Performance Program evaluation plan for details on the approach, sampling and timing of these efforts. Using evaluation funding from the ground source heat pump incentive component, the influence of incentives on GHP installations will be assessed through this primary data collection and be tracked over time.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Should the amount of evaluation funding dedicated to this program component need to be decreased, NYSERDA would eliminate the GHP-specific process and market portions of the evaluation. With an increased budget, NYSERDA would aim for 90/10 confidence/precision for additional market segments (*e.g.*, upstate/downstate, low-income/market-rate buildings, and/or for individual utility service territories) and a follow-up market assessment could be conducted at the scheduled end of the program.

4.2. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Multifamily Performance Program Geothermal Heat Pump Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis; the present value of the costs and benefits used in the analysis; and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table IV-17. Geothermal Heat Pump Incentives: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	15	36.6	14.4	0	50%

Table IV-18. Geothermal Heat Pump Incentives: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
Electric Funding Only	\$8.2	\$38.7	\$61.6

Table IV-19. Geothermal Heat Pump Incentives: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	7.5	1.6

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$3.0 Million.

Table IV-20. Geothermal Heat Pump Incentives: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	7.9	1.7

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 36,621 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 14.4 MW (cumulative) of coincident peak reduction in 2015.⁵⁷

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.29.⁵⁸

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

In master metered buildings, the customer class is 'commercial', however, program planning is done on a per unit basis without assuming the number of buildings targeted. Therefore, the percentage of customers reached is unknown. The program is targeting the installation of 3,600 ground source heat pump systems.

⁵⁷ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁵⁸ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

5. ELECTRIC REDUCTION IN MASTER-METERED MULTIFAMILY BUILDINGS (ELECTRIC FUNDING)

Program Elements

Program Description. This Program, that serves low-income and market-rate master metered buildings, provides incentives for the installation of: advanced submeters in master metered buildings; cost-effective in-unit electric reduction measures; and energy efficient common area lighting and ENERGY STAR® washing machines. The activities for participating buildings would follow the same procedures as in MPP, but would receive incentives on a per measure basis, rather than per dwelling unit. As the master meter would remain in the building, the bulk rate would still apply, while a submeter rate would be implemented building-wide that would encourage tenants to reduce their energy use, and if possible, shift load from peak use periods.

Building owners would also receive incentives (on a per fixture basis) to replace lights and appliances so further cost effective measures would be installed in the rental units and in common areas. Bulk purchase of appliances and lighting would lower the installation cost, and removed refrigerators and air conditioners would be collected for recycling. Incentives for electricity efficiency measures would be based on a prescriptive list of measures, paid only if the actual measures are installed (rather than on a per dwelling unit basis). The installation of the submeters provides an incentive to tenants to reduce electricity use, and the installation of efficiency measures reduces both the base and peak electricity use for tenants and owners. The submetering incentives are paid only if the unit measures are installed to ensure that the efficiency opportunities are maximized and owners aren't able to shift high energy bills to rental tenants.

Demand Reduction and System Benefits. Peak demand savings in 2011 are estimated to be approximately 47,823 kW for installed measures, with total cumulative MWh reductions of about 85,296.

Table IV-21. Electric Reduction in Master-Metered Multifamily Buildings: Total Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$14.94M	\$14.94M	\$14.94M	\$0	\$0	\$0	\$0	\$44.82M
Low Income	\$8.964M	\$8.964M	\$8.964M	\$0	\$0	\$0	\$0	\$26.892M
Market Rate	\$5.976M	\$5.976M	\$5.976M	\$0	\$0	\$0	\$0	\$17.928M

Projected Outreach/Marketing costs: \$1,000,000 in 2009, 2010 and 2011.

Table IV-22. Electric Reduction in Master-Metered Multifamily Buildings: Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	28,432	28,432	28,432	0	0	0	0
Annual Savings installed in prior years	0	28,432	56,864	85,296	85,296	85,296	85,296
Cumulative Annual Savings	28,432	56,864	85,296	85,296	85,296	85,296	85,296

Table IV-23. Electric Reduction in Master-Metered Multifamily Buildings: Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	8,448	8,448	8,448	0	0	0	0
Annual Savings installed in prior years	n/a	8,448	16,896	25,344	25,344	25,344	25,344
Cumulative Annual Savings	8,448	16,896	25,344	25,344	25,344	25,344	25,344

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPs Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. This Program will penetrate the rental market and address the split incentive barrier that has proven to be a hurdle to success in this market.

Coordination. The participating buildings would be enrolled in the MPP Program and have the benefit of the 56 energy services Partners established under that Program. Utilities can identify the master-metered buildings, assist in marketing efforts and coordinate on selected measures with any rebates offered by the utility. A common application will be used by both NYSERDA and utilities to reduce program confusion, and reduce the potential for “double dipping”. The installation metrics will be separated according to program implementer.

Co-Benefits. The whole-building approach will provide opportunities to improve the building stock in New York, reduce water use, and improve health and safety in the units. It is expected that some of the participating buildings in which submetering is undertaken will also receive additional whole-building energy efficiency work accomplished under the MPP.

Portfolio Balance. The Program addresses the experience of the MPP, which found that submetering incentives were not large enough to encourage installation. The Program provides a meaningful

opportunity for building owners that do not want to undertake the whole-building approach to significantly reduce their electric energy consumption.

Depth of Savings. Conversion from master-metering to master/sub-metering has shown energy reductions of about 20%, or more, due to behavioral changes alone. This, combined with the installation of all cost-effective electric reduction measures will maximize the electric energy reduction in the building.

Underserved Markets. Although all master-metered buildings would be eligible, the program will target current master-metered rental buildings where renters will be required to pay for electricity based on actual usage after the submeters are installed. The owners would receive an incentive to install the submeters, but would also be required to install the in-unit measures (with the help of financial incentives) to encourage the use of the most energy efficient measures by tenants, increasing the level of success in lowering their “new” electricity bills.

Commitment. The program will operate through 2011, with all measures installed by that date. It is anticipated that savings will result in each of the three program years, 2009 through 2011. As the program is built upon the infrastructure of the MPP and CEM programs, little ramp-up time is expected.

Customer Outreach. The MPP Program partners will bring the most referrals into the program. It is expected that metering vendors will also market the program to their clients. NYSERDA will coordinate with appropriate agencies of New York City. Overall marketing will be undertaken by NYSERDA in coordination with the utilities.

Collaborative Approach. Utility rebates will likely be available for lighting and appliances within the participant buildings, which should offset program costs and provide more services to buildings. Cross-marketing of programs, consolidation of application processes, and sharing of energy savings are all anticipated.

Fuel Integration. Although this is an electric reduction program, the installation of energy efficient appliances that use hot water (for example, dishwashers and clothes washers), and the replacement of electric clothes dryers with gas dryers is estimated to save 8,448 MMBtus per year.

Transparency. The energy savings associated with the submeter installation will be verified by direct meter reading by NYSERDA. Program results will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Buildings will participate on a first-come basis. Meters must meet specification developed by NYSERDA under the Comprehensive Energy Management Program.

5.2. EVALUATION.

General Evaluation Approach

Evaluation Goals

In addition to the evaluation goals described in the overarching MPP Expansion Program evaluation plan, evaluation goals related to the electric reduction in master metered multifamily buildings component include:

- verifying energy savings through pre-post billing analysis, with special emphasis on master-metered buildings;
- developing a program theory and logic model;
- characterizing and assessing the multifamily buildings market and owner/occupant relationships in master-metered and sub-metered buildings to assess barriers and opportunities to implementing sub-meters in multifamily buildings.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the electric reduction in master-metered multifamily buildings program component, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors to adapt the evaluation approaches that best suit the program as implemented, once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects the evaluation budget for this program component will likely be less than 5% of the program funding level minus yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. In order to effectively evaluate this electric reduction component, it is anticipated that approximately 60% of this evaluation funding will be allocated to impact evaluation, 20% for process evaluation and 20% for markets evaluation.

Evaluation Schedule

Evaluation of this program component will proceed according to the anticipated schedule shown in the following table. Major M&V and net-to-gross studies will be completed in 2010 and again in 2012. A process study is planned for 2011, and a market evaluation is planned in 2009.

Table IV-24. Electric Reduction in Master-Metered Multifamily Buildings: Evaluation Schedule 2009-2012

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)		X		X
Net-to-Gross (Impact)		X		X
Process Evaluation			X	
Market Evaluation	X			

Impact Evaluation

Measurement and Verification

As described in the overarching MPP Expansion evaluation plan, M&V activities are expected to include site visits of participating and nonparticipating new multifamily buildings as well as billing analysis of participating existing multifamily buildings. For the Electric Reduction in Master-Metered Multifamily Buildings component, an additional pre-post billing analysis is planned for participating and matched nonparticipating buildings to determine energy savings related to the implementation of sub-metering in the buildings.

Sample sizes for the electric reduction component of the program will be chosen to meet a 90/10 confidence/precision level statewide for low-income and market rate buildings together. Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols. M&V activities will occur in 2010 and 2012.

Net-to-Gross

In addition to the net-to-gross analysis conducted on the overarching MPP evaluation, additional analyses will be conducted for the electric reduction component such that freeridership and spillover can be assessed related to savings accruing from the sub-metering program element. This will involve surveys of owners and managers of participating and non-participating master-metered buildings; NYSERDA expects to work with the utilities to identify the non-participating buildings.

Similar to the overarching MPP evaluation, sample sizes will be calculated to meet 90/10 confidence/precision at the program component level (e.g., new construction and existing buildings). Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols. Net-to-gross activities will occur at the same time as the M&V efforts – in 2010 and 2012.

Process Evaluation

In addition to the process analyses identified in the overarching MPP evaluation plan, process activities focusing on electric reduction in master-metered multifamily buildings include in-depth interviews with program staff, manufacturers, vendors and program managers to assess issues associated with implementation of sub-metering programs. The process evaluation is also expected to include surveys of participating building owners and occupants to assess owner/tenant relationships as well as owner and occupant perspectives on split incentives, on the satisfaction with sub-metering, and occupants' changes in behavior. These surveys may be used in the billing analysis proposed as part of the impact evaluation to assess how occupant behavior affects energy use.

Participating building owner surveys will be conducted at the 90/10 confidence/precision at the program level, surveys of occupants will also be conducted at the 90/10 confidence/precision at the program level assuming occupant contact information is available. Data will be collected and analyzed by NYSERDA's independent contractors using established evaluation protocols. As has been developed in the past, the process evaluation will identify and develop actionable recommendations for improvements to program design, delivery, and implementation. These process efforts are expected to occur in 2011.

Market Evaluation

To supplement the baseline and characterization activities proposed in the overarching MPP evaluation plan, additional activities related to master-metered multifamily buildings include identifying the number

of buildings and units that are currently master-metered, for low-income units, market rate rentals, coops and condos. In addition, a program theory and logic model will be developed to assist in program design and planning and to identify program outputs and outcomes anticipated as a result of the initiative. Surveys of participating and matched nonparticipating building owners and tenants could be used to assess barriers and opportunities to implementing sub-meters in master-metered multifamily buildings. In addition, baseline measurements could be established for expected program outputs and outcomes identified in the program theory and logic model.

To the extent possible, NYSERDA will attempt to achieve 90/10 confidence/precision levels in interviews with key market actor groups; however, given the likely small population sizes for some actor groups, census samples may be used and the interviews may be qualitative in nature. NYSERDA will work with the utilities to help identify non-participating master-metered buildings within their respective service territories. Data collection and analysis will be conducted by NYSERDA's independent contractors following established evaluation protocols. Market baseline and characterization efforts are expected to occur in 2009.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Should the amount of evaluation funding dedicated to this program need to be decreased, NYSERDA would achieve 90/10 confidence/precision in the billing analysis statewide rather than separately for low-income and non-low-income buildings and the level of detail sought through the interviews and surveys would likely need to be reduced. With enhanced funds NYSERDA could aim to achieve 90/10 confidence/precision in the billing analysis for condos/coops, market-rate rental, and low-income buildings, and if populations justify it, by upstate/downstate regions. Additionally, additional evaluation funding could allow for a follow-up market assessment at the end of the funding period.

5.3. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Electric Reduction in Master Metered Multifamily Buildings required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table IV-25. Electric Reduction in Master-metered Multifamily Buildings: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	15 / 15	85.3	47.8	25,300	90%

Table IV-26. Electric Reduction in Master-metered Multifamily Buildings: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
Electric Funding Only	\$46.4	\$58.8	\$211.7

Table IV-27. Electric Reduction in Master-metered Multifamily Buildings: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	4.6	3.6

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$7 Million.

Table IV-28. Electric Reduction in Master-metered Multifamily Buildings: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	4.7	3.7

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 85,296 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 47.8 MW (cumulative) of coincident peak reduction in 2015.⁵⁹

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.2.⁶⁰

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

In master metered buildings, the customer class is 'commercial', however, program planning is done on a per unit basis without assuming the number of buildings targeted. Therefore, the percentage of customers reached is unknown. The program is targeting 48,000 units.

⁵⁹ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁶⁰ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

6. POWER MANAGEMENT PILOT PROGRAM (ELECTRIC FUNDING)

Program Elements

Program Description. NYSERDA will implement the Power Management Pilot Program (PMPP) as part of the existing **New York Energy \$martSM** Products Program. Power management is the practice of managing lighting, HVAC, and multiple consumer electronics (including computer equipment systems) found in the average home, by using new products and proactive energy saving actions.

There is large potential for energy savings associated with power management, yet the development and demonstration of new tools is necessary to assist consumers in managing the energy load associated with the energy intensive consumer products they are using in their homes. This Program will include measures such as “smart” power strips (*i.e.* a power strip that can automatically shut down products plugged in but not in use without any action by the consumer). Other products such as programmable thermostats, whole-house switches, and home automation systems, will be tested and evaluated as appropriate. Success could lead to the development of incentives to support the sale of these products.

The Program will include work with mid- and upstream market partners, offer cooperative advertising and product buy-down incentives, and develop point-of-purchase, educational, and promotional materials; with the anticipation that utility partners will provide consumers with the power management devices, educate them about how to use them and on the benefits of effective power management, and collect participant data. Together, NYSERDA and the utilities will analyze results and, as appropriate, update the program design for consideration in the future. This collaboration is needed for effective implementation, monitoring, and evaluation of the Pilot Program.

Demand Reduction and System Benefits. Peak demand savings in 2011 are estimated to be approximately 3,591 kW for installed measures, with total cumulative MWh reductions of about 46,365. As this is an emerging market, these are conservative estimates. Actual demand and energy savings will be determined through the evaluation of the pilot and depends on successful education of participants on how to most effectively use these tools.

Table IV-29. Projected Total Program Expenditures – Power Management Pilot Program (2009-2015)

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$1M	\$1M	\$1M	0	0	0	0	\$3M
Projected Outreach/Marketing costs: \$250,000 in 2009, 2010, and 2011.								

Table IV-30. Projected Installed MWh Impacts - Power Management Pilot Program (2009-2015)

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	12,505	15,455	18,405	0	0	0	0
Annual Savings installed in prior years	n/a	12,505	27,960	46,365	46,365	46,365	46,365
Cumulative Annual Savings	12,505	27,960	46,365	46,365	46,365	46,365	46,365

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. Early-adopters will be targeted to participate in the PMPP due to a general interest with new technology, willingness to experiment and to participate in follow-up marketing research on the effectiveness of the new technology. Underserved markets, such as low-income consumers and renters, will also be targeted. NYSERDA has partnerships with several power management product manufacturers and retailers, however, additional partners will continue to be sought, as well as new potential retail locations.

Coordination. Coordination with utilities to implement, monitor and evaluate the Program is a very important component of the program. California is the only other state of which NYSERDA is aware that is considering power management. New York State has an opportunity to be a leader in this emerging technology area and to develop a real demand for power management tools in its consumer products market.

Co-Benefits. Building on the primary benefit of the Program, the introduction of power management into the residential market, co-benefits of the program are the spillover of energy efficiency behaviors to other aspects of the daily life of consumers as a result of increased awareness and education, which could potentially lead to the use of “value-added” benefits such as using power management devices to control household systems that provide greater security (such as lighting or alarm systems) to the occupants.

Portfolio Balance. This Program will benefit New York by increasing demand for power management tools in the retail consumer products market. Also, certain power management systems can be installed as permanent measures in new construction, or as add-on wireless devices during home remodeling. The upstream and mid-stream aspect of the program will make such products more readily available in the marketplace for such projects.

Depth of Savings. Participants in the Program will receive a “smart” power strip or other power management product from their utility along with instruction in maximizing its energy savings potential. Participants will also be provided with a description of energy saving actions they can take to maximize the amount of energy saved through their participation in the Program. Consumer education will also be the focus at point-of-purchase locations through NYSERDA’s mid-stream **New York Energy SmartSM** Products Program initiative.

Underserved Markets. The selection of the Program participants will depend on the selection process of the utilities. Power management devices priced for residential usage are just beginning to enter the retail marketplace and are not widely used. This program will introduce more power management tools into the retail marketplace through the **New York Energy SmartSM** Products Program. Numerous retail locations, currently partners in the Program, sell consumer electronics, home security and communication systems. NYSERDA will work with manufacturers to make new products available at reduced prices to the retail locations.

Commitment. The Program will be in effect through 2011. Little ramp up times is anticipated to implement the program as NYSERDA has existing partnerships in place with manufacturers and retailers.

Customer Outreach. The **New York Energy SmartSM** Products Program will leverage its existing efforts in recruiting retailers and manufacturers for the Program. Retail partners will be provided with in store sales staff training on the benefits of power management tools and energy-saving actions, in addition to providing free point-of-purchase materials and signage.

NYSERDA will collaborate with partner utilities on educational information for participants that will include instructions on how to maximize the energy saving capabilities of the products; energy savings actions that can be taken in their homes, and information on additional power management tools they may consider. A more generic educational message will be delivered to non-participants by NYSERDA through print media, public service announcements, and local television segments.

Collaborative Approach. To date, certain utilities have expressed an interest in participating with NYSERDA on this pilot and NYSERDA considers this type of collaboration an integral part of the Program. NYSERDA will work with interested utilities to finalize the scope and responsibilities of both parties.

Fuel Integration. Some heating system savings may be achieved as a result of increased use of household control systems, although the primary target of the program is electric savings.

Transparency. A final report will be made available to the public for the review on the results of the PMPP. Program results will be made available by NYSERDA on its website. It is anticipated that a successful pilot may lead to an updated design for future consideration by the Public Service Commission. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Contractors needed to support this Program have been competitively selected to implement the **New York Energy SmartSM** Products Program.

6.2. EVALUATION.

Evaluation Goals

The primary evaluation goal for NYSERDA component of the Power Management Pilot Program is to verify anticipated program savings due to sales of power management devices. Secondary evaluation

goals include investigating key market actor awareness, knowledge, satisfaction and perceptions of the devices; identifying market barriers to full-scale implementation of the power management devices; developing a program theory and logic model for the pilot; and establishing a baseline for power management devices to inform program planning and design. NYSERDA will also coordinate with utilities to participate in the pilot.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Power Management Pilot and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects the evaluation budget for the Power Management Pilot Program to be approximately equal to 5% of the program funding, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. It is expected that the NYSERDA component of the Power Management Pilot Program evaluation budget will be designed to account for the specific needs of the program, and be allocated mostly to market evaluation (65%) and process evaluation (35%).

Impact evaluation to estimate savings due to the installation of power management devices are anticipated to be conducted by participating utilities, but developed in consultation and coordination with NYSERDA. As utilities are identified for participation in this pilot, NYSERDA will coordinate with them to identify the breadth and depth of these M&V activities. Given likely overlap in estimated savings between the utility's downstream activities and NYSERDA's mid- and up-stream activities, NYSERDA and participating utilities will need to make a determination prior to pilot implementation to avoid double counting and establish appropriate allocation of energy savings.

Should this program be expanded statewide, additional discussions will be held to determine the best way to expand program implementation and evaluation activities on a large-scale basis.

Evaluation Schedule

Evaluation studies included as part of the Power Management Pilot Program evaluation plan are shown in the table below along with the time frame for their anticipated completion. Market evaluation will be conducted in 2009 and process evaluation in 2010. NYSERDA proposes conducting a follow-up market study in 2011 to identify changes in the power management market and assess progress toward program goals.

NYSERDA proposes that utilities attempting to estimate savings related to homeowner installation of these devices conduct M&V evaluation in 2011, but the exact time frame for that work will be determined based on discussions between participating utilities and NYSERDA.

Table IV-31. Power Management Pilot Program: Evaluation Schedule 2009-2012

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)			X	
Net-to-Gross (Impact)				
Process Evaluation		X		
Market Evaluation	X		X	

Impact Evaluation

Measurement and Verification

Measurement and verification conducted to estimate savings based on consumer use of power management devices will be included as part of utility evaluation plans; however, M&V activities will be developed with NYSERDA coordination and input. Given likely overlap in estimated savings, NYSERDA and participating utilities will need to make a determination prior to pilot implementation to be sure double counting is avoided and appropriate allocation of savings is identified.

Net-to-Gross

Because this is a pilot program for devices that are not readily available in the market, it is not anticipated that net-to-gross analysis will be conducted; however, a final decision will be made upon discussions between NYSERDA and participating utilities.

Process Evaluation

NYSERDA proposes conducting a small-scale process evaluation of NYSERDA staff and program implementation staff, participating end-use customers, retailers and manufacturers to gauge awareness of the pilot, satisfaction with the equipment, perceptions of energy management systems, how people use the devices, and perceived market barriers to full-scale implementation⁶¹. Retailers and manufacturers will also be contacted to assess their perceptions of the product(s), the market readiness of the product(s) and the potential approaches that are being used to market the products. End-user participants who try the devices will be surveyed about their experiences with the products; data from these surveys can potentially be integrated into the anticipated impact evaluation, depending on the number of participants.

Depending on the number of homes participating in the pilot, a census sample may be taken. Otherwise, sample sizes will be chosen to meet a 90/10 confidence/precision level for the pilot. However, most results from the process evaluation effort are likely to be qualitative in nature, so the primary objective may be to sample to ensure a systematic and meaningful understanding of the technology can be obtained. The process evaluation will be conducted in 2010 after participants have begun using the devices and are able to provide their opinions of them.

⁶¹ It is possible that samples for participating end-user customers may not attain 90/10 confidence and precision depending on how homeowners participate in the program. If participant contact information cannot be attained from the utilities, alternative methods of obtaining participant data may need to be considered to collect usage information, including providing retailers with invitations for participating homeowners to provide NYSERDA with data regarding their awareness, knowledge and use of these power management devices.

Market Evaluation

An initial task in the market evaluation is to develop a program theory and logic model to ensure that expected program outputs and outcomes and associated measurement indicators are clearly defined.

This market evaluation will include an assessment to generate unit sales estimates for the power management devices promoted through this pilot and to estimate energy savings attributable to NYSERDA's mid- and up-stream efforts with retailers and manufacturers. This analysis will be similar to the analysis conducted on NYSERDA's **New York Energy \$martSM** Products Program to estimate unit sales and energy savings and will rely on primary and secondary data. For example, interviews with manufacturers could be conducted to obtain estimates of New York and nonprogram state power management device shipment data. In addition, interviews with retailers could be conducted to identify the presence of power management devices in stores. NYSERDA and the utilities will determine if the sales data from manufacturers and the units the utilities are responsible for overlap, and possibly subtract the latter from sales estimates. A follow-up to this effort will be conducted to assess increased availability and the extent to which increased availability is due to NYSERDA's efforts. The program theory and logic model and initial market assessment will be conducted in 2009 with the follow-up market assessment conducted in 2011. NYSERDA, if possible, will also examine customer survey data collected by the utilities and adjust its education and marketing accordingly.

In addition, NYSERDA proposes conducting a baseline study of consumer awareness and understanding of the power management devices promoted through this pilot. Since this program is anticipated to be implemented Statewide, NYSERDA believes this type of baseline study would benefit all EEPS program administrators and therefore proposes that it be undertaken in a jointly-funded manner with all program administrators contributing. The full study, including both the site visit and survey components, cannot be conducted by NYSERDA alone within the evaluation budget for the Power Management Pilot Program. If the power management baseline is not ultimately selected as one of the statewide studies to be funded by all program administrators, then NYSERDA could develop the program theory and logic model and conduct the telephone interview component described above, but not the site visits.

Surveys with market actors should meet 90/10 confidence/precision at the program (i.e., statewide) level. If budget permits, the sample could be increased to meet 90/10 at the utility territory level. Data collection and analysis will be conducted by NYSERDA's independent contractors according to established evaluation protocols. NYSERDA recommends conducting the proposed baseline study in 2009. A follow-up study would then be conducted in 2011 to determine any changes in the power management market and examine progress made toward achieving the expected outputs and outcomes specified in the program theory and logic model.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. With a decrease in resources, NYSERDA would eliminate the process evaluation. With an increase in resources, NYSERDA would include a larger market study to explore market opportunities and potential and establish a New York State baseline prior to full scale implementation, as well as an expansion of the process evaluation to conduct in-person interviews with end users who use the devices to explore their experiences and how they actually use the devices in their homes.

6.3. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Power Management required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table IV-32. Power Management: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	10	46.4	4.4	--	38%

Table IV-33. Power Management: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
Electric Funding Only	\$3.2	\$9.2	\$40.5

Table IV-34. Power Management: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	12.7	4.4

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$2.9 Million.

Table IV-35. Power Management: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	13.6	4.7

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 46,365 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 4.4 MW (cumulative) of coincident peak reduction in 2015.⁶²

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 1.2.⁶³

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

NYSERDA has projected the number of sales of products and not the numbers of customers. The projected number of sales transactions per year is 33,575.

⁶² NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁶³ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

7. REMODEL WITH ENERGY STAR (ELECTRIC FUNDING)

Program Elements

Program Description. The ReModel with ENERGY STAR Program is designed to target a large sector of the residential market that is, as yet untapped. While currently offered whole-building programs address new construction, HVAC systems, insulation, and renewable energy technologies, none adequately address the renovation of specific living spaces within a home. With the decrease in new construction starts for economic reasons, increased opportunities exist for home renovation. As NYSERDA partners with the New York State Builder's Association, with a membership of thousands of remodeling firms, the Program is designed to seamlessly integrate with the current business model of these firms, to further minimize barriers.

NYSERDA recognizes that some utilities may offer rebates on specific products that may be included in a remodeling effort. The intention is to ensure comprehensive remodeling projects place a higher priority on efficiency, and not to compete with rebate programs. Where utility rebates are offered, NYSERDA will coordinate offerings with the utilities by:

- offering targeted incentives to both customers and participating remodeling contractors for incorporating highly efficient products in their remodeling projects.
- obligating participating remodeling contractors to present energy efficient lighting, appliance, ventilation and domestic hot water options to homeowners;
- requiring customer education on the benefits of comprehensive energy saving techniques and other efficiency programs offered by NYSERDA and utilities for which the homeowner may be eligible.
- offering tiered incentives based on deemed energy savings, with the most efficient packages garnering the greatest incentives. A detailed list of eligible measures and technical specifications⁶⁴ will be included in the program information packet and application.

NYSERDA will encourage the participants in this Program to also participate in the Home Performance with ENERGY STAR Program, or in the case of certain condominiums, the Multifamily Performance Program. Incentives will be available to participating Remodel with ENERGY STAR contractors whose projects result in additional building performance work. These incentives will be structured to reward contractor networking and homeowner education that results in further energy savings.

Demand Reduction and System Benefits. Peak demand savings in 2011 are estimated to be approximately 5,521 kW for installed measures with total cumulative MWh reductions of 13, 311.

⁶⁴ Examples of specifications for measures include the following: ENERGY STAR® qualified refrigerator, clothes washer, or bathroom ventilation fans; CEE Tier II dishwasher; and a minimum of 80% of all replaced lighting to be ENERGY STAR qualified light fixtures. Additional specifications will be established for whole house and other point ventilation and water heating and management.

Table IV-36. ReModel with ENERGY STAR: Total Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$3.69M	\$3.78M	\$3.89M	0	0	0	0	\$11.36M
Projected Outreach/Marketing costs: \$792,500 in 2009; \$634,000 in 2010; and \$475,500 in 2011.								

Table IV-37. ReModel with ENERGY STAR: Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	3,651	4,458	5,202	0	0	0	0
Annual Savings installed in prior years	n/a	3,651	8,109	13,311	13,311	13,311	13,311
Cumulative Annual Savings	3,651	8,109	13,311	13,311	13,311	13,311	13,311

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. This market is largely untapped in NYSERDA's current portfolio of energy efficiency programs, as many projects have resulted primarily from the need for repairs or replacements of existing HVAC and building shell systems. These efforts often start with an outdated heating or cooling system, or a desire for new windows rather than significant remodeling activities. The potential electric savings related to new appliances, lighting, ventilation, cooling and bathroom fixtures result in a tremendous opportunity for energy savings. A downturn in new housing starts has resulted in many builders turning to remodeling as a business model. These increased opportunities for reaching the remodeling segment of the real estate market are supported by NYSERDA's partnership with the New York State Builders Association (NYSBA), and this Program was designed with significant input from NYSBA.

Coordination. This Program builds on the infrastructure of the New York ENERGY STAR Homes Program. The ENERGY STAR and Consortium for Energy Efficiency product standards set forth in this Program are determined at the national level, presenting no coordination issues at the state level. NYSERDA intends to promote this program Statewide and through its extensive network of program partners, further reducing the likelihood of customer confusion.

NYSERDA will work with the electric utilities to maximize their customer offerings and programs, while reducing customer confusion, duplication of services, and administrative expenses. In regions where a

utility offers rebates on specific products installed through this Program, coordination with the utility on rebate incentive levels, contractor training, marketing, comprehensive work scopes, and sharing of customer information will ensure customers the ability to obtain rebates and ensure no duplicate incentives are paid for the same energy savings measure.

Co-Benefits. Some of the co-benefits of highly efficient appliances such as clothes washers and dishwashers are that they save significant amounts of water, require less detergent, and reduce clothes drying time. This Program will also encourage the promotion of complementary NYSERDA programs, such as Home Performance with ENERGY STAR, to further maximize energy savings opportunities while advancing health and safety measures in homes.⁶⁵ Contractors participating in the program will be encouraged to participate in continuing education on topics such as improved lighting design, ventilation techniques and other aspects of making a home more comfortable for its occupants.

Portfolio Balance. This Program is designed to complement the ENERGY STAR Products Program, the New York ENERGY STAR Homes Program, and Home Performance with ENERGY STAR. Coordination between these programs will result in expanded work scopes and comprehensive energy savings. Currently, appliance and lighting upgrades are included as eligible measures in the Home Performance Program, however these upgrades are often overlooked by contractors who specialize in HVAC or building shell systems. To address this issues, this Program will engage builders and contractors who specialize in remodeling kitchens and bathrooms, and become another tool for them to offer their customers to highlight these additional savings opportunities.

Depth of Savings. Only comprehensive projects that use an array of energy saving appliances, lighting, fixtures and other technologies will be allowed through this Program. Rather than a program that provides an incentive for replacing a single item, this Program will focus on the entire work scope and further instill the concept that comprehensive efforts have the greatest energy savings effect.

Underserved Markets. NYSERDA is currently unaware of any program that addresses this market segment.

Commitment. No significant ramp-up time for this Program is anticipated, as it will build on NYSERDA's existing relationships in the market. This Program is centered on making better replacement equipment selections, such that contractors and home builders can easily use this program to supplement work already underway.

Customer Outreach. The marketing and outreach strategy will build upon strong alliances with energy service providers, home improvement contractors, and builders to further grow the energy efficiency industry in New York. NYSERDA's established contacts and relationships with trade associations, news stations, and product distributors will be used.

NYSERDA's GetEnergySmart.org website, a clearinghouse for all of NYSERDA's residential energy efficiency programs, will feature all pertinent information for builders, contractors, and homeowners interested in the Program. NYSERDA's regional implementation contractors, such as the **New York Energy \$martSM** Communities Coordinators, will provide program outreach services, attend local trade fairs, and assist in contractor and customer recruiting into the Program. NYSERDA will also coordinate

⁶⁵ For example, Home Performance with ENERGY STAR work resulting from a Remodel with ENERGY STAR project may include improved insulation, renewable technologies such as geothermal heat pumps, or other heating system upgrades- any of which would result in fossil fuel savings in addition to the electricity savings achieved through the program

marketing activities with utilities, co-branding where appropriate, and cross-marketing, where appropriate.

Collaborative Approach. This Program has been designed with input from the New York State Builders Association, a trade organization representing the interests of builders and contractors in New York State.

Fuel Integration. This Program will focus specifically on electric reduction measures. However, participants will be encouraged to avail themselves of the Home Performance with ENERGY STAR and the Multifamily Performance Program to facilitate additional savings attributable to HVAC and building shell systems.

Transparency. Information regarding the program, including program design, benefit/cost analysis, and supporting data, will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Implementation, marketing and other program services contractors are chosen through NYSERDA's competitive procurement process.

7.2. EVALUATION.

Evaluation Goals

The primary goal of the evaluation effort will be to achieve a high level of rigor and reliability for net savings, which is believed to be the greatest source of uncertainty in the overall savings estimate for this program. Gross savings will not be specifically examined since reasonable deemed savings values for most measures in the program are available either from NYSERDA or from other sources. Assessing net savings is an important issue since it is possible that consumers undertaking remodeling projects may choose ENERGY STAR appliances in the absence of the program. Given this, and because of a relatively modest evaluation budget, NYSERDA will focus efforts on measuring net savings, while relying on deemed values for gross savings.

Secondary to the goal outlined above, since this is a new program, the evaluation effort will also aim to provide information useful for developing and marketing the program. Activities are expected to include: developing a program theory and logic model to assist in program design and planning; assessing market actor interest and perceptions of the program; and conducting a baseline study of the remodeling market, including identifying key market actor groups to target and the prevalence/potential of home remodeling.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Remodeling with ENERGY STAR Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented, once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects the evaluation budget for the Remodel with ENERGY STAR Program to be approximately equal to 5% of the program funding level, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. In order to effectively evaluate the Remodeling with ENERGY STAR Program, it is anticipated that approximately 30% of evaluation funding will be allocated to impact evaluation, 10% to process evaluation, and 60% to markets evaluation. Further, it is anticipated that findings resulting from the markets evaluation (e.g., baseline analysis) will inform the impact evaluation.

Evaluation Schedule

The evaluation of Remodeling with ENERGY STAR will consist the major studies shown in the table below according to the time frame for their expected completion. Net-to-gross ratios will be examined retrospectively around the mid-point in 2010 and again at the conclusion of the funding period in 2012. One process evaluation will occur in 2010. Market evaluation will occur around the time of the program launch in 2009 and will be repeated again in 2011.

Table IV-38. ReModel with ENERGY STAR: Evaluation Schedule 2009-2012

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)		X		X
Net-to-Gross (Impact)		X		X
Process Evaluation		X		
Market Evaluation	X		X	

Impact Evaluation

Measurement and Verification

The planned M&V activities will involve analysis of the detailed project files available through the program. For individual measure savings, the evaluation will likely rely on deemed savings estimates, which could be derived from other NYSERDA evaluations (e.g., for lighting measures) or from other sources (e.g., DOE figures on appliance energy use). To further support appropriate baseline identification, the M&V could also use values derived from the proposed baseline study of remodeling practices or surveys with contractors and retailers to identify measures usually installed in remodeling projects (see Market Evaluation).

NYSERDA will aim to measure and verify program energy savings at 90/10 confidence/precision statewide. If budget permits, 90/10 confidence and precision could be achieved at the utility territory level. Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols. The M&V will be conducted in 2010 and again in 2012.

Net-to-Gross

NYSERDA intends to explore participant and non-participant spillover and participant freeridership through an enhanced self-report survey process with multiple decision-makers including homeowners and contractors involved in installing and promoting energy-efficient measures. Examinations will be made to assess self-selection bias between the participating and non-participating matched groups. These alternative methods will be used to derive a final triangulated net-to-gross (NTG) ratio with a high level of construct validity.

Sample sizes will be calculated to meet 90% confidence and 10% precision statewide. If budget permits, 90/10 confidence and precision could be achieved at the utility territory level. Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols.

The schedule for conducting attribution analyses will occur in tandem with M&V activities—that is, in 2010 and again in 2012.

Process Evaluation

Planned process evaluation activities include interviews with NYSERDA staff, staff from utilities possibly offering complementary programs, and participating and nonparticipating contractor/remodelers and homeowners. Key issues for the process evaluation will be the effectiveness and efficiency of program processes in reaching remodelers and eligible homeowners, satisfaction with the program, and contractor and homeowner decision making processes about the ENERGY STAR features.

Samples for the process evaluation effort will be drawn from sources such as program databases, program records, etc. As appropriate, the evaluation will aim to achieve 90/10 confidence and precision for all quantitative data statewide. To the extent possible, the results will be differentiated by downstate and upstate activities. Data collection and analysis will be conducted by independent contractors following established data collection and evaluation protocols. Issues identified during the process evaluation will be generated into actionable recommendations and provided to NYSERDA. Follow-up will occur with program staff to address the recommendations. The initial process evaluation is expected to occur early in 2010.

Market Evaluation

An important part of any program evaluation is a thorough understanding of the market environment in which the program is operating. The market evaluation for Remodeling with ENERGY STAR will first involve development of a program theory and logic model. Then, through its independent evaluation contractors, NYSERDA will undertake surveys of various market actors such as contractor/remodelers, homeowners and retailers to characterize the market, identify measures usually installed in remodeling projects, identify standard practices and efficiency levels and examine progress made toward achieving the expected outputs and outcomes specified in the program theory and logic model. The identification of measures typically installed in remodeling projects is also expected to serve the impact evaluation of the Remodeling with ENERGY STAR program. A study of this type and magnitude would require participation by other EEPs program administrators. Should this study be undertaken with additional EEPs program administrators, it is anticipated that surveys with market actors would meet 90/10 confidence/precision statewide. Data collection and analysis will be conducted by NYSERDA's independent contractors according to established data collection and evaluation protocols.

NYSERDA recommends developing the program theory and logic model and conducting the proposed baseline/market potential study in 2009. A follow-up study would then be conducted in 2011 to assess

changes in the home remodeling market due to the program and examine progress made toward achieving the expected outputs and outcomes specified in the program theory and logic model.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. If evaluation funding dedicated to this specific program needed to be reduced, Market and Impact Evaluations would occur once instead of twice. With an enhanced budget, the baseline study of the remodeling market could be expanded and 90/10 confidence/precision may be attained for additional market segments (e.g., upstate/ downstate or individual utility service territories).

7.3. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Remodeling with Energy Star Program required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table IV-39. Remodel with ENERGY STAR: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	13	13.3	5.5	--	5%

Table IV-40. Remodel with ENERGY STAR: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
Electric Funding Only	\$12.0	\$14.9	\$17.0

Table IV-41. Remodel with ENERGY STAR: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	1.4	1.1

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$1.0 Million.

Table IV-42. Remodel with ENERGY STAR: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	1.5	1.2

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 13,300 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 5.5 MW (cumulative) of coincident peak reduction in 2015.⁶⁶

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.28.⁶⁷

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

Table 5 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

⁶⁶ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁶⁷ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

Table IV-43. Remodel with ENERGY STAR: Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Residential - Electricity	6,240,788	9,750	0.2%

Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as “non-residential”. Commercial and industrial customers estimated by NYSERDA.

8. RESIDENTIAL GREEN HOMES INCENTIVE PROGRAM (ELECTRIC AND GAS FUNDING)

8.1. PROGRAM ELEMENTS

Program Description. The Residential Green Homes Incentive Program is a market transformation initiative designed to change building practices of the residential building industry for single and multifamily, new construction and complete residential rehabilitation projects.

The Program⁶⁸ is designed to provide financial incentives to new homeowners who decide to "go green" when building a new home or extensively renovating an existing home. Builders and homeowners who take advantage of the new incentives will reduce energy and greenhouse gas production and preserve natural resources. Other benefits are lower material costs, reduced waste, improved indoor air quality, and reduced indoor and outdoor pollution.

The Program is based on NYSERDA's New York ENERGY STAR® Homes Program which includes a third-party rating system, third-party verification process, and comprehensive quality assurance program. It is anticipated that the Green Homes Incentive Program will capitalize on the work of the American National Standards Institute, the National Association of Home Builders, and the U.S. Green Building Council in the Leadership in Energy and Environmental Design (LEED-H) program to set the definition of "green" for new home construction.

The Program addresses residential buildings of up to 12 dwelling units. In New York, over 17,400 single-family homes and 8,000 multifamily building units (2 units or more) were built in 2007, in addition to a substantial number of rehabilitation projects.⁶⁹ NYSERDA has an 11% participation rate in its ENERGY STAR Homes program within the one-to-four family new construction market. There is currently no ENERGY STAR qualification standard for five-to-twelve unit buildings; however a review of data regarding LEED certifications for buildings of this size, as well as information from NYSERDA's Multifamily Performance Program will be accomplished during the program preparation phase to better characterize market potential.

The Program will provide incentives to the building owner once the home receives a certificate of occupancy and a third-party certification that it meets the green standards established for the Program. The demand for the Program could be significant, although participation rates for substantial rehabilitation projects are expected to be lower in the earlier stages of the Program, but increase rapidly as market awareness increases.

NYSERDA will obtain contracted services through competitive processes for infrastructure development, project verification, program implementation, incentive processing, quality assurance, technical assistance, marketing and consumer education.

⁶⁸ Legislative bill A. 10684, introduced on April 23, 2008, sponsored by Assemblyman Cahill. The program preparation phase is expected to last through 2009 and will include a rulemaking process subject to public comment. Outcomes of the preparation phase include distinct rules and regulations for program qualification, incentive levels, standards specifications and criteria for verification. The program budget submitted in this proposal does not request funding for this preparation phase.

⁶⁹ Rehabilitation projects are not tracked by census, and often not through local building permits; therefore total production for this market is unknown.

Demand Reduction and System Benefits. Total cumulative MWh reductions of about 800. Marketing will target all areas, with a particular focus on new construction and rehabilitation markets in load constrained areas.

Table IV-44. Green Homes: Total Program Expenditures (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	0	\$3.41M	\$3.41M	0	0	0	0	\$6.82M
Electric Funding	0	\$0.31M	\$0.31M	0	0	0	0	\$0.62M
Gas Funding	0	\$3.1M	\$3.1M	0	0	0	0	\$6.2M
Projected Outreach/Marketing costs: \$310,000 in 2010 & 2011.								

Table IV-45. Green Homes: Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	0	400	400	0	0	0	0
Annual Savings installed in prior years	0	0	400	800	800	800	800
Cumulative Annual Savings	0	400	800	800	800	800	800

Table IV-46. Green Homes: Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	0	17,645	17,645	0	0	0	0
Annual Savings installed in prior years	n/a	0	17,645	35,290	35,290	35,290	35,295
Cumulative Annual Savings	0	17,645	35,290	35,290	35,290	35,290	35,290

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. This Program will build upon the successes of NYSERDA's current portfolio of energy efficiency programs where NYSERDA teams with builders and raters to facilitate the construction of ENERGY STAR qualified homes. The New York ENERGY STAR Homes program which provides incentives to builders to encourage energy efficient building practices and requires a third party rating. It is expected that more than 14% of new homes constructed in SBC territory will be completed through the New York ENERGY STAR Homes Program in 2008. However, although energy is an important issue, the "buzz word" in the market is "green," the concept of green construction incorporates a larger scope than is included in energy efficiency efforts. Reductions in energy use are essential for evaluating the program, but a "green" designation will include requirements for materials, location, orientation, design and construction. The increasing emphasis on green homes and products will certainly result in a significant increase in interest in both energy efficient homes and products. Every (one-to-four family) home that meets the standards set forth in this Green Homes Incentive Program will also earn the New York ENERGY STAR Home designation, and it is anticipated that this Program will increase market share of ENERGY STAR qualified homes in New York State by as much as 2 %.

Coordination. This Program builds on the infrastructure used in NYSERDA's New York ENERGY STAR Homes Program and the Multifamily Performance Program. The standards used in the Green Homes Incentive Program will be designed in the preparation phase, but are expected to be based on national standards to the extent possible. The program will rely on the Workforce Development initiative to support builder and verification personnel training. Marketing and outreach will be coordinated with utilities to the extent possible to target construction in load pockets, as well as with any other green incentive programs in order to maximize results. For example, through the Enterprise-NYSERDA Collaborative New Construction Grant Program, Enterprise will provide grants of up to \$25,000 for new construction and substantial rehabilitation projects in New York to offset the soft-costs associated with improving the energy and environmental performance. Projects must both participate in NYSERDA's Multifamily Performance Program (MPP) and meet Enterprise's Green Communities Criteria to be eligible.

Co-Benefits. Green homes have numerous benefits such as the following: increased indoor air quality, which will have significant health benefits for the home's occupants; more comfortable homes; decreased energy-use in construction practices; environmental benefits from reduced emissions and use of sustainable materials; decreased impact on the building site due to intelligent design; decreased transportation impacts due to construction site choices and access to public transportation; reduced water consumption and more efficient use of water resources; and less ground water contamination.

Portfolio Balance. This Program complements the highly successful New York ENERGY STAR® Homes and Multifamily Performance Programs and encourages new construction and substantial rehabilitation projects participating in those programs to include green building aspects. As there is a growing demand for "green" buildings and not only energy-efficient buildings, it is expected that there will be increased participation in the ENERGY STAR Homes Program and Multifamily Performance Program, as those seeking to build green look for opportunities to help offset the increased cost. Differing from the New York ENERGY STAR Homes Program that focuses on builders, the Green Homes Incentive Program will target the homeowner, providing a complementary approach.

Depth of Savings. Certification standards will establish a high goal for energy savings, meaning that appliances, lighting, fixtures, heating and cooling systems, insulation and construction practices will have to meet aggressive targets in a comprehensive manner. This Program will focus on the entire home and will educate customers that comprehensive approaches have the greatest effect.

Underserved Markets. Current US census data reports over 17,400 single family homes and 8,000 multifamily building units (2 units or more) were built in 2007 in NYS, in addition to a substantial number of rehabilitation projects. Due to the large number of small builders, and relatively small number

of production builders in the state, growth of energy efficient construction has been slower than other parts of the country, but steady. In 2007, 11% of one-to-four family homes earned the ENERGY STAR label, leaving much untapped potential for improving the energy efficiency of the residential new construction market. By providing incentives for green construction, a growth area, it is expected that market penetration will be dramatically increased.

Commitment. It is anticipated that this program will have immediate participation beginning on the expected start date of January 1, 2010. NYSERDA is particularly confident given that the program builds on the existing infrastructure of two successful programs. This additional lead time will provide opportunity to develop the administrative components of the program, as well as personnel training for builders and verification staff.

Customer Outreach. NYSERDA's marketing and outreach strategy will build upon its strong alliance with the New York State Builder's Association and its Research and Education Foundation, local builder's associations, individual builders, developers, and the existing rater network, to further grow the energy efficiency industry in New York. NYSERDA will also use established contacts and relationships with trade associations, television stations, radio channels, and products distributors to quickly reach a large customer base. Program marketing will focus on the growing demand for green homes and products, and will educate consumers and potential homeowners on the requirements for meeting the green standards. The Program will coordinate with utilities to the extent possible to target high-growth regions and load pockets within their service territories.

It is expected the demand for a "green" home will result directly from homeowner interest. Homeowners constructing high-efficiency, environmentally-responsible homes are generally more involved in all aspects of the home's construction than the typical new home buyer.

NYSERDA's GetEnergySmart.org website currently functions as the clearinghouse for all of NYSERDA's residential energy efficiency programs. This website will include information on the Green Homes Incentive Program and will feature all pertinent information to for builders, contractors, and homeowners interested in the Program.

Collaborative Approach. This Program was designed with significant input from the New York State Builders Association. Other organizations, such as the American National Standards Institute, National Association of Home Builders, and the U.S. Green Building Council (LEED-H) will also be integral to the success of the program. The final program design will include stakeholder input through a public process. NYSERDA will work closely with utilities to target high-growth regions within their service territory, and to co-market the program.

Fuel Integration. This Program will focus on all fuels and it is expected that overall energy use for each participant building will be dramatically decreased.

Transparency. Information regarding the program, including program design, benefit/cost analysis, and supporting data, will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. NYSERDA will use contracted services through competitive processes for infrastructure development, project verification, program implementation, incentive processing, quality assurance, technical assistance, marketing and consumer choice.

8.2. EVALUATION.

Evaluation Goals

Similar to other proposed EEPS programs, providing reliable and rigorous evaluation of energy savings impacts will be a top priority for the Green Homes Program evaluation. Secondary evaluation goals related to the Green Homes program include assessing implementation strengths and weaknesses associated with this new program, and assessing the potential for “green” homes in New York. Final evaluation goals are dependant, to some extent, on how “green” is defined for the Green Homes Program.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA’s current plans for the design and administration of the Green Homes Program and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA’s estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects the evaluation budget for the Green Homes Program to be approximately equal to 5% of the program funding level, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. In order to effectively evaluate the Green Homes Program, it is anticipated that approximately 45% of evaluation funding will be allocated to process evaluation and 45% to markets evaluation. In addition, 10% of evaluation funding will be allocated to supplement existing SBC-program impact evaluation activities. Specifically, since each new one-to-four family Green Home will be designated as an ENERGY STAR home, NYSERDA proposes to conduct Green Homes impact evaluation as part of the existing New York ENERGY STAR Homes SBC-funded evaluation. Similarly, for Green Homes with 5-12 dwellings, impact evaluation will be conducted as part of the existing Multifamily Performance Program using both SBC and EEPS evaluation funds. By leveraging the existing SBC-program impact evaluation activities, only a modest portion of the program evaluation budget for Green Homes needs to be allocated to impact evaluation to attain the high level of confidence/prevision and reliability that is being sought for EEPS programs.

Evaluation Schedule

As shown in the table below, the Green Homes Program evaluation effort will involve two major process evaluation studies and two major market evaluation studies, each timed to provide the greatest value for program implementation and decision making. As noted, impact evaluation, including measurement and verification and net-to-gross analysis, are important components of evaluating the Green Homes Program. These efforts will be timed to maximize overall coordination with and leveraging of impact evaluations being planned for the existing SBC-funded programs. At this time, a specific time for completion of these studies cannot be specified.

Table IV-47. Green Homes Evaluation Schedule 2009-2012

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)	TBD			
Net-to-Gross (Impact)	TBD			
Process Evaluation		X		
Market Evaluation	X		X	

Impact Evaluation

Measurement and Verification and Net-to-Gross

As described above, impact evaluation (e.g., billing analyses and site visits) on the Green Homes Program will be conducted as part of the existing New York ENERGY STAR Homes and Multifamily Performance Program evaluations funded by SBC and EEPS electric funds. Ten percent of Green Homes evaluation funding will be used to supplement these existing evaluation activities which may include billing analysis, site visits, and enhanced self-report survey methods for ascertaining attribution.

Process Evaluation

Given that the Green Homes Program is a new initiative, expected process issues to address through interviews with NYSERDA staff, implementation staff and participating partners include: ease of administrative process, market actor interest in program participation, and end-user interest and satisfaction. The program administrative processes (e.g., efficiency and effectiveness of the process, identifying and addressing potential threats to data reliability), will be a key focus of the 2010 process evaluation. Should the program be extended beyond 2011, a second process evaluation may be conducted to examine how effectively the program has addressed recommendations from the initial process evaluation, and to explore how the certification process has been working. In addition, the process evaluation will examine end-user and contractor satisfaction across the two years of implementation.

The process evaluation will involve a census attempt for interviews with program and implementation staff. Samples of participating contractors and end-users will be drawn to meet the 90/10 confidence and precision level. Data collection and analysis will be conducted by NYSERDA's independent contractors following established evaluation protocols. The process evaluation will provide actionable recommendations in an effort to improve the program, which will be especially important as NYSERDA considers offering the program statewide.

Market Evaluation

The market evaluation effort will involve working with program staff to develop a new program theory and logic model to ensure that expected program outputs and outcomes and associated measurement indicators are clearly defined. The final program theory and logic model will then guide subsequent evaluation efforts.

An important evaluation element for this Green Homes Program, supporting both market and impact evaluation efforts, is a baseline and market potential study focusing on residential new construction and rehabilitation practices, prevalence of green building activity in these markets, and renewable energy technology installation rates. Interviews will likely be conducted with a sample of new homebuilders and homeowners to assess common practices in homes designated as "green" and examine progress made

toward achieving the expected outputs and outcomes specified in the program theory and logic model. A sub-sample of home owners interviewed could be selected to conduct site visits and assess whether the home is performing as expected.

NYSERDA asserts that this type of baseline study would benefit all EEPS program administrators and therefore proposes that it be undertaken in a jointly-funded manner with all program administrators contributing. The full study, including both the site visit and survey components, cannot be conducted by NYSERDA alone within the evaluation budget for the Green Homes Program. If the residential green buildings practices baseline is not ultimately selected as one of the statewide studies to be funded by all program administrators, then NYSERDA could develop the program theory and logic model and conduct the telephone interview component described above, but not the site visits.

Surveys with market actors should meet 90/10 confidence/precision at the program (i.e., statewide) level. If budget permits, the sample could be increased to meet 90/10 at the utility territory level. Data collection and analysis will be conducted by NYSERDA's independent contractors according to established evaluation protocols. NYSERDA recommends conducting the proposed baseline study in 2009. A follow-up study would then be conducted in 2011 to determine any changes in the residential green building market and examine progress made toward achieving the expected outputs and outcomes specified in the program theory and logic model.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. With an increase in resources, NYSERDA would conduct a broader market evaluation including increased sample sizes as well as an increased number of site visits. With a decrease in resources, the process evaluation would be reduced. Samples sizes would likely decrease and the level of detail sought through the interviews and surveys would be reduced.

8.3. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Green Homes Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below shows the resource savings and average measure life used as inputs for the benefit/cost analysis, shows the present value of the costs and benefits used in the analysis, the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs. The Green Homes Program benefit/cost analysis was based on the combined electric fast track funding and gas funding requested in this proposal.

Table IV-48. Green Homes Program: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2010-2011	13/18	0.8	0.1	35,300	5%

Table IV-49. Green Homes Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
With Electric and Gas Funding	\$7.1	\$4.7	\$7.3

Table IV-50. Green Homes Program: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	1.0	1.6

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$100,000. Only the carbon reduction from electricity and natural gas savings was included.

Table IV-51. Green Homes Program: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	1.0	1.6

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 800 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 0.067 MW (cumulative) of coincident peak reduction in 2015.⁷⁰

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 1.36.⁷¹

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

The table below shows the number of expected program participants as a percentage of the number of customers in the residential class, although a much smaller population is expected to be building a home in any given year. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table IV-52. Green Homes Program: Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class ¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Residential - Electricity	6,240,788	975	Negligible
Residential – Natural Gas	4,095,085	975	Negligible

¹ Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

⁷⁰ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁷¹ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

9. EMPOWER NEW YORKSM (NATURAL GAS)

9.1. PROGRAM ELEMENTS

Program Description. Under the June 23, 2008 Order, the EmPower Program will be allocated \$8 million annually to provide electric efficiency services to low income households. Approximately 20% of program completions to date include home performance measures, supported by the SBC and by voluntary participation of three gas utilities.⁷² NYSERDA is proposing additional funding to target cost-effective natural gas efficiency measures such as insulation, blower-door assisted air-sealing, heating system repair and replacement, and health and safety measures for households who will receive electric efficiency measures funded under “Fast Track.” This funding will allow for the continuation and expansion of services to natural gas customers Statewide through 2011. This program will prioritize cost-effective efficiency measures for low-income households with high energy costs.

Natural gas distribution customers that live in residential buildings with 100 units or less, and either participate in a utility payment assistance program, or have a household income below 60% of state median, will be eligible at no cost to the customer. In rental units, measures that directly benefit the eligible tenant are permitted without landlord contribution. Additional measures generally require a 25% landlord contribution. The energy efficiency services are delivered by a mix of nearly 100 private contractors and Weatherization Agencies accredited by the Building Performance Institute (BPI).

Demand Reduction and System Benefits. Participants will receive electric reduction measures to be paid for by SBC or EEPS Fast Track at an average estimated annual savings of 850 kWh per household.

Table IV-53. EmPower New York: Total Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$9.15M	\$9.15M	\$9.15M	0	0	0	0	\$27.45

Projected Outreach/Marketing costs: \$50,000 in 2009, 2010 & 2011.

⁷² The utilities are National Grid, National Fuel Gas Distribution and the Consolidated Edison Company of New York. For the year ending August 31, 2008, National Grid provided \$2.5 million for EmPower to provide home performance measures to an estimated additional 965 natural gas customers. NYSERDA also coordinates with National Grid in New York City to deliver electric reduction measures to customers receiving gas measures through National Grid’s low-income natural gas program. NYSERDA has an agreement with National Fuel to deliver EmPower services to participants in its Conservation Incentive Program. The current agreement provides NYSERDA with \$2.9 million to provide efficiency services to an estimated 718 natural gas customers. NYSERDA received \$1 million to deliver gas efficiency measures to an estimated 370 Con Ed natural gas customers.

Table IV-54. EmPower New York: Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	45,720	91,440	91,440	45,720	0	0	0
Annual Savings installed in prior years	n/a	45,720	137,160	228,600	274,320	274,320	274,320
Cumulative Annual Savings	45,720	137,160	228,600	274,320	274,320	274,320	274,320

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. There are an estimated 2.2 million households in New York State with incomes below 60% of state median income and of the, most live in homes that would benefit from energy efficiency improvements but lack the resources to make the needed investment. The federal Weatherization Assistance Program (WAP) lacks adequate funds to meet the need.

Coordination. NYSERDA proposes to combine the resources that may be made available for gas measures through this proceeding with the resources already available through SBC and the EEPS Fast Track for electric measures. NYSERDA will invite each utility to refer participants in their payment assistance programs and will continue the dialogue to expand coordinated efforts for these services. The Program also closely coordinates with the WAP to ensure effective use of resources, and to provide support for households that would otherwise be subject to a longer waiting time.

Co-benefits. In-home energy use management education will be provided to all EEPS-funded participants. Participants will be invited to the free energy-use management and financial management workshops conducted across the state. An estimated 400 energy-use management and 200 financial management workshops are planned for the up-coming program year. The workshops will continue to be funded by SBC.

The program will work with participating utilities to develop an effective referral mechanism to target services to households with high energy burdens and improve coordination of complementary low-income energy programs. The program will enhance the network of energy service providers, including private contractors and Weatherization Agencies.

Portfolio Balance. This funding will be fully integrated with the existing EmPower program representing a cost-effective investment in comprehensive energy efficiency worksopes for low-income New Yorkers.

Depth of Savings/Fuel Integration. The opportunity to address both gas and electric measures will provide estimated average household gas savings of about \$536 and electric savings of about \$137 for a total savings of approximately \$673 per year.

Underserved Markets. To address the “split incentive” hurdle posed by rental properties, NYSERDA has adopted the policy of providing certain measures that result in lower energy bills for the income eligible tenant without a landlord contribution.

Commitment. The program is designed to run in parallel with the EEPS Fast Track through 2011.

Customer Outreach. The program relies primarily on referrals from participating utilities of customers in their payment assistance programs and does not market directly to potential participants. NYSERDA will contact participating utilities to develop utility referral mechanisms that will help ensure that resources are committed according to utility collections. The utility referrals are supplemented by outreach to Offices for the Aging, Departments of Social Services, Weatherization Agencies and other community-based organizations. An annual marketing and contractor recruitment budget of \$50,000 will cover costs associated with these activities.

Collaborative Approach. The original design of EmPower benefited from the input from utility representatives, DPS staff, weatherization agencies, and contractors. The program continues to obtain input from each of these constituencies through an annual statewide meetings and informal opportunities throughout the year.

Transparency. Information regarding the program, including program design, benefit/cost analysis, and supporting data will be provided in progress reports to the Public Service Commission and Department of Public Service Staff, as well as available for public review. Participating utilities will be able to access the program’s web-based database that includes information on customers served, including referral source, measures installed, with cost and estimated savings. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Implementation, marketing and other program services contractors are chosen through NYSERDA’s competitive procurement process. The opportunity for energy services providers to become participating contractors are posted on www.nyserda.org and www.getenergysmart.org

9.2. EVALUATION.

Evaluation Goals

The primary goal of the EmPower Program evaluation effort is to measure and verify the savings attributable to the program. A secondary goal is to provide valuable feedback on how Program processes are functioning with the additional EEPS funding, and to identify further opportunities for improving efficiency and effectiveness.

Brief Overview of the Evaluation Approach

NYSERDA’s *Supplemental Revision for New York Energy \$martSM Programs* (Supplemental Revision), filed with New York State Public Service Commission on August 22, 2008, provides details regarding proposed evaluation plans for the electricity-focused “fast track” EmPower Program.⁷³ NYSERDA expects that evaluation plans described in the Supplemental Revision can also apply to the EmPower gas funding being requested herein, and that the electric and gas program components will be evaluated in a

⁷³ NYSERDA, *System Benefits Charge Supplemental Revision for the New York Energy \$martSM Programs* (2008-2011) , As Amended, August 22, 2008.

coordinated fashion. NYSERDA anticipates that the approach, implementation, rigor level, and timing of evaluating gas savings associated with this filing will be similar to that described for the EmPower Program electric savings in the August 22, 2008 filing and described within this section. Funds earmarked for evaluating the gas portion will be added to the existing electricity-focused evaluation budget to accomplish this cost-effective coordinated evaluation. To the extent that NYSERDA's original SBC-funded EmPower Program can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional funding from the enhanced SBC III evaluation funding. NYSERDA's estimated evaluation budget for this program includes a small set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPs Evaluation Advisory Group.

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the EmPower Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPs program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent evaluation contractors flexibility to adapt the approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and other evaluation projects for which funding will need to be allocated.

Evaluation Budget

NYSERDA expects the evaluation budget for the gas portion of the EmPower Program to be approximately 5% of gas program funding, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. NYSERDA expects to spend approximately 70% of the EmPower evaluation budget on impact evaluation, with the remainder spent on process and market evaluations.

Evaluation Schedule

Evaluation studies expected to be part of the EmPower Program evaluation plan are shown in the table below along with the time frame for their anticipated completion.

Table IV-55. EmPower New York: Evaluation Schedule 2009-2012

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)		X		X
Net-to-Gross (Impact)		Pilot Study	Possible Full Study	
Process and Market Evaluation		X		

Impact Evaluation

NYSERDA and its contractors have been working, on an ongoing basis, to expand and improve database tracking to better serve the needs of both implementation and evaluation of the EmPower Program. Future evaluations of EmPower, as described in this section, will build on this effort.

Measurement and Verification

One of the most reliable impact evaluation methods for energy efficiency programs targeting existing buildings is using pre- and post-energy use data to statistically analyze average energy savings, referred to as billing analysis. This method is generally not recommended for programs or measures that are expected to save less than 10% of total energy use as smaller levels can be difficult to isolate statistically. The EmPower Program is expected to be well suited to use billing analysis to obtain reliable savings estimates at a high rigor level. NYSERDA therefore plans to use billing analysis as the primary method for impact evaluation. In order to conduct this analysis, NYSERDA will require utility account numbers and then pre- and post-energy use data (kWh, kW, therms and interval/advanced meter data), for participants and non-participants, to be automatically provided in easily readable electronic formats. NYSERDA recognizes the importance of protecting confidentiality of the consumer's data and has plans for this protection. In an effort to align with the timing of expected savings, this impact evaluation effort is planned to take place in 2010, and be repeated for later participants in 2012, assuming at least 12 months pre- and post-installation consumption data (24 months of data) are available.

If the consumption data are not provided, NYSERDA would aim to complete an adequate number of site visits with metering to meet 90/10 confidence and precision at the program level for the estimate of program savings. This would involve pre/post metering, delaying services to customers until after the pre-period metering was complete. Furthermore, NYSERDA may need to offer financial incentives to help reduce this significant negative impact to customers. If this fall-back option must be implemented, NYSERDA will attempt to meter and use the most rigorous impact evaluation method that can be obtained within budget given the inability to do large-scale billing analysis.

One evaluation enhancement that will be considered is an examination of the potential unclaimed energy savings related to household education and resultant long-term behavioral changes. Over 37,000 households have participated in on-site energy education, energy efficiency workshops, and/or financial management workshops. Data are currently being collected on what actions the customers have taken since their project was completed; this data can be used in a regression model for those households with sufficient total data, to estimate savings impacts from education/workshop participation. Also, the 2006 Process evaluation of EmPower indicated that 47% of participants surveyed installed additional energy efficiency measures on their own after participation. The increase in evaluation funding could permit NYSERDA to more completely and accurately quantify energy savings from this program. Consumption data is also necessary for this evaluation; the survey data alone likely will not provide a sufficient basis for counting the full savings impact from this program.

One key population served through EmPower is payment-troubled utility customers. If payment and other data are provided by the utilities, NYSERDA can evaluate the level and impact of program-induced reductions in late payments, total arrearage amount accumulations, shut-offs and reconnects, and other costs.

Net-to-Gross

EmPower provides services to a population with limited means of purchasing energy-efficiency goods and services on their own. Due to an anticipation of low freeridership and spillover rates, the SBC-funded EmPower Program has not been examined for attribution of program impacts. With enhanced and additional EEPS evaluation funding, NYSERDA plans to conduct a pilot attribution study to explore possible spillover and freeridership among participants during the mid-point impact evaluation conducted in 2010. This pilot self-report study could be conducted to 80/20 confidence and precision standards. If this initial pilot study demonstrates some degree of freeridership or spillover, an expanded follow-on study could be conducted in 2011, conforming to a 90/10 confidence and precision level, if deemed

necessary based on results of the mid-point study. This evaluation study would be closely coordinated with the impact work to assess potential additional savings being achieved.

Process and Market Evaluation

NYSERDA plans to devote approximately 25% of the EmPower Program evaluation budget to process and market evaluation. A process evaluation conducted on the EmPower Program in 2006-2007 focused on finding opportunities to improve the programs' cost-effectiveness, reduce its costs, methods to increase the rate of recruitment, increase participant satisfaction with the various services, and extend the program into new markets. The program has since expanded statewide from the initial two pilot utility territories. A second process evaluation is currently exploring reasons for lack of response to invitations to participate, effectiveness of the educational workshop, and effectiveness of quality control/quality assurance systems. The past process evaluations can be updated early in the three-year funding period to provide valuable feedback on how processes are functioning with the additional EEPS funding, and to identify further opportunities for improving efficiency and effectiveness.

The primary market assessment issue for EmPower is the varying response rates of eligible customers to outreach conducted by the utilities or other referral agencies. NYSERDA proposes conducting a market assessment, as needed, in conjunction with process evaluation work to further explore issues such as awareness of the program, previous program participation, average tenure of potential participants at their current address, access to various sources of information, and willingness to participate. This evaluation work is scheduled for 2010.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support other overarching areas of evaluation activities, the evaluation plans presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program needed to be reduced, NYSERDA would first remove funds from the market and process evaluation work areas. These areas could be limited in terms of their sample sizes and evaluation frequency, if needed. Conversely, if more of NYSERDA's total evaluation funding could be allocated to EmPower, the additional funds would be allocated to expand and increase the rigor of impact evaluation work

9.3. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the EmPower Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below shows the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs. EmPower benefit/cost analysis was based on the combined electric fast track funding and gas funding requested in this proposal.

Table IV-56. EmPower Program: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	13/18	29.4	4.5	274,300	30%

Table IV-57. EmPower Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
With Electric and Gas Funding	\$50.5	\$50.5	\$84.2

Table IV-58. EmPower Program: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	1.7	1.7

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

Table 4 shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$4.9 Million.

Table IV-59. EmPower Program: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	1.8	1.8

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 29,300 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 4.5 MW (cumulative) of coincident peak reduction in 2015.⁷⁴

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.74.⁷⁵

Number of Participants as a Percentage of the Number of Customers in the Class (Screening Metric 9)

Table 5 shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table IV-60. EmPower Program: Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class ¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Residential – Natural Gas	4,095,085	6,858	0.2%

Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

⁷⁴ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁷⁵ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

10. HOME PERFORMANCE WITH ENERGY STAR® (NATURAL GAS)

10.1. PROGRAM ELEMENTS

Program Description. The Home Performance with ENERGY STAR (HPwES) Program is the largest of its kind in the United States and an integral element in NYSERDA's program portfolio.⁷⁶ The Program has been the recipient of numerous national awards and has been recognized as an Exemplary Program by ACEEE. The Program is a market transformation program that uses Building Performance Institute (BPI)- accredited contracting firms to install comprehensive energy efficiency-related improvements and technologies in 1- 4 family homes and low-rise residential buildings.

The program increased the capacity and expertise of more than 140 home improvement contracting firms through classroom training, in-field technical assistance, software seminars, certification of individual technicians, and accreditation of firms. Targeted incentives to decrease barriers to entry are available for contractors to help offset the cost of home assessment equipment, marketing and business accreditation. To encourage customer demand, financial incentives such as low-interest financing and financing incentives are available to help pay for the cost of the installed measures.

Home Performance with ENERGY STAR is an all-fuels program that uses a building science and a whole-house approach to energy efficiency. The program was designed under the electric distribution SBC to target the energy consumption of the State's existing 1-4 family housing stock. Capturing high electric savings is challenging without also addressing heating-related energy saving opportunities. Improvements in the shell and heating systems are typically needed and result in significant fossil fuel savings. Energy efficiency improvements will be comprehensive and include building shell measures, high efficiency heating and cooling measures, ENERGY STAR appliances and lighting, EPA Phase II certified pellet and wood stoves, and health and safety features. Participating homes typically reduce their total energy use by 25-30%.

Additional gas funding is necessary to encourage the gas saving measures offered through the program. This enables SBC funds to be concentrated on electricity saving measures and cost effective renewable technologies, and increase participation from more than 2,960 homes (excluding Assisted Home Performance homes) in 2007 to 7,900 home completions annually by 2011. To further encourage growth, NYSERDA has streamlined the program for contractors and consumers. The program will devote substantial resources to increasing the number of contractors operating Downstate, considered an area with the greatest opportunity for program expansion, and will implement additional guidance enabling work to include low-rise housing of more than four units.

Demand Reduction and System Benefits. Ancillary peak demand savings in 2011 attributed to installation of gas measures are estimated to be approximately 329 kW, with total cumulative MWh reductions of 969 MWh and 693,968 MMBtu.

⁷⁶ Through August 31, 2008, work was completed for over 13,824 households (not including the Assisted HPwES component) with energy efficiency improvements totaling nearly \$100 million.

Table IV-61. Home Performance with ENERGY STAR: Total Gas Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$13.27M	\$14.35M	\$15.52M	0	0	0	0	\$43.14M
Projected Outreach/Marketing costs: \$2,070,000 in 2009, 2010 and 2011.								

Table IV-62. Home Performance with ENERGY STAR: Total MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	210,471	230,676	252,821	0	0	0	0
Annual Savings installed in prior years	n/a	210,471	441,147	693,968	693,968	693,968	693,968
Cumulative Annual Savings	210,471	441,147	693,968	693,968	693,968	693,968	693,968

Table IV-63. Home Performance with ENERGY STAR: Ancillary MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	294	322	353	0	0	0	0
Annual Savings installed in prior years	n/a	294	616	969	969	969	969
Cumulative Annual Savings	294	616	969	969	969	969	969

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. In cooperation with BPI, participating lenders, and the U.S. EPA, NYSERDA is offering a comprehensive assistance package to both consumers and participating contractors designed to increase awareness of, and demand for, building performance services while simultaneously building an infrastructure of trained and certified technicians and accredited contractors to deliver such services.

The success of the Program has resulted in increased consumer demand in most areas of the State and an increased number of mid-stream participants. With the rapidly escalating cost of home heating fuels expected for the upcoming heating season, it is expected that consumer demand will increase significantly. The program will rely, in part, on the Workforce Development Initiative to ensure an adequate number of BPI-certified technicians and skilled installers are available in high-demand regions.

Coordination. NYSERDA will work closely with the natural gas utility service companies to maximize their customer offerings and programs, while reducing customer confusion, duplication of services, and administrative expenses. Participating contractors will be educated about other available programs for their customers. NYSERDA will co-market programs with the utilities.

Co-Benefits. In addition to the cost-effective energy savings offered, the Program simultaneously addresses residential health issues pertaining to indoor air pollutants, focusing on carbon monoxide and other pollutants associated with combustion appliances, ventilation, and moisture control.

This effort increases the long-term durability of New York's housing stock by addressing such problems as ice-damming, mold and mildew. This effort increases local private contractor capacity for delivering high-quality comprehensive services, through training, certification of contractors, and accreditation of firms through BPI and the regionally established Centers for Energy Efficiency and Building Science (CEEBS). This wholesale enhancement of contractor skills and business practices supported by market-based workforce education and development ensures continuing energy efficiency capabilities long into the future.

Portfolio Balance. The Program will coordinate with energy-efficient mortgage programs now emerging in the market, as an alternative to low-interest financing offered through the program.

Other complementary programs include NYSERDA's proposed Remodel with ENERGY STAR® Program that will provide electric reduction packages for remodelers specializing in kitchen and bath remodeling, and homeowners seeking to incorporate energy savings appliances into their home improvement projects; and NYSERDA's Power Management Program that will provide tips for homeowners or renters to save money by reducing phantom loads from electronic appliances, and reducing peak demand. The programs are designed to encourage referrals between participating remodelers and home performance contractors, or to encourage remodelers to expand their business model to include certain home performance work.

Depth of Savings. This Program comprehensively addresses building shell, heating and cooling systems, lighting and appliances, making achieved natural gas and electric savings extensive and long-lasting.

Contractors complete comprehensive home assessments (CHA) for all homes submitted through the Program. When conducting a CHA, the contractor takes an inventory of the current home conditions (including diagnostic testing of combustion appliances, and blower-door testing for air-infiltration rates), and develops a work scope for proposed improvements including a cost and energy savings estimate. The CHA allows the contractor to recommend improvements that are comprehensive, and that maximize the energy savings achieved in every home.

Underserved Markets. This Program is a Statewide effort that provides significant energy savings to one-to-four family homes whether rental properties or owner-occupied with the intention to ensure an integrated, all-fuels approach that can be continued and expanded Statewide.

Commitment. The HPwES Program was first implemented in 2001, and while this effort has grown some time (about 6-8 months) will be needed to ramp up contractor capacity especially in the Downstate

region, as contractors require training and certification. This Program will rely on the Workforce Development initiative to develop this capacity.

Customer Outreach. NYSERDA maintains an extensive website dedicated to its residential efficiency programs, including the HPwES program, to provide a “one-stop shopping” experience for customers to find information about the program, participating contractors by geographic region, as well as financing options. NYSERDA’s marketing campaign includes television, print ads, and radio spots. Participating contractors will be encouraged to market themselves as “Home Performance Contractors” through a co-operative advertising incentive. Further, regional implementation contractors such as the **New York Energy \$martSM** Communities Coordinators will provide program outreach services, attend local trade fairs, and generally assist in contractor and customer recruiting into the Program.

NYSERDA’s established contacts and relationships with trade associations, key stakeholders and contractor groups, such as US EPA, BPI, Building Performance Contractors Association, Affordable Comfort Institute, US Department of Housing and Urban Development, National Association of Home Builders, as well as an extensive list of community-based organizations across the State, and others will market the program to their membership. NYSERDA will continue to coordinate with utilities to market and provide outreach for their respective programs.

Collaborative Approach. The Program was designed through the collaborative effort of NYSERDA staff, industry experts, trade associations, key stakeholders, and environmental groups. Since 2001, NYSERDA has actively performed program evaluations by third-party reviewers to address customer concerns, contractor interests, and program implementation obstacles. The program has benefited from over seven years of experience in New York contractor and consumer markets. NYSERDA continues to use a Project Advisory Committee made up of participating contractors and key stakeholders to review program status and suggest improvements.

Fuel Integration. By design, a comprehensive, whole-house approach to residential contracting will result in a complementary focus on fossil fuels and electricity and effectively be a “one stop shop” for the consumer. The recommended measures are prioritized by the software purely on a cost-effective scale. The end result is a single contract that aims to reduce the overall energy use of the home, both in fossil fuels, and electricity.

Transparency. All information regarding the program, including program design, benefit/cost analysis, and supporting data will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Implementation, marketing and other program services contractors are chosen through NYSERDA’s competitive procurement process. The opportunity for energy services providers to become participating contractors are posted on www.nyserda.org and www.GetEnergySmart.org.

10.2. EVALUATION.

Evaluation Goals

Primary goals to evaluate the natural gas component of the HPwES Program include verifying reported program savings; determining if implemented improvements to the program are successful (e.g., reducing participation “bottlenecks,” increasing the number of partners, etc); and conducting a comprehensive statewide baseline for existing one- to four-unit residential buildings.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the natural gas component of the Home Performance with ENERGY STAR Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group. At this point, NYSERDA will work with its independent evaluation contractors to determine the optimal approach for conducting this comprehensive evaluation of the various program components.

The natural gas efficiency component of the HPwES Program described in this plan is an extension of the existing SBC program. To the extent that NYSERDA's original and ongoing SBC-funded Home Performance with ENERGY STAR Program can be evaluated using the same approaches and time lines outlined in this section, NYSERDA will supplement this plan to include additional resources from the enhanced SBC3 evaluation funding. Furthermore, the HPwES Program evaluation effort will likely also include assessing impacts related to the additional gas funding being requested for the ongoing SBC-funded Assisted Home Performance with ENERGY STAR Program (AHP). AHP is a component of the core program, which offers additional incentives to households with income levels below 80% of State Median Income (SMI) or 80% of the Area Median Income (AMI), whichever is higher for their county. Benefits of pooling evaluation resources for the existing and proposed components of the market-rate and assisted Home Performance programs include a more comprehensive evaluation effort, availability of larger samples, increased rigor, and greater cost-effectiveness of the evaluation.

Evaluation Budget

NYSERDA expects the evaluation budget for the additional natural gas funding requested for the Home Performance with ENERGY STAR Program to be approximately equal to 5% of the program funding level, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. In order to effectively evaluate the Home Performance with ENERGY STAR Program, including the natural gas efficiency component, it is anticipated that approximately 50% of the program's evaluation funding will be allocated to impact evaluation; 20% to process evaluation and 30% to market evaluation.

Evaluation Schedule

The following table shows major studies that are planned for the Home Performance with ENERGY STAR Program evaluation and the time frame for their completion. The plan includes initial measurement and verification and net-to-gross studies, and follow up studies in these same areas in 2012. The plan also includes an early process evaluation in 2010 and a baseline market evaluation effort in 2009.

Table IV-64. Home Performance with ENERGY STAR: Evaluation Schedule 2009-2012

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)		X		X
Net-to-Gross (Impact)		X		X
Process Evaluation		X		
Market Evaluation	X			

Impact Evaluation

Measurement and Verification

One of the most reliable impact evaluation methods for energy efficiency programs targeting existing buildings is using pre- and post-energy use data to statistically analyze average energy savings, referred to as billing analysis. NYSERDA plans to use billing analysis to obtain reliable savings estimates at a high rigor level. In order to conduct this analysis, NYSERDA will require utility account numbers and then pre- and post-energy use data (kWh, kW, therms and interval/advanced meter data), for participants and non-participants, to be automatically provided in easily readable electronic formats. NYSERDA currently obtains account information and permission from the participant to obtain energy use data from the utility and recognizes the importance of protecting confidentiality of the consumer's data. From the larger set of nonparticipant data, NYSERDA will select a group of nonparticipants whose energy use matches that of participants in the pre-installation period.

If the energy use data are not available, NYSERDA would likely conduct site visits and metering within participating homes in order to verify the estimate of program savings. However, this would involve pre/post metering, increasing the cost of the evaluation, delaying services to customers until after the pre-period metering is complete, and potentially impacting the customer's and contractor's willingness or ability to participate in the program. NYSERDA may need to offer financial incentives to help reduce this significant negative impact to customers and contractors. If this fall-back option must be implemented, NYSERDA will attempt to meter and use the most rigorous impact evaluation method that can be obtained within budget given the inability to do large-scale billing analysis. This approach would also require reallocation of the evaluation budget and changes to plans for the market and process evaluation components.

For the proposed billing analysis, NYSERDA will rely on program data for participants and utility data for nonparticipants; results should meet the 90/10 confidence/precision criterion both statewide and within each utility service area. Should site visits be required, NYSERDA will attempt to complete a sufficient number of site visits with metering to meet 90/10 confidence and precision statewide as well as on an upstate vs. downstate regional basis. However, it should be noted that failure to obtain utility data leading to data collection-related project delays could have serious implications on program participation by the selected customer as well as the impacted contractor(s). If funding were added from elsewhere within NYSERDA's evaluation budget, 90/10 confidence and precision could be attained at the utility level. Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols.

In an effort to align with the timing of expected savings, this impact evaluation effort is planned to take place in 2010, and be repeated for later participants in 2012. This timing will allow for at least 12 months pre- and post-installation energy use data (24 months of data) to be available.

Net-to-Gross

NYSERDA intends to explore participant and non-participant spillover and participant freeridership by using an enhanced self-report survey process with multiple decision-makers including homeowners and contractors involved in promoting and installing energy-efficient measures. Because participating homeowners may not be aware of the influence of the program on the availability of energy-efficiency services, the evaluation effort will involve review of and potential adjustments to their responses about freeridership based on participating contractors' judgments about the program's influence on their offering of such services. Among participating homeowners and contractors, NYSERDA will also examine inside spillover (participating homeowners who install additional measures that are not included in program records), outside spillover (participating contractors who install measures at nonparticipating homes because of the influence of the program), and partial participant spillover (homeowners receiving a home energy assessment who installed recommended measures, but not through the program). NYSERDA will also examine nonparticipant spillover among contractors (measures installed by nonparticipating contractors because of the influence of the program). Because the incidence is likely to be low, which will make it difficult to attain the desired confidence/precision levels, NYSERDA will not examine nonparticipant spillover among homeowners (measures installed by nonparticipating homeowners because of the influence of the program). These methods will be used to derive a final triangulated net-to-gross (NTG) ratio which will provide a high level of construct validity for the net savings estimates.

Sample sizes will be calculated to meet 90% confidence and 10% precision statewide as well as on an upstate/downstate regional basis. If budget permits, 90/10 confidence and precision could be achieved at the utility territory level. Data collection may be conducted by NYSERDA's independent contractor and will follow established evaluation protocols for such data collection. Analysis will likely be conducted by NYSERDA's independent contractor and will follow established evaluation protocols in analyzing data.

The attribution analyses will occur in tandem with M&V activities. Thus, attribution analyses are planned in 2010 as well as 2012 for subsequent participants.

Process Evaluation

Previous process evaluations on the SBC-funded HPwES Program have found that the program has expanded contractors' capabilities to provide high-quality comprehensive home energy efficiency services and that substantial numbers of households have taken advantage of these services and installed recommended measures since the program's inception. Process evaluation recommendations included:

- focusing greater attention on production tasks while reducing administrative tasks so that existing program targets and expansions into new markets can be more easily accomplished;
- being more responsive to the needs of underrepresented and low performing contractor segments (small firms, community based organizations, and independent contractors) in order to recruit and retain more qualified firms for the program; and
- ensuring that input is obtained from a broad range of contractors before making program adjustments.

A comprehensive future process evaluation conducted in conjunction with the SBC-funded program will re-assess these issues using larger samples and greater rigor than the prior study and will address the

effects of including gas funding in the program. The process evaluation will also address design and implementation issues associated with rapid program expansion and will explore the changing market in relation to the program's higher savings goals and, potentially, new program partners or choices among programs for potential participants.

Planned activities will likely include interviews with NYSERDA Staff and program implementation contractors, and surveys of participating and nonparticipating contractors and homeowners. Samples will be drawn from sources such as program databases, program records, etc. As appropriate, all quantitative data will achieve 90/10 confidence and precision statewide and for the upstate/downstate regions. A census of program staff and implementation contracting staff will also be included. Data collection and analysis will be conducted by NYSERDA's independent contractors following established data collection evaluation protocols. Issues identified during the process evaluation will be generated into actionable recommendations and provided to NYSERDA. Follow-up will occur with program staff to address the recommendations.

The initial process evaluation will be conducted in 2010. Should energy efficiency program funding continue beyond 2011, NYSERDA would recommend repeating the study in 2011 (although this is not included in the current budget).

Market Evaluation

The first task for this evaluation area will involve NYSERDA's independent evaluation contractors working with program staff to develop a new program theory and logic model to ensure that expected program outputs and outcomes and associated measurement indicators are clearly defined. The final program theory and logic model will then guide subsequent evaluation efforts.

An important part of any program evaluation is a thorough understanding of the market environment in which the program is operating. NYSERDA believes that the best approach to fully characterize the target market for this program includes a large-scale baseline and measure saturation study, coupled with market characterization surveys of various market actors such as contractors, homeowners, distributors, retailers and manufacturers.

The large-scale baseline and measure saturation study should be conducted through site visits to fully characterize existing one- to four-unit homes, identify measures installed and replaced, including vintage and efficiency levels, and other factors. In addition, the program database containing information on more than 13,000 homes that have already participated in the program will be used. If unavailable from other sources, the analysis should include quantification of technically achievable savings potential by end use, as well as economic potential and market potential, based on a range of assumptions about future natural gas prices.

Although existing housing has been a difficult sector to characterize given its size, NYSERDA believes this type of study would benefit all EEPs program administrators, and therefore proposes that it be jointly funded with all program administrators contributing. The full statewide study, including both the site visit and survey components, probably could not be conducted by NYSERDA alone within the evaluation budget for the HPwES Program. However, if it is decided that this type of joint study is not worthy of support by all potential program administrators, NYSERDA will allocate approximately 15% of the overall evaluation budget for the Home Performance with ENERGY STAR Program to develop the program theory and logic model, evaluate the existing database information, and conduct the survey component of the market evaluation effort in 2009. Although the full value of this effort will be highly diminished, the market characterization survey component could still provide valuable information to assist NYSERDA in targeting this program to better serve the home renovation market and meet overall electricity and gas savings goals. Evaluation funding provided through SBC funds would further

supplement this NYSERDA-only approach and result in a more comprehensive evaluation for the Home Performance Program.

Surveys with market actors would meet 90/10 confidence/precision statewide level as well as on an upstate/downstate regional basis. If budget permits, the sample could be increased to meet 90/10 confidence/precision at the utility territory level. Data collection and analysis will be conducted according to established data collection protocols.

NYSERDA recommends conducting the proposed baseline and measure saturation study in 2009. Should energy efficiency program funding continue beyond 2011, NYSERDA would recommend repeating the study in 2012 (although this is not included in the current budget).

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. With reduced evaluation funds, the evaluation would achieve 90/10 confidence/precision statewide only and the level of detail sought through the interviews and surveys would be reduced. With increased funds, the evaluation could achieve 90/10 confidence/precision at the utility territory level.

10.3. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Home Performance with ENERGY STAR (Home Performance) Program required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The Tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs. The Home Performance Program benefit/cost analysis was based on combining the unexpended SBC funding with the gas funding requested in this proposal.

Table IV-65. Home Performance with ENERGY STAR: Program Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	13/18	19.4	6.6	694,000	2%

Table IV-66. Home Performance with ENERGY STAR: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
With Electric and Gas Funding	\$52.3	\$121.0	\$154.4

Table IV-67. Home Performance with ENERGY STAR: Program Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	3.0	1.3

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$8.3 Million.

Table IV-68. Home Performance with ENERGY STAR: Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	3.1	1.3

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 19,400 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 6.6 MW (cumulative) of coincident peak reduction in 2015.⁷⁷

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.34.⁷⁸

⁷⁷ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁷⁸ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

The following table shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011. It is assumed that 80% of customers will heat with natural gas, these are inclusive of the electricity only customers.

Table IV-69. Home Performance Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Residential - Electricity	6,240,788	19,848	0.3%
Residential – Natural Gas	4,095,085	15,878	0.4%

¹ Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

11. ASSISTED HOME PERFORMANCE WITH ENERGY STAR (NATURAL GAS)

11.1. PROGRAM ELEMENTS

Program Description. The Assisted Home Performance with ENERGY STAR® (AHPwES) Program, an income eligible component of the core Home Performance with ENERGY STAR® program, is designed to reduce the energy burden on low-income households. In each county, eligibility is defined by comparing 80% of State Median Income (SMI) with 80% of the Area Median Income (AMI) and choosing whichever is higher. A household meeting this income criteria is eligible for a subsidy of 50% of the project cost, maximized at a subsidy of up to \$5,000. For 2-4 family buildings, the maximum is \$10,000 per building and the percentage of project costs (up to 50%) is derived from the income eligibility of the tenants. In both instances, the balance of the work may be eligible for reduced interest-rate financing through the **New York Energy \$martSM** Loan Fund.

Only cost-effective projects with a savings-to-investment ratio (SIR) of 1.1 or greater are eligible. Through August 2008, work has been successfully completed on over 7,400 income eligible households. This represents over \$62.2 million in energy efficiency upgrades. This effort will couple additional gas funds with SBC funds, to increase the current program funding available for contractor incentives, homeowner incentives, implementation, quality assurance and administration. It is expected that the Program will nearly double savings achievements over a three-year period. Should energy prices continue to climb, NYSERDA may raise the ceiling of income eligibility and increase incentives for lower-income households.

Demand Reduction and System Benefits. Ancillary peak demand savings in 2011 attributable to installation of gas measures are estimated to be approximately 112 kW, with total cumulative MWh reductions of 480 MWh and 442,194 MMBtu.

Table IV-70. Assisted Home Performance with ENERGY STAR: Total Gas Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$14.97M	\$16.20M	\$17.55M	0	0	0	0	\$48.72M
Projected Outreach/Marketing costs: \$2.09M in 2009, 2010 and 2011.								

Table IV-71. Assisted Home Performance with ENERGY STAR: Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	134,111	146,986	161,097	0	0	0	0
Annual Savings installed in prior years	n/a	134,111	281,097	442,194	442,194	442,194	442,194
Cumulative Annual Savings	134,111	281,097	442,194	442,194	442,194	442,194	442,194

Table IV-72. Assisted Home Performance with ENERGY STAR: Ancillary MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	145	159	175	0	0	0	0
Annual Savings installed in prior years	n/a	145	304	479	479	479	479
Cumulative Annual Savings	145	304	479	479	479	479	479

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPs Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. The Program addresses the portion of the population with incomes over the threshold for other low-income energy efficiency or assistance programs that will be impacted the most from high energy prices, as well as high transportation and grocery prices. Current participation levels are near one-third of the total program. Additional gas funding will expand the Program to reach a larger number of participants and address an increasing societal need.

Coordination. NYSERDA continues to work closely with the natural gas utilities to maximize their customer offerings and programs, while reducing customer confusion, duplication of services, and administrative expenses. NYSERDA continues to work with and recruit new community-based organizations, municipalities, and community development agencies to market, deliver, and supplement the Program to low-to-moderate income homeowners and landlords.

Co-Benefits. As the income-eligible portion of the Home Performance with ENERGY STAR Program, AHPwES seeks to reduce the burden placed on the low-to-moderate income population of New York State. An unfortunate phenomenon has been described of income-limited households that are forced to choose whether to pay their winter heating bills or to buy groceries, known as “heat or eat.” This Program is designed to address this dilemma by increasing the all-fuels energy efficiency of such households, while keeping those improvements affordable for the homeowner. In addition to improving the energy efficiency for these homes, health and safety issues are also addressed. These potential health risks are not likely to be identified by contractors working outside of the Home Performance Program.

This effort increases the long-term durability of New York’s existing housing-stock. Ensuring quality workmanship within the Program also allows for homeowners to budget accordingly for future upgrades, and decreases worries of failing equipment or unexpected problems. This effort increases the capacity of local contractors to deliver high-quality comprehensive services to segments of the population that otherwise could not afford to make such improvements to their homes, including senior citizens and working families.

Portfolio Balance. NYSERDA also offers low-interest financing through its **New York Energy \$martSM** Loan Fund Program, and ENERGY STAR® Financing, to maximize customer financial assistance and implement strategies to maximize MMBtu savings in existing homes. NYSERDA’s

proposed Power Management Program is also complimentary and provides tips for homeowners or renters to save money by reducing phantom loads from electronic appliances, and reducing peak demand.

Through NYSERDA's EmPower New YorkSM program, energy efficiency tips and budget management workshops are offered throughout the State and are open to the public.

Depth of Savings. This comprehensive effort addresses envelope, HVAC systems, appliances, lighting and domestic hot water, saving fossil fuels and electricity. Contractors complete Comprehensive Home Assessments (CHA) for all homes submitted through the Program. Contractors complete comprehensive home assessments (CHA) for all homes submitted through the Program. When conducting a CHA, the contractor takes an inventory of the current home conditions (including diagnostic testing of combustion appliances, and blower-door testing for air-infiltration rates), and develops a work scope for proposed improvements including a cost and energy savings estimate. The CHA allows the contractor to recommend improvements that are comprehensive, and that maximize the energy savings achieved in every home.

As a program requirement for the Assisted Home Performance Program, work scopes are required to reach a savings to investment ratio (SIR) of 1.1. This prerequisite makes certain is that the homeowner will be able to pay for the energy efficiency improvements with the money they are saving on their energy costs (based on a ten year pay back term) and maximizes ratepayer investment.

Underserved Markets. Traditional low-income weatherization programs provide benefits to individuals and families earning 60% of the State Median Income or less. This Program targets the portion of the population above traditional weatherization program income limits yet still below the 80% SMI/AMI threshold. Households in this market segment are traditionally the hardest hit by increased energy costs and are typically not eligible for larger social service opportunities. The Program reaches an underserved audience and provides energy efficiency benefits with a greatly reduced homeowner investment.

Commitment. Although the Program has grown significantly since its inception in 2001, it will require some time (about 6-8 months) to ramp up contractor capacity particularly in the Downstate region, as technicians will require training certification and contracting firms will required BPI accreditation. Additional funding enables increased participation, a wider range of income eligibility, and increased financing incentives that will increase contractor participation and consumer demand in the program.

Customer Outreach. NYSERDA maintains an extensive website dedicated to its residential efficiency programs, including the HPwES program, to provide a "one-stop shopping" experience for customers to find information about the program, participating contractors by geographic region, as well as financing options. Through its contacts and relationships with trade associations, key stakeholders and contractor groups, housing agencies, neighborhood development corporations, and community-based organizations, NYSERDA will encourage the marketing of the program to their memberships. NYSERDA will collaborate with utilities to market the Program.

Collaborative Approach. The Program was designed through collaboration between NYSERDA, industry experts, trade associations, key stakeholders, and environmental groups. NYSERDA continues to work with utilities to collaborate on potential utility-sponsored programs. Third party reviewers conduct program evaluations on behalf of NYSERDA to address customer concerns, contractor interests, and program implementation issues. The program has benefited from over seven years of experience in New York contractor and consumer markets.

Fuel Integration. By design, a comprehensive, whole-house approach to residential contracting will result in a complementary focus on fossil fuels and electricity and effectively be a "one stop shop" for the consumer. The recommended measures are prioritized by the software purely on a cost-effective scale.

The end result is a single contract that aims to reduce the overall energy use of the home, both in fossil fuels, and electricity.

Transparency. All information regarding the program, including program design, benefit/cost analysis, and supporting data will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Implementation, marketing and other program services contractors are chosen through NYSERDA's competitive procurement process. The opportunity for energy services providers to become participating contractors are posted on www.nyserdera.org and www.GetEnergySmart.org.

11.2. EVALUATION.

Evaluation Goals

As described in the evaluation plan for the market-rate Home Performance with ENERGY STAR Program, the primary evaluation goals for the Assisted Home Performance program will also include verifying reported program savings; determining if anticipated improvements to the programs are successful (e.g., reducing participation "bottlenecks," increasing the number of partners, etc); and conducting a comprehensive statewide baseline for residential existing buildings.

Brief Overview of the Evaluation Approach

NYSERDA expects the evaluation of the Assisted Home Performance with ENERGY STAR Program to be conducted as a coordinated effort with the market-rate Home Performance with ENERGY STAR Program evaluation. Refer to the Home Performance with ENERGY STAR evaluation plan for details and the evaluation schedule.

Evaluation Budget

NYSERDA expects evaluation budget for the Home Performance with ENERGY STAR Gas Program to be approximately equal to 5% of the program funding level, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. Similar to the market-rate Home Performance with ENERGY STAR Program evaluation plan, it is anticipated that approximately 50% of evaluation funding will be allocated to impact evaluation; 20% to process evaluation and 30% to market evaluation.

Evaluation Schedule

Refer to the Home Performance with ENERGY STAR evaluation plan for details.

Impact Evaluation

Measurement and Verification

NYSERDA will explore possibly 90/10 confidence and precision levels for the statewide Assisted Home Performance effort. Depending on funding levels, attaining 90/10 confidence and precision for upstate/downstate or the utility territory level might also be possible.

Net-to-Gross

With the addition of Assisted Home Performance evaluation funds, sample sizes will be increased for freeridership and spillover surveys, and possible differentiation between Assisted Home Performance and market-rate Home Performance program participants will be explored.

Process and Market Evaluations

Refer to the Home Performance with ENERGY STAR evaluation plan for details. With the addition of Assisted Home Performance evaluation funds, sample sizes will be increased resulting in a more defensible reassessment of the issues raised in the last process evaluation and an ability to identify unique program effects relative to gas measures.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. With reduced evaluation funds, NYSEDA would achieve 90/10 confidence/precision only at the program level and the level of detail sought through the interviews and surveys would be reduced.. With increased funds, NYSEDA would achieve 90/10 confidence/precision at the utility territory level.

11.3. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Assisted Home Performance (AHP) Program required per Appendix 3 of the Commission's June 23, 2008 EEPs Order. As discussed earlier, NYSEDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs. The benefit/cost analysis was based on combining the unexpended SBC funding with the gas funding requested in this proposal.

Table IV-73. Assisted Home Performance Program: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	13/18	9.6	2.2	442,200	2%

Table IV-74. Assisted Home Performance Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
With Electric and Gas Funding	\$54.8	\$75.8	\$94.2

Table IV-75. Assisted Home Performance Program: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	1.7	1.2

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$5.1 Million.

Table IV-76. Assisted Home Performance Program: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	1.8	1.3

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 9,600 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 2.2 MW (cumulative) of coincident peak reduction in 2015.⁷⁹

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.5.⁸⁰

⁷⁹ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁸⁰ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

The table below shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table IV-77. Assisted Home Performance Program: Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Residential – Natural Gas	4,095,085	9,030	0.2%

Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

12. NEW YORK ENERGY STAR® HOMES (NATURAL GAS)

12.1. PROGRAM ELEMENTS

Program Description. New York ENERGY STAR® Homes (NYESH) program is an enhanced version of the US EPA ENERGY STAR® Qualified New Homes program. The New York program provides technical assistance and financial incentives to 1-4 family and low-rise residential home builders and Home Energy Rating System (HERS) Rater Providers. The program encourages the adoption of energy-efficient construction techniques and requires the installation of high efficiency HVAC equipment. A minimum kWh usage reduction is also required, and is obtained through the installation of ENERGY STAR qualified appliances, electronically commutated motors in HVAC equipment and advanced lighting. Homes that successfully earn ENERGY STAR designation use approximately 30% less energy than conventionally-built homes.

This effort is designed to increase the market penetration of NYSERDA's existing program, currently funded with SBC funds. In 2007, penetration rates of individual regions were as high as 29.1% in the Finger Lakes region and 28.6% in the Western region, with an overall average participation rate of 13.1% across the entire **New York Energy \$martSM** program area. This proposal will also enable builders to pursue higher efficiency gas equipment. In addition, builder incentives will be enhanced for homes that incorporate proven, cost-effective renewable technologies such as solar hot water systems.

Demand Reduction and System Benefits. Ancillary peak demand savings in 2011 attributable to installation of gas measures are estimated to be approximately 246 kW, with total cumulative MWh reductions of 1,725 MWh and 907,968 MMBtu.

Table IV-78. New York ENERGY STAR® Homes: Total Gas Program Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$7.04M	\$7.69M	\$9.38M	0	0	0	0	\$24.11M
Projected Outreach/Marketing costs: \$940,000 in 2009, 2010, and 2011.								

Table IV-79. New York ENERGY STAR Homes: Installed MMBtu Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	259,605	288,162	360,202	0	0	0	0
Annual Savings installed in prior years	n/a	259,605	547,767	907,969	907,969	907,969	907,969
Cumulative Annual Savings	259,605	547,767	907,969	907,969	907,969	907,969	907,969

Table IV-80. New York ENERGY STAR® Homes: Ancillary MWh Savings (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	496	546	682	0	0	0	0
Annual Savings installed in prior years	n/a	496	1,042	1,724	1,724	1,724	1,724
Cumulative Annual Savings	496	1,042	1,724	1,724	1,724	1,724	1,724

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners. NYSERDA will continue to work with DPS Staff and the EEPs Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Market Segment Need. In cooperation the U.S. EPA and the Residential Services Network (RESNET), NYSERDA offers a comprehensive assistance package including a tiered cash incentive and cooperative advertising, to participating home Builders and Raters, which is designed to increase awareness of, and participation in the New York ENERGY STAR Homes Program.

The success of the Program has resulted in increased consumer demand in many areas of the State and an increased number of participating home builders. As new home starts have declined across the State since 2004, New York ENERGY STAR Home production has increased from 1,743 completions in 2005 to 2,427 in 2007. This further underscores the consumer awareness and demand for high efficiency housing.

Coordination. NYSERDA will continue working with the natural gas utility service companies operating across the State to maximize their customer offerings and programs, while reducing customer confusion, duplication of services, and administrative expenses. NYSERDA consults regularly with the New York State Builders Association Research and Education Foundation for input on program improvements, ensuring that Programs properly designed and decrease barriers to entry.

The Program Implementation Contractor works with participating builders to quickly and effectively effectuate program changes. The Contractor also assists builders and HERS raters with technical updates to the program, aiding the ramp-up stages of this program and allowing for comprehensive savings as the program expands.

Co-Benefits. In addition to the cost-effective energy savings offered, the Program addresses residential health issues pertaining to indoor air pollutants (focusing on carbon monoxide and other pollutants associated with combustion appliances), ventilation, and moisture control. Homes built to the Program's standard are also less likely to have problems with ice damming, mold or air leakage, resulting in a longer lasting, more durable structure.

The Program's primary goal is to educate home builders and customers while transforming the market to produce substantial improvements in the overall energy efficiency in new construction projects through diverse education opportunities, targeted marketing, and changes in building technology and design

practices. Builder and HERS raters participating in this program advance their skills and use new technologies to improve the overall sustainability and long-term energy savings of homes built today.

Portfolio Balance. The NYESH Program will coordinate with other existing and proposed NYSERDA programs to further enhance KWh savings, and identify opportunities for installation of solar hot water and geothermal heat pump systems. This effort will complement the proposed Green Homes Program.

Depth of Savings. The Program provides opportunities to implement permanent energy efficiency and load management improvements in building envelopes, HVAC systems, lighting, home appliances and domestic hot water production. A New York ENERGY STAR home must be built by a participating builder, have a qualified heating system, contain electrical measures that produce annual electricity savings of at least 500 KWh, fulfill minimum ventilation requirements and attain a Home Energy Rating System (HERS) score of 84 or higher, indicating the home uses at least 30% less energy than a conventionally built home. Homes built through the Program have achieved tested energy savings and greater durability than nonparticipating homes.

Underserved Markets. While traditional energy efficiency programs focus on high profile projects and are limited to large-scale users or geographic boundaries, this Program is a Statewide effort providing significant energy savings to new construction or significantly renovated 1-4 family homes; rental or owner-occupied; and in all geographic locations. There are over 600 participating builders, ranging from large production builders to custom owner-builders. The Program targets households with income levels below 80% of State Median Income (SMI) or 80% of the Area Median Income (AMI); whichever is higher for their county, are eligible for an incentive of \$500 toward the purchase of their home.

Commitment. NYSERDA has a network of over 600 builders participating in the Program throughout the State. With additional gas funds NYSERDA will expand the Program to achieve increased MMBtu savings through technical assistance, targeted financial incentives, additional training, and demonstrations for home builders and buyers. While the structure of the program will not significantly change, program participation levels should reach expected levels within 8-10 months

Customer Outreach. NYSERDA maintains an extensive website dedicated to its residential efficiency programs, including the New Homes program, providing a one-stop shopping experience for customers to find information about the program, and participating builders by geographic region.

Participating builders are encouraged to market themselves as New York ENERGY STAR Home Builders through a cooperative advertising incentive. Regional implementation contractors such as the **New York Energy \$martSM** Communities Coordinators will provide program outreach services, attend local trade fairs, and generally assist in builder and customer recruiting into the NYESH program.

NYSERDA's established contacts and relationships with trade associations, key stakeholders and contractor groups, such as U.S. EPA, Building Performance Institute, Building Performance Contractors Association, Affordable Comfort Institute, US Department of Housing and Urban Development, National Association of Home Builders, NYS Builders Association, New York State Building Officials Conference, New York State Realtors Association, as well as an extensive list of community-based organizations across the State, and other groups will be used to market the program to these groups and their membership. NYSERDA will coordinate with utilities to market and provide outreach.

Collaborative Approach. The Program was designed through the collaborative effort of NYSERDA staff, industry experts, trade associations, key stakeholders, and environmental groups. NYSERDA actively performs program evaluations from third-party reviewers to address customer concerns, builder interests, and participation and program implementation issues. The program has benefited from over eight years of experience in New York's home building industry.

Fuel Integration. The HERS Scoring system used in the Program does not focus on one fuel type. The scoring methodology examines the whole-building and compares it to an accepted baseline. The technologies incorporated and building techniques used result in overall home energy use reductions.

Transparency. All information regarding the program, including program design, benefit/cost analysis, and supporting data will be made available by NYSERDA on its website. NYSERDA is also working with DPS Staff toward development of a uniform database to further increase transparency with regard to program results.

Procurement. Implementation, marketing and other program service contractors are chosen through NYSERDA's competitive procurement process. The opportunity for builders to become participating builders are posted on www.nyserda.org and www.GetEnergySmart.org.

12.2. EVALUATION

Evaluation Goals

The primary goal of the natural gas component of the NYESH Program evaluation will be verifying reported natural gas savings. Secondary goals include reassessing issues identified in previous process evaluations and conducting a comprehensive baseline study of residential new construction practices.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the natural gas component of the NYESH Program and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

The natural gas component of the NYESH Program described in this plan is an extension of the existing SBC program; thus, in order to maximize cost-effective use of evaluation funds, NYSERDA recommends conducting program evaluations for this proposed natural gas component of the NYESH Program at the same time evaluations are conducted on the SBC element of the program. This plan presents anticipated evaluation activities that, when conducted in a coordinated fashion with the enhanced SBC program evaluation efforts, would result in a more comprehensive evaluation, availability of larger samples, and increased rigor.

Evaluation Budget

NYSERDA expects the evaluation budget for the natural gas component of the NYESH Program to be approximately equal to 5% of the program funding level, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. The gas portion of the program will be evaluated simultaneously with the electric portion, for which additional enhanced evaluation funding will be available, thus allowing a comprehensive evaluation. This plan describes the anticipated approach for the comprehensive evaluation assuming additional funding. In order to effectively evaluate the NYESH Program, including the natural gas efficiency component, it is anticipated that approximately 50% of evaluation funding will be allocated to impact evaluation; 20% to process evaluation and 30% to market evaluation.

Evaluation Schedule

The table below shows major evaluation studies that are planned for the NYESH Program and the time frame for their expected completion. Early on in 2009, process and market evaluations will be completed in order to provide a solid basis upon which to ramp up the natural gas efficiency program element. Measurement and verification and net-to-gross studies will be completed in 2010 and 2012. The later years of the program will also include updates to process and market studies.

Table IV-81. New York ENERGY STAR® Homes: Evaluation Schedule 2009-2012

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
M&V (Impact)		X		X
Net-to-Gross (Impact)		X		X
Process Evaluation	X		X	
Market Evaluation	X			X

Impact Evaluation

Measurement and Verification

M&V activities are expected to involve analysis of the detailed project files already available through the program, and use savings values derived from a baseline study of existing homes (if such a study is supported as a statewide effort by all EEPS program administrators). The M&V evaluation is expected to involve billing analysis using one year of billing data from participant homes to adjust program estimates derived from DOE-2 files; this adjustment will account for occupant behavior. Then models will be rerun substituting values for key measures (HVAC, shell, etc.) derived from the as-built baseline; the difference will be the gross savings from the program. If the as-built baseline data are not available, NYSERDA will instead use the Energy Conservation Construction Code of New York State as the baseline in this analysis. Enhanced evaluation funding provided for the SBC NYESH Program would further supplement this proposed approach and result in a more comprehensive evaluation, including electric savings.

Efficient sample sizes will be chosen to meet a 90/10 confidence/precision level statewide. If budget permits, the sample could be expanded to meet 90/10 at the utility territory level. Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols. Billing analysis will occur in 2010 and again in 2012.

Net-to-Gross

NYSERDA intends to explore participant and nonparticipant spillover and participant freeridership using an enhanced self-report survey process with multiple decision-makers including participating, partial participating, and nonparticipating homeowners, builders, subcontractors, and distributors. These alternative methods will be used to derive a final triangulated net-to-gross (NTG) ratio estimate that will offer a high level of construct validity. Enhanced evaluation funding available for the SBC NYESH Program would further supplement this proposed approach and result in a more comprehensive evaluation, including electric savings.

Sample sizes will be calculated to meet 90/10 confidence and precision statewide. Should additional funds be available, 90/10 confidence and precision at the utility level may be possible. Examinations will be made to assess self-selection bias between the participating and nonparticipating matched groups. Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols. Net-to-gross analysis will occur in 2010 and again in 2012.

Process Evaluation

Previous process evaluations of the SBC-funded NYESH Program have found that implementers believe ENERGY STAR® homes are more energy-efficient, comfortable, and durable; participating builders believe the program has helped them differentiate themselves in the marketplace; and most home buyers have been very satisfied with their homes. In addition, some recommendations were highlighted, including a recommendation to ensure effective communication among all parties, especially when program changes are made, and how to expand the pool of HERS raters. Finally, prior evaluations found that implementers, builders, and home buyers all could benefit from having more feedback about the actual performance of ENERGY STAR® labeled homes. A process evaluation conducted in conjunction with the SBC-funded program will re-assess these issues using larger samples and greater rigor than previous studies.

Planned activities will likely include interviews with NYSERDA staff and program implementers, and participating and nonparticipating builders and homeowners. To the extent possible, the results will be differentiated by downstate and upstate activities. Enhanced evaluation funding available for the SBC NYESH Program would further supplement this proposed approach and result in a more comprehensive evaluation.

Samples for this process evaluation effort will be drawn from sources such as program databases, program records, etc. As appropriate, all quantitative data will achieve 90/10 confidence and precision. Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols. Issues identified during the process evaluation will be generated into actionable recommendations and provided to NYSERDA staff and program implementers. Follow-up will occur with program staff and implementers to address the recommendations.

The initial process evaluation will be conducted approximately six months following the implementation of gas EEPs funds (2009). A second process evaluation could be performed in 2011 to further assess highlighted issues and recommendations.

Market Evaluation

An initial task in the market evaluation is to develop a program theory and logic model that will take into account the changing market in relation to the program's higher savings goals and, potentially, new program partners or choices among programs for potential participants. NYSERDA's independent evaluation contractors will work with program staff to identify expected program outputs and outcomes and the indicators through which they can be measured, which will guide future evaluation efforts.

Another important evaluation element for the NYESH Program, supporting both market and impact evaluation efforts, is a baseline study of current residential new construction practices in New York for non-participants, given that the program already has information on building practices for participants. With a program goal of increasing market penetration of the program in advance of revised codes and standards, an accurate baseline of the residential new construction market should be established. Interviews could then be done with a sample of participating and nonparticipating builders to assess common practices on a number of specific energy measures (e.g., high-efficiency insulation and sealing, ENERGY STAR windows, doors, and appliances, etc.) and examine progress made toward achieving the

expected outputs and outcomes specified in the program theory and logic model. Then, a sample of those interviewed could be selected to conduct site visits and assess whether the homes are performing as expected.

NYSERDA believes this type of baseline study would benefit all EEPS program administrators and therefore proposes that it be undertaken in a jointly funded manner with all program administrators contributing. The full study, including both the site visit and survey components, cannot be conducted by NYSERDA alone within the evaluation budget for the NYESH Program. If the residential new construction baseline is not ultimately selected as one of the statewide studies to be funded by all program administrators, then NYSERDA will conduct the telephone interview component described above, but not the site visits.

Approximately 30% of the overall evaluation budget for the NYESH Program will be allocated to the basic telephone interview activities and analysis. Additional funding from NYSERDA's set aside for overarching evaluation studies could be used to support a statewide baseline study. In addition, evaluation funding provided through SBC funds could further supplement this NYSERDA-only approach and result in a more comprehensive evaluation for the New York ENERGY STAR Homes Program as a whole.

Surveys with market actors would meet 90/10 confidence/precision statewide. If budget permits, the sample could be increased to meet 90/10 confidence/precision at the utility level and/or on an upstate/downstate regional basis. Data will be collected and analyzed by NYSERDA's independent contractors following established evaluation protocols.

NYSERDA recommends developing the revised program theory and logic model as well as conducting the proposed baseline study in 2009. A follow-up study could then be conducted in 2012 to determine any changes in the residential new construction market, to examine progress made toward achieving the expected outputs and outcomes specified in the program theory and logic model, and to provide as-built baseline values that would support the impact analysis.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. If evaluation funding needed to be reduced for this particular program, 90/10 confidence and precision would not be attained at the utility level and the depth of questions in surveys and interviews would likely be reduced. With increased funds, NYSERDA would achieve 90/10 confidence/precision at the utility territory level and/or on an upstate/downstate regional basis.

12.3. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the ENERGY STAR Homes Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs. The ENERGY STAR Homes Program benefit/cost analysis was based on combining the unexpended SBC funding with the gas funding requested in this proposal.

Table IV-82. ENERGY STAR Homes Program: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
With Electric and Gas Funding	2009-2011	13/18	17.3	2.5	908,000	5%

Table IV-83. ENERGY STAR Homes Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
With Electric and Gas Funding	\$33.4	\$65.8	\$193.5

Table IV-84. ENERGY STAR Homes Program: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	5.8	2.9

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$10.3 million.

Table IV-85. ENERGY STAR Homes Program: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
With Electric and Gas Funding	6.1	3.1

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 17,300 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 2.5 MW (cumulative) of coincident peak reduction in 2015.⁸¹

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings is concentrated at the time of system peak. The peak coincidence factor for the program is 0.79.⁸²

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

The table below shows the number of expected program participants as a percentage of the number of customers in the class, although a much smaller population is expected to be building a home in any given year. The number of expected program participants represents NYSERDA's best estimate of participation for the current additional gas funding request through 2011.

Table IV-86. ENERGY STAR Homes Program: Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class ¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Residential - Electricity	6,240,788	15,039	0.2%
Residential – Natural Gas	4,095,085	15,039	0.4%

Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

⁸¹ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁸² Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

V. CROSS-SECTOR PROGRAM PORTFOLIO

1. OVERVIEW

The programs in this section cut across sectors, providing reductions in electricity consumption and demand through more efficient electric transportation systems, improved control over energy demand through “Smart Grid” applications, and the development of a trained and competent workforce to deliver energy savings for all program administrators, Statewide.

The goals of the EEPS are more likely to be achieved with an adequate, readily-available pool of qualified workers to properly install, operate and maintain energy efficiency measures. It is well-understood that to realize the expected savings associated with installed equipment and efficiency measures, installation must be done properly and systems must be properly maintained. An energy efficiency training network is addressing this need, and the consensus of the Workforce Development Working Group and the Governor’s Renewable Energy Task Force is that efforts must be expanded to fulfill the EEPS requirements. Eventually, the market forces of supply and demand will drive and sustain workforce development efforts; yet there is a near-term need to ramp up levels of skilled workers until market forces are in effect. The Workforce Development proposal presents a leveraged, comprehensive plan, meeting the workforce needs of all sectors, created with stakeholder input, and which sets the stage for a transition to a market-driven model in the near future.

Management of energy consumption through an automated communication infrastructure also holds much promise for delivering savings. The Smart Grid End-Use Efficiency Program, or “Smart Grid” Program, will incorporate information and analysis from the utility-side of the meter to plan and implement improvements in end-use efficiency and control on the customer-side of the meter. “Smart Grid”, or T&D optimization, includes integrated applications on both sides of the meter that rely on robust two-way communications, advanced sensors and information technology to improve the efficiency, reliability and safety of electric power delivery and use.

Electric transportation makes up a sizable portion of New York City’s electric load – while providing economical and efficient movement of people and goods. However, the systems are based on old technology and provide significant opportunity for efficiency improvements. Upgrading of systems is considered one of the single largest potential opportunities for electric efficiency improvements in the NYC metropolitan area. The Enhanced Electrified Rail program will support permanent installation of equipment for demonstration purposes, and development and qualification of additional advanced technologies for the electrified rail system. This is expected to lead to full-scale investment in these technologies by the NYC Metropolitan Transportation Authority and New York Power Authority.

2. WORKFORCE DEVELOPMENT

2.1. PROGRAM DESCRIPTION

The aggressive goals of the EEPS will benefit from a readily-available pool of qualified workers to install, operate, and maintain energy efficiency measures. This workforce can minimize barriers to program implementation are minimized and further ensure that sustained, long-term energy savings gained through the EEPS programs are realized. An energy efficiency training network has begun to address this need, however the consensus of the Workforce Development Working Group (convened by the Department of Public Service) and the Governor's Renewable Energy Task Force is that efforts must be rapidly expanded to adequately fulfill the EEPS requirements.

The energy efficiency industry is facing with a shortage of competent and certified workers across the job spectrum. There is limited access to on-the-job training opportunities and accredited training facilities to provide initial and continuing education courses in energy systems and efficiency practices. Workers, particularly those just entering the field, often lack the financial resources to pursue the training and certification opportunities needed to move along the training continuum that provides the assurance of the ability to earn a living wage through participation in the energy efficiency job market. Discussions at Working Group meetings suggest that, while market forces will begin to address the need for qualified workers as the demand grows, the goals of the EEPS require some level of interim initiative. Resources to develop the infrastructure and encourage larger numbers of candidates are needed immediately to "jump start" these efforts so they coincide with the ramp up of efficiency programs.

NYSERDA has joined with the New York State Department of Labor (DOL) to develop this comprehensive workforce development (WFD) proposal that will enable the strategic expansion of a qualified energy efficiency workforce, drawing from existing workers, emerging workers, and underemployed or idle workers, that will be trained and deployed to help meet the EEPS goals.

At approximately \$5.4 million per year (about 1.5% of overall EEPS funding), this Program budget is approximately \$16,255,050 for the 2009-2011 period. This level of investment to support workforce development strategies will leverage an additional \$11 million of funding being provided by the DOL that will help identify, screen, recruit, and place trained workers in jobs that follow clear career pathways and will strengthen the ability to develop and retain these workers in New York State. The potential workforce need created by the EEPS can be illustrated by U.S. DOE research which estimates that 52 jobs are created for every \$1 million invested in weatherization programs. While only illustrative, this result would extrapolate to the creation of a skilled workforce of approximately 17,000 jobs per year to support a \$330 million annual investment in energy efficiency.

There is a distinction between program the training outlined under the utility EEPS proposals and the Workforce Development training now proposed. Utilities participating on the DPS Workforce Development Working Group have expressed that the Program Marketing and Trade Ally component of their program proposals represent only a minimum level of programmatic and trade ally training necessary to support program implementation.

Comprehensive Training Initiatives. This proposal seeks to establish a comprehensive training agenda for New York State, supporting energy efficiency programs already approved by DPS, while building in the flexibility to support additional approved programs. In addition to the strategies described below, NYSERDA will issue an open solicitation through which projects and partnerships that respond to specific market needs will be supported.

NYSERDA will work closely with all EEPS program implementers and the DPS Workforce Development Working Group to identify opportunities to expand training and provide training subsidies where appropriate. NYSERDA plans to immediately:

- Expand the Hudson Valley Community College (HVCC) Center for Energy Efficiency and Building Science (CEEBS) training network which currently comprises 10 learning centers by adding several more training locations - especially in New York City, and develop additional training courses and curriculum;
- Work closely with partners such as the City University of New York, Lighting Research Center (LRC), and others to expand the commercial and industrial efficiency training for contractors, providers, architects and engineers, building operators, and facility managers;
- Develop and launch on-line courses and distance learning offered through training partnerships with colleges and universities and other third-party providers;
- Collaborate with the U.S. EPA and other partners to deploy “train-the-trainer” programs to support statewide building performance benchmarking, and new residential energy efficiency technology-based training; and
- Work with manufacturers to develop supplemental curriculum to enhance existing customer training programs, and emphasize energy efficiency, quality installation, and efficient operations and maintenance practices.

Internships and Apprenticeships. On-the-job training will be supported through a significant expansion of internship and apprenticeship programs. NYSERDA will work with colleges, universities, community colleges, labor unions, energy service companies, and others to promote internships within the energy efficiency industry and private sector.⁸³ These internship and apprenticeship programs give newcomers to the energy efficiency job market the opportunity to work with experienced energy professionals, and obtain “real life” experience. Internships serve as a job-placement mechanism giving energy firms and private-sector businesses the opportunity to hire experienced and trained workers who can quickly help the organizations be more productive and effective.

NYSERDA will build on its work with NYSDOL and the Workforce Development Institute to develop and implement new internships, apprenticeships, and job placement initiatives, particularly through the New York State Apprenticeship program. This program is a national training system administered by NYSDOL that combines paid on-the-job learning and related technical and theoretical instruction in a skilled occupation.

Professional Development and Continuing Education. Continued professional training is needed to support those already in the workforce, increase awareness of new technologies, and support the development of marketable skill sets in a wide variety of new technologies. Expanded technical skills in building systems that affect energy use (heating, cooling, lighting, and ventilation) and tenant comfort (temperature, air quality and illumination) are necessary. As a registered provider under the American Institute of Architects Continuing Education System, NYSERDA administers Continuing Education Units (CEU) credit for courses in high performance design, effective lighting, green building operations and maintenance, classes taught at CEEBS learning centers, and other energy efficiency (and renewable energy) technologies. To further expand career development efforts, NYSERDA will support curriculum development for courses offered through AEE, AIA, BOMA/BOMI, and others, and is working with the

⁸³ For example, NYSERDA has funded the development of the CUNY Building Performance Laboratory internship program to support the development of a skilled workforce for the building performance sector. Students learn to tailor technical solutions to individual buildings and equipment, determine and document optimum building and energy-system performance, monitor ongoing operations, and analyze data to maintain optimum building and systems performance.

Practicing Engineers Institute (PIE) to secure CEUs for the classes currently taught at CEEBS learning centers.

Promoting National Certifications and Standards. The workforce development initiatives described in this proposal will promote a standard level of competency to achieve the level of quality installation, operation, and maintenance of energy efficiency measures likely needed to support EEPS. Certification programs requiring written and field performance tests ensure quality assurance of the performance capability of industry professionals. Many EEPS-funded programs will require that individuals are able to demonstrate a specific competency level and will require minimum levels of quality assurance to ensure that installed measures perform as expected. NYSERDA will work with the DPS Workforce Development Working Group and other parties to determine the areas where certification is needed, and consider certification strategies that facilitate required levels of quality assurance without limiting the number of available workers supporting new programs. The cost of pursuing certification is a significant barrier to expanding the base of qualified professionals that pursue standard certification. Cost-sharing for training and certification will be provided to encourage a greater number of practitioners to participate.⁸⁴ NYSERDA will collaborate with professors and other professional trainers interested in pursuing certification or accreditation to quickly establish trainers to support specific EEPS programs.⁸⁵

NYSERDA will work with the DPS Workforce Development Working Group and others to evaluate existing certifications and develop new certifications as needed. NYSERDA will collaborate with the NYC Office of Long Term Planning and Sustainability, and other entities around the State to evaluate and determine certification needs that support green and energy efficiency policy objectives. For example, NYSERDA has identified the need for development of two new certifications: Quality Building Modeler and Quality Energy Auditor to support high efficiency buildings for new construction and energy auditing, respectively.

Career Pathways in Energy Efficiency. The EEPS provides a unique opportunity to align the activities designed to achieve energy efficiency targets, with the mission of DOL to provide opportunities for New York's existing and emerging workforce, as well as the unemployed and underemployed workers. In particular, DOL's One-Stop Workforce Development System will be used to target workers to participate in the training and certification programs defined in this proposal.⁸⁶

⁸⁴ Examples include BPI certification, Association Energy Engineers (AEE) Certified Energy Manager, NCQLP Lighting Certification, USGBC Leadership in Energy and Environmental Design Accredited Professional (LEED AP), North American Technician Excellence (NATE) HVAC certification, and National Association Energy Service Companies (NAESCO) certifications in HVAC and building envelope.

⁸⁵ For example, USGBC LEED Accredited Professional training is currently being cost-shared for students and educators in a pilot with Rensselaer Polytechnic Institute (RPI) and will be expanded under this proposal to a network of colleges and universities that have strong building science and engineering programs. Trained students will be placed on internships with contractors, technical assistance providers, and customers working with NYSERDA to implement new construction projects. Another example of effective train-the-trainer efforts to promote national standards in building science for building operators has been NYSERDA's sponsorship of CUNY as an approved provider for Building Operator Certification (BOC) training developed by the Northwest Energy Efficiency Council. As an approved provider, CUNY is able to reach out to local government staff, trade unions, and commercial building owners and managers to deliver BOC training for building operators.

⁸⁶ The DOL System currently includes: 33 Local Workforce Investment Areas aligned with the State's 10 economic development regions. Each area is overseen by a Local Workforce Investment Board; 79 One-Stop Centers; a customer base of over 600,000 individuals a year (about 7% of the State's workforce) possessing a wide range of occupational skills across most industries in the state; a statewide web-based inventory of training programs to enhance and develop occupational skills of the State's workforce (encompassing 1,329 training locations and 13,033

The programs administered by DOL through the One-Stop System largely provide skills development and occupational training services to individuals to meet the demand of businesses. DOL has identified renewable energy, energy efficiency and weatherization, as a priority, and directs resources to address the these workforce development. Up to \$9 million in One-Stop resources would be directed at serving this sector over the next three years, with an additional \$2 million directed to address specific workforce development needs associated with implementing EEPS workforce training initiatives.

DOL, in collaboration the New York State Division of Housing and Community Renewal and NYSERDA, will work with Local Workforce Investment Areas to develop entry level training initiatives. Potential trainees will be screened for skill, proficiency and interest, and then assessed for program readiness (including math ability, knowledge of basic carpentry, etc.). Strong candidates would be recruited and provided training at CEEBS, with the goal of producing 1,000 certified Bachelor of Arts degrees over a three-year period. At the same time, the One-Stop Workforce Development System would provide training in the entry level skills necessary for entry level employment in the energy efficiency sector, and as a beginning for a career pathway to higher skilled employment. This training will be developed to assist individuals with limited energy efficiency experience or training get the basic skills support needed to obtain entry level positions, as well as providing basic efficiency training to skilled practitioners such as carpenters, electricians, window installers, heating and air conditioning technicians.

2.2. DEMAND REDUCTION AND SYSTEM BENEFITS.

Workforce development and training will ensure systems are designed, operated and maintained properly and will contribute to the EEPS program impacts as designed and estimated. As indicated in several studies and reports, there is a significant potential to increase energy savings with training that addresses proper system sizing, installation, and proper matching of components.⁸⁷

training courses); and the New York State Apprenticeship Program, a national training system that combines paid on-the-job learning and related technical and theoretical instruction in a skilled occupation.

⁸⁷ As early as 1999, program evaluators examining the energy savings potential associated with proper installation of energy efficiency equipment have associated quality installation practices and training with greater operating efficiency and performance. The US EPA commissioned a report (Neme, Proctor, and Nadel, 1999) looking at the *“Energy Savings Potential From Addressing Residential Air Conditioner and Heat Pump Installation Problems”*. The report demonstrated that equipment installed by properly-trained HVAC technicians could save an average of 24 percent of energy use in existing homes and 35 percent in new construction. The report also states that the manner in which equipment is installed may have a much greater impact on actual operating efficiency than whether or not it has a high-efficiency rating. Further, Neme, Proctor and Nadel point out that studies conducted in 10 different states or regions of the U.S. have found that the average air conditioner or heat pump is oversized by about 50% and nearly one ton of capacity compared to properly-sized systems.

A TXU Electric Delivery Study (Stockard, Audet, Zarnikau, 2007) of installation practices of air conditioner installers between the years 2004-2006 demonstrates that significant savings can be obtained by promoting better installation and sizing practices. This report quantifies the impacts training has on proper duct sealing, attributing deemed energy savings of 17,129 MWh and 11.6 MW in demand savings with proper sealing techniques in 126,500 installations.

A report commissioned by the New York City Mayor's Energy Conservation Steering notes that quality assurance at installation and at regular intervals facilitates the sustainability in savings of energy efficiency measures. The report asserts that training of existing and newly-hired maintenance and facility management personnel on how to recognize and address energy-related equipment and maintenance needs is necessary and that training should address topics such as energy consumption monitoring, and proper operation and maintenance of particular pieces of equipment.

2.3. MARKET SEGMENT NEED

Collaboration with the New York City Office of Long Term Planning and Sustainability and the New York City Economic Development Council has identified a great need to support benchmarking and audit and retrofit legislation.⁸⁸ That legislation will affect over 9,000 multifamily buildings representing over 1.4 billion square feet, and 2,100 commercial buildings representing over 600 million square feet. There will be a substantial impact the energy efficiency community in New York City and has the potential to establish a replicable model for enactment throughout New York State.

Expansion of low-income and weatherization programs will require thousands of new practitioners. New programs aimed at increasing the efficiency of new and existing homes and multifamily buildings will require training for new contractors, continuing education for existing contractors, training for building operators, training for code officials and home energy raters.

2.4. COORDINATION

NYSERDA works closely with the Governor's Task Force on Renewable Energy and its Green Jobs initiatives, the DPS Working Group on Workforce Development and many others in identifying workforce training needs and developing the workforce training infrastructure needed to meet these needs.

NYSERDA leveraged millions of dollars in training partner co-funding. Current energy efficiency training partners include Onondaga-Cortland-Madison County BOCES, Broome Community College, Erie Community College, Bronx Community College, Fulton-Montgomery Community College, the Association for Energy Affordability, Westchester Community College, Onondaga Community College, and SUNY Canton. The existing residential energy efficiency training supported by NYSERDA takes place at educational institutions that have quality building trades programs and utilizes existing technical instructional staff to deliver the energy efficiency classes. This arrangement also provides the opportunity for matriculated students to take advantage of these classes. For example, NYSERDA is working with the Center for Sustainable Energy at Bronx Community College to provide a hub for energy efficiency training activities in the metro-New York area using the City University of New York system as a training platform. The training activities will include not only the delivery of energy efficiency training, but also instructor development activities to increase the number of qualified energy efficiency instructors in the region.

NYSERDA also established a partnership with the New York State Weatherization Directors' Association (NYSWDA). Many technicians working for weatherization agencies enroll in NYSERDA-funded energy efficiency classes. This partnership ensures that efforts are not duplicated and that resources are leveraged. It also provides an opportunity for other building technicians to improve their skills at NYSWDA's training facility that includes a classroom, heating lab, and laboratory house. The LRC, headquartered at RPI, provides technical instruction to contractors in the Multifamily Partner Program as well as contractors in NYSERDA commercial programs. Erie Community College (ECC) has applied to have BPI-recognized energy efficiency classes approved at the DOL's One-Stop Center at ECC. If approved, students enrolling in energy efficiency classes will have access to tuition support and job placement assistance.

⁸⁸ Proposed Local Law Int. No. 476-A to amend Chapter One of Title 27 the administrative code of the City of New York, in relation to benchmarking the energy and water efficiency of buildings.

2.5. CO-BENEFITS

Economic development is a significant co-benefit of new investment in workforce development. For example, some participating contractors in the Home Performance with ENERGY STAR[®] Program have grown their businesses significantly, adding both technicians and office staff. Also, a large number of BPI-certified technicians support NYSERDA's low-income programs, such as Assisted Home Performance with ENERGY STAR and EmPower New YorkSM, as they require certified technicians. In particular, EmPower New YorkSM, has seen a large increase in demand for its services and more certified technicians are needed to accommodate the demand.

Training centers have realized economic development benefits as they attract new students to participate in new workforce training and certification programs, and several institutions have reported waiting lists for their training and continuing education initiatives. BPI, located in New York, has seen significant growth as it develops new certifications and certifies more practitioners.

2.6. PORTFOLIO BALANCE

All programs, regardless of program administrator or source of funding, will benefit from an expanding and qualified workforce. This component is necessary to achieve a complete program portfolio and the level of funding requested (1.5% of total EEPs funds) is appropriate.

NYSERDA will continue to work with its training and business partners to ensure a balanced portfolio of training across all sectors. In areas where there is a need for additional training areas, NYSERDA can use the annual solicitation to meet those needs. Tuition and certification reimbursements can be adjusted to ensure that the portfolio of training options is balanced to meet the needs of the EEPs. Finally, marketing strategies, placement, and frequency can be adjusted as needed.

2.7. DEPTH OF SAVINGS

Properly trained technicians specify higher efficiency equipment, promote efficiency standards, maximize operations and equipment performance, and facilitate long-term accruals of energy savings. With proper training, practitioners will be better prepared to properly design, install, operate and maintain energy efficiency measures to help ensure that that energy savings are realized. By properly training practitioners how to design, build, or evaluate the "whole building", opportunities will be identified and measures recommended or implemented to improve the performance of the entire home, building, or facility as opposed to looking at single measures. Without proper training, these savings will be lost.

2.8. UNDERSERVED MARKETS

NYSERDA's workforce development plan will address issues of social and environmental justice, in that the jobs created by advancing the goals of the EEPs will clear career pathways out of poverty for low-income individuals and communities of color, from low-skill entry level positions into family-sustaining wage positions.

NYSERDA is working closely with DOL, New York City Economic Development Corporation (NYCEDC), CEEBS, the Association for Energy Affordability and others to ensure that training is available to dislocated workers as well as disadvantaged adults and youths. NYSERDA will also align its programs with the DOL's One-Stop System Workforce Development System to build upon the success of this program in targeting underserved populations. Market needs will be better assessed when the Commission approves the full portfolio of Fast Track Proposals.

2.9. COMMITMENT

Using its existing workforce development programs as a foundation, NYSERDA will ramp up its expanded workforce development programs immediately upon approval and expects to continue these activities through 2011. It is anticipated that the number of students will increase over the entire three-

year period and that the need for a trained qualified workforce to meet EPS goals will continue to drive training for existing contractors. The expanded energy efficiency programs will create a need for more trained building trades' technicians providing strong job opportunities for those students and workers seeking to enter the energy conservation field. This emerging workforce will provide large numbers of students seeking quality energy efficiency training. Based on the infrastructure developed for its existing workforce development programs, NYSERDA will quickly and appropriately respond to meet increased student demand for this technical training.

2.10. CUSTOMER OUTREACH

NYSERDA marketing efforts for workforce training will be significantly ramped up to promote workforce training initiatives and opportunities. NYSERDA will work closely with its partners, such as DPS Staff, the Department of Labor, and others, to market the EEPS training programs and will be a multi-media approach.

A comprehensive workforce training and education web portal will be developed to serve as a central location for information on all residential and commercial training programs and job opportunities within the State. The portal will link to resources offered through the www.GetEnergySmart.org website to recruit students, market training programs, market partnerships with colleges, universities and private companies participating in the internship and apprenticeship programs, and coordinate with entities such as the NYC EDC to educate consumers about the benefits of working with nationally certified contractors and other trained providers.

NYSERDA plans to coordinate with New York City's marketing and customer outreach efforts underway associated with its plaNYC to address energy efficiency workforce issues. The Mayor's Office of Long Term Planning and Sustainability, NYC & Company and the Economic Development Corporation's Energy Policy Department will work with NYSERDA to incorporate workforce issues in their ongoing energy efficiency campaign.

2.11. COLLABORATIVE APPROACH

. NYSERDA works closely with the members of the Governor's Renewable Energy Task Force and the EEPS Workforce Development Working Group and relied on their input in developing this Program. Representatives of the EEPS Workforce Working Group have provided information on training needs, available resources, job placement, student population issues, and funding needs. NYSERDA is a Co-Convener of the EEPS Workforce Working Group.⁸⁹

2.12. FUEL INTEGRATION

. Much of the training for this Program supports a comprehensive, whole- building approach. As students learn to identify and address energy conservation opportunities for both electric and gas utilities, benefits accrue across customer classes and fuel sources.

2.13. TRANSPARENCY

Training evaluation reports, including attendee lists, training schedules, instructor performance evaluations, and other supporting data are available for public review and accessible to other program administrators.

⁸⁹ The EEPS Working Group VII members are: the New York State Department of Labor, SUNY Alfred, New York State Department of Public Service, Hudson Valley Community College, Association for Energy Affordability, New York Energy Consumers Council, investor-owned utilities, Siemens, ACE-NY, Conservation Services Group, New York City Economic Development Corporation, and NYSERDA.

2.14. PROCUREMENT

. Workforce development tasks described in this proposal will primarily be implemented by third-party providers that are competitively procured by NYSERDA. New training programs and initiatives that meet new or changing EEPS needs will also be competitively procured.

2.15. BUDGET.

The table below shows the projected Workforce Development Program budget for 2009-2011.

Table V-1. Workforce Development: Budget (Projected) 2009-2011

EEPS	2009	2010	2011	Total
Workforce Development	\$6,176,919	\$5,526,717	\$4,551,414	\$16,255,050
	2009	2010	2011	Total
Marketing	710,619	635,817	523,614	1,870,050
Implementer	1,857,411	1,661,894	1,368,619	4,887,924
Incentives	3,537,069	3,164,746	2,606,261	9,308,076

2.16. EVALUATION.

Evaluation Goals: Evaluation goals related to this effort include conducting a joint process and market study to assess awareness of trainings, perceptions of trainings by training participants as well as employers, program penetration, number of jobs created, satisfaction and barriers to participation. An impact evaluation is not planned with evaluation funds set aside for this program, but energy savings impacts resulting from work force training efforts can be examined through evaluations conducted on the associated end-use programs (e.g., Home Performance, Multifamily Performance, etc).

Brief Overview of the Evaluation Approach: The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and implementation of the Workforce Development Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget: NYSERDA expects the evaluation budget for the Work Force Development Program to be approximately equal to 5% of the program funding level, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. As the Work Force Development Program is not expected to separately count direct energy savings, evaluation funding will be designed to account for the specific needs of the program, and allocated roughly equally to process and market evaluation. Should funding be provided by the NYS Department of Labor, discussions should determine what portion, if any, will be allocated to evaluation. If funds are added for evaluation, they could be used to supplement the proposed activities presented in this plan.

Evaluation Schedule: Process evaluation is expected to occur during each year that the program is operating. During 2009 and 2010, NYSERDA's independent evaluation contractors will work with

NYSERDA evaluation and program staff to develop post-training survey questions for assessing curriculum usefulness and effectiveness for each training program funded by NYSERDA. These surveys will be implemented at the close of each training effort. The evaluation will likely also involve phone interviews with a sample of training participants each year to assess response to the training and assess the level of learning. In 2011, NYSERDA's independent evaluation contractors will conduct a full evaluation of the training effort, including interviews with program staff, trainers, and surveys of a sample of participants and their employers regarding their post-training experience.

Market evaluation is expected to occur in 2009 and again in 2011. In 2009, NYSERDA's independent evaluation contractors will conduct an initial assessment of market needs among energy efficiency services industry employers exploring topics related to staffing needs, required skillsets, availability of skilled labor, and anticipated evolution of the marketplace. In 2011, a follow-up study is expected to assess the degree to which the training efforts have affected the market needs of energy efficiency services industry employers examining time-series trends in the data collected during the first year evaluation effort as well as additional researchable issues identified by earlier evaluation work.

Table V-2. Workforce Development: Evaluation Schedule

Evaluation Element	Expected Completion		
	2009	2010	2011
Process Evaluation	X	X	X
Market Evaluation	X		X

Measurement and Verification and Net-to-Gross: Impact evaluations are not planned for this program. Energy savings impacts resulting from work force training efforts can be assessed through evaluations conducted on the associated end-use programs (e.g., Home Performance, Multifamily Performance, etc). Interviews with market actors who participated in the workforce development training and with those who did not can be used to estimate energy savings impacts due to these efforts.

Process and Market Evaluation. Evaluations of work force training efforts should be grounded in Kirkpatrick's four levels of evaluation for assessing training effectiveness⁹⁰. The four levels address response of the trainee to the training, assessing what was learned, assessing performance in the workplace and estimating the effects of the training on the work place. Addressing these four levels requires both process and market evaluation activities such as surveys and interviews with program implementation staff, NYSERDA program staff, trainers, participating and nonparticipating technicians, and actual and potential employers in the market place and broadly examining the market response to the efforts.

The planned evaluation efforts will assess awareness and knowledge of NYSERDA and other related training efforts in New York, perceptions of the NYSERDA-funded training effectiveness and usefulness, recruitment vs. certification rates, and participant and employer satisfaction. A key component of the

⁹⁰ Kirkpatrick. D. *Techniques for Evaluating Training Programs*. Journal for the American Society of Training Directors, 13. 21-26, (1959b).

efforts will be to assess the first year for each training effort and provide feedback to the trainers on student response to the curriculum. As each training effort matures, the evaluation efforts will shift toward examining market response to the training, exploring topics related to employer staffing needs, availability of skilled labor, and anticipated evolution of the marketplace.

The breadth of impact anticipated from workforce training requires a variety of data collection efforts. Sampling strategies will be developed for each training activity to ensure that sufficient feedback is provided such that the program curriculum can evolve effectively. Timing is also critical in that input should be provided to trainers as soon as possible after training efforts are initiated so trainers can improve their curricula based on initial market feedback and also develop a mindset founded on the concept of continual improvement. As the workforce training effort grows, sampling of participants and targeted employers can be conducted at the 90/10 confidence/precision level. Information will be collected from market actor surveys and interviews by NYSERDA's independent evaluation contractors. Data analysis will be conducted by NYSERDA's evaluation contractors following established protocols.

The process evaluation will be conducted at a modest level for 2009 and 2010 to provide on-going feedback regarding the curriculum and training effort implementation and associated participant response. A full scale process evaluation will be completed in 2011. A baseline market study with energy efficiency services industry employers will be conducted in 2009 with a follow-up study conducted in 2011 to examine the effects of the training efforts on the energy efficiency services industry needs and examine longitudinal trends in the baseline parameter measurements.

Evaluation Plan Variations. Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. With reduced funds, NYSERDA would likely reduce the number of evaluation cycles. With enhanced funds, the market assessment anticipated for this project could be conducted at a much broader level to include traditional, non-energy efficiency services industry employers (e.g., architects, engineers, contractors, unions, etc.), but such a study would require statewide participation.

3. ENHANCED ELECTRIFIED RAIL PROGRAM

3.1. PROGRAM ELEMENTS

Program Description

The Enhanced Electrified Rail Program (Program) will achieve savings of grid-supplied electric energy (MWh). A recent assessment of the energy efficiency potential associated with introduction of new technology and advanced energy controls in the New York City rail system indicates that over 500,000 MWh in annual energy savings could be cost effectively achieved. This represents one of the single largest potential opportunities for electric efficiency improvements in the NYC metropolitan area.

This Program will sponsor permanent installation of equipment developed in the program (for example, energy-efficient track de-icing, a technology previously developed through the SBC program). The Program will also develop and qualify additional advanced technologies for the electrified rail system (examples include more efficient electrical conductors and electric insulators). In addition to the immediate benefits derived from installed measures, The Program will deliver “real world” experience with systems in an effort to inspire wide-scale adoption by the Metropolitan Transit Authority (MTA), or confirm payback period aspects as a means of attracting New York Power Authority (NYPA) financing.

It is anticipated that after a few years of simultaneously installing equipment, such as track de-icers and additional technologies, track de-icers subsidies will no longer be necessary and the newly-qualified technologies will be appropriate for permanent installations.

Program Goals and Objectives .

The Program will deliver permanent installation of energy-efficient equipment with an anticipated lifespan of 20 years. Electric savings attributable to The Program will also assist with alleviating grid constraints and preventing electric losses otherwise attributable to transmission and distribution (T&D) resistance in the highly constrained New York City T&D load pocket. Each year The Program will install a limited number of systems in the MTA electrified rail network.

Program Theory.

The Program will use an annual competitive solicitation, allowing NYSERDA to select the most promising projects to deliver the expected savings and additional technologies for development and qualification. Milestone-based contracts will be issued, and for those projects involving permanently-installed equipment, the majority payment will be tied to the installation and commissioning of the equipment. Contracts will include rigorous measurement, verification, and data reporting requirements. Program design and administration will be subject to change contingent upon marketplace response (for example, the quantity and quality of proposals received).

Anticipated Spending and Savings.

With an annual program budget of \$5,376,344 (electric funds), approximately \$5,000,000 will be earmarked for incentives. Annually, The Program will install a limited number of systems with collective savings of approximately 20,000 MWh/yr. Approximately half of the program budget will be used to permanently install equipment (and may be pursued as a single contract); the other half will be used to develop/qualify additional technologies. Projects permanently installing equipment will be eligible to receive up to 50% of the overall cost of the project. Projects developing/qualifying additional technologies will be eligible to receive \$500,000 or 50% of the overall cost of the project, whichever is less.

Table V-3. Enhanced Electrified Rail Program: Total Expenditures (Projected) 2009-2015 [net of administration and evaluation]

	2009	2010	2011	2012	2013	2014	2015	Total
Annual EEPS Spending	\$5.0M	\$5.0M	\$5.0M	0	0	0	0	\$15.0 M
Note: There is no marketing budget for this program.								

Table V-4. Enhanced Electrified Rail Program: Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings installed in the current year	0	20,000	20,000	20,000	0	0	0
Annual Savings installed in prior years		n/a	20,000	40,000	60,000	60,000	60,000
Cumulative Annual Savings		20,000	40,000	60,000	60,000	60,000	60,000

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners.

NYSERDA will continue to work with DPS Staff and the EEPS Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

Program Schedule.

Program launch in Q1 2009 with one-year lagtime before permanently-installed equipment is installed/operational. Operate the program for three (3) years (CY 2009 – CY 2011).

3.2. DEMAND REDUCTION AND SYSTEM BENEFITS:

It is anticipated that the measures developed and deployed in this program will result in permanent verifiable load reductions to the Con Edison distribution system. Thus the impact on peak load and system load factor, including metrics can be relied on by the New York Independent System Operator.

3.3. MARKET SEGMENT NEED.

The MTA's subway and commuter rail system is a 1,100 MW load served by the Con Edison distribution system, and annually consumes over 2 billion kilowatt-hours of electricity in the New York Metropolitan load pocket. There are no other programs focused on reducing this extremely large load.

3.4. COORDINATION.

There are no programs in New York focused on introducing new energy efficient technologies for the MTA's electrified rail system. Neither the MTA nor NYPA (the MTA's primary electric provider) have programs focused on innovative ways to reduce this large load. NYPA is prepared to finance energy efficiency measures based on shared savings, however these measures must first be developed and

verified. This program provides that technology verification and initial financial incentive necessary for early stage products to meet the return on investment criteria required by NYPA. Given the limited funding requested here, this program will not finance full build-out of the measures. Rather, it will characterize risk, demonstrate technology, and enable MTA and/or NYPA to make subsequent investments needed to achieve what is estimated to be a 500,000 MWh per year efficiency savings in New York City.

3.5. CO-BENEFITS.

Load reductions in the J and K areas improve reliability and reduce cost for all customers in those areas. Cost reductions and improvements to the performance of public transit systems benefit New York tax payers that subsidize the system and all residents. New York State business will be utilized to develop and manufacture the products deployed in the program creating employment and increased economic activity in the State.

3.6. PORTFOLIO BALANCE.

Not applicable.

3.7. DEPTH OF SAVINGS.

Not applicable.

3.8. UNDERSERVED MARKETS.

Refer to Coordination discussion above.

3.9. COMMITMENT.

A minimum of a five year commitment is necessary to develop and deploy a technology within the electrified rail system.

3.10. CUSTOMER OUTREACH.

Participation in the program will be encouraged through the marketing of competitive solicitations to stakeholders.

3.11. COLLABORATIVE APPROACH:

The program has been developed in consultation and in conjunction with the MTA, NYPA and potential technology providers.

3.12. FUEL INTEGRATION.

Not applicable.

3.13. TRANSPARENCY.

The program will be transparent regarding the program, including program design, benefit/cost analysis, and supporting data, are available for public review and accessible to other program administrators.

3.14. PROCUREMENT.

Each activity will be procured through competitive processes except to the extent they are performed directly by the program administrator.

3.15. EVALUATION.

The evaluation approach for early demonstrations of technologies necessitates flexibility; work varies with the technology and project types/stages such as product development/qualification, demonstration, and business development. This program will demonstrate products developed under SBC (such as a

“track de-icing” product) with energy savings; the demonstration is expected to motivate the Metropolitan Transit Authority (MTA) to widely deploy the technology and evaluation will verify the project’s capabilities.

Subsequent project technologies in earlier stages of development, selected through annual competitive solicitations, may not produce near-term savings and some projects may not prove successful. An evaluation will be conducted for each technology, with evaluation plans being tailored for the individual technologies as they are selected; consequently, the proposed evaluation plan presented here is general in nature and will evolve as the program develops.

Evaluation Goals

The evaluation goals for permanently installed energy efficient technologies are two fold: (1) to ensure rigorous impact evaluation of the claimed electricity (MWh) and associated demand (MW) savings, and (2) to collect feedback from MTA employees on their perceptions of and satisfaction with the technology’s performance. The evaluation goals of the technologies yet-to-be-chosen will be determined based on the technology and its stage of development.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA’s current plans for the Enhanced Electrified Rail Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPs program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA’s estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPs Evaluation Advisory Group.

Permanently installed technologies will undergo impact evaluation to verify the claimed annual electricity (MWh) and associated demand (MW) savings. Additionally, the process evaluation will assess the technology and possible further adoption as judged by MTA employees. The evaluation approach for the new technologies will be determined once the technologies are selected. As the MTA is expected to be the only customer, these will be census evaluations.

Evaluation Budget

NYSERDA expects the evaluation budget for the Enhanced Electrified Rail Program to be approximately 5% of the program funding level, less yet-to-be-determined funds set aside for statewide studies and other overarching costs borne by program administrators. It is expected that the Enhanced Electrified Rail Program evaluation budget will be designed to account for the specific needs of the program, and allocated primarily to impact evaluation (65%) with the remainder to process evaluation.

Evaluation Schedule

Installed equipment needs to be in operation for a minimum of one full year to assess its performance, reliability, and operations and maintenance (O&M). Scheduling must take into consideration if a technology is operational only part of year, *i.e.*, seasonal. For example, the performance of the de-icer must be evaluated during extreme cold and snow; necessitating the time frame be late 2010 and early 2011, with commencement of any necessary pre-installation visits in winter 2009. The table below shows the main evaluation components and the expected timing of their completion.

Table V-5. Enhanced Electrified Rail Program: Evaluation Schedule

Evaluation Element	Expected Completion		
	2009	2010	2011
M&V (Impact)	X		X
Process Evaluation	X	X	X

Impact Evaluation

Impact evaluation of the Enhanced Electrified Rail will consist of measurement and verification only. Net-to-gross analysis will not be performed for reasons cited below.

Measurement and Verification

The de-icer requires pre and post site visits with extensive long-term energy use or metered data both before and after installation. The specificity of energy use data that might already be available needs to be assessed. This would be used to further develop the impact evaluation plan and to determine what extent energy use data (along with weather and operating data) could be used to conduct the impact evaluation versus the need and extent of metering data. Consistency and reliability of equipment performance under varied conditions may also be assessed.

Energy use data must first be assessed for its appropriateness in the development of calibrated engineering. The evaluation plan development will likely involve such an assessment. Evaluation of this program could require long-term metering/data collection at the site both before and after installation. Data to be collected and the methodology will be determined with NYSERDA's independent contractors using established evaluation protocols as applicable to evaluating this specialized technology and circumstances.

Analysis may include research to estimate impacts on the specific transmission congestion points targeted and MW impacts. NYSERDA and its independent evaluation contractors will include the EEPS Evaluation Advisory Group (EAG) and the DPS evaluation advisors in the evaluation plan development to the extent these specialized technologies and circumstances require specialized evaluation designs and analysis and to ensure that the evaluation needs for the EEPS are met.

Net-to-Gross

Here, as in most circumstances of early demonstrations of technologies, net-to-gross does not apply. Freeridership does not occur for technologies that would not exist or would not be accepted into commercial applications without investments in technology development and early demonstration. Also, while the concept is similar to spillover, technology replication is more limited and part of program design and intent; consequently, replication will be assessed in the impact evaluation.

Process Evaluation

The process evaluation will involve working with employees at the site before installation (such as MTA employees for the de-icing technology) to establish a process to provide ongoing feedback so that real time concerns/points of interest can be incorporated in the process analysis.

A primary goal of early demonstration of technologies programs is to assess a technology and to identify lessons learned. Feedback in these areas will be an important part of this continual process evaluation effort.

The evaluations will also include interviews with program staff, the product developer, as well as test site contacts. These site contacts are those who are regularly in a position to assess the day-to-day operation of the equipment, training to operate the technology, O&M, reliability, and impact on other equipment.

The process evaluations will: identify issues of data reliability for the impact evaluation; develop a program theory and logic model for the program as implemented; and provide actionable recommendations on the feasibility of the technology and will incorporate lessons learned to inform future program development efforts.

Data collection and analysis will be conducted by NYSERDA's independent contractors based on established evaluation protocols and approved evaluation plans. With pre-installation contacts beginning in 2009 and new technologies yet to be solicited, process evaluations are anticipated to occur in 2009, 2010, and 2011.

Evaluation Plan Variations

Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Although measurement and verification of electric savings is critical, the evaluation could also examine each technology's viability for potential for commercialization. If NYSERDA's evaluation funding for this program were reduced, the process evaluation would be scaled back by limiting the number of interviews. Conversely, if this program were to be allocated more of NYSERDA's evaluation funding, process evaluation could be expanded to capture quantitative data.

3.16. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Enhanced Electrified Rail Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table V-6. Enhanced Electrified Rail Program: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	20	60.0	--	--	100%

Table V-7. Enhanced Electrified Rail Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
Electric Funding Only	\$15.4	\$28.9	\$80.5

Table V-8. Enhanced Electrified Rail Program: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	5.2	2.8

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$5.9 Million.

Table V-9. Enhanced Electrified Rail Program: Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	5.6	3.0

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 60,000 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Some projects funded through the program will provide savings only in the winter. Therefore, coincident savings were not estimated.⁹¹

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

See above.

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

The Enhanced Electrified Rail Program is intended to assist a single customer – the Metropolitan Transportation Authority.

⁹¹ NYSEDA defines coincident on-peak period as being between 12:00 noon and 6:00 PM on summer non-holiday week days.

4. SMART GRID END USE EFFICIENCY

4.1. PROGRAM ELEMENTS

Program Description.

“Smart Grid” end-use efficiency improvements address the challenges and opportunities that flow from an optimized transmission and distribution (T&D) system.⁹² In the program, end-user improvements will be chosen that incorporate information and analyses from the utility-side of the meter to allow enhanced control of electricity use on the customer-side of the meter. Smart Grid and T&D optimization include integrated applications that rely on robust two-way communications, advanced sensors, and information technologies to improve the efficiency, reliability, and safety of power delivery and use. The June 23, 2008 Order assigns utilities the task of investigating sources of system losses and identifying potential measures to reduce system losses and optimize system operations.⁹³ The Order states that some solutions to ameliorate system loss may involve installation of equipment by end users.

The utility T&D loss effort will result in individual utility reports to the Commission this December. A technical conference, held in July, scoped out a strategy for the proceeding and included reports by DPS Staff, utilities, NYISO and others providing an overview of system operations and the current state of knowledge. Presentations also included the customer perspective as well as local load factor considerations. Consolidated Edison provided information showing overall system efficiency for each component of the overall electric power sector: generation (33%), T&D (93%) and customer end-use (15-45%); as well as the seasonal and non-linear nature of T&D losses demonstrating disproportionate losses during summer and on-peak periods.

This Program addresses the nexus where significant end-use opportunities intersect with the time and location of high T&D system losses. This program will result in installations of technical options such as enhanced building management systems and controllable ballasts for the commercial and industrial sector that deliver both kWh and kW savings. For the residential sector, options include controllable thermostats for central and for room air conditioners, electric domestic hot water, pool pumps and home energy management systems to deliver both kWh and kW savings. The program design is intended to address direction provided in the Order that both efficiency and demand reduction are critical objectives, with impacts demand, particularly in constrained areas, as an important criterion.

Final program design will encompass input from stakeholders, including DPS, utilities, EPRI and NYISO; and be informed by the utility reports provided in December. Stakeholder discussions and reports will focus aggregated end-use efficiency and control projects on the time frames and in the locations of maximum benefit.

4.2. DEMAND RESPONSE AND SYSTEM BENEFITS

Project installations will be targeted based on information provided by utilities regarding constrained areas. The program will target these areas for energy efficiency measures that result in approximately 1,600 kW of peak load reduction. When efficiency measures are installed, controls and communications equipment will also be installed to enable curtailment of an additional 8,000 kW of peak load. Advanced

⁹² Deploying the Smart Grid became the policy of the United States with passage of Title 13 of the Energy Independence and Security Act of 2007.

⁹³ Case 08-E-0751 Proceeding on Motion of the Commission to Identify the Sources of Electric System Losses and Means of Reducing Them.

communication capabilities will equip contractors and customers to exploit real-time electricity pricing, incentive-based or emergency load reduction signals.

Table V-10. Smart Grid End-Use Efficiency: Total Program Expenditures (Projected) 2009-2015

Annual EEPs Spending	2009	2010	2011	2012	2013	2014	2015	Total
	\$0.34M	\$4.37M	\$6.64M	\$0	\$0	\$0	\$0	\$11.35M
Projected Outreach/Marketing costs: \$0.25M in 2009; \$0.25M in year 2010; \$0.67M in 2011.								

Table V-11. Smart Grid End-Use Efficiency: Installed MWh Impacts (Projected) 2009-2015

	2009	2010	2011	2012	2013	2014	2015
Annual Savings Installed in the Current Year	0	6,500	10,000	0	0	0	0
Annual Savings Installed in Prior Years	0	0	6,500	16,500	16,500	16,500	16,500
Cumulative Annual Savings	0	6,500	16,500	16,500	16,500	16,500	16,500

NYSERDA has developed initial evaluation plans with the intention of providing the rigor and reliability necessary for metrics to be used by the NYISO and transmission and distribution system planners.

NYSERDA will continue to work with DPS Staff and the EEPs Evaluation Advisory Group to devise final evaluation plans that meet established protocols and produce results that can be used as inputs for system planning and forecasting.

4.3. MARKET SEGMENT NEED

Customers indicate a growing interest in gaining control of their energy consumption and cost, reliability of supply, reducing associated environmental impacts, and are increasingly savvy with information technology. The detailed utility T&D information to be provided later this year will further define the extent and locations where this effort will be of the greatest benefit.

4.4. COORDINATION

Coordination with utilities is important to the success of the Program and NYSERDA will build on previous successful efforts in this area such as the many demand response programs and projects and the implementation of Consolidated Edison's controllable thermostat program for central air conditioning. Complimentary utility resources as well as the identification and details regarding load-constrained areas, and if cost-effective, performance payments similar to distribution and load relief programs. Should similar programs be proposed or approved, more extensive coordination will be undertaken.

4.5. CO-BENEFITS

Smart Grid technologies incorporate consumer equipment and behavior in the design, operation, and communications protocols in the Grid. Implementing Smart Grid technologies enables consumers to

control “smart appliances” and “intelligent equipment” in homes and businesses, permits interconnecting energy management systems in “smart buildings,” and enables consumers to improvement energy use management and, thus, reduce energy costs. Appropriately targeted installations support reliability and help defer the need for additional T&D infrastructure.

4.6. PORTFOLIO BALANCE

NYSERDA offers a portfolio of complementary programs providing customers with a holistic approach to energy projects, enabling all customer sectors to identify opportunities to meet their specific needs. This Program is a key component of that portfolio.

4.7. DEPTH OF SAVINGS

Significant untapped energy efficiency opportunities could be realized in implementing grid-integrated technology solutions. By providing incentives for end-use measures with rigorous efficiency requirements, and by requiring installation of communication technologies that enable aggregation and control of energy efficiency measures from remote sources, energy efficiency is achieved and curtailment is possible from remote locations. The program attribute is less depth of savings in a sector, but rather depth of savings where savings provide the greatest societal benefit.

4.8. UNDERSERVED MARKETS

To date, there are relatively few installations of high efficiency and grid-integrated equipment and technologies that achieve energy savings and kW reductions. The small-to-mid-sized commercial and residential markets have contributed relatively little in the way of demand response participation.

4.9. COMMITMENT

Sufficient time, a commitment to funding, clear terms, conditions, milestones, deliverables and payment schedules will all be critical to program success.

4.10. CUSTOMER OUTREACH

Marketing, outreach, and education are important components of the Program. Staff will build upon their strong alliances with energy service providers and contractors, including outreach that targets appropriate sectors. NYSERDA also anticipates working closely with the utilities to most effectively integrate and implement projects.

4.11. COLLABORATIVE APPROACH

NYSERDA has conducted numerous meetings with service providers working to develop business models and identify customers to incorporate Smart Grid concepts in demand response applications. NYSERDA discussed Smart Grid concepts with representatives of Energy East with regard to that Company’s plans to implement a widespread Advanced Metering Infrastructure (AMI) program. NYSERDA researched Smart Grid technology solutions to integrate energy efficiency and demand response efforts into a program offering. NYSERDA is an active party and has provided input into the Commission’s ongoing AMI proceeding.

4.12. FUEL INTEGRATION

While this Program will focus on electric savings and potential demand reductions, the technology program and communications platform used to generate electric energy savings could be transferable to end uses beyond those that are electric.

4.13. TRANSPARENCY

Program development will be based on significant planning and coordination in late 2008, early 2009. This process will be open to input from all interested stakeholders and will include, at a minimum, the

utilities, DPS, NYISO and NYSERDA Staff. This will result in the release of a competitive solicitation in 2009. Program savings and costs will be available for public consumption through the detailed reports developed by NYSERDA and external evaluators.

4.14. PROCUREMENT

Final program design and solicitation release is planned for 2009 based on research described above, as well as input from stakeholders, utilities, the Commission and DPS Staff. It is anticipated that contractors will be invited to compete for performance-based energy funding. Contractors will be required to specify the amount of funding needed to implement specific projects, within the bounds of decisions made with regard to the instant proceeding and the subsequent set of program guidelines to be designed.

Procurement will be based on one or more open and competitive solicitations.

4.15. EVALUATION PLAN

Evaluation Goals

The primary goal of the evaluation is to assess the energy and demand savings attributable to program activities. A secondary goal will be to provide feedback to support an efficient delivery mechanism.

Brief Overview of the Evaluation Approach

The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and administration of the Smart Grid End-Use Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget

NYSERDA expects the evaluation budget for the Smart Grid End-Use Program to be approximately equal to 5% of the program funding level, less yet-to-be determined funds set aside for statewide studies and other overarching costs borne by program administrators. It is expected that the Smart Grid End-Use evaluation budget will be designed to account for the specific needs of the program, and allocated primarily to impact evaluation (80%) and the remainder for process evaluation.

Evaluation Schedule

Evaluation studies included as part of the Smart Grid End Use Program evaluation plan are shown in the table below along with the time frame for their anticipated completion. The evaluation plan is expected to include multiple measurement and verification, net-to-gross, and process evaluation studies.

Table V-12. Smart Grid End-Use Efficiency: Evaluation Schedule

Evaluation Element	Expected Completion			
	2009	2010	2011	2012
Impact - M&V				X
Impact - Net-to-Gross		FR, MT	FR, SO, MT	
Process Evaluation	X			

FR = Freeridership examination SO = Spillover examination MT = Market transformation, top-down examination

Impact Evaluation

Measurement and Verification

Several of NYSERDA's programs promoting newer technologies have included significant pre-post metering data requirements, with twelve months of post-retrofit monitoring / metering, and independent quality assurance (QA) efforts. The evaluation team will recommend a similar data collection effort for the Smart Grid End-Use program for the large commercial projects, at a minimum. Logging of operating hours for individual measures pre and post can be substituted if the controlled appliance represents a small percentage of total load. Deemed savings may be used for smaller commercial and residential projects. Given the diverse sectors and technologies that will likely be addressed by this program, having this level of program data can allow for high quality impact evaluation methods within the limited evaluation budget.

Initially, the impact evaluation will involve review and assessment of the quality and comprehensiveness of the metering and monitoring data. If the data sets are complete, there may be little value gained in performing additional near-term metering. Therefore, M&V work will focus on the baseline assumptions for each project. If needed, strategies will be developed for addressing gaps in the data, including additional data logging and on-site data collection. For example, interviews with participants may shed light on the reasons for variations in measured data.

Participants will be put into homogenous groups. The detailed evaluation plan will be developed based upon the availability of quality pre-post metering data, the number of participants and expected savings per homogenous group. The initial evaluation plan for this program is to conduct analysis on electricity use by means of this data. With this evaluation method, billing analysis will be conducted on all participant electricity use data and efforts will be made to assess potential bias for those where data is not available or adequate for evaluation. Alternative evaluation methods will be explored if the pre-post metering data is not available or appears to be potentially biased.

The M&V evaluation is scheduled to be completed in 2012. This timing is based on the need for twelve months of post-retrofit use, metering, and monitoring data from all participants.

Net-to-Gross

This program generates direct savings and is also capable of operating as a market transformation effort. Given this, a combined approach of enhanced self-report and top-down market inquiry will be pursued for the largest expected savings sector or market niches to assess attribution.

The sampling procedures for the enhanced self-report methods will be representative of all participants in the program. The enhanced self-report method will survey multiple decision-makers including building owners, vendors, technical assistance providers, residents, etc. involved in adopting energy efficiency and controls. Proper examination of the multiple decision-makers, their level of influence and when decisions occur can provide higher quality freeridership estimates. The surveys will include alternative inquiries to test and provide construct validity for the net to gross (NTG) estimates. Sample sizes will be calculated to target 90% confidence and 10% sampling precision at the program level.

Inquiries related to influences in the decision-making process generally produce the most reliable results when they are conducted closer to the point of the decision. No completes are expected in 2009. The freeridership inquiries will, therefore, be completed in 2010 and 2011 for projects completed in each of those two years. Spillover decisions, however, are made after project implementation. Thus, the spillover inquiry is planned for 2011 in order to allow sufficient time for these effects to occur.

To supplement the self-report survey approach to assessing NTG, a top-down approach, also referred to as the market transformation (MT) examination, will be employed. For the largest expected savings sectors or market niches the evaluation will examine the market chain pre and post implementation. The approach for this area of the NTG analysis will be further developed in the detailed evaluation plan. In general, the sector, technology, market niche will be examined through interviews with multiple market actor groups concerning how these technologies are currently being distributed, installed and used, and how these factors will be changing over time. The MT research is expected to occur in 2010 and 2011.

Process Evaluation

Process evaluation activities will focus on the participation and decision-making process in the program. The implementation team will track contractors who are contacted for participation or who request information about the program services. Those who do not participate in the program will form the partial participant and non-participant population. Areas of inquiry expected for the process evaluation work will likely include:

- Barriers to participation
- Barriers to full-scale implementation
- Value of services provided to homes and business (non-energy and monetary)
- Benefits of participation and the equipment
- Overall customer satisfaction with the program services and the equipment
- Examination of customer decision-making, including roles of people involved and factors influencing the decision

The process evaluation work will generate actionable recommendations for improvements to the program. It is expected that process evaluation will be conducted approximately a year after the program start date so as to provide early feedback regarding the program processes and participation rates.

As the process evaluation will be in the field a year before the impact evaluation starts, the process evaluation will also involve an “evaluability assessment” and data review for the Smart Grid End-Use Program, which will ensure that the needed data are available for impact evaluation. Recommendations for data collection, validation and organization will be included as part of the process evaluation report and feedback to NYSERDA will be transmitted as findings and recommendations are available.

Market Evaluation. A separate market evaluation will not be conducted. However, specific small market niche studies are planned within the impact evaluation, discussed above, for the market niches with the largest expected savings.

Evaluation Plan Variations. Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. Specifically, if the total evaluation budget for this program needs to be reduced, impact evaluation would not be able to meet 90% confidence for 10% sampling precision. Conversely, if more of NYSERDA's total evaluation funding could be allocated to this program, the additional funds would allow for more site-specific data collection as part of the impact evaluation and larger sample sizes, e.g., by utility service territory and technology.

4.16. PROGRAM SELECTION CRITERIA

This section provides screening metrics for the Smart Grid End Use Efficiency Program required per Appendix 3 of the Commission's June 23, 2008 EEPS Order. As discussed earlier, NYSERDA intends to provide screening metrics related to electric and gas rate impacts (Screening Metrics 2, 3, 4, 8, 10, 11, and for the suite of programs Screening Metrics 1 and 2) in a separate supplemental filing. Also, for reasons described earlier, estimated MWh and coincident peak MW reductions in 2015 if the program continues to expand and extends through 2015 (Screening Metrics 5a and 6a) are not included.

Total Resource Cost Test Benefit/Cost Ratio (Screening Metric 1)

The tables below show the resource savings and average measure life used as inputs for the benefit/cost analysis, the present value of the costs and benefits used in the analysis, and the Program Administrator Cost (PAC) and Total Resource Cost (TRC) results. Appendix A provides additional information on benefit/cost definitions and inputs.

Table V-13. Smart Grid End-Use Efficiency Program: Cumulative Annual Savings

	Program Years	Average Life of Electric/Gas Measures (Years)	Cumulative Annual GWh/Year	Cumulative MW	Callable Load MW ⁹⁴	Cumulative Annual Fuel Savings (MMBtu)	% Downstate (Con Edison)
Electric Funding Only	2009-2011	12	16.5	4.8	8.0	--	38%

⁹⁴ The market price effect for the call-able load attributable to this Program is \$7.3 million (present value, 2008\$).

Table V-14. Smart Grid End-Use Efficiency Program: Program and Participant Costs (\$2008)

	Present Value of Program Administrator Cost (\$Millions)	Present Value of Program and Participant Costs (\$Millions)	Present Value of Resource Benefits (\$Millions)
Electric Funding Only	\$11.7	\$25.1	\$41.0

Table V-15. Smart Grid End-Use Efficiency Program: Benefit-Cost Ratios

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	3.5	1.6

Total Resource Cost Test Benefit-Cost Ratio with Carbon Externality (Screening Metric 8)

The table below shows the PAC and TRC test results when the estimated benefits of carbon reduction are included. Carbon was valued at \$15 per ton, resulting in a total present value of carbon benefits of \$2.4 Million.

Table V-16. Smart Grid End-Use Efficiency Program Benefit-Cost Ratios with Carbon

	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Electric Funding Only	3.6	1.7

MWh Saved in 2015 (Screening Metric 5b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 16,500 MWh (cumulative annual) in 2015.

MW of Coincident NYISO Peak Saved in 2015 (Screening Metric 6b)

Assuming the program functions only for as long as proposed, the Program is expected to achieve 4.8 MW (cumulative) of coincident peak reduction in 2015, based on increased end-use efficiency.⁹⁵

Peak Coincidence Factor of MWh Saved in 2015 (Screening Metric 7)

The peak coincidence factor is a measure of the extent to which the MWh savings from efficiency measures is concentrated at the time of system peak. The peak coincidence factor for the program is 0.39.⁹⁶

⁹⁵ NYSERDA defines coincident on-peak period as being between 12:00 noon to 6:00 PM on summer non-holiday week days.

⁹⁶ Peak coincidence factor = annual MWh saved/(MW saved on peak)(8,760 hours). For this equation, annual MWh saved is the cumulative annual savings expected in 2015 if the program is offered only as long as proposed, i.e., Screening Metric 5b.

Number of Participants as a Percentage of Customers in the Class (Screening Metric 9)

The table below shows the number of expected program participants as a percentage of the number of customers in the class. The number of expected program participants represents NYSERDA's best estimate of participation for the current funding request through 2011.

Table V-17. Smart Grid End-Use Efficiency Program Participants as a Percentage of Customers in Class

Customer Class	Number of Customers in Class¹	Number of Anticipated Program Participants	Participants as a Percentage of Number of Customers in Class
Residential - Electricity	6,240,788	6,750	0.1%
Commercial - Electricity	1,002,856	250	0.02%

¹ Sources: DPS Five Year Index Book of Files and DPS Electricity and Natural Gas Retail Access Migration Reports. Electricity figures do not include LIPA, municipal electric utility, rural electric cooperative, or NYPA customers. Gas figures do not include Keyspan/Long Island customers. Retail Access Migration Reports do not separate commercial and industrial customers and label all-such customers as "non-residential". Commercial and industrial customers estimated by NYSERDA.

VI. INDEPENDENT PROGRAM PROPOSALS SUBMITTED FOR CONSIDERATION BY NYSERDA

1. BACKGROUND

The June 23, 2008 Order invited the submission of innovative proposals by independent program administrators to NYSERDA or to a utility company to expand the range of program proposals, help achieve the 15% energy reduction by the year 2015, and encourage innovation.⁹⁷ Independent program administrators could submit proposals for programs to be implemented within the 2009-2011 time period. The Order further required that any proposal received by NYSERDA, or the utilities, must be considered for inclusion in the entity's 90-day submission, and its inclusion or omission must be explained. In response to the Order, NYSERDA established a process for independent program administrators to submit their proposals to NYSERDA and for NYSERDA to evaluate any submitted proposals.

2. NYSERDA'S PROCESS FOR INDEPENDENT PROGRAM PROPOSAL SUBMISSIONS

On July 14, 2008, NYSERDA issued Program Opportunity Notice (PON) 1259 to provide a vehicle for independent program administrators to submit proposals and for NYSERDA to evaluate any such proposals. The PON was a competitive solicitation that sought proposals for innovative programs that would not duplicate programs currently being offered by NYSERDA, or the utilities, or assigned to NYSERDA or utilities in the June 23, 2008 Order. The selection criteria stated in the PON were adopted from the June 23, 2008 Order contained in Appendix 3.

In response to the PON, twelve proposals were submitted to NYSERDA and reviewed by a Technical Evaluation Panel (TEP) consisting of both internal NYSERDA staff and external members. The TEP recommendations were submitted to NYSERDA's Management Review Process and two proposals were found to merit further investigation. NYSERDA has notified all proposers as to their status of inclusion in or omission from this filing. Upon request, NYSERDA will provide each proposer with a full debriefing regarding the evaluation of their proposal. NYSERDA will also, upon request, provide a more detailed explanation to the Commission or DPS Staff regarding the process undertaken or the resulting recommendations.

No funding has been included in this Program Proposal to accommodate the two proposals found to merit further investigation.

3. INDEPENDENT PROGRAM ADMINISTRATOR PROPOSALS RECOMMENDED FOR FURTHER INVESTIGATION

NYSERDA recommends that proposals submitted by EnerNOC, Inc. and EnSave, Inc. (both proposals are attached as appendices) be further investigated and have highlighted specific recommendations regarding these proposals.

EnerNOC, Inc. — EnerNOC proposes a Monitoring-Based Commissioning Program to assist commercial customers in better understanding their energy use and identifying strategies to reduce consumption. The proposed program offers potential to provide valuable information related to this program design and technical approach. NYSERDA recommends that the program be considered on a more limited basis of \$5 million and using a recognized regional or national benchmarking scorecard rather than a proprietary approach. The program would also benefit by closer coordination with NYSERDA and utility programs, clarification of its payment and deliverables schedule (including

⁹⁷ Order at page 59.

reducing front-loading and linking payments to energy savings performance), and increased goals for market penetration.

EnSave, Inc. — EnSave proposes to implement projects at farms sites and to work with upstream markets to expand the energy efficiency options available from equipment manufacturers and dealers. EnSave’s experience with the agricultural sector and key partners, its comprehensive approach, and the needs of this sector warrant support and further investigation of this proposal. NYSERDA recommends that the proposer designate a greater proportion of program funding for incentives to end-use or midstream market players. It would also benefit the program to reduce redundancy and provide closer coordination with NYSERDA and utility programs (leading to a greater understanding of existing programs and processes available for this sector). EnSave needs to clarify payment and deliverables schedule, coordination on measurement and verification with NYSERDA programs, and how thermos savings incentives were derived.

4. INDEPENDENT PROGRAM ADMINISTRATOR PROPOSALS NOT RECOMMENDED FOR FURTHER INVESTIGATION

Based on the established selection criteria and policy issues, the remaining proposals are not recommended for further investigation. The following is intended to provide a brief summary of the proposals received and identify the primary factors for NYSERDA’s determination to omit the proposals from this filing.

Air Power USA, Inc. - Air Power USA proposes to provide air compression audits, implementation support and monitoring for twenty-five large industrial customers.

American Wind Power & Hydrogen, LLC (AWP&H) – AWP&H proposes the installation of an energy efficiency project that would provide base load and peak power production through the use of hydrogen-powered fuel cells.

City University of New York (CUNY) Institute for Urban Systems - CUNY proposes to establish a New York City Retro-Commissioning Center tasked at retro-commissioning and enhanced building operations potential in New York City buildings. The main objective of this proposal is to accelerate the adoption rate of retro-commissioning. This Center proposes to work with the utilities and NYSERDA.

Consumer Powerline, Inc. - Consumer Powerline proposes to create an energy efficiency cap and trade market. This system would be based on the purchase and sale of “white certificates” representing energy efficiency achieved by the end user. By implementing energy efficiency measures any consumer in New York could obtain white certificates which could be sold, thereby giving the end user greater incentive to install energy efficient measures.

CoolNRG USA, Inc. - CoolNRG proposes to target residential customers in Con Edison territory to distribute 2.7 million free CFLs in March 2009. CoolNRG proposes to work in partnership with a single retail chain in New York City with roughly 220 stores.

EarthKind Energy, Inc. – EarthKind proposes a program to provide solar thermal technologies to electric hot water customers across the State. Note, this Proposal was marked ‘Confidential’.

Matrix Energy Services, Inc - Matrix Energy Services proposes to provide demand control ventilation (DCV) and other low-cost/no cost measures for 120 entertainment complexes such as movie theaters in New York. The proposed program would also provide a site energy audit to identify other energy efficient and demand response measure opportunities.

Nexant, Inc. - Nexant proposes to design and implement a Data Center Energy Management Program. The program focuses on existing buildings although it is potentially applicable to new construction.

SAIC - SAIC proposes an enhanced version of NYSERDA's New Construction Program delivery model for existing Healthcare Facilities in Consolidated Edison territory. SAIC proposes to create a Healthcare Advisory Board that would be the recipient of funds and provide advice and consent to SAIC for the administration of the funds.

State University of New York (SUNY) - SUNY proposes the installation of energy efficient projects, primarily combined heat and power projects and lighting retrofits, at 26 upstate SUNY campuses.

5. BASIS FOR RECOMMENDATION

The recommendation to not pursue further investigation of the remaining proposals is based on the established selection criteria and policy issues summarized below.

- The extent to which resource acquisition benefits (MWh reduction) are not achieved within the timeframe outlined in the June 23, 2008 Order: Air Power USA, AWP&H, CUNY, Consumer Powerline, and Earthkind Energy.
- Insufficient alignment of payment and deliverables schedule: AirPower, AWP&H, CUNY, Consumer Powerline, Earthkind Energy, Matrix, Nexant, SAIC and SUNY.
- The potential for unfair competitive advantage: AWP&H, CoolNRG, CUNY, EarthKind Energy, Matrix, Nexant, and SAIC.
- Equity and rate impact concerns associated with programs paying a high proportion (as much as 100%) of measure cost: AWP&H, CoolNRG, and SUNY.
- The redundancy or conflict with NYSERDA programs: Air Power, CoolNRG, Consumer Powerline, CUNY, EarthKind Energy, Matrix, Nexant, SAIC, and SUNY.
- Did not distinguish project development and management versus program development and management, and are more appropriately considered individual projects eligible to participate in NYSERDA or utility programs. In such cases, NYSERDA will encourage each proposer to submit their proposed projects to the appropriate NYSERDA programs: AWP&H, Air Power, Matrix, SAIC and SUNY.

APPENDIX A: BENEFIT/COST DEFINITIONS AND INPUTS

This Appendix provides definitions of benefit/cost terms, describes how certain concepts were applied to the Total Resource Cost analysis, and presents tables showing the key inputs to the benefit/cost analysis.

Avoided Electric Energy, Capacity, and Distribution Costs.

Energy - Historical New York Independent System Operator (NYISO) day-ahead (DA) clearing prices were used to estimate avoided energy costs in six time periods categorized as summer on-peak, summer off-peak, summer shoulder, winter on-peak, winter off-peak, and winter shoulder. For each period, a three-year average price from 2005 through 2007 was used as the starting point and future prices were indexed to the natural gas price forecast. Avoided electric energy costs used in the analysis are shown in Table A-1. These prices reflect the 7.2% line loss factor.

Capacity - Average historical clearing prices in the NYISO capacity auctions from 2005 to 2007 were used to estimate capacity costs for two regions: downstate (Consolidated Edison Service area) and upstate. Future prices were indexed to the natural gas price forecast. The avoided capacity costs are shown in Table A-1. These prices reflect the 15% reserve margin requirement, 7.2% line loss factor, and the avoided distribution costs estimated to be \$55 per kW-year upstate and \$110 per kW-year downstate.⁹⁸

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

Focal Year. The focal year of analysis was 2008 and all values are shown in 2008\$.

Gross Measure Cost. This is the estimate of the full or incremental cost of equipment. For retrofit programs, measure costs include cost of design, installation, and full cost of equipment. For new construction programs and programs designed for normal replacement, incremental cost (difference in cost between high- and standard-efficiency equipment) is used.

Line Loss Factor. Line loss was estimated to be 7.2% of the energy and capacity savings.

Avoided Natural Gas Cost. The basis of the avoided natural gas cost was Energy and Environmental Analysis, Inc.'s forecast of prices conducted in mid-2008. Adjustments were made to this forecast to reflect heating, water heating, and baseload use and to reflect avoided peaking and T&D costs. The forecast is shown in Table A-2.

Net-to-Gross Ratio. Assumed to be 1.0 for this analysis.

Program Administrator Costs. These costs include program implementation costs, incentives paid to customers, marketing, and NYSERDA administration and evaluation costs. For all

⁹⁸ CASE 07-M-0548, Staff's January 9, 2008 IR Response to the Joint Utilities' Questions on the "Revised Proposal for Energy Efficiency Design and Delivery and Reply Comments of the Staff of the Department of Public Service" Dated November 26, 2007, and the "Staff Revised Proposal for Energy Efficiency Design and Delivery and Reply Comments" Dated December 3, 2007.

programs, NYSERDA administration costs were set to equal 7% of total program budget and evaluation costs were set to equal 5% of total program budget.⁹⁹

Program and Participant Costs. The sum of the Program Administrator Cost and the participants' share of cost.

Program Administrator Cost (PAC) Test. This test divides the present value of the benefits by the present value of the Program Administrator Costs. A benefit-cost ratio greater than 1 indicates benefits exceed NYSERDA costs.

Total Resource Cost (TRC) Test. This test divides the present value of the benefits by the present value of Program and Participant Costs. A benefit-cost ratio greater than 1 indicates benefits exceed NYSERDA and participant costs.

⁹⁹ Total program budget includes administration and evaluation costs.

Table A-0-1. Avoided Electric Energy and Capacity Cost Forecast

	Summer on-peak	Summer off-peak	Summer shoulder	Winter peak	Winter off peak	Winter shoulder	Summer Capacity	Winter Capacity
	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kW-yr	\$/kW-yr
Upstate								
2007	0.10	0.07	0.08	0.09	0.07	0.08	42.04	35.11
2008	0.12	0.08	0.10	0.10	0.08	0.09	49.64	41.45
2009	0.13	0.09	0.10	0.11	0.09	0.10	53.24	44.46
2010	0.13	0.09	0.11	0.12	0.09	0.11	55.90	46.69
2011	0.14	0.10	0.11	0.12	0.09	0.11	57.72	48.21
2012	0.14	0.10	0.11	0.12	0.09	0.11	58.79	49.10
2013	0.14	0.10	0.11	0.12	0.10	0.11	59.21	49.45
2014	0.14	0.10	0.11	0.12	0.10	0.11	59.07	49.33
2015	0.14	0.10	0.11	0.12	0.09	0.11	58.47	48.83
2016	0.14	0.09	0.11	0.12	0.09	0.11	57.50	48.02
2017	0.13	0.09	0.11	0.12	0.09	0.11	56.25	46.98
2018	0.13	0.09	0.11	0.11	0.09	0.10	54.83	45.79
2019	0.13	0.09	0.10	0.11	0.09	0.10	53.32	44.53
2020	0.12	0.09	0.10	0.11	0.08	0.10	51.82	43.28
2021	0.12	0.08	0.10	0.11	0.08	0.09	50.43	42.12
2022	0.12	0.08	0.09	0.10	0.08	0.09	49.25	41.13
2023	0.12	0.08	0.09	0.10	0.08	0.09	48.36	40.38
2024	0.11	0.08	0.09	0.10	0.08	0.09	47.86	39.97
2025	0.11	0.08	0.09	0.10	0.08	0.09	47.84	39.95
2026	0.11	0.08	0.09	0.10	0.08	0.09	47.83	39.94
2027	0.11	0.08	0.09	0.10	0.08	0.09	47.82	39.93
2028	0.11	0.08	0.09	0.10	0.08	0.09	47.81	39.92
2029	0.11	0.08	0.09	0.10	0.08	0.09	47.79	39.91
2030	0.11	0.08	0.09	0.10	0.08	0.09	47.78	39.90
2031	0.11	0.08	0.09	0.10	0.08	0.09	47.77	39.89
Downstate								
2007	0.15	0.09	0.11	0.11	0.08	0.10	116.65	87.27
2008	0.18	0.10	0.13	0.13	0.10	0.12	137.72	103.03
2009	0.19	0.11	0.14	0.14	0.11	0.13	147.72	110.51
2010	0.20	0.12	0.15	0.15	0.11	0.13	155.11	116.03
2011	0.21	0.12	0.15	0.15	0.12	0.14	160.16	119.81
2012	0.21	0.12	0.15	0.16	0.12	0.14	163.13	122.04

	Summer on-peak	Summer off-peak	Summer shoulder	Winter peak	Winter off peak	Winter shoulder	Summer Capacity	Winter Capacity
2013	0.21	0.12	0.15	0.16	0.12	0.14	164.29	122.90
2014	0.21	0.12	0.15	0.16	0.12	0.14	163.90	122.61
2015	0.21	0.12	0.15	0.15	0.12	0.14	162.22	121.36
2016	0.21	0.12	0.15	0.15	0.12	0.14	159.53	119.34
2017	0.20	0.12	0.15	0.15	0.11	0.13	156.07	116.76
2018	0.20	0.11	0.14	0.14	0.11	0.13	152.12	113.80
2019	0.19	0.11	0.14	0.14	0.11	0.13	147.94	110.67
2020	0.19	0.11	0.14	0.14	0.10	0.12	143.79	107.57
2021	0.18	0.11	0.13	0.13	0.10	0.12	139.93	104.68
2022	0.18	0.10	0.13	0.13	0.10	0.12	136.64	102.22
2023	0.17	0.10	0.13	0.13	0.10	0.11	134.16	100.37
2024	0.17	0.10	0.13	0.13	0.10	0.11	132.78	99.33
2025	0.17	0.10	0.13	0.13	0.10	0.11	132.74	99.30
2026	0.17	0.10	0.13	0.13	0.10	0.11	132.71	99.28
2027	0.17	0.10	0.13	0.13	0.10	0.11	132.67	99.25
2028	0.17	0.10	0.12	0.13	0.10	0.11	132.64	99.23
2029	0.17	0.10	0.12	0.13	0.10	0.11	132.60	99.20
2030	0.17	0.10	0.12	0.13	0.10	0.11	132.57	99.17
2031	0.17	0.10	0.12	0.13	0.10	0.11	132.53	99.15

Note: Electric energy prices for 2007 reflect average load-weighted hourly day-ahead NYISO clearing prices from 2005 to 2007, adjusted for line loss. Forecasted prices (2008 to 2031) reflect the pattern of prices in the Henry Hub natural gas price forecast developed by Energy and Environmental Analysis, Inc., in 2008. Capacity prices for 2007 is the average capacity auction clearing prices from 2005 to 2007, adjusted for a 15% reserve margin requirement, 7.2% line loss, and avoided distribution costs of \$50 per kW upstate and \$110 per kW downstate. The "upstate" capacity price is a weighted clearing price from all zones except "J" & "K" for all auctions. The "downstate" capacity price is a weighted average of the New York City Total Cost and the "Upstate" prices applicable to zones "H" and "I".

Table A-2. Natural Gas Price Forecast

Year	Upstate				Downstate			
	\$/MMBtu				\$/MMBtu			
	Heating C/I	Heating Residential	Base- load	Water Heating	Heating C/I	Heating Residential	Base- load	Water Heating
2007	11.63	14.41	8.64	9.38	12.19	15.26	9.50	10.17
2008	13.56	16.67	10.22	11.05	13.66	16.87	10.83	11.54
2009	14.49	17.78	10.99	11.87	14.40	17.68	11.50	12.23
2010	15.19	18.60	11.57	12.47	14.95	18.28	11.99	12.73
2011	15.68	19.17	11.97	12.89	15.31	18.68	12.32	13.07
2012	15.97	19.51	12.21	13.15	15.52	18.90	12.51	13.26
2013	16.10	19.66	12.31	13.26	15.59	18.98	12.57	13.33
2014	16.08	19.64	12.30	13.24	15.54	18.93	12.53	13.28
2015	15.95	19.49	12.19	13.13	15.40	18.77	12.40	13.15
2016	15.73	19.23	12.01	12.94	15.17	18.52	12.19	12.94
2017	15.44	18.88	11.77	12.68	14.89	18.21	11.94	12.68
2018	15.10	18.49	11.49	12.39	14.57	17.86	11.65	12.38
2019	14.74	18.07	11.20	12.08	14.23	17.49	11.34	12.06
2020	14.39	17.65	10.91	11.77	13.93	17.17	11.07	11.79
2021	14.06	17.27	10.64	11.49	13.64	16.85	10.81	11.52
2022	13.79	16.95	10.41	11.26	13.39	16.58	10.59	11.29
2023	13.60	16.72	10.26	11.09	13.22	16.39	10.43	11.13
2024	13.51	16.62	10.18	11.01	13.14	16.30	10.35	11.05
2025	13.54	16.66	10.21	11.04	13.17	16.33	10.38	11.08
2026	13.72	16.87	10.36	11.20	13.33	16.51	10.53	11.23

Note: Natural gas prices are based on the most recent Energy and Environmental Analysis, Inc.'s forecast of Upstate and Downstate prices, adjusted for end-use type and avoided peaking and T&D costs.

APPENDIX B. ENERNOC, INC. PROPOSAL



get more from energy

***Monitoring-Based Commissioning
Energy Efficiency Program Proposal***

In Response to:

***Request for Independent Program Administrators
Energy Efficiency Portfolio Standard
Program Opportunity Notice (PON) 1259***

Presented to:

NYSERDA

Presented by:

EnerNOC, Inc.

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Appendix A: MBCx Technical Documentation

Appendix B: MBCx Work Paper

Executive Summary

Pursuant to Ordering Paragraph 8 of the New York State's Commission June 23, 2008 Order Establishing Energy Efficiency Portfolio Standard and Approving Programs in Case 07-M-0548, EnerNOC hereby submits its proposal to NYSERDA to act as an independent program administrator. Specifically, EnerNOC is proposing to offer Monitoring-Based Commissioning (MBCx) services to appropriate customers throughout the state. MBCx assists commercial customers to better understand their energy usage, participate in a comprehensive audit, implement cost-effective energy efficiency measures and engage in an ongoing, monitoring-based commissioning process that will generate substantial energy efficiency savings.

Working Group IV carefully considered this innovative and cost-effective approach to energy efficiency and recommended that the Commission approve MBCx as an eligible EEPS measure. We are confident that MBCx is exactly the sort of measure that the Commission was referring to when it solicited "innovative proposals brought forward by competitive suppliers." EnerNOC's national experience uniquely qualifies us as "capable of administering and delivering programs" and our performance-based pricing demonstrates that we are "willing to be held accountable for results."

The implementation budget of \$15,021,525 assumes that the program will be implemented for a total of 53 customers who will conserve an estimated 277,000 MWh, 9.3 Million Therms, and reduce peak demand by 4.8 MW, through 2015. The budget is an initial estimate and EnerNOC is prepared to modify this target to meet NYSERDA's program objectives. Customers will be enrolled in 2009-2011, and each customer will receive three years of ongoing monitoring. As designed, the program has a TRC Benefit/Cost ratio of 1.65(excluding carbon benefit).

Following the receipt of the proposal, EnerNOC is looking forward to cooperatively working with NYSERDA to refine the design and deployment of the MBCx program to meet your specific program objectives. EnerNOC expects to work with NYSERDA to provide additional information, including estimates of ratepayer bill impacts and, to the extent possible, other information, as provided for in the Order.

1 Program Description

1.1 Program Summary

EnerNOC is proposing to implement a unique *Monitoring-Based Commissioning* program for NYSERDA, to target existing commercial customers in the New York service territory. The objective of the program is to help commercial customers gain a better understanding of their energy usage, participate in a comprehensive audit, implement cost-effective energy efficiency measures (with possible help from incentives, if deemed appropriate and necessary), and engage in an ongoing, monitoring-based commissioning process that will generate substantial energy efficiency savings for customers and NYSERDA.

Monitoring-Based Commissioning (MBCx) is a relatively new energy efficiency application. Broadly speaking, it refers to the combination of remote retro-commissioning and continuous commissioning activities, coupled with ongoing, technology-based monitoring to ensure the persistence of savings. In our proposed approach, targeted customers are carefully screened and selected for participation in the program. We are not seeking to enroll a very large number of customers with this program; rather, we want to carefully select customers that are likely to yield the greatest savings and are able to fully participate in the program.

Once customers have been selected and enrolled, EnerNOC will install monitoring technology at each facility to capture energy usage data from interval meters, install sub-metering or data loggers where appropriate and necessary, and interface with building control and energy management systems (BCS/EMS). At NYSERDA's discretion, the cost of installing this equipment may be covered in part or in whole by the program, to offset this initial customer cost barrier. The data collected will then used to continuously track building operation and performance, and to create benchmarks for optimal building operations. At the same time, all participating facilities will go through a comprehensive audit remote monitoring based commissioning process to identify inefficient operations, as well as opportunities for system or capital upgrades that could lead to a cost-effective reduction in energy usage. Upon receipt of the comprehensive audit, and at the discretion of NYSERDA, participating customers will have access to per-kWh incentives to offset the cost of implementing some of the proposed measures. Once all measures have been installed or implemented, the program will measure and verify the impact of the installed measures, and transition the customer to the ongoing monitoring phase of the program.

Since all buildings invariably drift away from optimal operations, the ongoing monitoring ensures that building managers are alerted to any deviations from the

optimal range of operation, as well as to any maintenance or scheduling issues as they arise. With help from the program, building managers can then take the appropriate remedial action on a timely basis, and ensure that the buildings continue to perform at an optimal level, and that the savings are persistent.

For this program, EnerNOC will provide a technology solution (PowerTrak®), expertise in commercial building energy efficiency, and assistance with implementation, as well as overall program management. For each enrolled customer, EnerNOC will integrate with meter and BCS/EMS data, monitor and analyze energy usage, perform a comprehensive audit, manage customer implementations, provide follow-through monitoring, and deliver monthly MBCx Scorecards that provide recommendations for changes or upgrades and track savings from already-implemented measures.

1.2 Scope of Work

For the purpose of clarity, the implementation plan has been broken out into seven major phases:

- 1: Program Design**
- 2: Program Setup**
- 3: Program Launch**
- 4: Customer Enrollment**
- 5: Installations & Scorecards**
- 6: Measurement and Verification**
- 7: Program Termination.**

These phases are described in more detail below.

1. Program Design

As a first step in implementing this program, EnerNOC will revise its initially proposed program design to incorporate comments and recommendations from NYSERDA staff, and adjust for any recent developments in the market. EnerNOC will develop a revised program design that will incorporate all of these factors, and also include adjustments to address tie-ins with any other applicable programs. The final program design will address all of the following major design components: marketing and outreach, customer selection, enrollment process, incentive levels, interface with other programs, verification plan.

2. Program Setup

Once the program design has been finalized and approved, EnerNOC will move to the program setup phase, where we will build all of the processes, documents and materials

necessary to launch and operate the program. During this phase, we will focus on the following key aspects:

- Development of *marketing materials* (see below), which will include a website, a descriptive program brochure, a short program narrative, frequently-asked questions, and other material as appropriate.
- Development of *comprehensive program process documents* to address the following key processes:
 - Customer Selection
 - Customer Screening
 - Customer Enrollment
 - Customer Comprehensive Audit
 - Delivery of MBCx Scorecards
 - Measure Installation
 - Measure Verification
 - Incentive Calculation
 - Incentive Payment
 - Customer Complaint Resolution
 - Customer Feedback
 - Program Termination
 - Program Reporting
- Development of *key forms and materials* associated with the above processes (i.e. customer enrollment form, incentive payment form, audit report form, etc.)

During this setup phase, EnerNOC will work closely with NYSERDA and its representatives to ensure that all program elements follow established guidelines, are in line with other program processes, and do not lead to customer confusion.

3. Program Launch

Once the program design and setup has been approved, EnerNOC will officially launch the program and perform customer outreach. EnerNOC's outreach efforts will be focused on identifying the right customers for the program. EnerNOC will reach out to eligible customers in several ways, according to the marketing plan described in Section 1.7 below. EnerNOC will initially focus its primary outreach efforts on identifying customers within its existing customer base, and that present a good fit for this proposed program. EnerNOC will use its existing sales capabilities in place in New York to reach out to customers via traditional marketing channels.

4. Customer Enrollment

All prospective customers will be screened initially to determine whether they meet the program eligibility requirements, and that the facilities in question are good candidates for the program. Careful screening will ensure that the program does not invest in facilities that are not going to produce substantial savings. Screening requirements will include, but will not be limited to: appropriate BCS/EMS system, adequate levels of staffing, and program buy-in from building owners and facilities staff. Approved candidates will be required to enter into an agreement with the program to ensure that

they remain committed to the program. During the screening phase, EnerNOC will meet with the customer representative and perform a simple site assessment to ensure that the customer is a good fit for the program.

Once a customer has been identified and screened to ensure compatibility with the program eligibility and requirements, the customer will then be enrolled in the program. As part of enrollment, the customer will be required to enter into an agreement with the program to ensure proper commitment. The enrollment agreement will essentially guarantee that the customer is willing to dedicate some internal resources to comply with program requirements, and acknowledges that there will be some customer costs. If applicable, the agreement will also require the customer to implement certain measures before obtaining any incentive funds from the program.

5. Installations & Audits

Once any system upgrades required for integration have been completed, the program engineers will install additional permanent monitoring equipment at the customer location(s) to integrate EnerNOC's PowerTrak® application with the interval data recorders and BCS/EMS systems. The installed equipment may include additional meters for sub-metering, where appropriate, as well as connectivity equipment. Please see Appendix A – Technical Documentation, for a complete description of PowerTrak, as well as technical information on the equipment used to connect to these systems. At NYSERDA's discretion, the program may bear some or all of the costs to install this equipment.

EnerNOC will then collect and store meter data, along with building BCS/EMS data, in PowerTrak, EnerNOC's internet-based energy management platform. EnerNOC will augment this data with weather data, and building-specific data collected from databases such as IFMA (International Facility Management Association), APPA (Association of Physical Plant Administrators) and CBECS (Commercial Buildings Energy Consumption Survey). EnerNOC may also integrate with other systems to capture square footage data, average building occupancy, building type, schedules, and other relevant data.

EnerNOC's program engineers will monitor the buildings remotely, create baselines for the customer facilities, and review energy usage against those baselines. The program will also process all building data through PowerTrak filters, to uncover any equipment issues, schedule issues, or set point issues. All data and analysis will be performed using PowerTrak, and will be accessible to the customer, the utility, and to authorized third-parties via PowerTrak's web-based interface. In addition, program engineers will conduct a thorough and comprehensive audit of the participating facilities to uncover any areas of inefficiency. On a monthly basis EnerNOC will deliver Scorecard reports to the participating facilities. The Scorecard will include recommendations to the customer

on equipment and operational upgrades that could result in energy efficiency improvements, as well as track the savings from previously-implemented efficiency measures. These recommendations will distinguish between three types of measures: 1) measures that require simple maintenance or repairs, 2) measures that require enhancements to the controls systems, and 3) measures that require major repairs or the investment in new equipment. The recommendations will also include estimate savings and costs for each measure identified.

Upon review of the Scorecard, the customer will then enter into an agreement to implement specific and approved measures, based on the recommendations of the program. Based on the design of the program, the costs of improvement measures may be offset by pre-determined incentives. Measures will be implemented either by the customer, or by a contractor approved by the program. Measures with payback times of less than 1 year will only be eligible for incentives if approved by the program.

6. Measurement and Verification

EnerNOC will track and capture energy usage information before and after implementation to provide baseline data that will assist with the Measurement and Verification of the implemented measures. The objective of this process is to ensure that the savings realized through the program are persistent and to calculate the program impact and incentive payments. This information is displayed in the Scorecard report and is updated monthly.

7. Program Termination

The process outlined above will be employed for the duration of the program until the last customer is selected and enrolled in the program. EnerNOC will begin to ramp the program down after the last customers have gone through the process and develop the necessary reports and documents to assist with the final evaluation of the program.

Throughout the process outlined in the seven stages above, EnerNOC will also ensure that a reporting process is put in place with NYSERDA to provide the necessary program reports and administrative oversight. EnerNOC will maintain all records associated with customer participation for the duration of the program. Once the program is terminated, EnerNOC will turn over required documentation to NYSERDA and will continue to keep records for a period of 5 years.

1.3 Targeted Customers

The program will target large electric customers in the commercial, educational, healthcare, government and commercial real estate sectors. A typical customer will have a peak load of 1.5 MW or greater, will consume on average 10 million kWh per year or more, and will have multiple facilities. All participating customers will have a building

control or an energy management system with which EnerNOC will be able to interface. Examples of targeted customers include: public universities and community colleges, private schools and universities, commercial campuses, large commercial property, and government buildings.

EnerNOC has reviewed its existing customer base and has identified several customers that may be suitable for this program, primarily in the educational and government sector. EnerNOC has also performed a detailed analysis of NYSERDA's customer base, and has identified the potential for targeting this program in the service territory. This analysis is further detailed in Section 2 of this proposal.

1.4 Customer Eligibility

This program is a targeted program that, by design, is focused on a small set of customers. Eligible customers must meet the following initial criteria:

- Customers receive service from NYSERDA, with peak load (for all facilities) of 1.5 MW or greater (with some exceptions to accommodate smaller but well-suited customers).
- Customers are in the commercial segment and in the education, commercial property, healthcare or government sub-segments.
- Customers have an interval data recorder and use a BCS/EMS system.

1.5 The Customer Participation Process

To provide additional context to the program implementation plan described above, and to ensure that the program design does not overlook any key issues, EnerNOC has created a customer process to describe the steps that customers will take when they participate in the program. This process is illustrated in Figure 1 and described in more detail below.

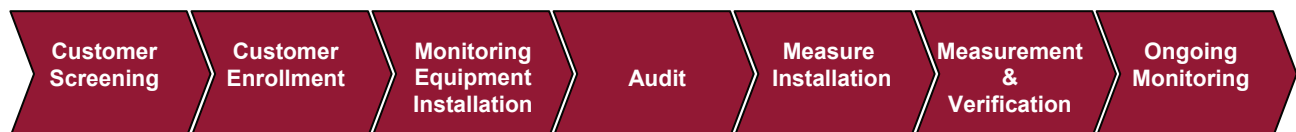


Figure 1

1. *Customer Screening:* All prospective customers will be screened initially to determine whether they meet the program eligibility requirements, and that the facilities in question are good candidates for the program. During the screening, the customer will be introduced to the program and will receive quick on-site assessment to ensure compatibility with the program. There will be no obligation at this stage, which is expected to last *on average 1 month per customer*.

2. ***Customer Enrollment:*** Once an interested customer has been screened and found to be eligible, the customer will be enrolled. As part of enrollment, the customer will be required to enter into an agreement with the program to ensure proper commitment. The enrollment agreement will require that the customer is willing to dedicate some internal resources to comply with program requirements, and acknowledges that there will be some customer costs. If applicable, the agreement will also commit the customer to implementing measures in order to obtain any incentive funds from the program. This enrollment step is expected to last, *on average, 1 week per customer.*
3. ***Monitoring Equipment Installation:*** Program engineers will then go onsite to install monitoring equipment at the customer's premises. Depending on NYSERDA's direction, the program may bear the cost of installing this equipment. EnerNOC will then collect and store meter data, along with building BCS/EMS data, EnerNOC may also integrate with other systems to capture additional data, such as square footage, occupancy, building type, and schedules. This process also includes an initial site assessment audit, which is used to determine the customer's operational conditions, such as equipment and systems, operational profiles and special customer requirements (for example: the labs must run 24/7/365 and maintain a constant temperature of 72°F). During this audit EnerNOC will also make note of general equipment conditions and take note of equipment or systems that should be considered for upgrades or replacement. The expected duration of this step is, *on average, 2 months per customer.*
4. ***Comprehensive Audit, Ongoing Monitoring and Scorecard Report*** After the equipment has been installed and data begins to flow, the customer will undergo a comprehensive audit to uncover any areas of inefficiency. EnerNOC will also deliver a monthly Scorecard report to each customer. The Scorecard will include and receive recommendations for equipment and operational upgrades that could result in energy efficiency improvements. These recommendations will distinguish between three types of measures: 1) measures that require simple maintenance or repairs, 2) measures that require enhancements to the controls systems, and 3) measures that require major repairs or the investment in new equipment. The recommendations will also include estimated savings and costs for each measure identified. The comprehensive audit is expected to last, *on average, 3 months per customer.* The Scorecard will be provided *on a monthly recurring fashion throughout the term of the contract.*
5. ***Measure Implementation:*** Upon review of the comprehensive audit Scorecard report, the customer will then enter into an agreement to implement specific and approved measures, based on the recommendations of the program. If deemed

- appropriate, the cost of measures *with a simple payback time greater than one year* will be offset by incentives. Measures will be implemented either by the customer, or by a contractor approved by the program. This step is *a monthly recurring event throughout the term of the contract*.
6. ***Measurement and Verification:*** Following Measure Implementation, EnerNOC will perform a verification of the measure installation, and initiate the process for the customer to receive incentives, if NYSERDA elects to offer incentives. The expected duration of this step is, *on average, 1 month per customer*. If incentive payments are to be used, the customer will receive an incentive payment once the verification has been completed and NYSERDA has approved the installation.
 7. ***Ongoing Monitoring:*** Enrolled customers will receive ongoing monitoring for their enrolled facilities to ensure that the savings are persistent and to uncover any new opportunities. These new opportunities will be processed as described through Steps 5 and on above. The customer will receive a monthly report and review proposed measures with the program on a quarterly basis. Please see Appendix A – Technical Documentation for a sample of the report. The program will support the customer in this phase for 3 years. At the end of this period, the customer will have the opportunity to continue participating in an ongoing monitoring phase by contracting directly with EnerNOC.

1.6 Examples

The MBCx concept was successfully pioneered as part of the UC/CSU/IOU Energy Efficiency Partnership, which demonstrated that the installation of permanent energy monitoring equipment, combined with retrofit activities, results in robust and more persistent energy efficiency savings¹. Several recent studies have evaluated the impact of this program, most notably Brown, Anderson and Harris, *How Monitoring Based Commissioning Contributes to Energy Efficiency for Commercial Buildings*, published in the Proceedings of the American Council for an Energy Efficient Economy. The analysis shows that MBCx can deliver cost-effective energy savings for higher-education campuses and other commercial facilities.

EnerNOC is also currently implementing a similar version of the program proposed here with some of the California State University campuses involved in the UC/CSU/IOU partnership. The program is currently under development..

¹ Anderson, M., McCormick, A., Meiman, A. and Brown, K. 2007. *Quantifying Monitoring-Based Commissioning in Campus Buildings: Utility Partnership Program Results, Lessons Learned, and Future Potential*. National Conference on Building Commissioning: May 2 – 4, 2007

1.7 Marketing Materials & Outreach

The program marketing will include the development of specific program materials, along with customer enrollment and screening forms and a program website. EnerNOC will also explore recruiting potential customers through proven marketing channels, such as trade allies, industry organizations, and trade shows.

Customer Outreach

Given our strong presence in the New York demand response marketplace, EnerNOC has a dedicated and robust sales team that will reach out to prospective customers daily and attract new participants. In addition, EnerNOC has found that working with NYSERDA account managers can be a very effective strategy to identify eligible customers. EnerNOC therefore proposes to work with NYSERDA account representatives to identify the initial set of prospective customers.

Based on our experience in a variety of programs with utilities across North America, EnerNOC has consistently found that the most successful programs are those where we work in “partnership” with our utility client in program marketing and customer recruitment. While EnerNOC takes on the ultimate responsibility for recruiting customer participants, we have learned that branding the program as a utility offering – and having active participation by the utility’s account executives in promoting the program – enhances customer satisfaction and delivers increased value to the utility.

Marketing Materials

EnerNOC’s will work closely with NYSERDA to design an appropriate branding and messaging strategy for the program. As mentioned above, we recommend that the program marketing materials focus on NYSERDA’s brand identity and identify EnerNOC as the “program implementation contractor.” We are happy to discuss other marketing strategies as well. All marketing materials and messaging will be sent to NYSERDA for approval before use.

In most of our monitoring-based commissioning program implementations, EnerNOC has utilized materials that provide an overview of the program and describe the key benefits of participation. We have found that a “frequently asked questions” insert can also be very useful.

In line with our targeted recruitment strategy, EnerNOC will produce a small set of materials and distribute them either via mail or through in-person meetings. Materials will also be available for download via the program website. Figure 2 illustrates some EnerNOC marketing materials.

EnerNOC MBCx Program Proposal

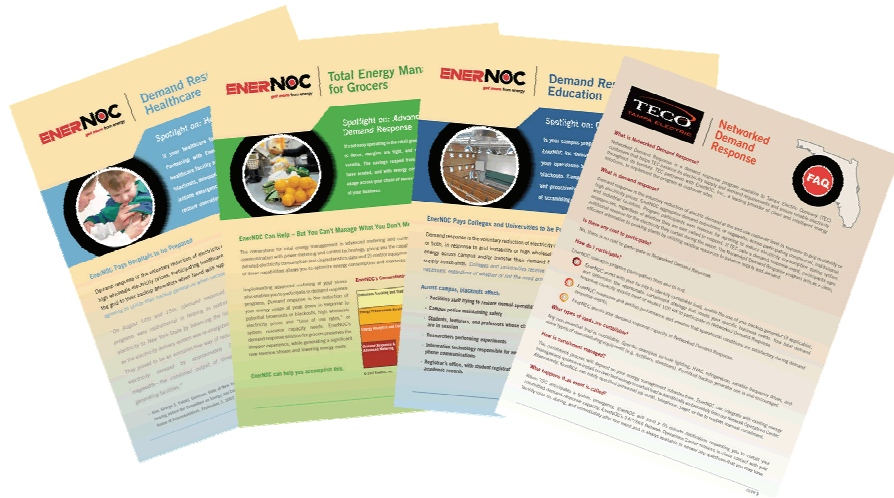


Figure 2: Examples of EnerNOC's Program-specific Marketing Collateral

Program Website

In addition to printed marketing materials, EnerNOC will create a program-specific website where customers can obtain more information about the program, download program documentation and get more information. The website branding will align with all other marketing materials to create consistency and reduce customer confusion. For an example of such a site developed by EnerNOC, please visit <http://www.keeplibertyalight.com/>.

2 Company Information

EnerNOC, Inc. is a leading developer and provider of clean and intelligent energy solutions for commercial, institutional, and industrial customers, as well as for electric power grid operators and utilities. Our technology-enabled demand response and energy management solutions help optimize the balance of electric supply and demand. As part of our energy efficiency offering, we provide monitoring-based commissioning services, and work with customers to implement energy efficiency solutions that achieve measurable and reliable energy savings.

<i>General Information (Headquarters)</i>	
Company Name	EnerNOC, Inc.
Mailing Address	24 West 40th Street 16th Floor New York, NY 10018
Telephone Number	212.624.0000
Fax Number	212.624.0001
Website	http://www.enernoc.com
<i>Contact Information</i>	
Contact Name	Lance Charlish
Mailing Address	24 West 40th Street 16th Floor New York, NY 10018
Telephone Number	617.895.8471
Fax Number	212.624.0001
Email Address	lcharlish@enernoc.com
<i>Business Information</i>	
Nature of Business	Developer and Provider of Clean Energy Solutions for Energy Efficiency and Demand Response
Ownership Structure	C Corporation
Date Business Formed	December 2001
Parent Company	None
Affiliates	None
Subsidiaries	MDEnergy, South River Consulting
For Profit of Tax-Exempt	For Profit
<i>Management Information</i>	
Chief Executive Officer	Tim Healy
President	David Brewster

EnerNOC MBCx Program Proposal

Chief Operating Officer	Darren Brady
Chief Financial Officer	Neil Isaacson
General Counsel	David Samuels

3 Experience and Qualifications

3.1 Overall Project Experience and Results

Since 2001, EnerNOC has been working closely with end-use customers to enable superior demand response solutions. As our demand response efforts have grown, many customers have asked us to provide additional energy management services. Our engineers and project managers routinely identify equipment upgrades and process improvements that not only reduce peak loads but save energy year-round. Until recently, these demand side activities were conducted separately by different entities. In New York, EnerNOC has worked with NYSERDA to disseminate an integrated demand response and efficiency solution for end-use customers.

At the end-use customer-level, EnerNOC provides customers with monthly reporting and analysis of energy usage in the form of a “Scorecard” report. This type of “hands-on” approach allows EnerNOC and the end-use customer to identify and track specific energy efficiency opportunities and activities including process changes and equipment upgrades. These reports are further detailed in the Appendix. For one particular customer, EnerNOC has identified, through monitoring based commissioning, and in less than a year, measures that effectively translated in a reduction in energy usage of approximately 13%.

EnerNOC is also currently implementing a pilot version of the MBCx program with the California State University (CSU) as part of the UC/CSU/IOU partnership. This pilot targets six campuses and seeks to identify permanent energy efficiency savings based on a process that is very similar to the one outlined in this abstract. This pilot installation phase is in full gear and as such has not yet returned any results.

4 Program Staffing & Planning

4.1 Staffing Plan

Key Personnel

The key personnel supporting this proposed program, along with their primary responsibilities, are:

- *Account Executive* □ Noel King will manage the relationship between EnerNOC and NYSERDA, and be involved as an account executive representing EnerNOC.
- *Program Manager* – Bill O'Connor will manage all aspects and day to day operations of the program.
- *Marketing Manager* – Taj Ait-Laoussine will manage program design, and will develop and manage the marketing plan.
- *Customer Manager* – Our staff of Business Development Managers will meet with potential customers to pre-qualify them for the program, develop and manage the relationships with customers, and handle the interface with subcontractors.
- *Energy Analyst* – Rick Paradis will review and analyze collected submeter and building management system data to determine potential energy efficiency projects.

The qualifications of the personnel described above are listed below. In addition to the key personnel above, various other EnerNOC personnel will fulfill specific tasks related to this project. These roles include:

- *Site Technician & Energy Auditors* – EnerNOC will provide personnel to perform on-site system auditing, site walk-through, and engineering analysis, and manage the energy efficiency project installation and system upgrades as necessary.
- *Program Administration* – EnerNOC staff with experience administrating energy efficiency programs for utilities will provide general administrative support to address reporting, document management, invoicing, customer service and other administrative tasks.

4.2 Qualifications of Key Staff Members

The following table lists the qualifications of all key personnel that will participate in this program implementation.

<i>Staff Members</i>	<i>Qualifications</i>
<i>Gregg Dixon</i> <i>Senior Vice-President, Sales</i>	Gregg will lead EnerNOC's marketing and sales team to successfully engage customers in the program, as he has in similar programs for utilities across North America. Prior to joining EnerNOC, Gregg was Vice President of Marketing and Sales for Hess Microgen, the leading provider of commercial

EnerNOC MBCx Program Proposal

<i>Staff Members</i>	<i>Qualifications</i>
	onsite cogeneration systems and services in the US. As a recognized expert in distributed generation, Gregg pioneered efforts to bring more than 20 MW of cogeneration to leading grocery, hospitality, commercial property, and manufacturing customers and developed Hess Microgen's leading-edge, Internet-based monitoring system, CONIFER. Gregg was also a partner at Mercer Management Consulting where he advised global Fortune 1000 technology, consumer products, and energy clients on customer and product strategy, economic choice analysis, and new business model development. Gregg graduated from Boston College with bachelor's degrees in Business Administration and Computer Science.
Noël King <i>Senior Director, Utility Sales</i>	Noël will serve as NYSERDA's point of contact through implementation of this program. Noël has over twenty years of experience in the utility and energy field. Prior to joining EnerNOC, Noel was a Director of Mercer Management Consulting's Energy Utilities practice, where he worked with utilities to develop business strategies and improve operational performance. Noël received a B.S. in Geology from Yale University and an M.S. in Applied Economics and Finance from MIT's Sloan School of Management.
Olav Hegland <i>Director of Energy Services</i>	Olav will act as an adviser to the program. Olav oversees the engineering and execution component of PowerTrak at EnerNOC. Olav has over 17 years of experience in the electricity consulting industry, including demand side management, performance contracting, measurement & verification and continuous commissioning. Prior to joining EnerNOC, Olav was Director of Services with Cimetrics, Inc in Boston, MA, Director of Project Development for Abacus Engineered Systems in Seattle, WA and held positions with Coneco Corporation, ERI Services and XENERGY Inc. Olav holds a Master of Science in Mechanical Engineering at the University of Massachusetts, Amherst, and did his undergraduate work at the University of Manchester Institute of Science and Technology in England and at the University of Massachusetts, Amherst. Olav is a registered Professional Engineer in the State of Massachusetts and a Certified Energy Manager (AEE).
Rick Paradis <i>Senior Energy Analyst</i>	Rick will be the primary program engineer for this project, performing the main analyses to identify opportunities and estimate the potential impacts. As Senior Energy Analyst, Rick is responsible for EnerNOC's Total Energy Management service offering, which includes monitoring-based commissioning and identification and M&V of energy efficiency projects. Rick has been in energy efficiency since 1978. Rick has experience writing technical assistance audit reports; developing design alternatives for HVAC, lighting, thermal storage, and alternative energy projects; providing construction observation and review services and monitoring and verification protocols. Rick has also managed and supervised technical potential studies and various technical assessments of end-use equipment for natural gas utilities in Massachusetts and New Jersey to develop utility

EnerNOC MBCx Program Proposal

<i>Staff Members</i>	<i>Qualifications</i>
	demand side management (DSM) programs. Rick graduated from Clark University. Rick is also a MEOER Certified Energy Auditor and a Certified Energy Manager. He co-authored two publications: “Intelligent Use of Energy at Work: A detailed account of Saving Energy and Cost at the Wellness Center of the University of Miami” and “How to Automate Strategies That Make Companies Energy Savvy” both in AEE publications.
<i>TajAit-Laoussine</i> <i>Senior Marketing Manager</i>	Taj will oversee the program planning and design and manage the marketing for this project. Taj will also help to project manage the project during its initial year. As Senior Marketing Manager Taj Ait-Laoussine is responsible for setting the marketing strategy and coordinating all of EnerNOC’s marketing activities related to energy efficiency. Taj has over twelve years experience working with utilities and large end-use customers, with a focus on energy efficiency, demand response and energy management software applications. Prior to joining EnerNOC, Taj was a Senior Product Manager for Nexus Energy Software, where he managed the development of meter data and energy management applications. He also held positions at Silicon Energy and Hagler Bailly Consulting. Taj has extensive experience designing, managing and implementing and evaluating energy efficiency programs. Taj has a B.A. in Physics for the University of California at Berkeley, and an M.S. in Energy and Resources, also from the University of California at Berkeley.

5 Program Impact, Deliverables, Budget and Pricing

5.1 Market Potential

In developing this proposal, EnerNOC has performed a detailed analysis of the market potential in NYSERDA's service territory. To perform this analysis, we have used the following criteria to identify qualified customers:

- ***Market Segments:*** our experience has shown that the most attractive MBCx targets are in the higher education, healthcare and owner-occupied commercial property (including the government sector). We therefore focused our analysis on these particular segments.
- ***Customer Size:*** MBCx is also most applicable to the larger commercial customers. EnerNOC typically targets customers that use, on average, 10 million kWh per year or more. While smaller customers may be eligible and benefit from an MBCx program, we have found that the best targets are in the 10 million kWh range.
- ***Customer Characteristics:*** ideal MBCx customers will have multiple buildings, and will manage at least part of those buildings using a BCS/EMS. We impose the presence of a BCS/EMS as a requirement, and only consider campus-like or multi-building customers as part of our targets.

5.2 Per Customer Impacts

EnerNOC has developed a comprehensive analysis of the MBCx process, and of its impacts and associated costs. This analysis is documented in a Technical Work Paper included in this proposal as Appendix A. The Work Paper provides a detailed example of how MBCx is implemented, drawing on examples from past EnerNOC experience, as well as a review of the existing literature. Table 1 highlights the impacts and costs associated with performing MBCx at a typical customer. The data is supported by the Work Paper. Note that this data is based on actual EnerNOC implementations of MBCx, and that this data was adjusted specifically to address customer in the New York climate zones.

Table 1

<i>Measure Name</i>	<i>Customer Annual Electric Savings (kWh/unit)</i>	<i>Customer Peak Electric Demand Reduction (kW/unit)</i>	<i>Customer Annual Therms Savings (Thm/unit)</i>	<i>Measure Installed Cost (\$/unit)</i>
Monitoring Based Commissioning	893,000	92	30,000	\$83,230

The costs shown in Table 1 are the costs associated with implementing measures identified as part of the MBCx process, but do not include the installation cost associated with enabling an MBCx customer. In past implementations, EnerNOC has had part or all of this cost borne by the program budget, since these costs are often barriers to the customer enrolling in the program. EnerNOC will look to NYSERDA's guidance in how to address these costs, which are estimated to be approximately \$25,000 per customer for a typical customer, and which are highlighted in the budget.

5.3 Proposed Program Impacts

Using the data presented in Section 5.2, we can calculate the proposed program impacts, as documented in Table 2. This table shows the analysis of the estimated program impacts, assuming that the customers are enrolled over a period of 3 years (2009-2011), and that each customer is then monitored by EnerNOC for a period of 3 years. After that three year monitoring mark, the customer can elect to extend the monitoring beyond 3 years by contracting directly with EnerNOC, but those costs are not covered by the program. EnerNOC is happy to provide NYSERDA with a program design that uses a different length of time for the ongoing monitoring. We have initially settled on a 3-year duration for the monitoring because it extends the impacts of the program through 2015.

Table 2

Overall Program Impact Analysis	2009	2010	2011	2012	2013	2014	2015
Avoided Energy(MWh)	11,609	29,469	47,329	47,329	47,329	47,329	47,329
Avoided Demand (kW)	1,196	3,036	4,876	4,876	4,876	4,876	4,876
Avoided Gas(Therms)	390,000	990,000	1,590,000	1,590,000	1,590,000	1,590,000	1,590,000

5.4 Reliability and Persistence of Savings

There have been several studies that have documented that MBCx programs result in persistent energy efficiency savings. In particular, Brown, Anderson and Harris reviewed the UC/CSU/IOU Energy Efficiency Partnership, and concluded that “enhanced monitoring capabilities have proven valuable in identifying, diagnosing, and quantifying measures to reduce energy use. Monitoring also provides a means to increase persistence of commissioning-related savings.”²

There have also been numerous studies on the success of retro-commissioning in increasing the efficiency of facilities, and in realizing persistent savings. For instance,

² Brown, K., Anderson, M. and Harris, J. 2007. *How Monitoring Based Commissioning Contributes to Energy Efficiency for Commercial Buildings*. Proceedings of the 2006 ACEEE Summer Study, Asilomar, CA.

Bourassa, Piette and Motegi, in a study of a retro-commissioning program at SMUD, found substantial, energy savings persistence well into the fourth year after the program³. In our analysis, we have assumed that the measure lifetime, on average, will be 5 years. We believe a measure lifetime of 5 years is appropriate, and is in line with the desired results of this program.

In addition to the efficient way in which savings can be identified and implemented, the thrust of EnerNOC's MBCx process is the built-in persistence associated with the long term monitoring of all critical building parameters. Once a building has reached the most optimum efficiency level, the fault detection filters and applications continue to work on the customers behalf. Instead of relying on measures not drifting back after 5 years, EnerNOC's remote monitoring and analytics ensures that all measures that recur or drift back as a result of operator adjustments are quickly brought back to it efficient state.

The intent with the MBCx offering presented here is that EnerNOC's data center and analytics will remain in full effect throughout the 5 year performance persistence period.

5.5 Customer Deliverables

As described in Section 1 above, the energy savings will be captured through the implementation of energy efficiency measures by the customer, based on the recommendations coming out EnerNOC's Comprehensive Audit and Scorecard Report. We expect that multiple recommendations will be provided per customer, and that the customer will be responsible for implementing the measures, with help as needed from the program. Our experience has shown that, on average, a customer going through this process may receive over 40 recommendations in the first year, and about half of that in subsequent years. Not all measures are implemented, but those that are lead to savings on the order of 5% - 15% of the total energy usage.

The specific deliverables to the customer, as part of EnerNOC's Monitoring-Based Commissioning Program, include:

- **Comprehensive Audit** Each customer will receive a comprehensive audit, which will identify recommendations on equipment and operational upgrades that could result in energy efficiency improvements. These recommendations will distinguish between three types of measures: 1) measures that require simple maintenance or repairs, 2) measures that require enhancements to the controls systems, and 3) measures that

³ Bourassa, N., Piette, M.A., Motegi, N. 2004. Lawrence Berkeley National Laboratory, Berkeley, CA.

require major repairs or the investment in new equipment. The recommendations will also include estimate savings and costs for each measure identified.

- ***Ongoing MBCx Scorecard Report:*** For each customer, EnerNOC will provide an MBCx report, as illustrated in Appendix A – Technical Documentation. This Scorecard will provide a list of all identified measures, corrected measures, building profiles, benchmarks, as well as an ongoing summary of the results of program participation. Customers will receive this report on a monthly basis. The Scorecard also tracks the savings that have accrued from previously-implemented measures.
- ***An Annual M&V Report:*** This report will be an annual roll-up report of actual performance achieved through the implementation of energy efficiency measures.
- ***Portfolio M&V Report:*** This report represents a NYSERDA view of the performance of the participating customers, with a roll-up of portfolio results and performance.

5.6 Project Time Line

EnerNOC is proposing a project timeline that completes the NYSERDA contract over 3 years (2009-2011), but allows for monitoring over a 3-year period beyond that time frame. This time line is reflected in Table 4 of the proposal. If selected, EnerNOC will work with NYSERDA to develop a detailed project plan and time line to ensure that the program milestones and deliverables are in line with NYSERDA's expectations.

5.7 Program Budget

Table 3 below provides a breakdown of the proposed budget for this program. Please note the following assumptions that were employed in arriving at that budget:

- The budget assumes that the program will be implemented for a total of 53 customers. As noted above, EnerNOC is using this figure as an initial estimate, and is prepared to modify this target to meet NYSERDA's preferred objectives.
- Customers will be enrolled in 2009-2011, and each customer will receive three years of ongoing monitoring. The budget shown below accounts for future monitoring costs (i.e. those costs incurred in 2012 and 2013) having been brought forward to 2009-2011.
- The budget does not include any incentives or offsets to the customer: this budget only reflects EnerNOC costs.
- The impacts associated with this budget are shown in Table 4.

Table 3

Program Budget Analysis	2009	2010	2011	Total
EnerNOC Program Administration	\$662,500	\$662,500	\$662,500	\$1,987,500
EnerNOC Customer Enablement	\$585,000	\$900,000	\$900,000	\$2,385,000
EnerNOC Customer Monitoring	\$1,398,357	\$3,549,675	\$5,700,993	\$10,649,025
Total EnerNOC Budget	\$2,645,857	\$5,112,175	\$7,263,493	\$15,021,525

As illustrated in Table 3, our budget is broken down into the following categories:

- ***Program Administration*** □ The administrative costs designated for this project encompass all the program overhead costs associated with the program design, implementation, and management.
- ***Customer Enablement*** – These costs included the costs associated with enabling the customers being targeted for this program. These costs only represent EnerNOC costs, and do not include any incentives to the customers, or any offsets of the costs required for installing the monitoring equipment. The costs shown in this category represent steps 1 through 6 of the customer process outlined in Section 1.5.
- ***Customer Monitoring*** □ The Customer Monitoring Costs represent the costs of performing the ongoing monitoring for 3 years with each customer. Note that although these costs extend beyond the 3-year program window, they have been brought forward to facilitate the budgeting process. EnerNOC is open to considering different arrangements whereby the monitoring costs are incurred in line with when the monitoring occurs.

The overall budget for the EnerNOC MBCx program is designed to maximize the kWh and kW savings from each project undertaken in the program. While this proposal is based on a total of 53 implementations, this is only an approximate target. EnerNOC will be happy to adjust the budget to reflect a different scope for this program.

6 Selection Criteria

6.1 Cost/Benefit Ratios and Program Impacts

TRC Analysis

EnerNOC has conducted a cost-effectiveness analysis using the TRC test to provide some guidance on the cost-effectiveness of the proposed program. The TRC analysis presented here is based on input obtained from the New York State Department of Public Service, and may need to be adjusted pending additional or updated data to be provided by NYSERDA. The assumptions behind the TRC analysis are documented below. Note that the avoided cost numbers we used are statewide numbers, without the inclusion of Long Island.

- **Discount Rate:** 5.5%, per New York State Department of Public Service input
- **Measure Life:** 5 years, as documented in Appendix B – Technical Work Paper
- **Ongoing Monitoring:** 3 years
- **TRC Benefits:** we assumed TRC benefits attributable to the following sources:
 - **Avoided Energy Costs:** we obtained avoided energy costs, inclusive of line losses, from the New York State Department of Public Service. These costs are listed in Appendix B.
 - **Avoided Capacity Costs:** we obtained avoided capacity costs, which included T&D and line losses, also from New York State Department of Public Service. These costs are also listed in Appendix B.
 - **Avoided Gas Costs:** finally, we obtained avoided gas costs, also from New York State Department of Public Service. These costs are also listed in Appendix B.
- **TRC Costs:** we assumed TRC costs attributable to the following sources:
 - **Program Administration Costs:** these costs correspond to the EnerNOC budget described in Section 5.7. We have not included any administrative costs attributable to NYSERDA managing the program.
 - **Customer Costs:** which include the measure costs of \$83,230, as highlighted in the Appendix B – Technical Work Paper, and the \$25,000 monitoring equipment installation costs, for a total of \$108,230 per customer.

The analysis shows that the proposed program has a *TRC Benefit/Cost ratio* of 1.65, when calculated using the assumptions documented above. This TRC ratio does not include any incentives or customer installation costs, as these are transfers and therefore do not factor into the analysis. This analysis also does not include any benefits attributable to avoided CO2 emissions. Those are included and described later in this section.

Our calculations do not include the program administrator costs other than those budgeted for EnerNOC. We assume that there are no increases in supply costs, since this program do not results in any increases in supply.

Electric Rate Impact

As noted in the footnote of Appendix A of the RFP, NYSERDA indicates that there may not be sufficient information in the RFP to perform this calculation. Once additional information is available, EnerNOC will be happy to conduct this analysis for NYSERDA.

Electric Rate Impact per MWh saved

As noted in the footnote of Appendix A of the RFP, NYSERDA indicates that there may not be sufficient information in the RFP to perform this calculation. Once additional information is available, EnerNOC will be happy to conduct this analysis for NYSERDA.

Electric Rate Impact per MW Saved

As noted in the footnote of Appendix A of the RFP, NYSERDA indicates that there may not be sufficient information in the RFP to perform this calculation. Once additional information is available, EnerNOC will be happy to conduct this analysis for NYSERDA.

MWh Saved in 2015

As described in previous sections and in the supporting documentation, the program shows an estimated MWh savings for 2015 of 47,329 MWh. This figure is the same whether the program only functions for the period proposed, or if the program is extended, since we are performing ongoing monitoring until 2015. This figure, however, may change if the program is expanded to include more customers.

MW of Coincident NYSIO Peak Saved in 2015

As described in previous sections and in the supporting documentation, the program shows an estimated peak kW savings for 2015 of 4,876 kW. This figure is the same whether the program only functions for the period proposed, or if the program is extended, since we are performing ongoing monitoring until 2015. This figure, however, may change if the program is expanded to include more customers.

In order to perform this calculation accurately, EnerNOC recommends using load shape data to compare the load shape impact of the proposed measure to the NYSERDA system profile. We have deliberately chosen a conservative figure here absent any load shape information. This is reflected in our coincident factor calculation.

Peak Coincidence Factor

Using the figures noted above, the peak coincidence factor for this program is calculated to be 1.1. This derives from a measure kWh savings of 893,000 and a measure peak kW savings of 92. Given that this number is greater than 1, it implies that the savings accrue more frequently during the off-peak hours than the on-peak hours. As noted above, EnerNOC recommends using load shape data to compare the load shape impact of the proposed measure to the NYSERDA system profile. In addition, the possibility exists for enrolling the customers targeted by this proposal into demand response programs, providing an additional peak demand reduction. This reduction is not calculated as part of this proposal, but EnerNOC can easily provide additional information or analysis if requested.

TRC Calculation with Carbon

To account for the environmental benefits associated with the program, we used a figure of \$15 / ton of CO₂, as well as an average factor of 0.454 ton per MWh for the service territory. This is based on data obtained from the EPA E-Grid Database⁴.

We performed the TRC calculation with Carbon benefits. The results of this analysis shows that the resulting *TRC Benefit / Cost Ratio climbs to 1.75*.

Number of Participants as Percentage of Customer Class

The proposed program will result in an implementation with 53 commercial customers in the commercial property, education, government, and healthcare industries. EnerNOC does not have access to the total number of customers in the customer class to calculate the percentage that this represents, but we would be happy to do so if provided with the data.

Gas Rate Impact

As noted in the footnote of Appendix A of the RFP, NYSERDA indicates that there may not be sufficient information in the RFP to perform this calculation. Once additional information is available, EnerNOC will be happy to conduct this analysis for NYSERDA.

Gas Rate Impact per MBTU saved

As noted in the footnote of Appendix A of the RFP, NYSERDA indicates that there may not be sufficient information in the RFP to perform this calculation. Once additional information is available, EnerNOC will be happy to conduct this analysis for NYSERDA.

6.2 Narrative Considerations

⁴ <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>

Demand Reduction and System Benefits

The demand reduction that we expect to achieve through this program is detailed Table 5 below. The determination of this impact is described in full in Sections 5.2 and 5.3 of this proposal.

Table 4

Overall Program Impact Analysis	2009	2010	2011	2012	2013	2014	2015
Avoided Energy(MWh)	11,609	29,469	47,329	47,329	47,329	47,329	47,329
Avoided Demand (kW)	1,196	3,036	4,876	4,876	4,876	4,876	4,876
Avoided Gas(Therms)	390,000	990,000	1,590,000	1,590,000	1,590,000	1,590,000	1,590,000

At this stage, the demand reduction impact proposed here is significant, but will probably not rise to the attention of the New York Independent System Operator. The overall energy savings impacts are more significant. As described above, the possibility exists for enrolling the customers targeted by this proposal into demand response programs, providing an additional peak demand reduction that could provide value for the ISO and could be relied on by T&D System Planners. This reduction is not calculated as part of this proposal, but EnerNOC can easily provide additional information or analysis if requested.

Evaluation

EnerNOC's approach to Measurement and Verification is to deploy a consistent approach between energy savings estimates and verified energy savings. Savings estimates presented to customers play an important role in the implementation decision-making process. The verified energy savings represent the true performance delivered to NYSERDA.

EnerNOC realizes that it is important for the estimated and verified energy savings to be consistent. Therefore we have devised an M&V approach that will use two IPMVP Options (B and C) to bring confluence between energy savings estimates communicated to the customer for implementation (Option B), and overall program performance delivered to NYSERDA (Option C). The following summarizes EnerNOC's approach to M&V.

The savings for this program are expected to be in the 10% range. According the IPMVP this is the threshold given for the effective use of Option C; whole building monitoring. In this savings range, factors such as occupancy schedules, production, and weather, and unaffected loads such as plug loads, can make it difficult to isolate the true measure impact. However, because the MBCx measures affect the whole building and often interact with other measures, the Option C approach is desirable, provided it can be

combined with an effective mechanism for isolating external factors. Wherever the Option C approach introduces significant noise, EnerNOC intends to use Option B to document and fill in for factors that interfere with the accurate use of Option C.

The M&V plan can be summarized as follows:

- Option B - the combination of engineering computations and continuous measurement of energy proxies, will be utilized to determine the ongoing savings estimates to the customer.
- Option C - whole building metering, will be used to true-up the savings after the completion of measure implementation.
- Parameters monitored in the Option B approach will be used for mitigating external factors that affect energy consumption, and which are outside of the scope of the implemented measures. This includes the monitoring of system operating factors during, before, and after the Option C energy baseline is developed.
- A comparison between the “bottom-up” Option B results will be compared to the “top-down” Option C results. The Option C baseline and post-installation energy consumption will remain the primary performance criteria in EnerNOC’s M&V approach, but whenever static or noise factors interfere, Option B results will be used to supplement measure isolated results for performance verification.
- In this program the aggregated Option B results will be considered equivalent to the Option C results whenever the two options are within $\pm 10\%$ confluence.

Market Segment Need

EnerNOC believes that this program provides an excellent fit into NYSERDA’s existing portfolio of programs, and fills a previously unmet need for end-use customers. Opportunities deriving from Monitoring-Based Commissioning have not been substantially achieved in the state of New York, and present a significant need. The proposed program will seek to meet that need, and unlock an efficiency potential that is currently not being met.

Coordination

EnerNOC will coordinate this program with other programs offered in the state, to the extent appropriate. It is important to note that there is an opportunity to coordinate this program with other existing demand response programs, for which EnerNOC is a provider in New York State. This coordination may enable customers to use the same monitoring equipment to not only achieve the demand reductions and energy savings illustrated in this proposal, but also to enable a significant and additional demand-

response load. That capacity is not included as part of this proposal. However, EnerNOC can provide additional information or analysis if requested.

Co-Benefits

EnerNOC has found that many of the commercial customers that participate in an MBCx program will generally experience additional value stemming from improved maintenance practices and reduced maintenance costs. The MBCx approach allows customers to keep their facilities running more smoothly: they are alerted to potential problems as soon as they occur, and have an opportunity to address those problems early on. Indeed, MBCx can be seen as a form of preventative maintenance, which can significantly reduce repair costs. At this stage, EnerNOC does not have quantitative information on the savings associated with this benefit, but we expect it to be significant to the customers considering this opportunity.

Portfolio Balance

NYSERDA offers a wide and comprehensive array of programs for energy efficiency. EnerNOC believes that this proposed program is an innovative approach to capture energy efficiency opportunities that will complement and balance the NYSERDA portfolio. EnerNOC will coordinate this program with other programs offered in the state, to the extent appropriate.

Depth of Savings

During the analysis and benchmarking phase, EnerNOC will not limit the process to a specific set of measures. The analysis will review all systems in use at the customer facilities and provide recommendations on a broad range of measures, from lighting to HVAC to process. While the objective of this program is to implement permanent measures, the analysis will undoubtedly uncover additional opportunities for efficiency that do not require any capital investment, but are primarily a result of incorrect settings, schedules or equipment operation. The reports provided to the customer will highlight those measures, and encourage the customer to implement additional energy efficiency opportunities. A sample customer report is included in Appendix A, and highlights the comprehensive nature of this offering. In addition, the analysis may uncover measures that are best addressed by other New York programs. We will refer the customer to those programs as appropriate.

Underserved Markets

This program is not targeted at underserved markets.

Commitment

The process for obtaining customer commitment is described in detail in Section 1.5 of this proposal. In summary, customer will be required to enter into an agreement with the program to ensure proper commitment. The enrollment agreement will essentially guarantee that the customer is willing to dedicate some internal resources to comply with program requirements, and acknowledges that there will be some customer costs. If applicable, the agreement will also commit the customer to implementing measures in order to obtain any incentive funds from the program. The customer will then receive ongoing monitoring for a period of 3 years, along with all the customer deliverables described in Section 5.5 of this proposal.

Customer Outreach

The focus of the program outreach will not be on finding all customers, but on finding the *right* customers. As discussed above, this program will target a select group of customers in the commercial sector. Our implementation plan contains a very extensive customer screening and enrollment process to ensure that the customers that participate will deliver the most value to NYSERDA and successfully meet the program objectives. A key part of this process will center on the identification of a program champion within each customer. In our experience, we have found that program champions are key facilitators of customer engagement, swift implementation, and successful kWh reductions. The selection criteria described below are designed to ensure that the program enrolls eligible and desired customers:

- *Basic Selection Criteria:* First we ensure that the customer meets the basic selection criteria, i.e. size, type of facilities, presence of building control systems, history of energy efficiency efforts.
- *Customer Commitment:* We screen customers for their ability to commit to the program. This will be based on their willingness to dedicate time and resources, their ability to identify a program champion, and their openness to meeting with EnerNOC program managers. During the screening phase, we will evaluate prospective customers against these criteria.
- *Empowered Champion:* Our experience shows that one of the keys to a customer's success is that the decision-maker with which we interface is empowered to make decisions about elements that will affect the program. For example, we will make sure that the proposed program champion will be able to clear any barriers regarding the installation of monitoring equipment and the use of resources' time.
- *Customer Stability:* The last element we will evaluate when selecting a customer is whether the customer and project champions are likely to remain stable and in place during the implementation. We have experienced changes in management in the past

that have affected the outcome of our programs. We will determine, ahead of enrollment, whether such changes are likely to occur and develop strategies to address challenges should there be turnover during the program.

The program will seek to gain commitment from the program champion and explore, *before enrollment*, the willingness of the champion to agree to and implement the cost effective measures identified in the Scorecard Report.

Collaborative Approach

This program proposal was developed in a short time-frame which precluded extensive cooperative discussions. However, the EnerNOC staff has held numerous conversations and discussions about this program with the various New York Utilities, NYSERDA, the New York State Public Commission, and the New York Department of Public Service. If our proposal is accepted EnerNOC will conduct additional conversations with other administrators, customer representatives, and community organizations to ensure that the program is delivered through a collaborative approach.

Fuel Integration

The program will focus on both electricity and gas, and generate savings for both fuels. The approach does not favor one fuel over another. The electric impacts will be more significant, given that the end-uses targeted are more weighted towards electricity. The program will address both electric and gas savings through a single customer contact.

Transparency

The data identified in Appendix A (i.e. the Sample Scorecard report) will be made available to end-users as well as program administrators, to ensure full transparency.

Procurement

EnerNOC will perform all functions specified in this proposal and will not procure any functions through a competitive bid.

Appendix A - Technical Documentation

1 The EnerNOC Solution

EnerNOC's full-service solution is built on non-proprietary, open-architecture, scalable, and economical technology. This platform is used to design, customize, and quickly deploy a variety of energy management solutions that deliver reliable and economical results. EnerNOC's solution has three main components:

- The EnerNOC *Network Operations Center*, or NOC, our centralized communication infrastructure where we manage and store data, and from which we are remotely connected to all our customers sites;
- Remote *EnerNOC Site Servers* (ESS) and *BMS Gateways*, advanced metering and communications nodes located at each end-user site, and that collect local data from meters and building controls systems;
- *PowerTrak®*, EnerNOC's proprietary web-based energy management platform, hosted at the NOC and available to any users with an Internet connection.

1.1 The Network Operations Center (NOC)

Much like a utility control center, the NOC combines advanced software, internet communications, and highly-skilled professionals to collect and present end-user energy consumption and process data, initiate remote commands, and continuously monitor the status of remote sites. The NOC connects to each site through a communications node called the EnerNOC Site Server, or ESS.



The NOC utilizes a comprehensive security infrastructure, including firewalls, intrusion detection systems, and encryption for transmissions over the Internet. The NOC, illustrated in Figure 1, is staffed around the clock, 365 days a year.

1.2 The EnerNOC Site Servers and BMS Gateways

Figure 1 - EnerNOC Network Operations Center

EnerNOC Site Servers

The ESS serves as a gateway to connect the NOC with a variety of data collection systems and equipment at end-use customer sites. The ESS is typically installed in the electrical room at a customer's site. It is connected to the site's local network, and it includes a Web service software application which enables the secure, bi-directional transfer of data across firewalls and over the Internet. In some instances, EnerNOC may need to install multiple ESS's per building.

All meters involved in this implementation will be connected to the ESS via pulse block connections or via Modbus protocol. The ESS will collect and store all data captured by the meters, and will make that data available, in near real-time, to EnerNOC's Network Operations Center via PowerTrak.



Figure 2 - ESS Gateway



Figure 3 - Echelon iLon

This universal connectivity allows us to leverage a customer's existing infrastructure investment, lowering our overall cost of enablement and making data available to corporate networks and the Internet through industry standard communication protocols. Figure 2 and Figure 3 illustrate the installation of an ESS at a customer site.

BMS Gateways

If data from a building management system (BMS) is required, then a BMS Gateway will also be installed at each location, and will be connected to the local Intranet. This gateway will collect BMS point information via a standard open protocol called BACnet/IP. The Gateway will typically be located at the campus control room where the BMS workstation is located.

1.3 PowerTrak

PowerTrak is a Web-based enterprise energy management software platform used for power measurement, load control and energy analysis. Powertrak is built on Linux, Java and Oracle technologies, and operates an open Web services architecture. PowerTrak handles many vital

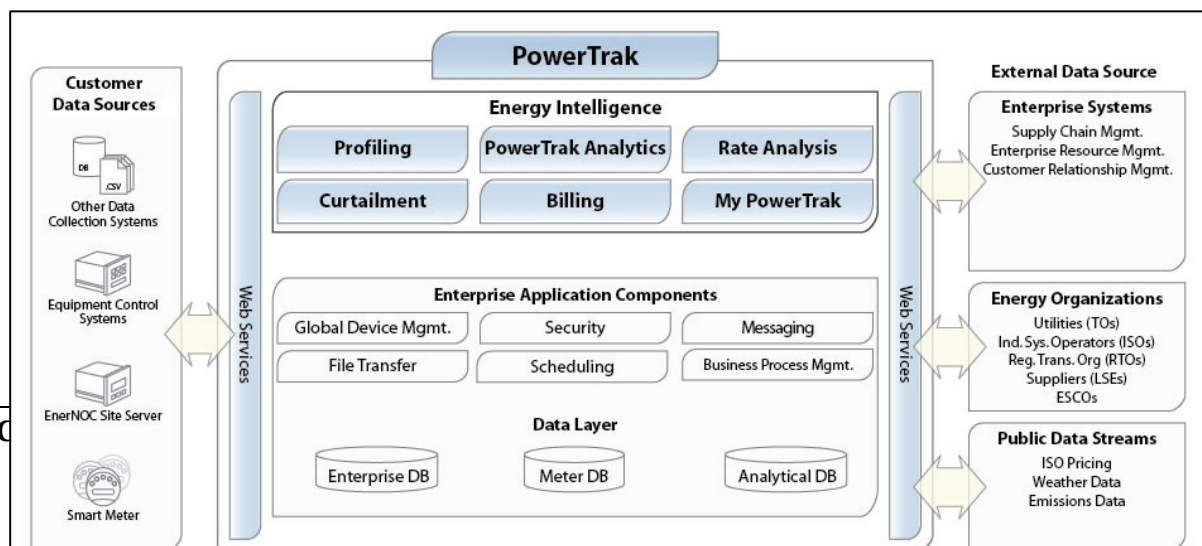


Figure 4 - PowerTrak Architecture

data acquisition tasks. PowerTrak is a hosted application, meaning that it requires no installation of any physical hardware or software. Users with access to an Internet connection have access to PowerTrak. The diagram in Figure 4 provides an overview of the PowerTrak system architecture.

PowerTrak collects facility consumption data on a 1-minute, 5-minute, 15-minute and hourly basis, and integrates that data with real-time, historical, and forecasted market variables. PowerTrak can be used to measure, manage, benchmark, and optimize end-use customers' energy consumption and facility operations. In particular, PowerTrak supports the following business processes:

- Analyzing energy consumption patterns;
- Forecasting energy demand;
- Measure the real-time performance of sites during demand response events;
- Continuously monitoring building management equipment to optimize system operations;
- Model rates and tariffs to turn energy data into cost data;
- Creating energy scorecards to benchmark similar facilities.

In addition, PowerTrak enables us to track each end-use customer's greenhouse gas emissions by mapping their energy consumption with the generation fuel mix in their location (e.g., coal, nuclear, natural gas, and fuel oil).

1.4 PowerTrak Data Layer

The PowerTrak data layer is a relational database that is designed for query, analysis and transaction processing. It contains historical energy data and data from other sources. It separates analysis workload from transaction workload and enables us to consolidate data from several sources. These records include customer demographics, interval energy information (e.g. 1-minute, 5-minute, 15-minute), building management system data, weather data, emissions data, aggregated summary data, and pricing data.

1.5 PowerTrak Data Warehousing and Scalability Capabilities

The PowerTrak application is built on Linux, JAVA and Oracle technologies. We are using Oracle RAC (Real Application Clusters) as the data warehouse. As we scale to ten's of thousands of points, Oracle RAC enables the deployment of a single database across a cluster of servers, which is the foundation for grid computing. This strategy offers the following advantages:

We can expand capacity by simply adding low-cost commodity hardware (e.g. servers and disk arrays to our cluster on demand);

No PowerTrak application changes are necessary;

The application does not have to be taken offline, providing 24/7 availability for continuous uptime for database applications.

PowerTrak is a tiered Service Oriented Architecture. The Presentation Tier provides browser-based (HTML, AJAX or RSS) user interfaces or a service interface for any business process using SOAP, as well as Java calls. The Middle Tier implements business processes using application server, Business Process Workflow (BPEL or JBI) and Enterprise Application Integration (EAI) technologies. The Enterprise Tier provides access to data, services and security.

1.6 PowerTrak Functional Capabilities

PowerTrak offers extensive energy management and analysis capabilities. A general overview of these capabilities is provided below, organized by functional area.

Meter Aggregation

Using a tree-based hierarchical structure the user can assign metering/monitoring devices to a group and view aggregated reports on the virtual/aggregated group. These groups can represent geographical regions, business units, utility territories, etc.

Energy Profiling

Energy Profiling displays various types of energy data, and provides the capability to merge, overlay, and compare it with other key data streams such as energy pricing, weather, and energy budgets. In addition, data summarization features allow users to understand the implications of facility activities over defined intervals. Multiple facilities and data streams can be easily compared using a powerful, graphical user interface.

Bulk Data Export

Bulk Data Export allows the user to export detailed energy interval data for a user-specified period of time for any meter or set of meters, in aggregate or individually, from PowerTrak into a .csv (comma separated value) file. This data can be used for many purposes, including detailed analysis, third-party commodity procurement negotiation, etc.

Alerts and Alarms

PowerTrak's alerting and alarming capabilities allow users to set static thresholds for any incoming data sources (e.g., temperature, kW, kWh, therms, GPM, etc.). Notification can be configured to deliver emails and pages. Notification types are user defined and can include certain information, including time, alarm type, and actual monitored data value at time of alarm. All alerts and alarms are delivered in real-time to ensure a prompt resolution.

External Data Feeds

PowerTrak integrates publicly-available data streams such as energy market real-time prices, weather data (e.g., wet-bulb temp, humidity, atmospheric pressure), and other subscription-based data streams as users request. This data can be used to normalize commodity data (e.g., electricity usage per degree day) across facilities and provide insight into energy usage.

Forecasting

PowerTrak provides a powerful forecasting tool that allows users to forecast any commodity consumption and demand against past consumption using sophisticated stochastic and historic variables. Forecasts can also be created for actual bills, based on a combination of user-defined tariffs and consumption data, which provide monthly and annual plans.

Tariff Builder

The Tariff Builder allows users to replicate utility tariffs (e.g., gas bill, electric bill) in order to generate shadow bills, forecasted bills, and to track against actual bills received. Because PowerTrak captures actual utility meter interval data in real-time, the data is identical to what the utility captures. However, the utility may not always bill correctly and this functionality provides powerful fact checking functionality. Additionally, the Tariff Builder provides a bill presentment functionality that enables the generation, viewing, and exporting of estimated billing information.

Reporting

Reporting makes available a standard library of reports to centralize facility and customer data for benchmarking and financial analysis. The following are a sample of available reports:

- Load Duration Curve
- Load Factor Peak Demand Variance
- Hourly Demand vs. Temp
- Building Rankings by Usage per Sq. Ft
- Daily Min/Max Demand Chart
- Billing Report
- Emissions Footprint
- Usage vs. Baseline

Cognos ReportNet

Cognos ReportNet is one of the most advanced business intelligence reporting applications available. PowerTrak has integrated the full power of Cognos ReportNet into the system, allowing users to view powerful reports developed from any available data source in PowerTrak. Reports can be scheduled to run at user-defined times and be distributed to user-defined groups and individuals.

Emissions Reporting

PowerTrak calculates a facility's "emissions footprint" by capturing regional power generation emissions statistics, as reported directly from the Environmental Protection Agency. Using a facility's State, Utility and real-time energy consumption, PowerTrak is able to provide detailed particulate emissions profiles from the power consumed by the facility.

Data Capture and Storage

PowerTrak stores data for a minimum of three years. Customers can choose to archive data after this time frame or simply pay for continued data storage at a predetermined price.

2 Sample EnerNOC Monitoring Based Commissioning Report

The following pages contain a sample report detailing the information that EnerNOC provides to its MBCx customers on a monthly basis. Note that the reports provide information on the overall energy picture, along with specific recommendations for measures. These reports form the cornerstone of the MBCx approach. They provide the necessary visibility to the customer on all of their energy cost drivers, and provide recommendations for continuing to reduce energy usage and ensuring persistence of savings. Please note that EnerNOC has obtained permission from the customer to use the data and reports shown below.



Redacted ScoreCard

Appendix B - Technical Work Paper

EnerNOC, Inc.

Monitoring Based Commissioning (MBCx)

August 1, 2008

1 At a Glance Summary

Measure Name	Monitoring Based Commissioning (MBCx)
Savings Impacts Common Units	Customer
Customer Base Case Description	Existing building condition
Code Base Case Description	Same as Customer Base Case
Costs Common Units	Customer
ASHRAE Climate Zone	10B, 11B, 12B, 13A, 14A, 15, 16
Building Type	Educational, Commercial Property, Government
Building Vintage	1978 – 2004
Measure Equipment Cost (\$/unit)	Not Applicable
Measure Incremental Cost (\$/unit)	Not Applicable
Measure Installed Cost (\$/unit)	Varies, see “Measure Installed Cost” column in next table
Effective Useful Life (EUL) in years	5 years
Program Type	Retrofit
Time of Use (TOU) AC Adjustment	0%
Important Comments	Measures, energy savings, and demand reduction are highly building and project specific. Although there are certain “standard” types of equipment and system configurations, HVAC and lighting systems in larger buildings are unique and “custom” for a specific building, with a specific occupancy, schedule, orientation, climate zone, etc.

Measure Name	Customer Annual Electric Savings (kWh/unit)	Customer Peak Electric Demand Reduction (kW/unit)	Customer Annual Therms Savings (Thm/unit)	Measure Installed Cost (\$/unit)
Monitoring Based Commissioning	893,000	92	30,000	\$83,230

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General Measure and Baseline Data

1.1 Measure Description and Background

Monitoring Based Commissioning is a relatively new energy efficiency application. Broadly speaking, it refers to the combination of retro-commissioning and continuous commissioning & verification activities, coupled with ongoing, technology-based monitoring to ensure persistence of savings. Selected facilities are analyzed to identify and implement cost-effective retro-commissioning activities that typically require little or no capital investment. During the implementation phase, monitoring technology is installed at each facility to capture energy usage data from interval meters, as well as to interface with building control or energy management systems (BCS/EMS). This data is then used to create benchmarks for optimal building operations, and also to continuously track building operation and performance. Since all buildings invariably drift away from optimal operations, the ongoing monitoring ensures that building managers are alerted to any issues as they arise, and can then take appropriate remedial action on a timely basis.

EnerNOC has developed a unique and powerful approach to Monitoring Based Commissioning. We have pioneered this approach with some of our existing customers, and have been able to achieve significant energy savings. Our Monitoring Based Commissioning approach is as follows:

- EnerNOC will install the appropriate meters at all customer sites to collect electric and gas information on a campus/master meter-level, as well as electric and gas data at appropriate building or facilities, and BTU consumption for CHW and HW systems, also for select buildings. EnerNOC will also interface with the relevant points in the Building Management Systems (BCS) on these sites.
- The information will be collected in near real-time at user-adjustable sample rates, and warehoused at our Network Operations Center (NOC) via our PowerTrak® application. Any user with access to the Internet, and with the proper credentials, will be able to view both meter and BCS data using a simple browser interface.
- EnerNOC will establish benchmarks for all buildings monitored using data published by the International Facility Management Association or other appropriate sources. Once the benchmarks are established and calibrated, EnerNOC will compare building usage to benchmarks to identify potential areas of energy savings.
- The energy savings from MBCx is comprised of the aggregated savings from multiple measures. These measures are identified from anomalies or faults visible through the host facility BCS system. Since the BCS system is mostly controlling and monitoring facility HVAC systems the measures are typically identified in these end-use categories.

The following is a list of end-use systems and measures that are most commonly addressed by MBCx:

EnerNOC- Typical MBCx Measures*	
General Fault Detection and Diagnostics (FDD)	Setpoint Error Tracking Sensor range checking Operating parameter out of range Pinned or flatlined sensor Actual vs. Intended Schedule Analysis Equipment Manual Override Detection Excessive Equipment Cycling
Zones	Setpoint Analysis Heating Setback Cooling Setforward Air Starvation Analysis Zone Comfort Analysis Indoor Air Quality Analysis
Air Handling Units	Economizer Operation Simultaneous Heating and Cooling Excessive or inadequate ventilation Demand Ventilation Air starvation Static pressure analysis Schedule Heating/Cooling Coil Efficiency Leaking Valve Optimum Start/Stop Analysis Air Filter Analysis- Dirty Filter
Terminal Units	Variable Air Volume Analysis Zone Reheat VAV Box Damper Modulation
Cooling Plant	Chiller Performance analysis - kW/Ton Optimum Chilled Water Supply Temperature Optimum staging Optimum Condenser Water Supply Temperature Cooling Tower Fan Efficiency Low/High Temperature Differential Analysis Optimum Flow analysis Optimum Pump Utilization Optimum Thermal Storage Utilization
Heating Plant	Boiler Sequencing Optimization Boiler Air Preheat Boiler Combustion Controls Boiler Economizer Boiler Combustion Efficiency Boiler Burners Performance Boiler Blowdown Boiler Efficiency Optimum Pump Utilization

* *Varies depending on point sufficiency and anomaly detection*

1.2 Codes and Standards Requirements Analysis

The measures described here are not governed by codes and standards since they generally only involve adjustments to existing equipment. ASHRAE has a guideline for Commissioning but not for Retro-commissioning or Monitoring Based Commissioning. Examples of typical MBCx measures may include economizer control adjustments; excessive equipment runtime set-points vs. actual variations, VAV-Box hunting, heating/cooling valve hunting, chilled water temperature reset schedule modifications, pumps, flow adjustments, simultaneous heating and cooling, etc.

1.3 EM&V, Market Potential, and Other Studies

The most recent study on the evaluation, measurement and verification relevant to this measure was done by Brown, Anderson and Harris, 2007¹. That study reviewed the energy savings results of the 2004-05 MBCx pilot program for UC/CSU/IOU. The median savings of 10% of the baseline source energy was cited for this program. The authors also concluded that colder climates tended to have slightly lower savings than higher or more humid climates.

1.4 Base Cases and Measure Effective Useful Lives

Since MBCx can be applied to a wide variety of building components and systems, and because of the wide range of potential measures, it is difficult to establish a common measure effective useful life (EUL). In general, the maximum measure life for an MBCx measure cannot exceed the life of the equipment or system undergoing improvement.

The literature cites a wide range of measure life estimates. In the paper by LBNL and SMUD on “An Evaluation of Savings and Measure Persistence from Retro-commissioning of Large Commercial Building”, 2004², measures tended to retain 80% of their initial energy saving into the fourth year. Since the MBCx program is intended to continuously monitor the facilities for a three year period, this should delay the onset of diminished savings until after the Monitoring aspect is discontinued. Continuous or on-going monitoring is intended to maintain saving performance since any changes to the ‘improvements’ will be identified and addressed, thus minimizing the impact of inevitable drift. For the purpose of this Work Paper, the EUL will be set for five years.

2 Calculation Methods

2.1 Energy Savings Estimation Methodologies

As part of the MBCx measure, calculations for each indentified measure will be made. This measure specific or “bottom-up” approach builds on the traditional retro-commissioning approach by isolating specific measures or opportunities within building systems (central plant, air distribution, terminal devices) or sub-systems (chillers, air handlers, sensors and valves etc). Each opportunity is identified through fault detection (FD) using powerful automatic filters and visualization schemes to identify faults and optimization opportunities. Once an opportunity is identified, it is flagged for further evaluation, including validation, possible diagnostic and remediation. Energy savings are calculated on a stand-alone basis along with cost savings.

Since equipment is being continuously monitored a combination of engineering computations and continuous measurement of proxies for energy use is utilized as the base case. With this method, dynamic parameters, such as flow, temperatures, speeds, etc. will be measured directly and supplied to engineering equipment models which are developed around actual field conditions. Industry standard methodology, such as ASHRAE Standards is used to annualize energy consumption and savings. The BIN method, combined with Typical Meteorological Year (TMY3 data is now available and will be used for this program) data is most often used to determine the annual energy consumption or savings associated with recommendations identified through the MBCx process. As seasonal and annual consumption histories are complete, actual system energy consumption can be derived directly from the accumulation of the streaming data from the host facility.

Even when the Owner has not chosen the package of measures to implement yet, accounting for interactions is important because this simple payback calculation must be sufficiently accurate to determine which measures will be implemented and allow the Program to correctly allocate incentive payments. After measures are implemented, ‘Updated Annual Savings’ are calculated for the Implementation Summary Table including interactions of the selected group of measures.

For consistency between estimated and verified savings, MBCx deploys a measure calculation and verification approach using two industry standard calculation and verification methods. These are derived from the International Performance Measurement and Verification (IPMVP) where Options (B and C) are used to bring confluence between energy savings estimates communicated to the customer for implementation (Option B), and overall program performance delivered to SCE (Option C). The following summarizes the MBCx calculation and verification approach:

The savings for the MBCx program are expected to be in the 10% range. According the IPMVP this is the threshold given for the effective use of Option C: Whole Building Monitoring. In this savings range, factors such as occupancy schedules, production, and weather, and unaffected loads such as plug loads, can make it difficult to isolate the true measure impact. However, because the MBCx measures affect the whole building and often interact with other measures, the Option C approach is desirable, provided it can be combined with an effective mechanism for isolating external factors. Wherever the Option C approach introduces significant noise, The

MBCx program uses Option B to document and fill in for factors that interfere with the accurate use of Option C.

The plan can be summarized as follows:

- Option B, the combination of engineering computations and continuous measurement of energy proxies, will be utilized to determine the ongoing savings estimates to the customer.
- Option C, whole building metering, will be used to true-up the savings after the completion of measure implementation.
- Parameters monitored in the Option B approach will be used for mitigating external factors that affect energy consumption, and which are outside of the scope of the implemented measures. This includes the monitoring of system operating factors during, before, and after the Option C energy baseline is developed.
- A comparison between the “bottom-up” Option B results will be compared to the “top-down” Option C results. The Option C baseline and post-installation energy consumption will remain the primary performance criteria in EnerNOC’s M&V approach, but whenever static or noise factors interfere, Option B results will be used to supplement measure isolated results for performance verification.

In this program the aggregated Option B results will be considered equivalent to the Option C results whenever the two options are within $\pm 10\%$ confluence.

A complete list of findings, derived for an actual customer, can be found in Appendix A, which is the source of the data presented in the various summary tables. The following are example of savings calculations for various findings typical of the MBCx measure. They are highlighted in yellow in the complete list of findings.

Example 1: AHU running continuously

An air-handler fan was found to be operating continuously during the month of April regardless of occupancy and programmed schedule. Using the general filter and parameter out of range (POOR) aspect of PowerTrak®, this air handler was flagged as violating its scheduled rules and was investigated by analysts to verify that it was not a false positive and determine what the savings would be based on actual off-scheduled performance. The air-handler is equipped with a variable speed drive, so the average speed during the off-hours time period was used to calculate savings potential from turning off the unit during un-occupied hours.

Energy Savings are evaluated as follows:

$$\text{kWh}_{\text{savings}} = \text{kW}_{\text{fan}} \times (\text{Hours}_{\text{pre}} - \text{Hours}_{\text{post}})$$

The power draw of the air-handler fan motor was based on drive monitored output rather than using its nameplate rating since the motor was not running at peak capacity during the off-hours. Figure 1 shows the measurements for this measure:

AHU-3 Motor Size	25-hp
Power Reading from Drive	
kW _{max}	15.54-kW
kW _{avg-offHrs}	6.33-kW

	Existing Schedule		Proposed Schedule	
	Weekdays	Weekend	Weekdays	Weekend
StartTime	00:00	00:00	08:00	08:00
Stop Time	23:59	23:59	21:00	21:00
Hours	24	24	13	13
Days	260	104	260	104
Total Hours:	6236	2494	3380	1352

Figure 1 Fan motor Power Measurement (Example 1 Calculation)

Inserting the Figure 1 numbers into the savings equation, Figure 2 shows the following savings:

		Existing			Proposed			Savings	
		kW	Hours	kWh	kW	Hours	kWh	kWh savings	% of Savings
Summer	on-peak								
	off-peak	6.33-kW	1683	10,653	6.33-kW	0	0	10,653	41.9%
Winter	on-peak								
	off-peak	6.33-kW	2332	14,762	6.33-kW	0	0	14,762	58.1%
Totals			4015	25,415		0	0	25,415	100.0%

Figure 2 Measurement Savings (Example 1 Calculation)

Since the new schedule does not turn the fan motor off during the peak demand period, there are no demand reduction associated with particular measure.

Example 2: Economizer not modulating / fixed at maximum position

Using the general filter and parameter out of range (POOR) aspect of PowerTrak®, this air handler was flagged as violating its economizer rules, mixed air temperature too high, and was investigated by analysis to verify that it was not a false positive and then determine what the savings would be based on intended operational performance.

With the Outside air damper stuck at 100% open, too much OA is used during all but the temperature Bins between the SAT of 55°F and the RAT of 75°F where 100% OA would be the norm. Figure 3 below shows the Bin temperature and Hours of occurrence at various 4-hour time intervals. This allows for a better match to actual occupancy usage than the standard three, eight-hour shifts. The bin data is based on the TMY2-8760 weather data used in EnergyPlus. Since TMY3 weather data is now available, the new 4-hour time intervals will be populated using this newest weather format. The calculations in the example used TMY2 since that was all that was available at the time. The technique shown will not change, only the source of the weather data will.

	Annual											
	OBSERVATION HOUR GRP						Free Cing/Htng					
BIN Temp	0	4	8	12	16	20		Un-Occupied		Occupied		
	TO 4	TO 8	TO 12	TO 16	TO 20	TO 24		Hours	Avg Temp	Hours	Avg Temp	
112.5												
107.5												
102.5				1								
97.5				1	12	1						
92.5				8	34	12						
87.5				41	80	34						
82.5			6	90	140	89						12
77.5	18	37	126	119	100	49	39.5	77.9	970.5	82.0		
72.5	56	62	104	95	102	83	Free Cing/Htng					
67.5	111	121	112	99	134	129						
62.5	161	156	142	127	151	197		Un-Occupied		Occupied		
57.5	146	169	113	100	105	134		Hours	Avg Temp	Hours	Avg Temp	
52.5	170	130	109	113	91	118						
47.5	90	80	68	65	82	89						
42.5	99	110	96	92	111	108						
37.5	144	120	120	126	128	155						
32.5	156	134	111	109	116	108						
27.5	74	93	76	57	77	84						
22.5	77	79	55	44	52	68						
17.5	68	69	42	24	37	67						
12.5	45	28	18	15	21	28						
7.5	21	39	19	8	15	18						
2.5	13	15	7		2	10						
-2.5	11	11	2			3						
-7.5		1										
-12.5												
-17.5												
-22.5												
-27.5												
-32.5							1423	34.3	3419	35.5		
Average OAT when MAT at min OAT of 25% would be less than 55°F										37.5	-0.8	

Figure 3 Hours and Avg OAT at 100% OA and at 25% OA (Example 2 Calculation)

The minimum economizer outside air fraction should be at 25% percent but is currently at 100%. The post-retrofit economizer will control the amount of outside air from the 25% minimum, when MAT is less than SAT or OAT is greater than RAT or otherwise be at 100%.

The savings will be as follows:

Existing

Eq1= [CFM x 1.1 x ΔT x Hrs] / (100,000 x 80%)					
Eq2= SAT - OAT = ΔT (when OAT is less than 55F)					
Heating Usage during Occupied Period					
AVG CFM	ΔT	Hours - Heating Occ-Hours	Heating Therms	Existing Heating	Cost
25,000	31.52	3,418.50	37,035.02		\$25,924.52
SAT	OAT	ΔT			
67.00	35.48	31.52			

Proposed

Eq1= [CFM x 1.1 x ΔT x Hrs] / (100,000 x 80%)					
Eq2= SAT - OAT = ΔT (when OAT is less than 55F)					
Heating Usage during Occupied Period					
AVG CFM	ΔT	Hours - Heating Occ-Hours	Heating Therms	Proposed Heating	Cost
20,000	1.20	37.50	12.37		\$8.66
SAT	OAT	RAT	MAT		ΔT
55.00	-0.80	72.00	53.80		1.20

Existing

Eq3= [CFM x 1.08 x ΔT x Hrs] / (12,000 x 0.8-kW/ton)					
Eq2= OAT - SAT = ΔT (when OAT is greater than 74F)					
Cooling Usage during Occupied Period					
AVG CFM	ΔT	Hours - Heating Occ-Hours	kWh Cooling	Existing Cooling	Cost
25,000	26.97	970.50	47,108.25		\$7,537.32
OAT	RAT	SAT	ΔT		
81.97	75.00	55.00	26.97		

Proposed

Eq3= [CFM x 1.08 x ΔT x Hrs] / (12,000 x 0.8-kW/ton)					
Eq2= MAT - SAT = ΔT (when OAT is greater than 74F)					
Cooling Usage during Occupied Period					
AVG CFM	ΔT	Hours - Heating Occ-Hours	kWh Cooling	Proposed Cooling	Cost
20,000	21.05	970.50	29,410.83		\$4,705.73
OAT	RAT	MAT	SAT		ΔT
81.97	75.00	76.05	55.00		21.05

Existing

Eq4= [kW x Hrs] when OAT is less than 55F			
At full speed due to too high and SAT, Actual Data			
Existing Fan Operation			
kW	Hours - Heating Occupied	kWh Saved	Fan Cost Savings
15.54	4,389.00	68,212.38	\$10,913.98

Proposed

Eq4= [kW x Hrs] when OAT is less than 55F			
Assumes an 80% speed as an avg with a lower SAT			
Proposed Fan Operation			
kW	Hours - Heating Occupied	kWh Saved	Fan Cost Savings
9.30	4,389.00	40,829.13	\$6,532.66

Savings

Existing Cost		Proposed Cost		Avoided Cost		Therms		Energy	
Heating	\$25,924.52	Heating	\$8.66	Heating	\$25,915.86	Existing	37,035.02	Existing	115,320.63
Cooling	\$7,537.32	Cooling	\$4,705.73	Cooling	\$2,831.59	Proposed	12.37	Proposed	70,239.96
Fan	\$10,913.98	Fan	\$6,532.66	Fan	\$4,381.32	Avoided	37,022.65	Avoided	45,080.66
				Total	\$33,128.76				

Average cost: \$0.16/kWh and \$0.70/Therm

Peak and Demand Savings

Month	Max Temp	RAT	MAT		DAT	ΔT		Diff	kW
			At 100%	At 25%		At 100%	At 25%		
May	87.5	75.0	87.5	78.13	55.0	32.5	23.1	9.4	26.37
Jun	92.5	75.0	92.5	79.38	55.0	37.5	24.4	13.1	36.91
Jul	97.5	75.0	97.5	80.63	55.0	42.5	25.6	16.9	47.46
Aug	102.5	75.0	102.5	81.88	55.0	47.5	26.9	20.6	58.01
Sep	92.5	75.0	92.5	79.38	55.0	37.5	24.4	13.1	36.91
Average Demand Reduction									41.13

Uses Eq 3 and 25,000-cfm in both cases assuming that full speed is needed under peak conditions each month.

Figure 4 Electric and Thermal Savings from Fixing OA Damper (Example 2 Calculation)

Example 3: Building Load factor too high for building class at this site

Not all the buildings on a campus are connected to the BCS, but analyzing the interval meter data, a relative assessment of performance can be determined. In this example, one building designated as a classroom building consistently had a load factor of over 70% when all other classroom buildings at this site ranged between LFs of 50% and 60%. After review of the building's intended operation by scheduled building 'open' hours, it was determined that this building should have a lower load factor. By calculating the energy wasted by not being able to schedule lights and HVAC equipment off, the customer decided to expand the campus DDC controls into this space. The load factor/profile after implementation clearly shows the building performing to estimate. Continuous monitoring will flag the building if the load factor creeps above a 'high' threshold.

As can be seen in Figure 5 below, the Load Factor for November was 78% while in December, after implementing the BCS controls, the Load Factor dropped to 59%. To calculate annual savings, the actual previous 12-month usage was adjusted to the new load factor of 60%. Since all energy savings are off-hours, no demand savings were calculated.



Figure 5 Load Factor too high/install BCS controls (Example 3 Calculation)

	Days	Actual kWh	Pk-kW	LF	New-LF	Proposed kWh	Reduction kWh
Dec-06	31	50,371	84.87	79.8%	60.0%	37,886	12,485
Jan-07	28	51,315	93.96	81.3%	60.0%	37,885	13,431
Feb-07	31	48,610	89.64	72.9%	60.0%	40,015	8,595
Mar-07	30	52,314	88.47	82.1%	60.0%	38,219	14,095
Apr-07	31	51,521	107.37	64.5%	60.0%	47,930	3,591
May-07	30	55,399	100.26	76.7%	60.0%	43,312	12,087
Jun-07	31	46,138	81.54	76.1%	60.0%	36,399	9,739
Jul-07	31	49,708	83.97	79.6%	60.0%	37,484	12,223
Aug-07	30	85,462	168.93	70.3%	60.0%	72,978	12,484
Sep-07	31	72,460	170.00	57.3%	57.3%	72,460	0
Oct-07	30	46,734	153.45	42.3%	42.3%	46,734	0
Nov-07	31	51,571	90.81	76.3%	60.0%	40,538	11,033
							109,763

After BMS installation

	Days	Actual kWh	Pk-kW	LF
Dec-07	31	39,016	87.57	59.9%

The above were examples of the techniques use to establish annualized savings for each finding that allows the customer to rank order implementation. Table 3 represents a roll-up of the aggregated measure impact of MBCx. The full list of measure comprising MBCx from an actual customer site can be found in the Appendix.

Table 2 Example of Annual Energy Savings Summary

Examples of Finding typical of the MBCx Measure	ASHRAE Climate Zone	Unit Definition	Gross Unit Saved	Gross kW Reduced	Affected Building Area	Gross Unit/ square foot
Monitoring Based Commissioning	12a	kWh	893,000	92	1,039,869	0.859
	12a	Therms	30,000	0	1,039,869	0.0289

2.2 Demand Reduction Estimation Methodologies

For the MBCx Program, demand reduction is defined as the reduction in the building's maximum demand during the peak demand period, i.e., average of 9 am to 5 pm during weekdays. All reductions in peak demand are reported in the Findings Workbook and supported by calculations or modeling.

For example, changing the set-points of an air-side economizer will probably not result in a peak demand reduction since it would only impact energy use during non-peak periods when the outdoor air temperature is well below peak temperatures. Changing the fan static pressure setting, fan speed limiting or space temperature reset will have an impact during the demand period. Savings can be documented based on regression or by the prevalent Demand Response

program Baseline technique, while continuous monitoring of the BCS will ensure that IAQ stays within the acceptable norm albeit at the higher end during such time periods.

In 2007, the measures completed in our example most of the projects only saved energy during part-load conditions, and therefore, did not impact the peak demand. There are a few measures, such as the OA-damper stuck at 100% and other SAT/MAT set-point changes that will save peak demand and will be documented/calculated as shown in the example based on the TYM2 Bin data (TMY3 has only recently been available) for the appropriate time frame and average for the season.

3 Base Case and Measure Costs

3.1 Base Case Costs

Since the base case is the “as-is” condition of the building, there are no costs associated with the base case.

3.2 Measure Costs

The forecast cost basis for the MBCx Program is \$0.51/sf based upon the paper by K. Brown, M. Anderson and J. Harris, 2007. In this study, the scope includes review the 13 buildings that participate in the MBCx pilot program during 2004-05 and calculates average cost and savings based on actual cost and savings per site as self reported. The focus on MBCx is low-cost operational and maintenance improvements rather than equipment replacement, but can include upgrades to existing equipment like expanding BCS DDC control. MBCx includes control programming, scheduling changes, control settings and set-point improvements, and some small material costs like the addition of critical sensors, BTU meters, and gas meters. It doesn't include such items as chillers, lighting, and motor replacements.

In this Brown et.al. study, the average MBCx cost for all of the buildings of different types was \$0.51/sf. However, the MBCx costs vary dramatically with the objectives of the effort, the specific scope of services, and the size of the building. As noted in prior sections, the determination of the cost for MBCx projects will be made on a case-by-case basis.

For the College/University project completed in 2007, the total installed cost was \$83,230. Note that the affected building area varied by measure. The Air Handler measures were limited to the area that each systems serves, while the Whole Building Control measure used the gross square footage and no other measures applied to that building. On aggregate this resulted in a measure cost of \$0.080/square foot. Note that the costs per square foot are substantially lower than the forecasted cost. There are a number of possible reasons that include:

- The measures identified at the site were the most cost effective of a much larger pool of projects (selection of the “lowest hanging fruit” measures).
- The College-University is in a much different climate zone (CTZ 15-equivalent) than the projects in the Brown study (more energy savings due to higher overall energy use).

The measures were able to make use of in-house labor/parts which could be significantly less cost than outsourcing for the types of measures implemented Table 3 summarizes the measure savings and costs for 2007:

Table 3 Measure Cost Summary

Measure Name	Gross Therms Saved	Gross kWh Saved	Gross kW Reduced	Affected Building Area	Cost	Cost per Sq Ft
Monitoring Based Commissioning	30,000	893,00	92	1,039,869	83,230	0.080

Major equipment maintenance items that result in energy savings and have a greater tendency to persist are considered eligible measures if they are performed due to, or in conjunction with, the MBCx work. If major maintenance items that have long term persistence are found, such as fixing leaking or failed valves, actuator or damper operation, or leaks causing low refrigerant charge, is identified by the MBCx Provider, these should be included in the *Master List of Findings*.

Also, while testing, adjusting, and balancing (TAB) are not considered part of the scope of MBCx, it may be part of a larger scope of work negotiated with the Owner. In these cases, the MBCx Provider should record savings associated with the TAB work following these requirements:

- The TAB work is done because of the MBCx Program and would not otherwise be done.
- The TAB work corrects a deficiency and results in energy savings.

The Program may include limited controls enhancements such as variable frequency drives installed on existing motors to replace variable-pitch vane axial fan controls, occupancy sensors to permit advanced control of existing systems, and additional capabilities added to existing energy management systems. These may be eligible under the Program, if they meet the following qualifications:

- The measure must enhance or restore the operation of an existing piece of equipment or a system.
- The measure must have a simple payback of no more than four years.
- The cost of the measure must be no more than 10% of the cost of the existing system that it enhances, as estimated using the most recent version of the RS Means Building Construction Cost Data.

Note that the costs described here are the measure implementation costs, not the costs of installing the monitoring equipment associated with enabling sites for MBCx. These costs are considered to be outside of the measure costs, and are estimated to amount to about \$25,000 per customer.

3.3 Incremental and Full Measure Costs

Since there is generally no base case costs, the measure costs would be equivalent to the installation costs of the MBCx measures.

Appendix

The appendix contains, on the next page, a table of all findings at a customer site which comprise the measure specific and overall MBCx program savings and costs.

College-University Monthly Scorecard

Report Parameters

Start Date: January 1, 2007
End Date: December 31, 2007

Number of Findings Identified: 43

Building	System Type	System	Description	Recommendation	Annual Avoided Cost	Annual Avoided Therms	Annual Avoided kWh	Peak Avoided kW	Est. Implementation Cost
Science Building	AHU	AHU-3 C Wing	Units operating off Schedule.	Put system in Auto.	\$11,130	659	66,681	0	\$470.00
Science Building	AHU	AHU-7 Common Area	Units operating off Schedule.	Put system in Auto.	\$22,640	1,395	135,397	0	\$470.00
Science Building	AHU	AHU-7 Common Area	static pressure setting is higher than needed.	Reduce sp setting by 20%.	\$22,110	0	138,190	6	\$470.00
Library	Hot Water	HX	20°F-60°F OA to 140°F - 200°F reset schedule. At 45°F OAT, 161°F HWS and 157°F HWR. Value is too high. Don't need water that hot.	Change control range to 0°F-60°F OA and 110°F-190°F HWS.	\$270	380	0		\$470.00
Library	AHU	AHU-3	Fan speed is always 100%. Can not get to 1" setpoint. Low ZN temp is 71°F+. OAD is 100%. If 51°F OA, why is DAT over 67°F. Do dampers function properly?	Fix OAD and reduce DAT setpoint.	\$17,000	13,986	45,081	41	\$7,800.00
Library	AHU	AHU-2	AHU-2 DAT setpoint goes up to 90°F at night between 10pm and 6am. Htg valve actually opens to 18.3% on average to maintain that setting.	Either disable heating valve at night, or change night setpoint value to equal day setpoint value.	\$780	1,114	0	0	\$2,600.00
Library	VAV-Boxes	VAV03	On most day, the box goes to 100% damper and 1400-CFM late in the day.	Verify VAV damper controls are operating correctly	\$80	64	240	0	\$660.00
Student Center	VAV-Boxes	Corridor01	VAV box goes to a very high flow (1500-CFM) making space very cold 61°F. (with 71°F as its setpoint).	Fix VAV box so that it modulates correctly.	\$90	69	260	0	\$660.00
Student Center	VAV-Boxes	MingRm01	Ming Room 01's CFM goes well above max CFM of 500-CFM (~900 CFM at peak).	Reset damper so that the air is limited to the designed max cfm.	\$100	79	300	0	\$660.00

College-University Monthly Scorecard

Report Parameters

Start Date: January 1, 2007

End Date: December 31, 2007

Number of Findings Identified: 43

Building	System Type	System	Description	Recommendation	Annual Avoided Cost	Annual Avoided Therms	Annual Avoided kWh	Peak Avoided kW	Est. Implementation Cost
Student Center	VAV-Boxes	MtgRm02	Mtg Rm 02's air flow is always maxed out.	Verify VAV damper controls are operating correctly.	\$60	42	160	0	\$660.00
Student Center	VAV-Boxes	MtgRm05	Mtg Rm 5's air flow is always maxed out.	Verify VAV damper controls are operating correctly.	\$50	36	135	0	\$660.00
Student Center	AHU	AHU-3	Unit is currently operating off Schedule.	Put system in Auto.	\$3,910	0	24,414	0	\$0.00
Student Center	AHU	AHU-1	Calling for Cooling w/Chiller off.	Disable Chilled Water Valve while chiller is off.	\$160	0	1,018	0	\$470.00
Student Center	AHU	AHU-2	Calling for Cooling w/Chiller off.	Disable Chilled Water Valve while chiller is off.	\$60	0	370	0	\$470.00
Student Center	Hot Water	HX	20°F-60°F OA to 140°F - 200°F reset schedule. At 45°F OAT, 161°F HWS and 157°F HWR. Value is too high. Don't need water that hot.	Change control range to 0°F-60°F OA and 110°F-190°F HWS.	\$850	1,209	0	0	\$470.00
Classroom-1	AHU	All	This building is a classroom facility and should not be operating from 2300 to 0600.	Check Controls to ensure that AHU equipment is being shut-off during unoccupied periods.	\$40,880	0	255,500	0	\$13,000.00
Library	AHU	AHU-1	AHU-1 DAT setpoint goes up to 90°F at night between 11pm and 6am. Htg valve actually opens to 3.5% on average to maintain that setting.	Either disable heating valve at night, or change night setpoint value to equal day setpoint value.	\$290	410	0	0	\$470.00
Library	AHU	AHU-4	AHU-4 DAT setpoint goes up to 90°F at night between 11pm and 6am. Htg valve actually opens to 8.2% on average to maintain that setting.	Either disable heating valve at night, or change night setpoint value to equal day setpoint value.	\$700	998	0	0	\$470.00

College-University Monthly Scorecard

Report Parameters

Start Date:

January 1, 2007

End Date:

December 31, 2007

Number of Findings Identified: 43

Building	System Type	System	Description	Recommendation	Annual Avoided Cost	Annual Avoided Therms	Annual Avoided kWh	Peak Avoided kW	Est. Implementation Cost
Library	AHU	AHU-5	AHU-5 DAT setpoint goes up to 90°F at night between 11pm and 6am. Htg valve actually opens to 9.7% on average, to maintain that setting.	Either disable heating valve at night, or change night setpoint value to equal day setpoint value.	\$830	1,180	0	0	\$0.00
Library	Hot Water	HX	The steam meter reads -148 MBtuH when flow/use should be 0.	Recalibrate meter. No energy savings are predicted, but readings are suspect until meter works properly.	\$0	0	0	0	\$5,200.00
Classroom-2	AHU	AHU-3	The CO2 Sensor is reading between 5-ppm and 110-ppm for the month. These values are too low.	Recalibrate sensor. No energy savings are predicted, readings are suspect until sensor works properly.	\$0	0	0	0	\$2,080.00
Student Center	AHU	AHU-5	The status for this unit is showing the unit to be on continuously while the speed indicates that the unit is turning off on schedule.	Recalibrate the status sensor. No energy savings are predicted, readings are suspect until sensor works properly.	\$0	0	0	0	\$880.00
Science Building	Chiller	Chiller	The gpm and ΔT readings at the Chiller and secondary loop often show supply temperatures greater than return temperatures when there is substantial flow.	Calibrate main and secondary loop temperature and flow sensors.	\$0	0	0	0	\$880.00
Student Center	Chiller	Chiller	The Chiller often show the ΔT between the supply temperatures and the return temperatures to be, at best, 5°F and on average ~2.8°F.	The chiller controls should be checked to make sure it is unloading correctly. A 4°F rise in ΔT would save 8% energy use	\$4,530	0	28,290	30	\$3,120.00

College-University Monthly Scorecard

Report Parameters

Start Date: January 1, 2007
End Date: December 31, 2007

Number of Findings Identified: 43

Building	System Type	System	Description	Recommendation	Annual Avoided Cost	Annual Avoided Therms	Annual Avoided kWh	Peak Avoided kW	Est. Implementation Cost
Library	AHU	AHU-1	Mixed air temperature does not vary as much as other units, averaging about 2°F higher.	Verify that damper, setpoint and sensor are working correctly.	\$490	0	3,063	0	\$660.00
Student Center	AHU	AHU-2	Mixed air temperature does not vary as much as other units, averaging about 2°F higher.	Verify that damper, setpoint and sensor are working correctly.	\$0	0	0	0	\$660.00
Student Center	AHU	AHU-3	The MAT and DAT "Actual" reading do not vary. Point may not be mapped correctly in the BMS.	Recalibrate the status sensor. No energy savings are predicted, readings are suspect until sensor works properly.	\$0	0	0	0	\$660.00
Classroom-2	Chiller	Chiller	The Chiller often show the ΔT between the supply temperatures and the return temperatures to be, at best, -6°F and on average 3°F.	The chiller controls should be checked to make sure it is unloading correctly. A 4°F rise in ΔT would save 8% energy use	\$2,300	0	14,400	15	\$3,120.00
Student Center	AHU	AHU-1	On Oct 27 th , the schedule definition for 'on' was switched from 0 to 1, but the control logic for the AHU was not changed and promptly went "off". At the same time scheduled time frame of operation was altered. The unit was overridden to be "on" after	Complete the control logic so that the unit is following the intended occupancy schedule.	\$2,920	1,645	11,075	0	\$0.00
Student Center	AHU	AHU-2	Same as above.	Same as above.	\$4,300	2,036	17,989	0	\$0.00
Student Center	AHU	AHU-4	Same as above.	Same as above.	\$4,300	2,036	17,989	0	\$0.00
Student Center	AHU	AHU-5	Same as above.	Same as above.	\$4,300	2,036	17,989	0	\$0.00

College-University Monthly Scorecard

Report Parameters

Start Date:

January 1, 2007

End Date:

December 31, 2007

Number of Findings Identified: 43

Building	System Type	System	Description	Recommendation	Annual Avoided Cost	Annual Avoided Therms	Annual Avoided kWh	Peak Avoided kW	Est. Implementation Cost
Student Center	AHU	AHU-4	Parameter out of range issue: Static Pressure is close to 30 inH2O	Recalibrate the status sensor. No energy savings are predicted, readings are suspect until sensor works properly.	\$0	0	0	0	\$660.00
Student Center	AHU	AHU-5	Parameter out of range issue: Static Pressure is ranging between +/- 70 inH2O	Recalibrate the status sensor. No energy savings are predicted, readings are suspect until sensor works properly.	\$0	0	0	0	\$660.00
Library	VAV-Boxes	VAV Boxes: 14, 25, 50, 56, 75, 77, 88, 91, 92	VAV Box Hunting. Flow and Damper Positions vary more than ±20% for several 5-min intervals.	Find route cause and repair. Hunting can cease early equip. failure. Potential Comfort/Energy waste issue.	\$0	0	0	0	\$660.00
Classroom-2	VAV-Boxes	VAV Boxes: 14, 26, 29, 30, 32, 34	VAV Box Hunting. Flow and Damper Positions vary more than ±20% for several 5-min intervals.	Find route cause and repair. Hunting can cease early equip. failure. Potential Comfort/Energy waste issue.	\$0	0	0	0	\$1,770.00
Student Center	VAV-Boxes	VAV Boxes: Corridor-1, Director Off, MtngRm-5	VAV Box Hunting. Flow and Damper Positions vary more than ±20% for several 5-min intervals.	Find route cause and repair. Hunting can cease early equip. failure. Potential Comfort/Energy waste issue.	\$0	0	0	0	\$880.00
Library	VAV-Boxes	VAV Boxes: 37, 39, 41, 43	VAV Box flow is hunting, but damper position is not.	Find route cause and repair. Could be faulty Damper or Flow Sensor. Hunting can lead to early equipment failure. A potential comfort issue.	\$0	0	0	0	\$980.00

College-University Monthly Scorecard

Report Parameters

Start Date: January 1, 2007
End Date: December 31, 2007

Number of Findings Identified: 43

Building	System Type	System	Description	Recommendation	Annual Avoided Cost	Annual Avoided Therms	Annual Avoided kWh	Peak Avoided kW	Est. Implementation Cost
Library	VAV-Boxes	VAV Boxes: 57, 63	VAV Box flow always reads 0-cfm	Find route cause and repair. Could be faulty Flow Sensor. Hunting can lead to early equipment failure. A potential comfort issue.	\$0	0	0	0	\$880.00
Haas Library	VAV-Boxes	VAV Boxes: 53, 57, 63	VAV Box damper position is hunting, but flow is not.	Find route cause and repair. Could be faulty Damper or Flow Sensor. Hunting can lead to early equipment failure. A potential comfort/energy waste issue.	\$0	0	0	0	\$880.00
Library	VAV-Boxes	VAV Boxes: Corridor-1, DirectorOff, InfoDesk, Library, Lounge, Mtngrm-2, Off-3, OpenWorkArea, PrepArea, Pub, StorageRm	VAV Box Actual Space temperature is more than ±3°F of VAV Box Setpoint	Find Route Cause Analysis. Overcooling/underheating when 3°F lower and Undercooling/overheating when 3°F higher.	\$1,250	633	5,030	0	\$1,770.00
Classroom-3	Meter	hourly kW	The building hourly load profile had a Load Factor of 74% even though it is a classroom building and not 'open' at night.	Install time-clocks or implement other control strategies that allow for the building to be in un-occupied mode from 0:00 to 06:00 to reduce the LF to 60%.	\$17,560	0	109,763	0	\$26,000.00
Total Avoided Cost					\$163,940	30,006	893,334	92	\$83,230
Of Total Electric for Site with Opportunity IDs 11.3%									

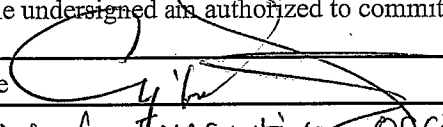
4 References

- ¹ K. Brown, M. Anderson and J. Harris, "How Monitoring Based Commissioning Contributes to Energy Efficiency for Commercial Buildings", January 2007, June 2003, American Council for an Energy-Efficient Economy (Adobe Acrobat File: http://www.ucop.edu/ciee/mbcx/documents/MBCx_ACEEE_2006_revised_9jan07.pdf).
- ² N. Bourassa, M. Piette, and N. Motegi, "An Evaluation of Savings and Measure Persistence from Retrocommissioning of Large Commercial Buildings", 2004 (Adobe Acrobat File: 860310.pdf found at <http://www.osti.gov/bridge/servlets/purl/860310-Q60uUq/860310.PDF>)

APPENDIX C. ENSAVE, INC. PROPOSAL

ATTACHMENT A - PON No. 1259

PROPOSAL CHECKLIST (MANDATORY)

Proposal Title <u>New York Agricultural Energy Efficiency Program</u>		Due Date <u>8/7/08</u>	
Primary Contact (Prime Contractor) <u>Craig Metz</u>		Title <u>Chief Executive Officer</u>	
Company <u>En Save, Inc.</u>		Phone <u>802-434-1822</u>	Fax <u>802-434-7011</u>
		e-mail <u>craigm@ensave.com</u>	
Address <u>65 Millet St, Suite 105</u>	City <u>Richmond</u>	State or Province <u>VT</u>	Zip <u>05477</u>
Secondary Contact <u>Amelia Gulki</u>		Title <u>Program Development Manager</u>	
Company <u>En Save, Inc.</u>		Phone <u>802-434-1822</u>	Fax <u>802-434-7011</u>
		e-mail <u>amelia.g@ensave.com</u>	
Address <u>65 Millet St, Suite 105</u>	City <u>Richmond</u>	State or Province <u>VT</u>	Zip <u>05477</u>
<p>THE PRIME CONTRACTOR MUST SIGN THIS FORM BELOW and ANSWER THE FOLLOWING QUESTIONS:</p> <p>Do you accept all Terms & Conditions in the Sample Agreement? (if no, explain on separate pg) <u>✓</u> Yes <u> </u> No</p> <p>Have you been indicted/convicted for a felony within the past 5 years? (if yes, explain on separate pg) <u> </u> Yes <u>✓</u> No</p> <p>Are you a Minority or Women-Owned Business Enterprise? <u> </u> Yes <u>✓</u> No</p> <p>Does your proposal contain Minority or Women-Owned Business enterprises as subcontractors? <u> </u> Yes <u>✓</u> No</p> <p>Are you submitting the required number of copies? (See proposal instructions.) <u>✓</u> Yes <u> </u> No</p> <p>Is other public funding pending/awarded on this and/or very similar topic (prior and/or competing proposals)? <u> </u> Yes <u>✓</u> No</p> <p>(if yes, explain on separate page)</p>			
AUTHORIZED SIGNATURE & CERTIFICATION			
<p>I certify that the above information, and all information submitted in connection with State Finance Law §139-j and §139-k, is complete, true, and accurate, and that the proposal requirements noted have been completed and are enclosed. I affirm that I understand and will comply with NYSERDA's procedures under §139-j(3) and §139-j(6)(b) of the State Finance Law. I understand that this proposal may be disqualified if the solicitation requirements are not met. I the undersigned am authorized to commit my organization to this proposal.</p>			
Signature 		Name <u>Craig Metz</u>	
Title <u>Chief Executive Officer</u>		Organization <u>En Save, Inc.</u>	
Phone <u>802-434-1822</u>			

NOTE: This completed form **MUST** be signed and attached to the front of all copies of your proposal.

Disclosure of Prior Findings of Non-Responsibility Form

(Mandatory)

Name of Individual or Entity seeking to enter the procurement contract: <u>En Save, Inc.</u>	
Address: <u>65 Millet Street, Suite 105, Richmond, VT 05477</u>	
Date: <u>August 6, 2008</u>	
Solicitation or Agreement Number: <u>PON 1259: Request for Independent Program Administrators</u>	
Name and Title of Person Submitting this Form: <u>Craig Metz, Chief Executive Officer</u>	
Has any Governmental Entity made a finding of non-responsibility regarding the Individual or Entity seeking to enter the Procurement Contract in the last four years? (Please indicate with an "X")	<input type="checkbox"/> Yes
	<input checked="" type="checkbox"/> No
Was the basis for the finding of non-responsibility due to a violation of §139-j of the State Finance Law? (Please indicate with an "X")	<input type="checkbox"/> Yes
	<input checked="" type="checkbox"/> No
Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Governmental Entity? (Please indicate with an "X")	<input type="checkbox"/> Yes
	<input checked="" type="checkbox"/> No
If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.	
Government Agency or Authority:	
Date of Finding of Non-responsibility:	
Basis of Finding of Non-responsibility: (Add additional pages as necessary)	
Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named Individual or Entity due to the intentional provision of false or incomplete information? (Please indicate with an "X")	<input type="checkbox"/> Yes
	<input checked="" type="checkbox"/> No
If you answered yes, please provide details below.	
Government Agency or Authority:	
Date of Termination or Withholding of Contract:	

Offerer certifies that all information provided to NYSERDA with respect to State Finance Law §139-k is complete, true, and accurate.

By: _____

Signature

Date: _____

08-06-08

Name: _____

Craig Metz

Title: _____

Chief Executive Officer



**Proposal for:
New York Agricultural Energy Efficiency Program**

**Submitted to:
New York State Energy Research & Development Authority
17 Columbia Circle
Albany, NY 12203-6399**

**Request for Independent Program Administrators
Energy Efficiency Portfolio Standard
Program Opportunity Notice 1259**

August 7, 2008

**Submitted by:
EnSave, Inc.
65 Millet Street, Suite 105
Richmond, VT 05477
(802) 434-3792
www.ensave.com**

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1. PROGRAM DESCRIPTION

EXECUTIVE SUMMARY

EnSave, Inc. (EnSave) herein proposes the New York Agricultural Energy Efficiency Program (“Program”). This program will deliver energy savings to New York’s agricultural sector, through the verified installation of energy efficiency measures on the farm site. We will promote the opportunity to 35,000 New York farms, and will enroll approximately 800 New York farms over the three year program period.

We will deliver energy savings to a key sector of New York’s rural economy while leveraging additional opportunities for savings. We will maximize available technical assistance through NYSERDA’s FlexTech, NYSEG, and National Grid’s economic development, and federal funding such as the United States Department of Agriculture’s Rural Energy for America Program.

EnSave will market the program, enroll participants, manage the installation process, and pay rebates. Through this process we will deliver approximately 16.5 million kWh, 2,900 kW, and 788,672 therms of gas savings. The net present value of the electric benefits is \$9.3 million and the net present value of the gas benefit is \$547,000.

EnSave will deliver this program by working closely with energy efficient equipment manufacturers (upstream market actors), equipment dealers who sell energy efficient equipment (midstream market actors), as well as the extended agricultural community. The agricultural community is comprised of organizations such as the New York Farm Bureau, New York Department of Agriculture, Cornell Cooperative Extension, Conservation Districts, Resource Conservation & Development Councils, and other organizations that advocate for farmers.

This work will utilize EnSave’s successful track record of delivering farm energy efficiency programs to NYSERDA and other clients throughout the United States. EnSave delivered 10 million kWh to 572 New York farms in 1999-2003 through the New York Variable Speed Drive Farm Program¹; supported NYSERDA’s Smart Equipment Choices program in 2002-2003 by helping over 300 New York dairy farms install plate coolers, saving over 6 million kWh; and provided energy audits to 75 dairies in 2004-2005 through the Dairy Development Energy Program. This prior success shows that farms are eager participants in energy efficiency programs, if given the right opportunity.

New York is a leader among U.S. states in the production of several commodities, and within the top ten states in gross sales of milk, vegetables, and cotton. Agriculture is a \$3 billion industry in New York in the sales of commodities alone.² Many other New York small businesses,

¹ Please see Attachment A for a case study of this program.

² United States Department of Agriculture Census of Agriculture, 2002.

including equipment dealers, electricians, feed sellers, and other supporting businesses are dependent upon the agricultural sector for their success. Thus, when farms are empowered to reduce energy consumption and become more sustainable, the beneficial effects are felt throughout the rural community.

PROGRAM DELIVERY

1. Planning and Development

This program utilizes a program design that EnSave has deployed successfully in the past; therefore, there will be minimal ramp-up time before we can begin capturing energy savings from the installation of energy efficient equipment. Anticipating a program start date of January 1, 2009, we anticipate overseeing the first equipment installations within 90 days from contract signing.

In the planning stage of the program, we will meet with NYSERDA and the DPS to agree to specific program timelines, incremental goals, and other metrics. EnSave will also create the program administration documents, including:

- Application form
- Introductory letters to manufacturers, equipment dealers, agricultural community
- Program Acceptance Letter
- “Sorry letter” for applicants who do not qualify
- Equipment Installation Form
- General program brochure/flyer
- Other marketing materials or program administration documents as necessary

We will also procure lists of equipment manufacturers, equipment dealers, the extended agricultural community, and farmers to be used for mailings and phone calls. EnSave has access to many of these lists already through its prior work in New York. These past program participants represent a group of progressive farmers who have already made an investment in energy efficiency. These farmers are good prospects to install additional measures because they are already familiar with EnSave and with participating in an energy efficiency program. Therefore, we will conduct a special “fast track” marketing campaign recognizing these farmers for their previous efforts.

EnSave will leverage the support of New York’s agricultural community, comprised of organizations such as the Farm Bureau, Resource Conservation & Development Councils, Conservation Districts, and other organizations that support New York agriculture. EnSave will work closely with these groups to disseminate program information, ensuring all New York farmers are aware of the program and how to participate. These groups will help spread

information through newsletters, meetings, and networking with individual farms. This approach will ensure wise use of program funds by reaching potential participants in the state without conducting an expensive mailing campaign to all 35,000 New York farms.

EnSave has partnerships with both the National Association of Resource Conservation and Development Councils and the National Association of Conservation Districts. These partnerships allow EnSave to help these organizations bring energy efficiency into the array of conservation services they bring to the rural community. As part of our partnership with these organizations, EnSave will work with New York's resource conservation and development councils and conservation districts to involve them in the promotion of the program, and in supporting farms with applications to USDA Rural Development's Rural Energy for America Program (REAP).

REAP provides low interest loans and grants on a competitive basis for farms and rural small businesses who install energy efficiency or renewable energy systems. EnSave has completed over 20 energy audits as mandatory supporting documentation for applicants to this program. EnSave's familiarity with this program can help New York farms access more of these federal funds.

While the Agricultural Energy Efficiency Program does not cover all fuels used on the farm, EnSave will capture energy efficiency information on all fuel types for farms that go through the USDA's REAP. EnSave will also create a list of farms who are interested in renewable energy, and will refer them to renewable incentives available through NYSERDA or other sources.

Deliverable	Due Date
Program begins	January 1, 2009
All parties attend kick-off meeting	January 15, 2009
EnSave submits draft program documents for review	January 30, 2009
NYSERDA issues document approval	February 15, 2009
Obtain lists of agricultural producers	January 30, 2009

2. Marketing

We will design a clear, concise, engaging marketing piece (brochure) promoting the availability of rebates for energy efficient farm equipment. The brochure will explain the details of the program, and how farmers can participate. We will also create a press release to distribute to agricultural publications in order to promote the program.

EnSave's marketing strategy will leverage and work with three key stakeholders to reach the farmer: equipment manufacturers, equipment dealers, and the agricultural community. We plan

to leverage these other organizations by having them include program information in their newsletters and mailings; providing program information for dissemination at meetings and events; and having these partners encourage farmers to apply for the program. This enables EnSave to distribute program information to a wide section of New York's farms without relying on expensive mass mailings, and also builds local support for the program when local organizations have ownership of some program elements.

This marketing strategy has been implemented successfully in over a dozen of EnSave's other farm energy efficiency programs.

Equipment Manufacturers

The first group that will be contacted through marketing is the manufacturers of energy efficient equipment. These will be manufacturers of all the major measure categories used in the program, such as lighting, HVAC, motors, and dairy measures. EnSave will send them a letter followed by a phone call to inform them of the program and request contact information for their sales representatives and dealer network. We will also request their support through other means, such as offering an additional discount on energy efficient equipment in order to encourage more installations, or by sending a mailing to their distributors notifying them of the program.

Equipment Dealers

EnSave will then market the program to dealers, sending them a letter explaining the program and how it will benefit their customers as well as their business, followed by a phone call to further explain the program and ensure they understand how the program can benefit their farm customers. These dealers are critical partners in a program, because they are the first ones farmers will turn to when seeking advice about which equipment to purchase. Evaluations of EnSave's prior agricultural energy efficiency programs have shown that dealers are responsible for up to 70% of the applications farmer submit to the program.

EnSave will keep in continual contact with the dealers throughout the program in order to build relationships, track progress, and answer questions. A strong relationship with dealers helps ensure success of the program. EnSave has established strong working relationships with equipment dealers through its previous farm energy efficiency programs in New York, and we will continue to build these relationships.

Agricultural Community

Concurrent to dealer notification, EnSave will inform the agricultural community of the program by sending them a program announcement. EnSave will work with these groups to reach farmers by encouraging them to include program information in their mailings, newsletters, and meeting agendas. This will help bring the program message to farmers statewide, and will support the

mission of these organizations by saving their members money and making them more sustainable. As a side benefit to the program, as these organizations inform their members about energy efficiency, they will be learning about the wise use of energy themselves, thus helping to spread energy efficiency education throughout the rural community.

Farmers

EnSave has already worked with several hundred New York farmers through its previous NYSEDA programs. EnSave will contact these farms to promote new measures and other funding opportunities they can access (such as other NYSEDA programs, utility economic development funds and REAP).

EnSave will also obtain lists of other farmers by name, address, phone, and type of production. We will lease these lists from an agricultural list broker firm such as FarmMarketID.

Our direct marketing to farmers will focus on targeted subsets of farmers (such as dairies, large energy users, and past EnSave program participants). In order to reach as many of the 35,000 farmers in the state as possible, we will work with and leverage manufacturers, dealers, and the agricultural community to distribute information.

Our program representatives will be responsible for making phone calls to farmers and informing them of the program. These representatives will enroll farmers, and work with them through their entire installation process to ensure they are able to navigate the process.

Marketing Strategies

Our direct mail, outreach, event attendance, and web site will take the following forms:

- Direct mail to manufacturers, dealers, agricultural community (four per year)
- Ongoing outreach calls (phone and personal visits) to manufacturers, dealers, agricultural community, and farmers (ongoing)
- Attend farm shows, state fairs, and other appropriate events with a farm audience (four per year)
- Program web site updated regularly with news, press releases, and success stories

Deliverable	Due Date
Conduct fast track marketing campaign to past participant	February 28, 2009
Introductory mailings to manufacturers, dealers, agricultural community	February 28, 2009
Phone outreach to manufacturers, dealers, agricultural community	February 28, 2009; ongoing throughout program
Update EnSave web site with program information	January 31, 2009
Attend events	4 times per year

3. Customer enrollment

The program application form will be available both in paper and electronic form. It can be downloaded and printed from EnSave's web site, filled out as an interactive PDF online, or filled out in paper form. The application form will record the farmer's name, address, farm type, utility company, and other identifying information. The application will also require the farmer to fill out the type of equipment to be replaced and other information about electricity usage (such as pounds of milk sold per year, for dairies) that enable EnSave to determine energy savings. The application will also include all eligibility rules of the program and require the farmer to agree that he/or she is eligible for the program. Applicants will indicate an estimated installation date, which must be within 120 days of the application signature date. The application will clearly state that funds will be held for 120 days following the application date, and if an installation is not completed they must reapply.

Upon EnSave's receipt of the farmer's signed application form, we will review the application and follow up by phone with any questions.

In order to be eligible for the program, farmers must:

- Be a farmer in New York state, as defined by NAICS codes 111 (crop production), and 112 (animal production).
- Not have received a rebate through system benefit charge funds for the same measure (to prevent double-dipping)
- Pay in to the system benefit charge
- Meet the equipment specifications of the program (to be supplied to NYSERDA during contract negotiation)

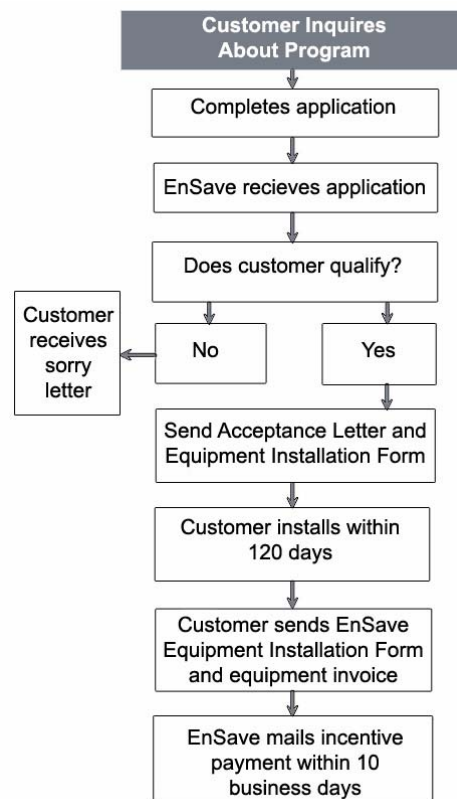
Farmers will be encouraged to call EnSave prior to applying to discuss their potential project, and allow EnSave to determine energy savings and the rebate amount over the phone. This

allows the farmer to ask questions about the program and receive the support needed to enroll them.

After EnSave receives a successful application, we will send the farmer a Program Acceptance Letter stating they will receive a rebate provided they install the equipment within 120 days from the application date, and submit the equipment invoice and equipment installation form. This Acceptance Letter will serve as proof that the participant has been accepted. The farmer will not receive an Acceptance Letter until everything in their application has been checked.

When farmers install, they will send EnSave an equipment installation form attesting that the equipment is installed, as well as a copy of the equipment invoice. After EnSave receives these documents, we will send the farmer a rebate check. All rebates will be based upon the calculated energy savings of the project(s).

For any projects selected for measurement and verification (M&V), EnSave will work with the M&V contractor to provide contact information for farms as well as any supporting program information needed for them to complete their evaluation.



Deliverable	Due Date
EnSave receives application, reviews application and answers any farmer questions	March 1, 2009 and ongoing
EnSave sends program acceptance letter detailing next steps to receive rebate, include copy of equipment installation form	March 5, 2009 and ongoing
Farmer installs	March 10, 2009 and ongoing
Farmer submits equipment installation form and copy of equipment invoice	March 20, 2009 and ongoing
EnSave issues rebate check	March 31, 2009 and ongoing

4. Installation documentation and tracking

EnSave will maintain an internal tracking system to track various metrics. Fields will likely include:

1. Contact information (name, title, full address, phone, email, fax, cell phone)
2. Type of agriculture
3. Number of livestock/acres/square footage
4. Date of contract/agreement to install measure (information verification form received)
5. Date of beginning of installation process
6. Installation completion date (installation verification form received)
7. Installation contractor
8. Installation location: street location, town, zip code, building (milking parlor, barn, shed)
9. Project or work order #
10. Energy delivery utility
11. Measure type (lighting, HVAC, motor drive, etc.
12. Annualized energy savings
13. Measure life (years)
14. Total measure installed cost
15. Incremental measure cost
16. Rebate payment amount
17. Project completion date

This tracking system will allow EnSave to manage program metrics and adjust the program schedule or activities in response to the pace, size, and location of installations. We will use this data to generate reports to NYSERDA and will also provide it to the M&V contractor who will be evaluating the program.

Deliverable	Due Date
EnSave tracks pertinent data	March 1, 2009 and ongoing
EnSave submits data to M&V contractor	As requested by M&V contractor
EnSave submits data to NYSERDA	Quarterly

5. Rebate payment

EnSave will issue rebate payments to farmers within ten business days of receiving all completed paperwork. EnSave will invoice NYSERDA monthly for reimbursement of rebate costs. Rebate payments will be

- \$0.08 per kWh saved for all electric measures except lighting
- \$0.05 per kWh saved for lighting
- \$0.14 per therm saved for gas measures

These rebates are higher than NYSERDA's general

Deliverable	Due Date
EnSave issues rebate check	March 31, 2009 and ongoing

6. Reporting & Invoicing

EnSave will provide NYSERDA with quarterly reports, year-end annual reports, and a final program report. We will maintain a tracking system, which will track the number and status of applicants, cost of installations, energy and demand savings, and rebate payments. We will include a public version of each report, removing farmer names and identifying information. NYSERDA and/or the DPS can then post this public version.

The quarterly reports will contain the following elements, plus any additional metrics desired by either NYSERDA or the DPS.

1. Overview of marketing and outreach activities
2. Tally of total applicants for the quarter
3. Tally of accepted applicants
3. Summary of information verification forms received (pending installations)
4. Summary of installations completed
5. Summary of installations verified
6. Rebates paid
7. Planned activities in next quarter
8. Budget summary

EnSave will also invoice NYSERDA monthly for funds spent in the previous month.

Deliverable	Due Date
EnSave submits invoices to NYSERDA	By 10 th of each month for activities completed in previous month
EnSave submits quarterly reports to NYSERDA	Quarterly
EnSave submits year-end annual reports	January 2010; January 2011; January 2012
EnSave submits final program report	February, 2012

7. Ramp Down and Shut Down

EnSave will ensure that all upstream and midstream stakeholders (manufacturers, dealers, agricultural community) as well as farmers are aware of the December 1, 2011 application deadline, and the December 15, 2011 installation deadline. We will do this by featuring this date on the application form and equipment installation form.

On November 1, 2011, we will send a mailing to all dealers, and post information on our web site that the application deadline is December 1, 2011. Also on November 1, we will send certified letters to all dealers and all farmers with pending installations (have been accepted but have not yet installed) that they will need to install and submit installation paperwork by December 15, 2011 in order to receive a rebate payment.

Deliverable	Due Date
Notify manufacturers, dealers, and agricultural community of December 1, 2011 application deadline	November 1, 2011
Post program application deadline notice on EnSave web site	November 1, 2011
Send certified letter to all farmers who have been approved to install but have not yet installed of need to submit installation documentation by December 15, 2011	November 1, 2011
Program closes for applications	December 1, 2011
Program closes for installations	December 15, 2011
EnSave sends final rebate checks to farmers	December 31, 2011
Program closes	December 31, 2011

PROGRAM MEASURES

Measures to be included in this program will encompass ventilation, lighting, dairy, irrigation, and motors. Below, we have provided a list of all measures. We will provide equipment

specifications for all measures during the contract negotiations with NYSERDA. More detail is provided in the Selection Criteria section on page 23.

Measure Name
20" - 26" energy efficient Low Volume High Speed Exhaust or Circulation Fans - RETROFIT
36" energy efficient Low Volume High Speed Exhaust or Circulation Fans - RETROFIT
48" energy efficient Low Volume High Speed Exhaust or Circulation Fans - RETROFIT
50" - 60" energy efficient Low Volume High Speed Exhaust or Circulation Fans - RETROFIT
20" - 26" energy efficient Low Volume High Speed Exhaust or Circulation Fans - NEW
36" energy efficient Low Volume High Speed Exhaust or Circulation Fans - NEW
48" energy efficient Low Volume High Speed Exhaust or Circulation Fans - NEW
50" - 60" energy efficient Low Volume High Speed Exhaust or Circulation Fans - NEW
4 High Volume Low Speed Fans 16 Ft Diameter*
Well Pump Variable Speed Drive (VSD)**
Sprinkler to Drip-Irrigation
Low Pressure Impact Sprinkler Nozzles (permanent)
Low Pressure Impact Sprinkler Nozzles (portable)
Screw-in Compact Fluorescent Lamp, 5 - 13 watts
Screw-in Compact Fluorescent Lamp, 14-26 watts
Screw-in Compact Fluorescent Lamp, >=27watts
T-8 or T-5 Lamp and Electronic Ballast - 4 foot (T12 replacement only)
HID Fixture, Interior Pulse Start 251 - 400 watts mercury vapor basecase
HID Fixture, Exterior Pulse Start > 176 watts incandescent basecase
Photocell
Timeclock
Milk Precoolers
Milk Transfer Pump Variable Speed Drive
Milking Vacuum Pump Variable Speed Drive
Compressor Heat Recovery Units (electric water heaters only)
Scroll Compressors for Bulk Tanks
Premium Efficiency Motor 1 HP
Premium Efficiency Motor 1.5 HP
Premium Efficiency Motor 2 HP
Premium Efficiency Motor 3 HP
Premium Efficiency Motor 5 HP
Premium Efficiency Motor - 7.5 HP
Premium Efficiency Motor - 10 HP
Premium Efficiency Motor - 15 HP
Premium Efficiency Motor - 20 HP
Premium Efficiency Motor - 25 HP
Premium Efficiency Motor - 30 HP
Premium Efficiency Motor - 40 HP

Premium Efficiency Motor - 50 HP
Premium Efficiency Motor - 60 HP
Premium Efficiency Motor - 75 HP
Premium Efficiency Motor - 100 HP
Premium Efficiency Motor - 125 HP
Premium Efficiency Motor - 150 HP
Premium Efficiency Motor - 200 HP

Custom - Lighting
Custom - Motors, Other Equip.
Custom - Irrigation
Custom - AC&R Controls
Custom - AC & Refrigeration, Compressors

Storage Water Heaters (LRG >75 MBTUH)
Storage Water Heaters (SML <= 75 MBTUH)

Tank Insulation - Low Temperature Applic. (SF) 2 in
Tank Insulation - Low Temperature Applic. (SF) 1 in
Tank Insulation - High Temperature Applic. (SF) 2 in
Tank Insulation - High Temperature Applic. (SF) 1 in
Pipe Insulation - Hot Water Applic. (LF) 2 in
Pipe Insulation - Hot Water Applic. (LF) 1 in
Pipe Insulation - Low Pressure Steam Applic. (LF) 2 in
Pipe Insulation - Low Pressure Steam Applic. (LF) 1 in

Greenhouse Heat Curtain

2. COMPANY BACKGROUND

Since 1991, EnSave has supported the American agricultural sector with innovative energy efficiency and pollution prevention solutions. EnSave provides agricultural producers and food processors with cost-effective ways to reduce operating costs while saving energy and reducing pollution.

EnSave's clients include state and federal energy and environmental agencies, investor-owned utilities, and rural electric cooperatives. EnSave implements its programs by developing relationships with equipment manufacturers, local equipment dealers and the local agricultural community. Ultimately, these programs promote economic investment in the rural economy and improve the quality of America's land, air, and water.

Company Contact Information:

EnSave, Inc.
65 Millet Street, Suite 105
Richmond, VT 05477
(802) 434-3792

Main Contact:

Craig Metz, Chief Executive Officer

Phone: (802) 434-1822

Fax: (802) 434-7011

craigm@ensave.com

Federal Employer Identification Number: 03-0358926

3. COMPANY EXPERIENCE AND QUALIFICATIONS

EnSave has delivered programs on behalf of several public clients including NYSERDA, the California Public Utilities Commission, Maryland Energy Administration, Michigan Public Service Commission, and the Texas State Energy Conservation Office. Additionally, we have worked with several agencies within the United States Department of Agriculture and the United States Environmental Protection Agency.

We design, implement, and administer energy efficiency and pollution prevention programs. Our tasks encompass designing program documents, marketing a program, enrolling participants, tracking participation, verifying installations, and reporting results. We work with equipment manufacturers, equipment dealers, and customers in order to successfully complete installations. We also work with the “extended agricultural community” in our agricultural programs- encompassing organizations such as the Farm Bureau, University Extension, and Conservation Districts. These stakeholders are trusted advisors to farmers. EnSave works with them to bring program information to their members. In order for an agricultural program to be successful, it must have grassroots support.

Our demonstrated experience will deliver a clear message to all New York farmers, and will ensure installation of energy efficiency measures. We will build upon the success of the program to enroll additional partners and leverage more funding. In particular, our familiarity with the United States Department of Agriculture’s Rural Energy For America Program (REAP) will leverage state funds with competitive federal dollars available for energy efficiency installations on farms and rural small businesses.

EnSave has worked in eighteen states, and has delivered over a dozen incentive programs. Most of our programs are a “turnkey” design, where EnSave has designed the program and its eligibility requirements, developed and implemented a marketing plan, enrolled customers, enrolled trade allies, tracked and reported program results, and delivered rebate payments. Recent experience includes:

California Dairy Energy Efficiency Program (multiple similar programs), 2002-Present

This series of programs began in 2002-2003 by offering rebates on one technology to dairy farm customers of Pacific Gas & Electric and Southern California Edison. In 2004-2005, the program expanded to include multiple technologies. In 2006-2008, the program expanded the technologies further still and focused its efforts on Pacific Gas & Electric dairy customers. EnSave has exceeded the program goal for the current program and is negotiating a continuation of its contract for 2009-2011.

EnSave designed the program marketing campaign, provided program information to equipment manufacturers, equipment dealers, members of the extended agricultural community, and over 1,500 dairy customers. EnSave oversaw installation of energy efficiency measures, performed initial verification of installation, and reported results to the client. Since 2002, the program has saved over 12.5 million kilowatt hours for these customers.

Reference:

Tim Drew, Energy Division Representative
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102
(415) 703- 5618
zap@cpuc.ca.gov

New York Variable Speed Drive Farm Program, 1999-2003

EnSave worked with NYSERDA to deliver the Variable Speed Drive Farm Program to 572 dairy farmers in New York State. EnSave designed the program marketing campaign, provided program information to equipment manufacturers, equipment dealers, members of the extended agricultural community, and over 6,500 dairy farmers. EnSave oversaw installation of the energy efficiency measure, performed initial verification of installation, and reported results to the client.

Reference:

Jessica Zweig, Project Manager
NYSERDA
17 Columbia Circle
Albany, NY 12203
(866) 697-3732, ext. 3346
jlz@nyserda.org

Maryland Farm Energy Site Assessment Program, 2006-Present

EnSave designed this program to deliver energy audits and rebates to agricultural producers in Maryland. The first phase completed 25 audits; the second phase will complete 50 audits. EnSave also designed the rebate program to distribute \$50,000 worth of rebates for customers. EnSave partnered with Maryland Natural Resources Conservation Service, the Maryland Energy Administration, the Maryland Department of Agriculture, Maryland Eastern Shore and Western Maryland Resource Conservation and Development Councils, USDA Rural Development, Washington County Soil Conservation District, and the Maryland Agriculture and Resource Based Industry Development Corporation (MARBIDCO), an economic development organization. This partnership enabled program participants to receive additional financial assistance to facilitate installations. EnSave also actively promoted USDA Rural Development's Renewable Energy & Energy Efficiency program, which offers additional financial assistance to program participants.

Reference:

Chris Rice, Program Manager
Maryland Energy Administration
1623 Forest Drive, Suite 300
Annapolis, MD 21403
(410) 260-7207
Crice@energy.state.md.us

4. RESUMES OF KEY PROJECT PERSONNEL

For quick reference, we have provided a table of all personnel to be involved in this program. We have provided a brief description of key staff experience, and have attached full resumes for key staff as Attachment B.

EnSave has secured office space at the Plaza Office Center in Albany, NY. Upon proposal approval, EnSave will activate the lease. The New York office will be fully staffed with one or more EnSave employees in order to facilitate communication with NYSERDA, DPS, and New York program partners. Other staff will be based in EnSave's Richmond, Vermont office and will be available for travel to New York.

Name/Title	Role
Key Staff	
Edward Sengle, Program Manager	Mr. Sengle will manage day-to-day operations of the program and will be NYSERDA's primary contact person.
Illari Vihinen, Energy Engineer	Mr. Vihinen will be in charge of all engineering and technical services. He will be the liaison

	with NYSERDA and DPS staff regarding measure cost savings, calculations, and total resource cost.
Kyle Clark, Program Representative	Mr. Clark will contact farmers to encourage them to participate in the program. Once enrolled, he will work closely with farmers and equipment dealers to ensure installations are completed.
Corey Conant, Program Representative	Mr. Conant will contact farmers to encourage them to participate in the program. Once enrolled, he will work closely with farmers and equipment dealers to ensure installations are completed.
Katherine Williams, Marketing Coordinator	Ms. Williams will produce all marketing materials and coordinate with NYSERDA's marketing and public affairs staff on media releases, and other joint marketing activities.
Bruce Jones, Finance Manager	Mr. Jones will handle tracking all program finances including accounts receivable, accounts payable, and payment of rebates. He will monthly provide invoices to NYSERDA.
Other Program Staff	
Amelia Gulkis, Program Development Manager	Ms. Gulkis will oversee the start-up phase of this project and will transition the project to full implementation.
Craig Metz, CEO	Mr. Metz will oversee overall implementation of the contract and supervision of all staff.
Lynn Knight, Government and Special Projects Coordinator	Ms. Knight will work closely with the extended agricultural community and government entities to gather support and additional funds to support the program.

Edward Sengle, Program Manager

Mr. Sengle will oversee day-to-day program activities and will act as liaison to NYSERDA and DPS staff. He will be responsible for overall program implementation, tracking, reporting, and managing EnSave's assigned program staff. He has managed comprehensive energy efficiency programs, including EnSave's Ag Efficiency Plus and Dairy Energy Efficiency Program for California customers, and the Texas Agricultural Technical Assistance Program.

Mr. Sengle's career focus has been energy conservation, renewable generation, and green technologies. He is experienced in wind energy system production, assembly and servicing; bio-aerosol testing and filtration; semiconductor manufacturing and characterization, and HVAC design.

Most recently, Mr. Sengle was a project manager for Northern Power Systems, responsible for overseeing wind generation projects. He has over twenty five years' experience as a mechanical engineer, including fourteen years as an engineer for IBM. He holds a B.S. in Mechanical Engineering from Lehigh University and has completed graduate coursework in mechanical engineering.

Illari Vihinen, PE, Energy Engineer

Mr. Vihinen will provide documentation of all measure energy savings for the program, including providing work papers and engineering calculations as needed. He will work with NYSEERDA, DPS, and the utilities as necessary to provide cost/benefit analyses, technical documentation, and other materials.

Before coming to EnSave, Mr. Vihinen was a Hydroelectric Operator at Spruce Mountain Design, operating and maintaining two hydroelectric plants. Mr. Vihinen has managed several multi-million dollar R&D and product development programs involving wind and power electronics, directed resource planning and budgeting, and served as an ISO 9001-2000 auditor. He has prior engineering and management experience with GE Industrial Systems and as a Captain and Combustion Research Engineer in the United States Air Force.

Mr. Vihinen holds a B.S. in Mechanical Engineering from Cornell University and a M.S. in Mechanical Engineering from Clarkson University. He was awarded Professional Engineering License for Mechanical Engineering in 2000.

Corey Conant and Kyle Clark, Program Administrators

The administrators will field customer queries, represent the program at events, and be the primary contact people from the customer perspective.

Program administrators are customer service experts, able to guide participants through the steps needed to complete projects. They will file and track all program paperwork for each customer, and submit continually follow up with farmers to ensure installations take place. They will also conduct outreach calls to equipment manufacturers, equipment dealers, and the extended agricultural community.

Mr. Conant has been a program representative and energy auditor for EnSave since 2005. He has delivered program information and enrolled customers in incentive programs for six different

incentive programs with very different rules and eligibility guidelines. He has extensive sales and customer support experience. Mr. Conant attended the University of Vermont and currently attends Bridgewater State College.

Mr. Clark has been a program representative for EnSave since 2007. He has also assisted with the design and use of EnSave's energy auditing tool. In his role as program administrator, he has worked on two large energy efficiency incentive programs, responsible for maintaining an active account base of about 200 customers and twenty five equipment dealers. He holds a B.S. in Natural Resources Planning from the University of Vermont and is a Certified Agricultural Irrigation Specialist.

Katherine Williams, Marketing Coordinator

Ms. Williams will design all program marketing materials and application materials using Adobe Creative Suite, and will oversee the printing and distribution of all pieces. She will also be the webmaster of the program web site, and will implement program advertising. She will produce press releases in collaboration with NYSERDA, and coordinate media coverage of the program.

Ms. Williams has produced advertisements, marketing mailings, brochures, and press releases for numerous energy efficiency incentive programs, and has a successful track record of securing press attention. Prior to EnSave, Ms. Williams held positions of increasing responsibility in the marketing field, including seven years with a major trade publisher. She holds a B.A. from the College of New Rochelle.

Bruce Jones, Finance Manager

Mr. Jones will produce invoices and track program finances using QuickBooks accounting software. He will work closely with EnSave's program manager to produce quarterly financial reports and monthly invoices. As EnSave's finance manager, Mr. Jones is responsible for all company financial functions including budgeting, forecasting, cash flow analysis, accounts payable, and accounts receivable. Mr. Jones has twenty six years' experience in accounting and financial management. He holds a B.A. from Johnson State College and an M.B.A. from Babson College.

5. BUDGET

EnSave's budget for this three-year program is \$2,972,940, with the majority to be paid on a performance basis. We propose a hybrid payment structure, where we are paid 25% of total non-incentive costs on time and materials and the remaining 75% based on kWh and therms saved. We request a performance payment of \$0.16 per kWh saved and \$0.30 per therm saved.

This payment structure will reimburse EnSave on a time and materials basis for funds expended prior to capturing energy savings, and will also pay for fixed costs such as travel, printing, and other materials. Once the first customer has installed equipment and documented the installation, we will invoice based on the performance payment, so we are paid only on documented energy savings. In this model, NYSERDA and DPS will ensure judicious use of public funds by only paying for documented energy savings.

Table 1: Program Budget

Category	2009	2010	2011	Total Program Cost
Administration	\$203,315	\$158,147	\$158,147	\$519,608
Marketing	\$191,094	\$143,789	\$142,839	\$477,721
Direct Implementation	\$173,842	\$173,842	\$173,842	\$521,526
EM&V	\$53,312	\$48,689	\$48,641	\$150,643
Rebates (based on kWh savings)	\$397,676	\$397,676	\$397,656	\$1,193,029
Rebates (based on therm savings)	\$36,474	\$36,474	\$37,466	\$110,414
Total program cost 2009-2011	\$1,055,713	\$958,616	\$958,611	\$2,972,940

Table 2: kWh/kW Savings

Total Electric Program Cost	\$2,729,787
Total Gross kWh Savings	16,545,827
Total Net kWh	11,582,583
Total Gross kW Savings	2,900
Total Net kW	2,031
Payment per kWh Saved	\$0.16
Rebate (per kWh) paid to participant at:	
Lighting	\$0.05
Other	\$0.08

Table 3: Therm Savings

Total Gas Program Cost	\$243,153
Total Gross Therm Savings	788,672
Payment per Therm Saved	\$0.31

Rebate (per Therm) paid to participant at:	\$0.14
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Table 4: Hybrid Payment

Total Program Cost	\$2,972,940
Minus Rebates	\$1,303,443
Program Costs: includes administration, marketing, direct implementation, EM&V	\$1,669,497
Time and material payment based on EnSave's Labor Rates (25% of program cost) (See Table 3. EnSave Labor Rates)	\$417,374
Subtotal	\$1,252,123
Performance Payment to EnSave: EnSave will be paid \$0.16 per kWh saved (See Table 1. kWh) and \$0.30 per Therm saved (See Table 2. Therm)	\$1,252,123

Table 3. EnSave Labor Rates

Labor Category	2009	2010	2011
Senior Associate I	\$182	\$191	\$201
Senior Associate II	\$155	\$163	\$171
Associate I	\$105	\$110	\$116
Associate II	\$90	\$95	\$99
Program Administrator	\$80	\$84	\$88

SELECTION CRITERIA (APPENDIX A, SECTION A OF PON 1259)

The DPS order stipulates that independent program administrators “should use best efforts to include the information required in Appendix 3 (Narrative Considerations section of this proposal).³” In the narrative documentation section below, EnSave has answered the questions based on information provided by the NYSERDA and the DPS. As acknowledged in the DPS order, independent program administrators may update the proposal within the 90-day period applicable to NYSERDA and the utilities, and can update the proposal with information required in Appendix 3 “to the extent the proponent is capable of developing the information.⁴”

³ New York Department of Public Service, Case 07-M-0548- Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard; Order Establishing Energy Efficiency Portfolio Standard and Approving Programs, June 23, 2008, page 59.

⁴ Ibid.

EnSave plans to update the Narrative Considerations section if DPS, NYSERDA, and/or the utilities provide us with information that enables us to complete the analysis.

We have provided Attachment C: DPS Tool, which addresses all of the questions below. We have also provided, in electronic format only, a Weighted Average Calculations Workbook spreadsheet. This is a spreadsheet of individual measures used to create the weighted average measure for gas, and the weighted average measure for electric.

1. TOTAL RESOURCE COST BENEFIT-COST RATIO

We have calculated TRC B/C ratio for electricity, gas, shown in Attachment C: DPS Tool. Peggie Neville from NYSERDA said we do not need to provide TRCs for each measure.

2. ELECTRIC RATE IMPACT

Electric rate impact can be calculated from GWh, MW saved, as shown in the tool based on Long Run Avoided Costs (LRACs) we were provided with by Harvey Tress from the DPS. We do not have the specific DPS and utility information required to calculate the exact change in \$/kWh or \$/kW for utilities. This could be provided between August 7 and September 23 by NYSERDA or utilities.

3. ELECTRIC RATE IMPACT PER MWH SAVED

See response 2.

4. ELECTRIC RATE IMPACT PER MW SAVED

See response 2.

5. MWH SAVED IN 2015

We have calculated MWhs saved up through 2015.

6. MW OF COINCIDENT NYISO PEAK SAVED IN 2015

We have calculated MW of coincident NYISO peak saved in 2015.

7. PEAK COINCIDENCE FACTOR OF MWH SAVED IN 2015

We do not have the specific DPS and utility information required to calculate the peak coincidence factor of MWh saved in 2015 for utilities. This could be provided between August 7 and September 23 by NYSERDA or utilities.

8. TOTAL RESOURCE COST TEST'S BENEFIT-COST RATIO, WITH CARBON EXTERNALITY ADDED, ASSUMING A CARBON VALUE OF \$15 PER TON (TRC +C)

We have calculated the TRC with Carbon Externality Added.

9. NUMBER OF PARTICIPANTS AS A PERCENTAGE OF THE NUMBER OF CUSTOMERS IN THE CLASS AS OF 2015

We can calculate this assuming the weighted average of end use life for all measures to estimate how many are still in effect in 2015.

10. GAS RATE IMPACT

We do not have the specific DPS and utility information required to calculate the Gas Rate Impact for utilities. This could be provided between August 7 and September 23 by NYSERDA or utilities.

11. GAS RATE IMPACT PER MBTU SAVED, LEVELIZED OVER THE YEARS THROUGH 2015

We do not have the specific DPS and utility information required to calculate the Gas Rate Impact per MBTU for utilities. This could be provided between August 7 and September 23 by NYSERDA or utilities.

SELECTION CRITERIA (APPENDIX A, SECTION B OF PON 1259)

1. ELECTRIC RATE IMPACT AS OF YEAR 2015

We do not have the specific DPS and utility information required to calculate the Electric Rate Impact as of year 2015 for utilities. This could be provided between August 7 and September 23 by NYSERDA or utilities.

2. GAS RATE IMPACT AS OF THE YEAR 2015

We do not have the specific DPS and utility information required to calculate the Gas Rate Impact as of year 2015 for utilities. This could be provided between August 7 and September 23 by NYSERDA or utilities.

3. NARRATIVE CONSIDERATIONS

Demand Reduction and System Benefits

EnSave does not have access to data on peak load and system load factor, and the impact on T&D system needs. EnSave looks forward to working with NYSERDA and DPS to supply these metrics during the negotiation phase of the project, if EnSave is able to obtain the information.

Evaluation

On July 31, 2008, EnSave obtained a draft guidance document from the Office of Energy Efficiency and Environment. The guidance document provided a general recommendation for how programs overall will be evaluated.⁵

⁵ "Evaluation Plan Guidance for EEPs program administrators", July 30, 2008, received by EnSave from Karen Tuczinski, Energy Efficiency Program Implementation Section, Office of Energy Efficiency and Environment, July 31, 2008.

EnSave has calculated 5% of the total program cost to be used for M&V. We recommend that NYSERDA or DPS develop an RFP to select a third-party, independent evaluator following the guidelines suggested by the DPS on page 2 of the guidance document:

Components of the Evaluation Plan

- Program summary, including goals and objectives.
- Evaluation goals and priorities (program theory and logic model, if appropriate).
- Process evaluation methodology -- Process evaluation assesses program design, delivery, and implementation. It is also used to identify opportunities for program improvement and tracking program progress
- Impact evaluation methodology -- Impact evaluation quantifies energy and demand savings and identifies other potential impacts, as appropriate (e.g., environmental benefits). This component should delineate the information to be reported including energy savings (e.g., MWh, kW, therms), the appropriate measurement and verification approach, and how various attribution factors, such as free rider and spillover measurement, will be addressed.⁶
- Net to gross analysis -- Net to gross analysis is represented as a ratio designed to compare the gross savings of a program to the energy savings actually attributable to the program. Energy savings are estimated after adjusting for factors such as measurement error, measure installation quality, user behavior, and the actions program participants and non-participants would have taken absent the program (e.g., free ridership and spillover). The path proposed to arrive at net savings should be discussed.
- Benefit cost analysis -- establishes the ratio of the value of the program benefits and program costs. At a minimum, the results should be reported using the total resource cost test. To facilitate accurate benefit cost tests, impact results should be estimated for the time periods the savings occurred. For example, residential lighting use tends to peak on weekday evenings and not on system peak, which tends to be weekday afternoons.

⁶ “Spillover” refers to the energy savings associated with energy efficient equipment installed by consumers who were influenced by an energy efficiency program, but without direct financial or technical assistance from the program. Spillover includes additional actions taken by a program participant as well as actions undertaken by non-participants who have been influenced by the program. Sometimes spillover is referred to as “free-ridership” or as “market effects.” These market effects may be current or may occur after a program ends. When market effects occur after a program ends, they are referred to as “momentum” effects or as “post-program market effects.”

⁶ “Free-ridership” refers to the percentage of savings attributed to customers who participate in an energy efficiency program but would have, at least to some degree, installed the same measure(s) on their own if the program had not been available.

- Sampling strategies and sample design.
- Data reliability standards (e.g., precision and confidence level for customer surveys, measurement and verification).
- Steps to identify and mitigate threats to data reliability (e.g., systematic error, random error) and uncertainty (e.g., assumptions, adjustments to data).
- Data collection and management process (e.g., what data will be collected and in what format?)
- Timeline for major evaluation milestones.
- Evaluation report format.
- Evaluation budget. The budget established by the EEPS Order is for evaluation funding of up to 5 percent of a program administrator's total program budget. The budgets for individual programs may be more or less than 5 percent.
- Roles and responsibilities (i.e., who does what?).
- Format and timing of periodic program progress reports (both evaluation results and routine program data (e.g., measures, installed, dollars spent)).
- Policy describing how the program administration function will be organizationally separated from the evaluation function.
- Other relevant issues (This will vary depending on the program.).

We recommend the RFP be sent to qualified M&V contractors for responses. EnSave will make all program data (all farmer installation information and savings calculations) available to the M&V contractor to ensure program integrity.

The DPS also forwarded EnSave the comments of TecMarket Works's memo *Review of the Evaluation Plan Guidance for EEPS Program Administrators*. TecMarket Works has been hired by DPS to assist in the development of the evaluation plan. The memo states: "The plan as it is now structured requires that the utilities, NYSEDA, and the implementation contractor construct a 'detailed plan' for evaluating their program. *This places the same organizations that are offering the programs in the position of developing the detailed plans for how their performance will be assessed. This approach can establish a conflict between having an approach that provides objective unbiased results vs. an approach that may not be as unbiased.*

If this aspect of the plan remains, it will be important for the evaluation plans to be carefully reviewed by evaluation experts to make sure they are unbiased (italics added)."

EnSave does not consult on program evaluation, and its understanding of program evaluation is that of a participant in the evaluation process rather than an evaluator. Our understanding is that of an educated member of the energy efficiency industry, of which there are many subject matter experts. Because it appears DPS is considering the separation of the administration and evaluation functions, we believe that the full development of an M&V plan is best left to a discussion between the Office of Energy Efficiency and Environment, NYSERDA, and/or independent program evaluation contractors.

Market Segment Need

New York's agricultural sector (made up of about 37,500 farms) has a strong demand for more agriculture-specific energy efficiency programs. After the end of our Dairy Development Energy Program, we heard numerous requests from equipment dealers and farmers who wanted the program to continue. Since 2004, New York farmers have not had an agriculture-specific rebate program, but the need remains. Today, as fuel prices continue to rise, the pressure has only increased for farmers. While they are eligible to participate in NYSERDA's Enhanced Commercial/ Industrial Performance Program and other programs offered through NYSERDA and the utilities, few actually complete this process. This is because farms are not likely to know about energy efficiency programs unless the information is brought directly to them.

Existing energy efficiency programs are well suited to commercial and industrial businesses that have staff people devoted to facilities management and process improvement. Even if commercial or industrial businesses do not investigate these programs in house, they are courted by energy services companies (ESCOs) that specialize in commercial and industrial projects.

In contrast, most of New York's farms are family owned operations with limited time and hired help. Farmers are business people and acutely aware of the need to manage operating costs, but most of their concern lies with managing the traditional inputs of feed, fertilizer, and large equipment. Farmers need to be educated about energy efficiency opportunities in order to incorporate the wise use of energy into their decision making.

NYSERDA, National Grid, and NYSEG all offer some form of energy efficiency assistance to farmers. As described in greater detail in the Coordination section below, farmers have a potential to save energy that extends beyond their historically low participation in these programs.

Tables 1 and 2 below estimate the number of predominant farm types and the number of farms to participate in the program within NYSEG or National Grid's service territories. EnSave used USDA National Agricultural Statistical Service (NASS)⁷ data and adjusted the expected participation rate based on the following assumptions:

- Equal geographic distribution of farms in each county;
- Percent of the county covered by NYSEG or National Grid service⁸; and
- EnSave's previous success enrolling various farm types in energy efficiency programs.

Table 1 provides the total number of farms estimated to be within the service areas.

Table 1. Number of Farms in NYSEG or National Grid Service Areas (2002 NASS)

NY NYSEG and Nat. Grid Service Area	Beef	Milk	Hogs and pigs	Sheep and lambs	Layers	Broilers	Green- houses	Other	Total Farms
Total:	6,140	6,958	1,448	2,288	2,522	417	2,374	12,536	34,700

There are a total of about 35,000 farms in the respective service areas.

Table 2 provides an estimate of the number of farms that could be expected to enroll in an agricultural energy efficiency program within the service territories.

Table 2. Estimated Number of Farms Served (adjusted by assumed participation rate)

NY NYSEG and Nat. Grid Service Area	Beef	Milk	Hogs and pigs	Sheep and lambs	Layers	Broilers	Green- houses	Other	Total Farms
Total:	123	397	56	16	45	17	27	119	800

EnSave estimates that a total of 800 farms will be served through this program. About half of these operations will be dairies.

Table 3 illustrates the projected kWh and Therm savings for the program. EnSave estimates a total savings of 16.5 million kWh of electricity and 788,672 Therms of natural gas. This is based

⁷ NASS state and county level farm data can be found at: <http://www.nass.usda.gov/>

⁸ National Grid service area map was located at:

http://www.nationalgridus.com/niagaramohawk/about_us/serviceterr_map.asp

NYSEG service area map was located at: <http://www.nyseg.com/OurCompany/servicearea.html>

upon EnSave's experience and expected average savings of about 20,625 kWh per farm and 25,000 Therms per greenhouse.

The majority of energy savings are expected to be found on dairy operations.

Table 3. Estimated Program annual kWh Savings (expressed in Therms for Greenhouses)

NY NYSEG and Nat. Grid Service Area	Beef (kWh)	Milk (kWh)	Hogs and pigs (kWh)	Sheep and lambs (kWh)	Layers (kWh)	Broiler (kWh)s	Other Farms (kWh)	Total Farms ¹ (kWh)	Green- houses (Therms) ²
Total:	155,360	12,571,802	1,778,008	19,962	576,567	1,039,527	358,794	16,500,000	7,892,382

¹ Total Farms expressed in kWh. Does not include Therms savings due to estimated savings in Greenhouse natural gas use

² Greenhouse energy savings expressed in Therms due to estimated natural gas savings

Coordination

Coordination with Utilities

EnSave has spoken with Economic Development representatives of both NYSEG and National Grid. We have reviewed each utility's economic development offerings. NYSEG offers "up to \$100,000 per project for smaller farms toward electric related infrastructure improvements on either NYSEG-owned or customer-owned (as directed by NYSEG) equipment. Each project must involve capital investment of at least \$50,000 and have a monthly incremental electric demand after capital investment of at least 25 kilowatts." As applicable, we are prepared to work with NYSEG's program for those farms who meet those requirements.

National Grid has a Dairy Industry Productivity Program for their dairy customers, which offers grants of up to \$5,000 in concert with incentives available through NYSEDA or other entities, not to exceed 75% of the total project cost. EnSave worked with this program in its 2004-2005 Dairy Development Energy Program, which provided energy audits, measure rebates, and integration with National Grid's economic development incentives. EnSave helped 49 farmers fill access \$231,790 in incentives from National Grid's program in 2004-2005.

Currently, National Grid's and NYSEG's programs offer incentives after the installation has occurred. EnSave will inform farmers of the opportunity to receive additional incentives, and will provide National Grid and NYSEG contact information and applications to those farmers

who are interested in applying. EnSave will report the number of referrals to the utility programs in its quarterly reports to NYSERDA.

EnSave requested farm customer participation from both NYSEG and National Grid's economic development staff. As of August 7, 2008 EnSave has not heard from either utility so we can only assume that farm participation is low.

Coordination with NYSERDA

EnSave has a long history of working successfully with NYSERDA to deliver energy efficiency to New York's agricultural sector. EnSave delivered 10 million kWh to 572 New York farms in 1999-2003 through the New York Variable Speed Drive Farm Program; supported NYSERDA's Smart Equipment Choices program in 2002-2003 by helping over 300 New York dairy farms install plate coolers, saving over 6 million kWh; and provided energy audits to 75 dairies in 2004-2005 through the Dairy Development Energy Program.

Currently, New York's farmers are able to receive free energy audits through NYSERDA's FlexTech program. EnSave will coordinate with FlexTech contractors to provide energy audits to those farmers who could benefit from them. We will encourage applicants to our program to consider an energy audit if:

- a) They are a particularly large or complex operation that would likely benefit from uncovering additional energy savings opportunities through an audit
- b) They are hesitant to move forward with installing a project without knowing more about other opportunities, which an audit would describe

Conversely, EnSave will work with FlexTech contractors serving agriculture to encourage their customers to apply for the Agricultural Energy Efficiency Program's rebates.

NYSERDA also offers incentives for farm renewable energy generation, such as small wind, solar, and methane digesters. EnSave will inform program participants of these NYSERDA opportunities and refer participants to the appropriate contact person at NYSERDA. We also plan to meet regularly with NYSERDA to discuss the status of agricultural participation in programs. These meetings will also identify ways to further integrate our respective efforts in order to provide the best possible assistance to the farmer.

Co-Benefits

Environmental Justice

Within the NYSEG and National Grid service area, EnSave will work with the appropriate agricultural service organizations to ensure that all customers are provided the opportunity for service, regardless of race, gender, ethnicity, or racial characteristics.

Environmental Benefits

This program's reduction in overall energy use will result in air quality benefits. The following estimates were developed with use of EPA's Power Profiler web tool⁹, which estimates air quality benefits based on utility fuel mix. Table 4 illustrates the total expected SO_x, NO_x, and CO₂ impacts that would be expected to be avoided through the program's participating farms energy savings.

Table 4. Estimated Program Environmental Impacts (tons/year)

NY NYSEG and Nat. Grid Service Area	SO_x (Tons)	NO_x (Tons)	CO₂ (Tons)
Total:	34.41	8.19	6,718.27

Overall, we expect that the reductions in agricultural electricity use would achieve reduced power plant emissions of over 34 tons of SO_x, 8 tons of NO_x, and over 6.7 thousand tons of CO₂.

Expected Program Impact on the New York Economy

EnSave used IMPLAN^{®10} to estimate the impact of the collective agricultural reduction in energy use (savings in \$) upon New York's economy. IMPLAN[®] is an economic impact modeling system used to create Social Accounting Matrices and account for multiplier effects of the program on New York's economy. The common use of IMPLAN[®] is to estimate the magnitude and distribution of economic impacts for a project.

The 16.5 million kWh and 788,672 thousand therms of estimated energy savings will amount to \$3.4 million in savings to agricultural producers. It is assumed that 30% of these savings will go towards taxes and increased savings, resulting in the remaining 70% (about \$2.4 million) that will be directly spent in the New York economy. The \$2.4 million in increased spending will

⁹ EPA's Power Profiler can be found at: <http://www.epa.gov/cleanenergy/energy-and-you/how-clean.html>

¹⁰ IMPLAN[®] is developed and maintained by the Minnesota IMPLAN Group and is recognized as the leader in economic impact modeling. More information on IMPLAN and its use can be found at: <http://www.implan.com/>

result in both indirect (business to business) and induced (household to the economy) multiplier effects amounting to a total of \$3.1 million.

As a result of this program, the savings in energy would result in increased farm household spending. Increased spending in other economic sectors would likely result in over 15 new jobs in New York state.

Portfolio Benefits

This program design is complementary to EnSave's other programs that it administers. As of August 7, 2008, EnSave operates the following agricultural energy efficiency programs, all of which share some elements with the proposed Agricultural Energy Efficiency Program.

- California Dairy Energy Efficiency Program: Measure incentive program for Pacific Gas & Electric Company's dairy customers
- Maryland Farm Energy Audit Program: Energy audit and incentive program for agricultural producers in Maryland
- Texas Agricultural Technical Assistance Program: Energy audit and technical assistance program for all agricultural producers in Texas

As stated above in the Coordination section, EnSave is prepared to work with NYSERDA's technical assistance programs for agriculture, as well as the utilities' economic development programs.

Depth of Savings

We will continually follow up with customers enrolled in the program in order to identify lost opportunities for energy savings. Our marketing approach also individually targets each potential participant, ensuring they are given every opportunity to understand the program's offerings and take advantage of them.

Our experience has shown that most farmers install energy efficiency projects piecemeal rather than taking a whole-farm approach to energy efficiency. This is due to cash flow concerns, seasonality of equipment purchases, and the need to prioritize projects. We will revisit all measure installers throughout the program to maximize the number of measures implemented per customer contact.

Underserved Markets

Agricultural customers have not traditionally participated in energy efficiency programs, largely due to their lack of awareness of such programs. Through a comprehensive marketing campaign that engages manufacturers, dealers, and the agricultural community, we will ensure farmers understand the available opportunities.

Commitment

This program will require a brief ramp-up time in order to prepare the program. Assuming a January 1, 2009 start date for the contract, we anticipate capturing our first customer kWh savings within 90 days. Due to our prior experience delivering similar programs to NYSERDA, we already have relationships with key New York equipment manufacturers, equipment dealers, and members of the extended agricultural community. This network will ensure we will be able to “hit the ground running” with a high level of trust and commitment from program stakeholders.

Our time-tested marketing and outreach approach (described in further detail in the “Customer Outreach” section below) will keep EnSave staff in regular contact with farmers, their equipment dealers, and opinion leaders for the farm. This regular contact will continually encourage the installation of as many cost-effective measures as possible for each farm site.

Customer Outreach

We will identify customers in several ways:

- Using EnSave’s list of past program participants (approximately 650 farms).
- Obtaining publicly available lists of farms (such as the list of New York dairy farms maintained by the New York Department of Health).
- Leasing lists of farmers through a list broker such as FarmMarket ID.

Once we obtain these lists, we will provide them to NYSEG and National Grid for comparison with their own customer lists. For those farms that are also customers, we will obtain annual electric and gas usage. This will enable EnSave to determine the largest energy users among New York farms, and prioritize these ones that have a potential for significant energy savings. In obtaining information about NYSEG and National Grid customers, we will ensure that data will be kept confidential, and will only be used for this program.

We will encourage customer participation through the manufacturers, equipment dealers, and agricultural community, who will augment EnSave’s efforts working directly with farmers.

Below, we discuss the role each of these organizations will play in the customer outreach process.

Equipment Manufacturers

The first group that will be contacted through marketing is the manufacturers of energy efficient equipment. These will be manufacturers of all the major measure categories used in the program, such as lighting, HVAC, motors, and dairy measures. EnSave will send them a letter followed by a phone call to inform them of the program and request contact information for their sales representatives and dealer network. We will also request their support through other means, such as offering an additional discount on energy efficient equipment in order to encourage more installations, or by sending a mailing to their distributors notifying them of the program.

Equipment Dealers

EnSave will then market the program to dealers, sending them a letter explaining the program and how it will benefit their customers as well as their business, followed by a phone call to further explain the program and ensure they understand how the program can benefit their farm customers. These dealers are critical partners in a program, because they are the first ones farmers will turn to when seeking advice about which equipment to purchase. Evaluations of EnSave's prior agricultural energy efficiency programs have shown that dealers are responsible for up to 70% of the applications farmer submit to the program.

EnSave will keep in continual contact with the dealers throughout the program in order to build relationships, track progress, and answer questions. A strong relationship with dealers helps ensure success of the program. EnSave has established strong working relationships with equipment dealers through its previous farm energy efficiency programs in New York, and we will continue to build these relationships.

Agricultural Community

Concurrent to dealer notification, EnSave will inform the agricultural community of the program by sending them a program announcement. EnSave will work with these groups to reach farmers by encouraging them to include program information in their mailings, newsletters, and meeting agendas. This will help bring the program message to farmers statewide, and will support the mission of these organizations by saving their members money and making them more sustainable. As a side benefit to the program, as these organizations inform their members about energy efficiency, they will be learning about the wise use of energy themselves, thus helping to spread energy efficiency education throughout the rural community.

Farmers

EnSave has already worked with several hundred New York farmers through its previous NYSERDA programs. EnSave will contact these farms to promote new measures and other funding opportunities they can access (such as other NYSERDA programs, utility economic development funds and REAP).

EnSave will also obtain lists of other farmers by name, address, phone, and type of production. We will lease these lists from an agricultural list broker firm such as FarmMarketID.

Our direct marketing to farmers will focus on targeted subsets of farmers (such as dairies, large energy users, and past EnSave program participants). In order to reach as many of the 37,500 farmers in the state as possible, we will work with and leverage manufacturers, dealers, and the agricultural community to distribute information.

Our program representatives will be responsible for making phone calls to farmers and informing them of the program. These representatives will enroll farmers, and work with them through their entire installation process to ensure they are able to navigate the process.

Collaborative Approach

EnSave is well aware of the need to bring community groups into the initial discussions of the program. EnSave has spoken with the New York Farm Bureau, the New York State Federation of Resource Conservation and Development Councils, New York Department of Agriculture and Markets, and representatives from NYSEG and National Grid's economic development staff.

Given the time constraints of the proposal period, not all organizations are able to secure board approval for a support letter. EnSave has spoken with the following entities about the program and hopes to secure formal letters of support from all of them within the next 45 days:

- New York State Department of Agriculture and Markets
- NYSEG
- National Grid
- Assemblyman David Koon, 135th Assembly District
- Assemblyman William Magee, 111th Assembly District

As Attachment D, please see the attached letters of support from:

- New York Federation of Resource Conservation & Development Area Councils
- Dairy Farmers of America
- National Association of Conservation Districts

The New York Farm Bureau will mail a letter of support directly to NYSERDA shortly.

Fuel Integration

This program will focus on both electric and natural gas measures. Most farm energy savings will be electric. However, farmers whose measures use both fuels will find the process seamless. Our application will include a place to record both electric and gas measures, and there will be no programmatic distinction between electric and gas measures except for the different calculations used to determine savings.

We anticipate a relatively small amount of gas savings (788,672 therms) because many rural areas do not yet have natural gas service, and because there are relatively few instances of gas equipment used on the farm.

Transparency

EnSave requests that its proposal and proposal documents remain confidential except for NYSERDA and DPS review, and for excerpts to be included in NYSERDA's comprehensive proposal to DPS.

Our quarterly reports will be available online for viewing by the general public as well as other program administrators.

Procurement

EnSave does not intend to have any subcontractors in this program. It will be responsible for all major functions of the program except for evaluation, measurement, and verification. This function will be handled by an independent third party, selected by the DPS.



New York State Variable Speed Drive Farm Program Case Study

Funding Source: New York State Energy Research and Development Authority (NYSERDA)

Program Duration: 1999 - 2003

Contact Amounts: \$1,500,000

Geographical Location: Statewide

Program Type: Equipment replacement and new construction

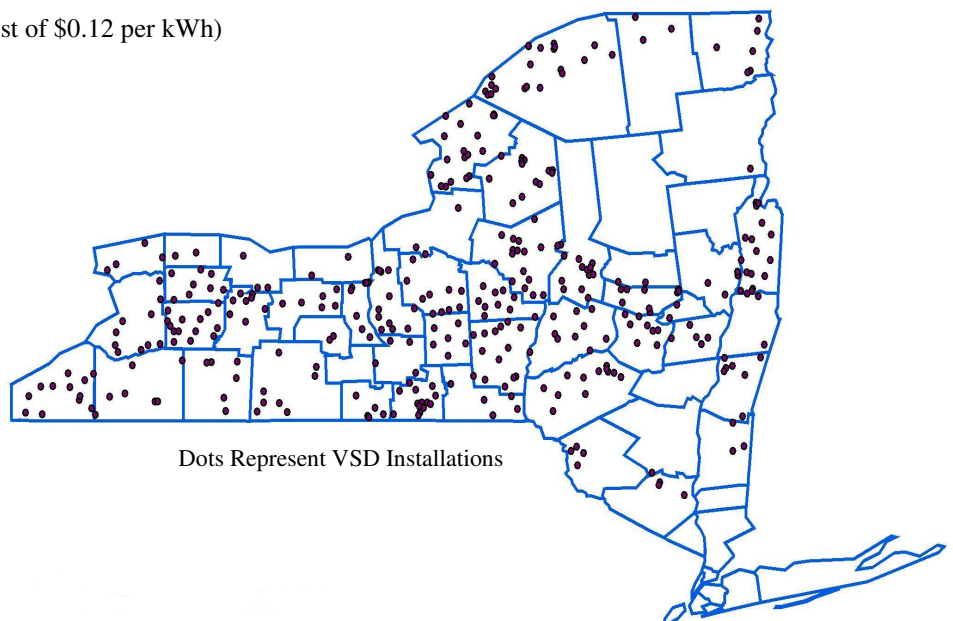
The objectives of this multi-year program were to save energy, reduce dairy producers' energy costs, and lower NO_x emissions. Through NYSERDA's Standard Performance Contract, EnSave offered cash incentives to dairy producers to install milking vacuum pump variable speed drives (VSDs), and encourage producers to work with their local equipment dealers to install the equipment.

EnSave developed the program and educated 6,500 New York dairy producers about the benefits of a VSD and its energy use on the farm. EnSave marketed the program in conjunction with the local agricultural community including the Cornell Cooperative Extension, the New York Department of Agriculture, and the New York Farm Bureau to ensure that farmers learned about the program from familiar sources.

Five hundred and seventy-two producers participated in the program. Measurement and verification of the energy savings was conducted by Science Applications International Corporation (SAIC) of New York.

The Program saved 10 million kWh, avoided 2.92 tons of NO_x emissions, and delivered \$1.2 million first year energy savings to participating dairy producers. Over the 15-year measure life of the VSD, these 572 dairy producers will save \$18,000,000 in energy costs.

(Savings based on an average electricity cost of \$0.12 per kWh)



EDWARD W. SENGLE

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eds@ensave.com, (800) 732-1399

SUMMARY

Engineer/Project Manager with proven ability to deliver quality products and projects on time and under budget. Career focus on energy conservation, renewable generation, and green technologies. Experienced in wind energy system production, assembly and servicing; bio-aerosol testing and filtration; semiconductor manufacturing and characterization; and HVAC design.

PROFESSIONAL EXPERIENCE

EnSave, Inc., Richmond, VT

Program Manager, 2007–current

- Manage energy efficiency programs for agricultural customers on behalf of electric utilities.
- Implement rebate and audit programs to achieve energy savings targets.
- Comply with extensive regulatory and reporting requirements.
- Implement multi-tiered marketing campaign.
- Manage staff, including the oversight of staff time allocation.
- Act as primary contact for client program manager.
- Manage workflow to comply with timelines and budget.

Energy Engineer, 2007

- Use manufacturer specifications, technical literature, and available research to assess and calculate energy usage and cost and other performance characteristics of agricultural and food processing equipment intended to benefit the respective sectors.
- Develop savings calculations for energy efficient equipment.
- Identify pollution prevention measures that create value for agricultural producers and food processors.
- Develop, maintain, and improve spreadsheet tools that calculate energy and cost savings, including AutoAudit™ and other internal tools.

Northern Power Systems, Waitsfield, VT

Project Manager, 2005–2007

Alaska Village Electric Cooperative Project (\$4M):

- Managed the procurement, production, and shipment of 13-100 kW wind turbines to four remote Alaskan Villages; controlling revenue, margin, and cash-flow to corporate targets.
- Coordinated and scheduled the installation, commissioning, troubleshooting and service of turbines with partner construction firm in Alaska.

Distributed, Low Wind Speed Turbine Project (\$3M):

- Directed a team of engineers, contractors, production technicians, and DOE scientists in the design, assembly, testing, and installation of a next-generation, permanent magnet wind turbine.
- On target to meet aggressive schedule and cost-of-energy objectives.

Triosyn Corp, Williston, VT

Engineering Manager, 2002–2005

- Led the development of a biocidal filter cartridge using a proprietary iodine-activated resin, for use in a personal air-purifying respirator, resulting in NIOSH and CE certification.
- Managed engineering group in development of novel processes to imbed resin in filtration media, including measurement of microbiological performance and quality control metrics.
- Designed Biosafety Laboratory and Testing Facility for the Air Force Research Laboratory, including HVAC, filtration, compressed air, and high purity water systems.

IBM Microelectronics Division, Essex Junction, VT

Program Manager, 2000–2002

- Managed multiple concurrent semiconductor wafer manufacturing programs representing \$300M in yearly revenue.
- Directed teams from engineering, production, and quality assurance to enhance yield, meet supply requirements, guarantee product quality, and reduce costs.
- Led team of manufacturing and electrical test engineers in identifying primary defect types, designing and evaluating experiments, and implementing process changes to reduce defects by 65%.
- Identified root causes of potentially significant reliability problems, qualified and implemented process changes, minimized quality risk and shipment delays to customer.
- As recognized technical expert, expanded and taught 16-hour course on Semiconductor Fabrication Techniques to employees from engineering, manufacturing, sales, and marketing.

Lead Process Integrator, 1997–2000

- Led team of engineers and technicians in development of new wafer manufacturing process creating strategic new business opportunity representing \$200M in global yearly revenue.
- Delivered process to manufacturing on schedule and under budget while incorporating numerous customer-driven specification changes and nonstandard product enhancements.
- Reduced manufacturing cycle time 35% by scrutinizing process flow, eliminating redundant operations, combining compatible operations, and implementing novel process improvements.
- Collaborated with engineering teams from production sites in France, Japan, and Taiwan to successfully install new manufacturing process in their facilities.

Process Team Leader, 1993–1997

- Directed engineering team to increase yield and reduce defects, cost, and cycle time within a group of process operations that formed initial transistor isolation.
- Developed, patented, and implemented a novel manufacturing process resulting in \$1M in yearly savings and a 40% reduction in module cycle time.
- Led company wide team representing research, development, manufacturing, and design to foster innovation, resulting in numerous patent ideas and improved coordination of engineering resources.

Photolithography Engineer, 1988–1993

- Designed and implemented first electric monitor for measuring within-field linewidth variation in production; implemented tool/process changes reducing variability by 50%.
- Demonstrated manufacturing feasibility of novel optical process enhancement, resulting in process capabilities far exceeding state-of-the-art technology.

Eastman Kodak Company, Rochester, NY

Facilities Engineer, 1982–1986

- Designed and installed process support systems (air filtration and conditioning, high purity gases, corrosive exhaust, cooling water, drainage, fire safety, energy conservation) for photographic film, biological, and microelectronics research facilities.
- Implemented monitoring system for power plant including steam/refrigeration cogeneration cycle.

EDUCATION

BS Mechanical Engineering, Lehigh University, 1982

Graduate Studies in Controls Engineering, Rensselaer Polytechnic Institute, 1986–1987

PATENTS & PUBLICATIONS

Hold 4 US Patents in various areas of semiconductor manufacturing and design.

Authored numerous papers for internal publications, including *IBM Journal of Research and Development*.

ILLARI VIHINEN, PE

65 Millet Street, Suite 105, Richmond, VT 05477
illariv@ensave.com (800) 732-1399

Summary

Professional Engineer with a diverse background, bringing dedication, attention to detail and proven managerial experience to energy efficiency. Possesses proven leadership skills with a Six Sigma Black Belt, with experience in hydroelectrics, quality engineering and combustion engineering.

Experience

EnSave, Inc., Richmond, VT

Energy Engineer, 2007–Present

- Research and analyze end-use agricultural and food processing technologies
- Develop, verify and manage energy efficiency tools
- Manage EnSave's Evaluation, Measurement and Verification (EM&V) functions
- Determine energy savings from energy efficiency technologies
- Provide technical review of farm energy audits

Spruce Mountain Design, Montpelier and Winooski, VT

Hydroelectric Operator, 2007

- Responsible for operating & maintaining 2 hydroelectric plants (800 kW and 7.4MW)

Northern Power Systems, Waitsfield, VT

Program Manager, 2003–2007

- Managed \$1M program to design/build/test drives; delivered 1st within 10 days of baseline
- Managed \$1M program to design/build/test prototype converter; done within 5% of budget
- Managed \$2M next-generation NW100 wind turbine program with GE, DOE, NREL
- Managed \$1.4M of power electronic development programs (Microgrid, DER Switch)
- Directed resource planning, budgeting, and monthly status reports for \$6M R&D portfolio
- Developed Resource Planning, Task Management Tools, Business Process Improvements
- Completed ISO 9001-2000 Training; 1/20 Internal Auditors for certification, improvement

GE Industrial Systems, Plainville, CT

Six Sigma Black Belt/Quality Engineer, 2000–2003

- Mentored 80+ GE Engineers worldwide to Six Sigma Green Belt Certifications
- Developed Maturity Index Metric for Measuring/Tracking Key Project Risks
- Designed Next-Generation Project Quality Scorecards with Flexible Hierarchy
- Created Kano Visualization Tool to Drive Sales, Market Share Growth in NPIs
- Launched web-based eQFD Tool to conduct QFDs anywhere, anytime online
- Instructor/Editor for Scorecards, GE DFSS Book of Knowledge, for MBBs
- Completed Six Sigma DMAIC, DFSS, and Design for Reliability Training

Air Force Research Laboratory, Dayton, OH

Combustion Research Engineer, Captain, USAF, 1996–2000

- Led AFRL/GEAE Trapped-Vortex Combustor Single-Cavity Team in testing revolutionary high performance, low emissions combustor concept
- Designed and built a counterflow burner based on a French design for studying flame-vortex interactions and turbulent combustion phenomena
- Initiated spray characterization studies of new fuel injector concepts with laser sheet visualization, PDPA, and photographic techniques
- Responsible for management of a \$10M, 30-person R&D contract

Education

Master of Science, Mechanical Engineering, Clarkson University, Potsdam, NY, 1996

Bachelor of Science, Mechanical Engineering, Cornell University, Ithaca, NY, 1994

KYLE CLARK

65 Millet Street, Suite 105, Richmond, VT 05477
kylec@ensave.com (800) 732-1399

Summary

Highly motivated, organized and creative, with diverse background and life experience. Proven ability to motivate and work effectively, with a talent for analyzing problems and finding innovative solutions. Naturally gifted at computer science and information technology. Committed to personal and professional excellence. Extremely fast learner, always seeking new intellectual and leadership challenges.

Experience

EnSave, Inc.,

Program Representative, 2007–Present

- Perform energy audits for large agricultural operations
- Develop and streamline energy auditing tools
- Assist in the development of proposals
- Manage a large volumes of customer, dealer, and manufacturer accounts
- Research and present technical data for proposals and reports
- Conducts outgoing phone calls to enroll producers in an energy efficiency program
- Fields incoming phone calls from customers and clients about programs
- Uses energy efficiency calculators and other criteria to evaluate a producer's eligibility for a program

Chittenden County Regional Planning Commission

Geographic Information Systems (GIS) Intern, 2006

- Perform extensive database updates using Microsoft Access, Excel and SQL
- GPS data collection and data analysis
- Develop a more efficient strategy for annual database update

University of Vermont, Department of Natural Resources

Computer Lab Assistant, 2005–2006

- General software and hardware troubleshooting for university students
- Monitored and maintained functionality of computer lab

National Wildlife Federation

Volunteer Project Coordinator and GIS Consultant, 2006

Smartech and Associates, LP

Contracted Computer Technician, 2006

Dirtworks Organic Farming Supply

Shipping Manager and Customer Support, Summers of 2004 and 2005

University of Vermont, Center for Sustainable Agriculture

Data entry and Office Assistant, 2004

University of Vermont, National Park Studies Laboratory

Database Manager and Webmaster, 2003–2004

EDUCATION AND TRAINING

- Bachelor of Science in Natural Resource Planning, University of Vermont, 2006
- Certified Agricultural Irrigation Specialist, 2007

COREY J. CONANT

65 Millet Street, Suite 105, Richmond, VT 05477
coreyc@ensave.com (800) 732-1399

SUMMARY OF SKILLS

Possesses strong farm energy technical skills with experience in marketing, sales, and customer service as well as experience working on dairy farms, with a focus on customer enrollment for energy efficiency programs. Grasps nuances of complex programs and engage producer to move forward with a project, and has an extensive familiarity with farm operations and farm needs.

PROFESSIONAL EXPERIENCE

EnSave, Inc., Richmond, VT

Energy Auditor, 2006–Present

- Uses *AutoAudit*™ and other internal tools to develop narrative farm energy audit reports
- Works closely with engineering technical staff to ensure accuracy and consistency of written reports
- Liaises between technical staff and farmer in order to deliver information about energy efficiency
- Provides information and answers queries regarding program eligibility and rules
- Provides marketing and outreach services as needed for special projects

Program Administrator, 2005–2006

- Conducts outgoing phone calls to enroll producers in an energy efficiency program
- Fields incoming phone calls from customers and clients about programs
- Uses energy efficiency calculators and other criteria to evaluate a producer's eligibility for a program
- Provides program data for use in reports

The Cape Cod Winery, Falmouth, MA, 2005

- Maintain vineyard and equipment
- Sell wines and maintain distribution system with licensed liquor outlets

Paul Marquis Concrete / Kevin Youngman Construction, 2003–2004

- Flat work, decorative concrete stamping
- Framing, roofing, siding

Phish Dry Goods, Burlington, VT, 2001–2003

- Conduct outside phone sales
- Provide phone customer service to anyone with questions about products
- Process orders
- Provide support for shipping and receiving department

Conant's Riverside Farms, Richmond, VT

- Dairy farm laborer

EDUCATION

Environmental Studies, University of Vermont, 1999–2001

KATHERINE WILLIAMS

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katew@ensave.com (800) 732-1399

Summary

Highly experienced direct marketer, with expertise in design, implementation, management, and execution of promotions. Exceptionally organized, and has a proven ability to compose publishable press releases and articles.

Experience

EnSave, Inc.,

Marketing Coordinator, 2007–Present

- Provide marketing strategy and execution for two California energy efficiency incentive programs, including direct mail promotions, press releases, and advertising
- Complete marketing deliverable for Texas Agricultural Technical Assistance Program, including brochure design and execution, mailing list collation, training materials, and forms and flyers
- Provide initial and on-going marketing support for Oregon pilot project
- Maintain EnSave, Inc. website
- Design and execute promotions, maintain company branding standards on all promotional and technical pieces
- Compose and disseminate press releases and articles for EnSave, Inc.
- Requires expertise in MicroSoft Office Suite, and Adobe Creative Suite, including InDesign, Photoshop, and Illustrator

Ashgate Publishing

Senior Marketing Coordinator, 2005–2007

- Prepare annual, quarterly, and monthly marketing plans
- Provide monthly, quarterly, and annual analysis of sales and marketing budgets
- Track and report on success rate of past promotions
- Advise commissioning editors on marketing and sales potential for forthcoming titles
- Provide feedback and input on subject line development for four lines

Marketing Coordinator, 2001–2005

- Drive marketing initiatives from campaign creation to execution
- Create catalogs and flyers for direct marketing campaigns, responsible for design, copy-editing, and vendor management
- Acquire pertinent mailing lists for direct mail promotions
- Represent company at academic trade shows and conferences
- Act as liaison to authors and editors
- Determine marketing placement strategies for new titles

Conference Coordinator/Marketing Assistant, 2000-2001

- Coordinate company's presence at academic trade shows and conference, responsible for arranging registration, travel, and shipping
- Create advertisements for placement in conference programs, and flyers for display at the conference
- Communicated Advanced Book Information (ABI) to customers, including library buyers and retailers
- Act as liaison to Library of Congress

State of Vermont Department of Social and Rehabilitation Services (SRS)

Project Assistant, Rural Domestic Violence and Child Abuse Project, 1997–2000

- Control, update, and insure accuracy of resource, personnel, budgetary, statistical and contractual records
- Design, review, and refine Project-related brochures, flyers, conference material, and information packets
- Provide administrative support for a team of four, including Project Director
- Liaise with statewide domestic violence and SRS offices

Administrative Assistant, 1999–2000

- Process foster parent applications, including the running of State background checks
- Enter information into departmental databases
- Provide temporary office support for Commissioner's Office and Residential Licensing Department

Jim Henson Productions

Public Relations Intern, 2006

- Provide administrative support for a staff of three
- Retrieve, distribute, and catalog press clippings
- Collate and distribute press and business packets

EDUCATION AND TRAINING

College of New Rochelle, NY

Bachelor of Arts, 2006

- Major: Psychology
- Minor: Communication Arts, specializing in Advertising
- Graduated *cum laude*, Honors Program degree, and member of Psychology Honors Society (*Psi Chi*)

BRUCE JONES

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brucej@ensave.com (800) 732-1399

Summary

Professional accountant and auditor with 26 years' experience in the private sector. Experienced manager, comfortable in both a Controller and Human Resources position.

Experience

EnSave, Inc.,

Finance Manager, 2007–Present

- Direct financial activities for EnSave, including:
 - Prepare and analyze monthly financial statements
 - Prepare and analyze EnSave's annual budget
 - Prepare and analyze EnSave's cash flow
 - Prepare and analyze project budgets
- Invoice and collection of Accounts Receivable
- Coordinate activities of EnSave's bookkeeper
- Coordinate quarterly and annual tax review and preparation with external accounting firm
- Oversee payroll and employee benefit administration
- Manage distribution and tracking of rebate payments to incentive program participants

Strategy Plus, Inc., and Chips & Bits, Inc

Controller/General Manager, 1995–2007

- Directed financial activities for both Strategy Plus, a magazine publisher, and Chips & Bits, an e-commerce retailer
- Instrumental in the evaluation, selection, and implementation of new accounting/e-commerce system
- Manage day-to-day operations of accounting, purchasing, customer service, and shipping departments
- Prepare budgets and all financial reports needed by senior management
- Analyze financial records to forecast future financial position and budget requirements
- Reconcile and balance accounts
- Coordinate internal and external audits of company records
- Responsible for staff of 4

Mount Mansfield Resort

Accounting Manager, 1994–1995

- Apply principles of accounting to analyze financial information and prepare financial reports
- Prepare balance sheet, profit and loss statement and other reports to summarize current and projected company financial position
- Coordinate daily audit of all revenue areas
- Allocate and post details of business transactions to ledger accounts
- Compile and analyze financial information to prepare entries to accounts, such as general ledger accounts, documenting business transactions
- Reconcile and balance accounts
- Coordinate internal and external audits of company records
- Responsible for hiring and supervising seasonal staff of 5

Sugarbush Ski Resort

Assistant Accounting Manager, 1988–1994

- Please see previous position for description

Shawmut Bank Holding Company*Manager, Financial Analysis, 1987–1988*

- Apply principles of accounting to analyze past and present financial operations
- Document revenues and expenditures expected and submit to management
- Serve as liaison between senior management and operating division managers
- Advise management on matters such as effective use of resources and assumptions underlying budget forecasts related to interest margin, service income and controllable expense

Shawmut Bank, N.A.*Assistant Controller, 1983–1986*

- Manage accounting department for the Shawmut Bank of Boston
- Direct supervisory responsibility for staff of 5
- Manage monthly closing procedure to assure timely and accurate reporting of revenue
- Prepare and review senior management financial reporting package
- Prepare and review reports required by external regulatory agencies
- Coordinate internal and external audits of company records

Shawmut Corporation*Senior Auditor, 1981–1983*

- Examine and analyze accounting records to determine financial status of establishment
- Prepare reports for management concerning scope of audit, financial conditions found
- Prepare financial reports concerning operating procedures
- Identify problems, diagnose causes and determine corrective actions
- Deliver oral and written presentations for management regarding audit findings and recommendations
- Supervise and coordinate activities of 2–3 staff auditors specializing in specific operations of both banking and non-banking subsidiaries undergoing audit

EDUCATION**Babson College, Wellesley MA***Master of Business Administration, 1987***Johnson State College, Johnson VT***Bachelor of Arts–Social Science, 1974*

**New York Agricultural Energy Efficiency Program
Benefit / Cost Summary**

Electric

Present-Valued Benefits	9,291
Electricity	9,291
Natural Gas	0
Present-Valued Costs	2,347
Net Present Value (thousands 2007\$)	6,945
Benefit/Cost Ratio	3.96

Gas

Present-Valued Benefits	547
Electricity	0
Natural Gas	547
Present-Valued Costs	201
Net Present Value (thousands 2007\$)	346
Benefit/Cost Ratio	2.72

Electric & Gas

Present-Valued Benefits	9,839
Electricity	9,291
Natural Gas	547
Present-Valued Costs	2,548
Net Present Value (thousands 2007\$)	7,290
Benefit/Cost Ratio	3.86

Attachment C

New York Agricultural Electric Efficiency Program

#	Item	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Number of farms eligible	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500
2	Participation rate	0.007	0.007	0.007	0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Program participation - annual	0	263	263	263	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Annual number of electric upgrades per participant	21	21	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Annual number of electric upgrades	0	5,513	5,513	5,513	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	kWh saved/electric upgrade, net	0.0	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9	696.9
7	Net to Gross Ratio, electric	0.7																						
8	kWh saved total		3,841,751	3,841,751	3,841,751																			
9	Ratio of kW/kWh savings	Not needed for this program																						
10	Peak diversity factor	0.75																						
11	kW saved/electric upgrade (summer peak), net	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916	0.0916
12	therms saved/electric upgrade	N/A - not considering possible reduced cooling costs related to lighting upgrades																						
13	Direct program incremental operator costs/program year		\$912,189	\$912,189	\$912,189																			
14	Direct program operator costs /electric upgrade		\$165.48	\$165.48	\$165.48																			
15	Direct program operator costs / participant		\$3,475.01	\$3,475.01	\$3,475.01																			
16	Cost per upgrade (weighted)		\$260	\$260	\$260																			
17	Cost per participant		\$5,460	\$5,460	\$5,460																			
18	Direct program operator costs / kWh		\$0.24	\$0.24	\$0.24																			
19	Participant cost / kWh		\$0.0014	\$0.0014	\$0.0014																			
20	Total program operator budget (thousands)		\$912	\$912	\$912																			
21	Total program operator and participant budget (thousands)		\$918	\$918	\$918																			
22	Incremental GWh saved from current year installations	0.000	3.842	3.842	3.842	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	Incremental MW saved from current year installations	0.000	0.505	0.505	0.505	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24	Billion Btu saved from current year installations	N/A																						
25	Incremental GWh saved from current & prior year installat	0.000	3.842	7.684	11.525	11.525	11.525	11.525	11.525	11.525	11.525	11.525	11.525	11.525	11.525	11.525	7.684	3.842	0.000	0.000	0.000	0.000	0.000	0.000
26	Incremental MW saved from current & prior year installat	0.000	0.505	1.010	1.515	1.515	1.515	1.515	1.515	1.515	1.515	1.515	1.515	1.515	1.515	1.515	1.010	0.505	0.000	0.000	0.000	0.000	0.000	0.000
27	Incr. Billion Btu saved from current & prior year installati	N/A																						
28	MWh Saved in 2015	11,525																						
29	MW of Coincident NYISO Peak Saved in 2015	1,515																						
30	Weighted average measure life (years - electric)	13																						
31	Total Avoided Cost (thousands 2007\$)	0.0	381.7	748.0	1101.0	1082.4	1099.8	1118.8	1121.9	1132.3	1143.0	1153.7	1164.5	1175.5	1186.6	798.5	403.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	Electricity	0.0	381.7	748.0	1101.0	1082.4	1099.8	1118.8	1121.9	1132.3	1143.0	1153.7	1164.5	1175.5	1186.6	798.5	403.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33	Natural Gas																							
34	Discounted Benefits (thousands 2007\$)	0.0	342.9	637.0	888.7	828.1	797.7	769.1	731.0	699.3	669.2	640.2	612.5	586.1	560.7	357.7	171.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	Electricity	0.0	342.9	637.0	888.7	828.1	797.7	769.1	731.0	699.3	669.2	640.2	612.5	586.1	560.7	357.7	171.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	Natural Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37	Discounted Costs (thousands 2007\$)	0.0	824.5	781.5	740.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	Present-Valued Benefits	9291.5																						
39	Electricity	9291.5																						
40	Natural Gas	0.0																						
41	Present-Valued Costs	2346.7																						
42	Net Present Value (thousands 2007\$)	6944.8																						
43	Benefit/Cost Ratio	3.96																						

Notes (tied to row numbers in left column)

- 1 Number of NYS farms.
- 4 Derived from weighted average of electric measure installations (Eg., 21 individual lights per farm)
- 5 Total of all individual measures installed annually
- 6 Derived from weighted average of electric measure savings from electric measure workbook.
- 10 Standard load factor assumption
- 13 Electric portion of total budget = 92%
- 16 Derived from weighted average of measure participant cost from measure workbook.
- 30 Derived from weighted average of measure Equipment Useful Life from measure workbook.

Attachment C

New York Agricultural Energy Efficiency Program

#	Item	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Number of eligible farms		2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374
2	Participation rate (% eligible who participate)		0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%	0.47%
3	Program participation - annual		11	11	11																			
4	Annual number of gas upgrades per participant	-	1,253	1,253	1,253																			
5	Annual number of gas upgrades		13,921	13,921	13,921																			
6	Net therms saved / upgrade		18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
7	Net therms saved/year	0	251,861	251,861	251,861	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Direct program incremental operator costs / program year	0	\$78,791	\$78,791	\$78,791	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Direct program operator costs / gas upgrade	0	\$5.66	\$5.66	\$5.66	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
10	Direct program operator costs / participant		\$7,092	\$7,092	\$7,092																			
11	Cost per upgrade	0.0	\$8.92	\$8.92	\$8.92																			
12	Cost per participant	0.0	\$11,175	\$11,175	\$11,175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	Direct program operator costs / Therm		\$0.31	\$0.31	\$0.31																			
14	Participant cost / Therm		\$0.04	\$0.04	\$0.04																			
15	Total program operator budget (thousands)		\$79	\$79	\$79																			
16	Total program operator and participant budget (thousands)		\$90	\$90	\$90																			
17	GWh saved from current year installations	N/A																						
18	MW saved from current year installations	N/A																						
19	Billion Btu saved from current year installations	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	GWh saved from current & prior year installations	N/A																						
21	MW saved from current & prior year installations	N/A																						
22	Billion Btu saved from current & prior year installations	0	2	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5	2	0	0	0	0
23	Weighted average measure life (years per MBtu - electric)	N/A																						
24	Weighted average measure life (years per MBtu - gas)	16																						
25	Total Avoided Cost (thousands 2007\$)	0.0	22.0	41.4	59.4	58.4	58.6	57.4	56.3	56.2	56.1	56.2	56.7	56.2	55.7	57.0	58.8	60.4	41.1	20.8	0.0	0.0	0.0	0.0

Notes (tied to row numbers in left column)

- 1 Number of NYS farms utilizing natural gas
- 4 Derived from weighted average of electric measure installations (E.g., 21 individual lights per farm)
- 5 Total of all individual measures installed annually
- 6 Derived from weighted average of gas measure savings from electric measure workbook.
- 8 Gas portion of total budget = 8%
- 11 Derived from weighted average of measure participant cost from measure workbook.
- 24 Derived from weighted average of measure Equipment Useful Life from measure workbook.



NEW YORK FEDERATION

Of Resource Conservation and Development Councils

**Black River / St. Lawrence - Central New York - Finger Lakes - Greater Adirondack
Hudson Mohawk - Lake Plains - Lower Hudson-Long Island - Seneca Trail**

Federation Officers

President: Judy L. Wendt Vice President: Ken Bush Secretary: Tom Goodwin
Treasurer: Sheelagh Baily

August 6, 2008

Craig Metz, CEO
EnSave, Inc.
65 Millet St. Suite 105
Richmond, VT 05477

RE: New York Agricultural Energy Efficiency Program

Dear Mr. Metz:

The New York Federation of Resource Conservation & Development Councils (NY RC&D) supports the proposal for the New York Agricultural Energy Efficiency Program (AEEP) proposal currently being submitted to NYSERDA by EnSave, Inc. The program would work with all agricultural customers who pay a system benefit charge to bring energy efficiency to local farms.

NY RC&D's role in the program will be to help support USDA's Rural Energy for America Program (REAP) by assisting in the packaging of grants. NY RC&D will also help to leverage the greater agricultural community by disseminating AEEP information to local producers and encouraging them to participate in the program.

The National Association of Resource Conservation and Development Councils has a national partnership with EnSave and has had the opportunity to work with them in other states. We look forward to developing a comprehensive program within New York State to assist its agricultural community with energy efficiency solutions.

This program will help with economic development, and bring both environmental and societal benefits to the New York State agricultural community. We look forward to being a part of this important program.

Sincerely,

Judy L. Wendt
President
New York Federation of Resource Conservation and Development Councils

Please address all questions regarding this support letter to:

Sharon Ruggi
93 Leavy Hallow Ln.
Hudson Falls, NY 12839
Telephone: 518-747-7384
E-mail: eandsruggi@verizon.net

Visit our Web Site: www.nyrcd.org

The mission of the NYRC&D Federation is to coordinate and support local, state, regional and national priorities for resource, conservation and development. All programs and assistance of the NYRC&D Federation are available without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status.



August 4, 2008

Craig Metz, CEO
EnSave, Inc.
65 Millet Street, Suite 105
Richmond, VT 05477

RE: New York Agricultural Energy Efficiency Program

Dear Mr. Metz:

Dairy Farmers of America is pleased to support EnSave's proposal for the development of the New York Agricultural Energy Efficiency Program.

Dairy Farmers of America (DFA) is a dairy marketing cooperative that serves and is owned by more than 18,000 dairy farmers in 48 states. Our Northeast area Council (which includes New York) has 1,563 members and produces over 2.8 billion pounds of milk per year. DFA is one of the country's most diversified manufacturers of dairy products, food components and ingredients.

This program will help our New York members become more sustainable by reducing their energy costs. The program's cash incentives will also help make the initial investment in new equipment more affordable. We look forward to having this opportunity available to further support New York's dairy farmers.

Again, DFA supports EnSave's proposal. For questions please contact me at (816) 801-6698.

Sincerely,

A handwritten signature in cursive script that reads 'Bruce Brinkmeyer'.

Bruce Brinkmeyer
Vice President, Member Services
Dairy Farmers of America



National Association of Conservation Districts

Partnership Letter

The purpose of this letter is to define the terms of a partnership between the National Association of Conservation Districts (NACD) and EnSave, Inc. (EnSave). This partnership will be considered effective upon the signing of this letter by authorized representatives of both organizations.

The focus of the partnership is to develop programs that advance the conservation mission of each organization, with a focus on agricultural energy issues. The partnership will provide a framework for cooperation between EnSave and Conservation Districts throughout the United States. EnSave and NACD will encourage the exchange of information between the two national organizations through their respective delivery and outreach mechanisms.

Examples of activities developed could include:

- Provide energy audit services to agricultural producers within Conservation Districts
- Train and certify Conservation District staff or their designees to become on-farm energy audit data collection specialists
- Design and implement energy efficiency and other natural resource conservation projects
- Provide energy or natural resource-related technical assistance

The partnership between EnSave, NACD and individual Conservation Districts will support the organizations' common goals through the development and promotion of energy conservation, energy efficiency and resource conservation activities. Through these activities, both organizations will grow and continue to serve agricultural communities throughout the United States.

This partnership helps support each organization's involvement in the local agricultural community by working nationwide while recognizing the need for local, grassroots support for conservation activities.

The partnership does not restrict NACD or EnSave from participating in similar activities with other public or private agencies, organizations, and individuals.

This partnership shall not commit either NACD or EnSave to obligate or transfer any funds. Specific work projects or activities that involve the transfer of funds, services, or property among the organizations will require execution of separate agreements and will be contingent upon the availability of funds.

NATIONAL ASSOCIATION OF
CONSERVATION DISTRICTS

Authorized Representative Date


Krysta Harden 02/08/2008

ENSAVE, INC.

Authorized Representative Date


Craig Metz 02/08/2008