LIPA Efficiency Long Island PY2009 Assessment Volume II

Final

Prepared for:

Long Island Power Authority

Prepared by:

Opinion Dynamics Corporation,
Energy & Resource Solutions Inc.
and Megdal & Associates

Contact: Bill Norton, Vice President
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1. INTRODUCTION TO VOLUME II

1.1 Structure of the Evaluation Report

This report presents the results of the 2009 evaluation of LIPA's Efficiency Long Island (ELI), Renewable Energy and Demand Response programs conducted by the Opinion Dynamics Evaluation Team conducted by Opinion Dynamics, ERS and Megdal Associates. The report is divided into two volumes. The information in this volume (Volume II) provides program-by-program impact analysis results, specific findings from the evaluation team's engineering review of measure level savings and assumptions, and program level process findings. This volume was developed for program planners and managers. Volume I provides an overview of the portfolio evaluation, including findings from the evaluation team's impact and process evaluations.

1.2 Structure of Volume II

The remainder of Volume II is divided into three sections.

Section 2 provides a program-by-program review of energy savings for residential, commercial and renewable programs. For each program, this section outlines the energy and demand savings accrued in the 2009 program year and provides measure specific recommendations.

Section 3 presents supporting documents for the evaluation of energy savings. These include Technical Reference Manuals (TRM) for the Commercial Efficiency program, Energy Efficient Products program, Cool Homes program, Residential Energy Affordability Partnership program and Home Performance Direct program. Each TRM details measure specific energy savings and algorithms for these programs. Following the TRM chapters, this section also provides a review of the Commercial Efficiency program's measure specific realization rates, as well as a review of the Commercial Efficiency program's Project Screening tool.

Section 4 presents supporting documents for the process evaluation conducted for the 2009 program year. These include a list of program documents that the evaluation team reviewed in order to identify key cross-cutting areas for future research and develop program implementation models. This section also contains each program's implementation model, each program's non-energy goals and a review of evaluations conducted over the last ten years.

2. Program – by – Program Findings

This section presents our program-by-program energy and demand savings findings. In Volume I, we compared impacts between program level evaluation findings and program goals. This document focuses on comparing evaluation findings against expected savings, as opposed to comparing evaluation findings to goals. Additionally, we provide program level impacts as well as end use impacts.

The terms associated with impact evaluations can vary. For this volume, the evaluation team uses the following terms to describe program impact results:

- Ex Ante – Assumed impacts tracked and reported by National Grid and contained in program tracking spreadsheets. This term is referred to as "Expected Savings" in Volume I.
- Ex Post – Estimated impacts determined through an evaluation process. This term is referred to as "Evaluated Savings" in Volume I.
- Gross Impacts – The change in energy consumption and/or demand that results directly from program-related actions taken by participants, regardless of why they participated.
- Net Impacts – The total change in energy or demand that is attributable to the program.
- Realization Rate – Ex post impacts divided by ex ante impacts.

The custom rebate component of CEP as well as the wind and solar programs were assessed using engineering analysis of a sample (or in the case of the wind program, the population) of the projects. For the remainder of the CEP and residential programs, a different approach was used.

The engineering method employed to calculate energy savings for the prescriptive component of the Commercial Efficiency Program and residential programs is based on three pieces of information: 1) per unit energy savings values, 2) descriptions on how those per-unit savings were calculated (i.e., the algorithms used by the program to estimate savings), and 3) inputs and assumptions around the values in the algorithms. These algorithms were developed by LIPA's previous planning and design contractor and were used to establish the 2009 savings goals. These sources are the basis for tracking expected program savings. (Volume I provides a comprehensive review of our evaluation methodology).

The evaluation team worked with LIPA and the previous planning and design contractor to obtain this data. Ultimately, this data came from many sources such as the program level tracking datasheets and other documentation from the previous planning and design contractor. However, the evaluation team experienced challenges in performing the same level of assessment across all measures as some of the supporting documentation was not provided by the previous planning and design contractor. Our results reference these cases where applicable.

Moving forward, LIPA has contracted with a new planning and design contractor. The evaluation team is already working closely with the contractor to ensure complete and transparent knowledge of how expected (or Ex-ante) energy estimates are determined.

This report can also be used as a guide by the program design team to prioritize and investigate measures for program years 2010 and 2011.The 2010 estimated measure savings will be based on information from the previous planning contractor. Currently, program level measure savings for 2010 will use the previous planning contractor estimates, but changes are being made where applicable.

2.1 Commercial Program Impacts

2.1.1 Commercial Efficiency Program

The Commercial Efficiency Program's (CEP) mission is to increase energy efficiency at commercial and industrial facilities throughout Long Island by providing rebates for efficient equipment. The program includes prescriptive, custom, and whole building paths, in addition to special incentives for not-for-profit organizations. This section provides results and recommendations from our review of prescriptive, custom measures and the CEP custom project screening tool.

A significant portion of net energy and demand savings from the 2009 portfolio of ELI programs are attributed to the CEP program; accounting for 28% of net MWh and 37% of net MW impact goals. The CEP program met its MW goals, achieving 102% of its goal, and 114% of its MWh goals. As discussed in Volume I, the primary objective of the 2009 evaluation effort was to validate program savings estimates and does not include an assessment of the factors that contributed to achieving program goals. Going forward the evaluation team will conduct process assessments and measurement and verification activities to identify and analyze factors that influence program performance.

The CEP program provides rebates for an extensive variety of measures of all programs in the ELI portfolio. To evaluate measure level savings, we analyzed the savings algorithms and associated inputs for all prescriptive measures and conducted a desk review of a statistically valid sample of custom projects. Table 1 presents measure specific net impacts due to the program. The evaluation team consolidated these measures into one of the seven measure categories. The table provides these results by program component: prescriptive, custom as well as the RECAP program. The table provides a comparison of net ex ante and net ex post savings attributed to the CEP program (e.g. realization rate) by program component and measure category. While realization rates for individual measure categories vary significantly, the program level realization rates show a small variance between ex ante and ex post energy and demand savings.

Lighting comprised the largest share of installed measures (units) and accounted for the majority of demand and energy savings associated with prescriptive projects. Prescriptive Motors and VFD's and Compressed Air projects also contributed significant ex post savings. Custom projects realization rates were 88% and 94% for kW and kWh respectively. RECAP[1]

[1] The Retrofit Energy and Capacity Program (RECAP) targeted commercial customers, multifamily buildings and

projects achieved 100% for kW and kWh realization rates.

Table 1. CEP Net Impacts by Measure Category

Program Component	Category	Number of Units	Ex-Ante		Ex Post		Realization Rate	
			kW Saved	kWh Saved	kW Saved	kWh Saved	kW	kWh
Prescriptive	Performance Lighting	229	2,021.8	9,001,014	2,639.6	8,699,241	131%	97%
	Lighting	25,925	2,222.6	8,918,758	1,906.3	6,816,269	86%	76%
	Motors and VFDs	150	76.3	1,537,800	84.4	1,713,080	110%	113%
	Compressed Air	73	83.4	1,463,863	364.1	1,906,979	436%	130%
	HVAC	339	575.4	1,012,106	595.2	907,673	103%	90%
	HVAC Controls	277	0.4	372,847	0.5	210,582	110%	56%
	Kitchen Equipment	3	4.9	21,166	4.3	18,279	88%	86%
Custom	All Projects	156	3,881.5	23,403,738	3,406.6	21,979,768	88%	94%
RECAP	All Projects	5	0.2	1,086	0.2	1,086	100%	100%
	Totals	**27,154**	**8,868**	**45,732,738**	**9,001**	**42,252,956**	**102%**	**92%**

Prescriptive Program Review

Our review of CEP's prescriptive measure savings algorithms produced a number of recommended changes to deemed savings values, lighting measure savings, central air unit savings, and estimates for equipment operating hours. We provide measure specific explanations and recommendations of our results from our analysis below:

- Lighting – Some of the lighting measures inputs to the savings algorithms in the TRM supplied by the previous planning and design contractor were different than the savings algorithms used in the CEP program tracking database. Specifically, several measures claimed much larger savings in the database than documented in the TRM document. We show an example of this difference in Table 2.

Table 2. Example of Lighting Differences

ID	Lighting Measure	Database Watts	TRM Document Watts
10100	Open Non-recessed Fixture, 4 ft, Specular Reflector	39	4
10110	2 Tandem Wired 4 ft. Fixtures, Specular Reflectors	60	3
10120	Open Non-recessed Fixture, 8 ft, Specular Reflector	46	4
10150	2 T8 or T5 Lamps, Elect. Ballast, Hi-Eff	11	2
10152	3 T8 or T5 Lamps, Elect. Ballast, Hi-Eff	24	5
10160	3 T8 or T5 Lamps, Low Power Elect. Ballast, Hi-Eff	11	2
10162	2 T8 or T5 Lamps, Low Power Elect. Ballast, Hi-Eff	8	4

10171	3 T8 or T5 Lamps, Elect. Ballast, Low Glare	24	5
10195	Recessed Indirect Fluorescent Fixtures T8 or T5	49	6
10200	T8 or T5 Lamps, Elect. Ballast, Indirect	17	13

Our analysis found that the possible savings for these measures were closer to the prior planning and design contractor's TRM document leading to a reduction in realization rates for these measures. This finding will likely be unique to program year 2009 as the introduction of the Siebel system should alleviate this issue in the future.

- HVAC - The evaluation team identified three discrepancies related to HVAC measures. We review these discrepancies below.

The evaluation team adopted ASHRAE 90.1 2004 as a baseline for measures covered by the program standard. The evaluation team found the ex ante baselines to be mostly consistent with ASHRAE 90.1 2004, with the exception of HVAC measures less than 5.4 tons. We recommend that the baseline used in calculations going forward be updated to be consistent with ASHRAE 90.1 2004. These recommendations are stated in detail in the measure-by-measure reports in the CEP TRM Review document (Appendix B).

An additional factor affecting kWh savings occurs due to an inconsistency in the number of equipment operating hours. Not all of the values used in the CEP algorithms document had cited sources, some of the cited sources were not available, some were determined to not be up to date, regionally applicable, or the most defensible source available. As a result, the evaluation team often consulted third-party references, such as ENERGY STAR for objective operating hours or equivalent full load heating and cooling hours. Depending on the equipment, this either increased or decreased the value currently used by the CEP program. The most significant adjustment was made to the ENERGY STAR recommended number of equivalent full-load heating hours for heat pumps (see the measure-by-measure reports in Appendix B for further details). In this case, the evaluated equivalent full load hours were significantly higher, resulting in increased savings, although the magnitude of the change varied by measure.[2]

The evaluation team identified discrepancies that underestimated expected kW savings for central air units less than 65,000 Btu/h.[3] This discrepancy is due to the improper use of EER and SEER values in the program tracking spreadsheets. In these spreadsheets, code for these units is based on SEER, but demand is determined based on EER. Because of how the SEER and EER values are calculated, SEER values are higher than their corresponding EER values. The evaluation team identified ex ante baseline EER values for central air units less than 65,000 Btu/h that were abnormally high. Higher in fact, than the SEER value, indicating that they were set high. However, we do not know the origin of the value. The evaluation team updated the EER values to more appropriately match the recorded SEER values.

[2] Note that this change was insignificant to the portfolio as only four heat pumps were installed in 2009.

[3] We learned that this difference was noted by the NGRID evaluator and discussed with the prior planning contractor who agreed that the difference should be updated for future programs.

- Compressed Air – The high realization rate for kW for Compressed Air was due to differences in demand savings for variable speed controls. In both cases, the ex ante values were found to be low. The evaluation team increased these values substantially. The values are now in line with demand savings applied by NYSERDA for similar measures.
- Motors & VFDs – The evaluation team found the savings methodology presented in the algorithms document to be valid. However, using these algorithms and inputs, the evaluation results did not exactly match those in the database. We recommend that the database algorithms for motors and drives be reviewed to ensure consistency with the CEP algorithms document.

The evaluation team provides a review of measure-specific findings outlined in Appendix B of this report.

Custom Program Review

In addition to the prescriptive rebates, LIPA offers custom rebates for projects that are not covered by prescriptive rebates, or projects determined to be early replacements. The evaluation team conducted an engineering desk review of project files for a sample of completed 2009 custom applications. In the course of this review, we made adjustments to better reflect baseline efficiency assumptions and as built conditions based on program documentation. Most adjustments resulted in slightly decreased energy savings, although, as can be seen in

Table 3, program level results were favorable as many custom programs within the industry have realization rates from 50% to 75%.

Table 3. Custom Projects Net Impacts for Sampled Projects

Custom Projects	kW	kWh
Ex Ante	3,881.5	23,403,738
Ex Post	3,406.6	21,979,768
Realization Rate	**88%**	**94%**

Below we provide measure specific explanations of our results from our analysis below.

Without conducting site visits to verify baseline and post installation conditions, an engineering desk review approach assumes that the existing conditions and proposed conditions stated in the application are accurate. Our review identified some files that contained conflicting information. For example, two VSD drives calculated savings assuming variable volume air-handlers, although other information in the file suggested that the air-handlers were constant volume systems. It is not unusual to find this type of differences within large custom project documentation. In these situations, the evaluation team utilized the assumptions or conclusions used by LIPA. Future evaluations will include on-site or telephone measurement and verification, which will clarify actual operating conditions.

Where an assumed value (such as operating hours or efficiency) used in the project file was deemed atypical and not supported by any documentation in the file, the evaluation team incorporated a more typical value based on engineering judgment or other data. For example, we revised a hospital lighting project that assumed an EER of 10 for the interactive cooling calculation to an EER of 16 for the chilled water system stated to be at this site because an EER of 16 is a more reasonable assumption for a chilled water system.[4]

The team evaluated demand by assessing peak coincident demand. As is common in evaluating demand reductions, variations in ex ante and ex post demand reductions were found. We believe that this is largely due to a lack of clarity in defining demand. It is important to clearly define claimed demand savings as system peak coincident demand reduction. This is especially important in evaluating off peak measures such as EMS measures. Additionally, it is important to consider building type when estimating demand savings. For example, the sampled sites included many schools. Since this evaluation did not include site visits and interviews, it is difficult to predict school operating hours with certainty. In the sampled schools, none of the ex ante estimates discounted the demand savings based on changes to school operating hours in the summer, e.g. being closed or operating at reduced schedules. Further, during the school year, schools generally finish classes around 2:00 PM, while the system peak occurs at 5:00 PM. While schools may have some after class activities, usage is likely to be significantly reduced by 5:00 PM. We recommend incorporating the effect of school operating hours on energy use when claiming demand savings. While the evaluation team still credited demand reduction for schools, we recommend that LIPA evaluate schools operating hours on a case-by-case basis before claiming demand savings. Additionally, we recommend that demand reduction be clearly defined for program staff who evaluate these savings. For example, demand may be defined as Monday through Friday, 2:00 PM – 6:00 PM during July and August. Alternatively, it may be defined more specifically as an ASHRAE summer design day at 5:00 PM. While LIPA is in the best situation to define demand based on its system peak, we recommend clarifying what demand savings means in savings algorithms.

Another reason for the reduction in evaluated demand savings is that demand reductions were claimed for measures that only yield savings during off peak periods. For example, several sampled projects were conversions from damper control to VFD control in variable air volume (VAV) HVAC systems. Since VAV systems are at maximum airflow during LIPA's peak, the VFD installation may have some demand reduction, but significantly less demand savings than during an off peak day.

While the evaluation found favorable realization rates, particularly for kWh savings, several recommendations can be drawn from the review. Below we outline these recommendations for program improvements.

- Minimum equipment efficiency levels should be developed for measures rebated for both prescriptive and custom projects. The evaluation revealed a trend in custom retrofit projects such that equipment installed here was not efficient enough to qualify for prescriptive rebates. One solution would be to ensure that any equipment covered by custom rebates must meet prescriptive minimum efficiency levels. This is an important step in ensuring that LIPA funds only high efficiency equipment.

[4] In evaluating interactive cooling, the evaluation team used estimated EERs of 10 for DX or air cooled chiller cooling, and 16 for water cooled chiller cooling.

- A standard wattage table should be adopted to consistently and accurately evaluate lighting projects, particularly baseline wattages.
- As-built conditions such as actual installed fixture counts should be carefully reviewed to make sure final savings claim is consistent with the as-built conditions.
- Demand reduction calculation methodology should be clearly defined and intended to capture demand reduction coincident with system peak. A protocol should be developed for determining demand savings from buildings such as schools that close or reduce operation in the summer, or technologies, such as VFDs on cooling equipment, that largely result in energy savings only, with the possibility of some small peak demand savings.
- All assumptions used in calculation of savings should be carefully scrutinized during the review process. Some assumptions, such as baseline efficiencies, were found to likely result in an over estimate of savings. Often, a pre-installation site visit is useful to collect baseline equipment data, speak to building staff about baseline operations, or even measure baseline conditions.

Review of the 2009 CEP Project Screening Tool

As part of our analysis of the 2009 CEP program, we reviewed the Commercial Efficiency Program Project Screening Tool (developed by the prior planning contractor), referred to as the "Model". This spreadsheet is used by program staff to screen individual custom projects for cost-effectiveness, calculate a customer incentive and to present financial results to customers. Since cost information is input by the user into the Model, this review focused on the calculation of the total net benefits utilized in screening the measures for cost-effectiveness. Our review found that there were five areas in which the model features or assumptions had an impact on benefit calculations. Our recommendations from this review are in Table 4.

Table 4. CEP Screening Tool Recommended Changes

Model Feature or Assumption	Impact on Benefit Calculation	Recommendation
Cost of generation	Model values are low, reducing calculated benefits in the 30-40% range.	Update Model with current LIPA avoided generation costs.
Cost of capacity	Model capacity values are high, overstating capacity benefits.	Update capacity values to reflect current and projected clearing price based on the ICAP demand curve.
Discount rate	Model discount rate is high, reducing calculated benefits by about 5-15%.	Update Model discount rate.
Life of Measures	When the Model is used in a retrofit application, the resulting life is too short (a 50% range reduction); in a new construction/replacement application, the life may be too long (a 30% range overstatement).	Consider modifying measure lives to be consistent with most of the Northeast.

A full review of all the features of the CEP screening tool is provided in Appendix I.

2.2 Residential Program Impacts

2.2.1 Energy Efficient Products

The overall objective of the Energy Efficient Products (EEP) program is to promote efficient alternatives for residential appliances and lighting. This is accomplished through financial incentives for, and continued consumer education on, high-efficiency products. EEP program requirements are in coordination with ENERGY STAR, the Environmental Protection Agency (EPA), and the U.S. Department of Energy (DOE). EEP efficiency requirements are updated whenever a change is made to any of these programs. ENERGY STAR standards lag the market at times. The program can (and does) move with the market when ENERGY STAR does not support the technology. For example, the program provides incentives for two-speed and variable speed pool pumps, a category that is not currently supported by ENERGY STAR.

The EEP program accounts for a significant portion of net energy and demand savings goals for the 2009 portfolio of ELI programs, accounting for 41% of net MWh goals and 36% of portfolio net MW. The EEP program met its MW goals, achieving 109% of the goal, and fell short in achieving its MWh goal, achieving 68% of the 2009 goal. This review does not include an assessment of the factors that contributed to achieving program goals. Going forward, we will conduct process assessments and measurement and verification activities to identify and analyze factors that influence program performance.

Table 5 provides a review of measure specific net impacts for the program. We find that the kW realization rate is approximately 100% or more for nearly all measures, and 151% for the program overall. The kWh realization rates for lighting, appliances and pool pumps measures range from 96% to 109% while the realization rate for Room AC measures is 43%. Lighting comprises the largest share of units installed as well as the largest share of kW and kWh. Appliances achieved the second largest share of impacts, despite having a much smaller number of units installed, followed by HVAC and Pool Pumps.

Table 5. EEP Net Measure Specific Impacts

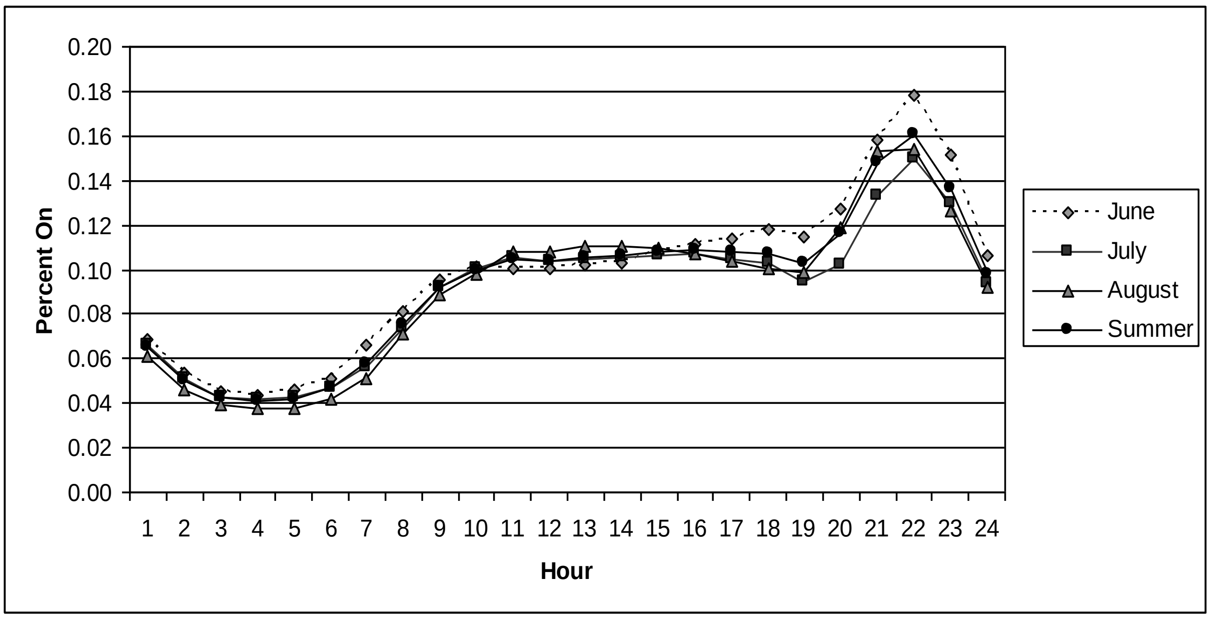
EEP Category	N	Net Ex Ante Impacts		Net Ex Post Impacts		Realization Rate	
		kW	kWh	kW	kWh	kW	kWh
Lighting	1,114,157	3,901	59,063,051	6,230	56,547,813	160%	96%
Appliances	33,378	1,120	3,940,369	1,764	4,307,681	158%	109%
Room AC	12,959	732	420,246	714	182,037	98%	43%
Pool Pumps	164	74	140,201	74	140,201	100%	100%
Total		**5,827**	**63,563,867**	**8,782**	**61,177,732**	**151%**	**96%**

The basis for the evaluation of EEP impacts was the program tracking spreadsheet which contains deemed savings values on an aggregate and per unit basis. While this prevented us from consulting the sources or algorithms used to generate ex-ante deemed savings, we did conduct our own research to find what we believe to be the most defensible sources to determine savings for each measure. When applicable, external references were cited to determine baselines, energy savings, run hours and/or coincidence factor for consumption and coincident demand savings, respectively. We recommended that these sources and the evaluation methodology be adopted in the development of future deemed savings and a TRM of residential measures. Our specific values are found in Appendix C.

We provide measure specific explanations of our results from our analysis below:

- For lighting measures, the evaluation team found realization rates of 160% for kW and 96% for kWh. We were unable to determine specific algorithms and inputs within the ex ante estimates for demand impacts. For the ex post analysis, we utilized ENERGY STAR savings values, combined with a coincidence factor based on a residential lighting study done for a number of regional entities[5]. Figure 1 is from the study and illustrates coincidence with summer peak. Note that peak was evaluated as 5:00 PM, resulting in a coincidence factor of 0.11.

Figure 1. Residential CFL Coincidence



- For appliances, the energy savings value used for the ENERGY STAR Dishwasher and Dehumidifier measures were found to be low and were substantially raised in our ex post analysis. However, this result had a minimal impact on reported savings for appliances, as no dishwashers were rebated in 2009 and the savings for the ~4,500 dehumidifiers rebated are small compared to other appliances. Moving forward, we recommend that this value be increased to match the energy savings value used by ENERGY STAR (where applicable). The ex ante and ex post per-unit values for clothes washers and refrigerators were identical (e.g. the realization rate was 100%). For room AC units, the evaluation team assumes that the ex ante algorithms did not recognize that these units are operated differently from central A/C or commercial A/C units. Room air conditioners tend to be used much more intermittently and thus

[5] Nexus Market Research, “Residential Lighting Markdown Impact evaluation”, 2009.

have significantly lower run hours. We recommend that equivalent full load hours (EFLHs) used are modified so that 2010 measures reflect the recommendations in the EEP TRM. The EFLHs used in this evaluation were a derivative of a NEEP study that measured EFLHs of a number of room A/C units. The EFLHs were adjusted to reflect weather differences between Boston and Long Island. While the Cooling Degree Days (CCDs) in Boston are slightly higher than Islip, LIPA felt that Kennedy airport weather was more representative of Long Island's weather. As such, the EFLHs have been adjusted to account for the increased CCDs at Kennedy Airport.

- For pool pumps, the evaluation team found that the savings values were reasonable. However, we recommend further research to measure the pre and post conditions to fine tune the savings values used for this program.

2.2.2 Residential Existing Homes

Residential Existing Homes programs include Residential Energy Affordability Partnership (REAP), Cool Homes, Home Performance with ENERGY STAR®, Home Performance Direct and Information & Education. Ex post savings from the Residential Existing Homes comprises 30% of portfolio net MW impact goals and 10% of net MWh impact goals. Below we discuss the impacts for each program.

Residential Energy Affordability Partnership (REAP)

The objective of the Residential Energy Affordability Partnership (REAP) is to assist low-income households with energy efficiency improvements. In particular, the program focuses on account holders having difficulty making payments. The logic behind this program is that a reduction in utility bills through energy efficiency would lower LIPA's financial risk with collection and bad debt while improving residential energy efficiency on Long Island. Specific income requirements must be met before households are eligible for the REAP program.

Ex post savings from REAP makes up about 4% of portfolio net MW impact goals, and 4% of portfolio net MWh impact goals. REAP exceeded its goals, achieving 140% of its MW goal and 104% of its MWh goal. This review does not include an assessment of the factors that contributed to achieving program goals. Going forward, we will conduct process assessments and measurement and verification activities to identify and analyze factors that influence program performance.

Table 6 provides a review of measure specific net impacts for REAP. Our results show that for kW, the program has a realization rate of 151%. For kWh, the program has a realization rate of 108%. Lighting measures comprised the largest share of energy savings, followed by HVAC, refrigerators, and Hot Water measures. Lighting which comprises the largest share of installations and energy and demand savings had a realization rate of 110% for kW and 107% for kWh. For both HVAC and hot water measures, the evaluation team found realization rates that exceeded 145% in some cases reaching over 600% and falling below 10% for other measures.

Table 6. REAP Net Measure Specific Impacts

Measure Category	N	Ex Ante		Ex Post		Realization Rate	
		kW	kWh	kW	kWh	kW	kWh

Lighting	40,544	193.2	3,858,689	212.8	4,140,373	110%	107%
HVAC	1,732	105.2	91,313	485.5	608,288	462%	666%
Refrigerators	1,487	314.8	1,764,435	200.1	1,427,520	64%	81%
Hot Water	1,076	5.3	56,136	37.1	81,256	7%	145%
Total		**618.5**	**5,770,573**	**935.5**	**6,257,437**	**151%**	**108%**

The evaluation team was able to collect all ex ante deemed savings values, along with documentation of the methodology employed to calculate savings. However, in some cases, not all of the ex ante inputs and assumptions could be identified.

Below are measure specific explanations of the results:

- For lighting measures, the evaluation team concluded that the algorithms and values used are reasonable and no changes are recommended.
- For HVAC measures, an update to the number of heating degree days (HDD) accounts for the majority of realization rate discrepancies. The evaluation team referenced an average of the National Oceanic and Atmospheric Administration (NOAA) data to determine a more current HDD value for Long Island. We recommend utilizing NOAA data for future HDD values.
- Some uncertainty exists for domestic hot water measures, as it is unknown from 2009 statistics if all projects involved electric water heating. We believe this is being appropriately handled based on ex ante savings values. However, for these measures there was no documentation available from the previous planning contractor on the exact inputs utilized to assess savings. Because we had no specific information on savings, we utilized a study that determined the market penetration of electric water heaters nationwide to account for a mix of electric and non electric hot water heaters. While we cannot identify some of the inputs used in the ex ante savings determination, we suspect discrepancies are attributable to the coincidence factor and the blend of electric and non electric hot water heaters. We recommend evaluating the projects that involve electric water heating in future evaluation efforts.

Cool Homes

The Cool Homes program seeks to improve the energy efficiency of residential heating, ventilation and air conditioning (HVAC) systems throughout Long Island. Through the assistance of a LIPA-approved contractor, residential account holders can apply for incentives associated with the installation of higher-efficiency HVAC equipment. Additionally, a general home tune-up, which could lead to a future equipment incentive, is associated with the Cool Homes program.

Ex post savings from Cool Homes makes up 14% of portfolio net MW impact goals, and 2% of portfolio net MWh impact goals. Cool Homes exceeded its MW and MWh goals, achieving 108% of MW and 166% of MWh. This evaluation does not include an assessment of the factors that contributed to achieving program goals. Going forward, we will conduct process assessments and measurement and verification activities to identify and analyze factors that influence program performance.

Table 7 provides measure specific net impacts for Cool Homes. Results show that for kW, the program has a realization rate of 75%; and for kWh, the program has a realization rate of 97%. The measure specific net ex post values were at times lower than the net ex ante values and at times, substantially higher. A/C Tune ups, installation of Central A/C units, and geothermal heat pumps generated the largest energy savings by measure. Our results show that for air source heat pumps and geothermal heat pumps, kWh realization rates approached 481% and 228% respectively.

Table 7. Cool Homes Net Measure Specific Impacts

Measure Category	N	Net Ex Ante Impacts		Net Ex Post Impacts		Realization Rate	
		kW	kWh	kW	kWh	kW	KWh
A/C Tuneup	3,875	3,208	2,476,733	2,075	1,955,396	65%	79%
Central A/C	878	1,046	588,238	1,133	454,628	108%	77%
Geothermal Heat Pump	136	364	243,827	201	555,959	55%	228%
Unitary Heat Pump	121	117	62,226	135	299,130	115%	481%
Furnace Fans	38	9.6	15,732	7.2	12,681	75%	81%
Total		**4,745**	**3,386,756**	**3,551**	**3,277,794**	**75%**	**97%**

Current program algorithms for many measures involve statistics for free rider, spillover, line loss, and run hours specific to Long Island. The evaluation team has no comparable information with which to review these algorithms, as any alternative data would not be specific to Long Island. Therefore, the evaluation team has verified these inputs as reasonable based on engineering judgment. However, we recommend that these algorithms be considered as possible future research areas. Line loss factors were applied at the total savings level listed in Table 7, but not at the measure-by-measure evaluations listed in Appendix E.

We provide measure specific explanations of our results from our analysis below:

- For A/C Tuneup and Central A/C measures, program staff recently updated the algorithms used to determine savings. It is anticipated that the updated algorithms will more accurately represent savings.
- For Heat Pump measures, we believe discrepancies in realization rates can be attributed to higher equivalent full-load heating hours (EFLHs) recommended by ENERGY STAR for New York City. Program documents did not contain data for heating hours for Air-Source Heat Pump, Geothermal Heat Pump, and Ductless Mini Split measures. There are a variety of sources that cite residential EFLHs, which vary significantly, even when comparing those sources that utilize similar locations. For this evaluation, we used ENERGY STAR EFLHs for New York City for both heating and cooling. We recommend that EFLHs be considered for primary research going forward, given the large variations in currently available reference sources
- For Geothermal Heat Pump measures, limited algorithm input data and assumptions were available. The primary reason for high realization rates for these measures is

the unusually low baseline EER assumed by the program. The evaluation team recommends that this baseline be reassessed going forward.

- For the Electrically Commutated Motors (ECMs) on Furnace Fans measures, only unreferenced deemed savings were available from program documentation. Thus, it is difficult to determine specific reasons for discrepancies in the realization rate for furnaces. We recommend that LIPA utilize the revised algorithm presented in the TRM going forward.

Home Performance with ENERGY STAR® / Home Performance Direct

The Home Performance with ENERGY STAR® and Home Performance Direct (HPD) programs work in concert to provide homeowners with free low cost measures and information to encourage greater energy savings. Together, the programs consist of a full-home audit, home energy rating score, and possible incentives for new, efficient equipment. The HPD program conducts full-home audits with a LIPA certified home energy rater. If deemed necessary, the HPD program provides free air and duct sealing measures and compact fluorescent light bulbs. Home Performance with ENERGY STAR® encourages installation of weatherization, insulation and other building shell measures through incentives for residential account holders.

Ex post savings from Home Performance with ENERGY STAR® and Home Performance Direct make up 6% of portfolio net MW impact goals, and 2% of portfolio net MWh impact goals. This program met its MW and MWh goals, achieving 209% of MW and 351% of MWh. Our evaluation does not include an assessment of the factors that contributed to achieving program goals. Going forward, we will conduct process assessments and measurement and verification activities to identify and analyze factors that influence program performance.

Table 8 provides net measure specific impacts for both programs. The overall realization rate for both programs was 101%. Lighting comprised the largest share of energy savings, followed by insulation, HVAC and air sealing.

Table 8. Home Performance with ENERGY STAR® and Home Performance Direct Net Measure Specific Impacts

Measure Category	N	Net Ex Ante Impacts		Net Ex Post Impacts		Realization Rate	
		kW	kWh	kW	kWh	kW	kWh
Lighting	29,839	1,041.6	1,041,615	1,041.6	1,041,615	100%	100%
Insulation	1,341,692	64.0	781,482	64.0	781,482	100%	100%
HVAC	58,443	425.8	599,322	425.8	599,322	100%	100%
Air Sealing	8,345	30.2	416,974	30.2	416,974	100%	100%
Hot Water	732	22.6	46,578	31	68,773	137%	148%
Door/Window	90	0.3	3,214	0.3	3,214	100%	100%
Totals		**1,584.5**	**2,889,185**	**1,592.8**	**2,911,380**	**101%**	**101%**

We provide measure specific explanations of our results from our analysis below:

- The evaluation team obtained documentation concerning the algorithms for each of the HPD measures. However, information on algorithm inputs was incomplete due to lack of supporting documentation from the previous planning and design contractor. Due to this, we only assessed algorithms for HVAC, Air Sealing, Lighting, and a realization rate was given based on algorithm logic. Nevertheless, the evaluation team suggests several recommendations for these measures moving forward as indicated in the detailed measure review in Appendix F.
- A number of measures, Door/Window, Insulation, contained sufficient information in program documentation to determine savings. The evaluation team verified the methodology and assessed a realization rate of 100%.
- Hot Water measures contained insufficient information to evaluate the ex ante methods and assumptions used to calculate energy and demand savings. However, the evaluation team independently evaluated the ex post savings to produce a realization rate of 137% and 148% for kW and kWh respectively.

Information & Education

The evaluation team conducted a desk review of LIPA's Information & Education Program. The Information & Education Program is a marketing, education, and market transformation oriented program that is offered to residential customers and includes on-line home energy analysis tools (HEA), and in-classroom energy education (In Concert With the Environment (ICWE) presentations to students in Grades 4-8 with accompanying audit activities. The program also supports brand representation at community events.

Ex Post energy savings from Information & Education makes up 5% of portfolio net MW impact goals, and 1% of portfolio net MWh impact goals. The program met its MW and MWh goals, achieving 369% of MW and 249% of MWh. Our evaluation does not include an assessment of the factors that contributed to achieving program goals. Going forward, we will conduct process assessments and possibly measurement and verification activities to identify and analyze factors that influence program performance. However, the program design team is currently discussing whether energy savings will be claimed after 2009, which may affect future evaluation efforts.

Table 9 provides net impacts for the program. For both In Concert with the Environment (ICWE) and the Home Energy Audit (HEA), our review found a realization rate over 100% for kW. This result is because the ex ante values used an identical per unit kW impact for the HEA as well as ICWE rather than the expected higher value for the HEA, leading to a higher kW realization rate. This is described in more detail below.

Table 9. Information & Education Net Impacts

Measure Category	N	Net Ex Ante Impacts		Net Ex Post Impacts		Realization Rate	
		kW	kWh	kW	kWh	kW	kWh
In Concert with the Environment	3,224	239	711,537	239	444,267	100%	62%

Home Energy Audit	6,923	512	1,527,906	942	1,795,134	184%	117%
Total		**751**	**2,239,443**	**1,180**	**2,239,401**	**157%**	**100%**

LIPA estimates the program impact as the product of the number of program participants and a deemed savings per participant. In 2008, LIPA commissioned RLW Analytics, Inc to conduct an evaluation of the program. This evaluation was documented in a report entitled "An Impact Evaluation of the Long Island Power Authority's Clean Energy Initiative: Information and Education Program", Final Report, March 6, 2008. This study surveyed participants to determine the rates at which measures were installed and behavior changed as a result of either ICWE or HEA participation. Impacts were estimated using a unit estimator for each measure installed or behavior changed. The resulting savings were appropriate per implementing participant. While the original design of the program was intended to account for both implementers and non-implementers, the low response rate led to the conclusion that the results were biased and overly represented implementers. Table 10 provides a summary of the method for determining participation rates. This method is consistent with the definition of a participant as identified in the evaluation report referenced above.

Table 10. Information & Education Program Summary of Participation

Program Component	Measure of participation	2009 Participants
In-classroom program, ICWE	A participant is counted as a returned student energy survey package. Program notes indicate the program was presented to over 3,500 students.	3,224
Home Energy Audit	Number of unique users completing the Home Profile Questions portion of the on-line audit	6,923
Community events	Participation not tabulated for impact purposes	
Total		**10,147**

A white paper entitled "LIPA Residential Information and Education Program: Discussion of RLW Analytics, Inc Evaluation Findings and Results", March 2008, further qualified the impact finding, developing reasonable ratios of non-implementing vs. implementing participants. Table 11 provides a summary of savings per participant.

Table 11. Information & Education Program Summary of Savings Findings[6]

Program Component	kWh/part	kW/part
A. ICWE student, with implemented measures	275.5	0.148
B. ICWE student, weighted for non-implementers	137.8	0.074
C. HEA user, with implemented measures	432.1	0.227
D. HEA user, with some implemented measures	259.3	0.136
E. Weighted average savings for ICWE and HEA participants	220.7	0.114

[6] LIPA Residential Information and Education Program: Discussion of RLW Analytics, Inc. Evaluation Findings and Results, March 2008.

The values of 220.7 kWh/participant and 0.114 kW/participant reflected a particular proportion of HEA and ICWE which had been achieved at the time of the report. The ex post assessment did not use these values, but applied the ICWE (B) and HEA (D) values in Table 11 to the number of participants from Table 10. However, this had no effect on energy impacts, indicating that the ratio of ICWE to HEA participants has not changed substantially from when the original report occurred. However, there was a difference in the demand savings with the ex post values higher than the ex ante values. While we are not certain what occurred, it seems that the ex ante value of 0.074 was applied for all participants rather than the 0.114 weighted average factor.

The evaluation report shows very similar results to preliminary estimates projected by LIPA. This indicates that the current methodology of projecting performance is accurate and should be continued with the exception of using the correct weighted demand factor. We recommend that LIPA use the unit estimators appropriate for the program component which will ensure that savings are not distorted by changes in participation patterns.

2.2.3 Residential New Homes

The Residential New Homes program is a new construction program. Historically, the previous LIPA efficiency program worked with many of the towns in Long Island to institute ENERGY STAR standard as the code for new residential construction. In 2009, the program provided incentives to build beyond this code, increasing the incentive as buildings became more efficient. Similar to the Energy Efficient Products program, Residential New Homes follows ENERGY STAR and EPA guidelines.

Ex post savings from Residential New Homes makes up 2% of portfolio net MW impact goals, and 1% of portfolio net MWh impact goals. This program met its MW and MWh goals, achieving 197% of MW and 129% of MWh goals. Our evaluation does not include an assessment of the factors that contributed to achieving program goals. Going forward, we will conduct process assessments and possibly measurement and verification activities to identify and analyze factors that influence program performance.

Table 12 provides net impacts for the program. We found a realization rate of 100% for kW and kWh for the program.

Table 12. Residential New Homes Net Impacts

Measure Category	N	Net Ex Ante Impacts		Net Ex Post Impacts		Realization Rate	
		kW	kWh	kW	kWh	kW	kWh
New Homes	286	535	754,000	535	754,000	100%	100%

By examining the savings algorithm and assumptions associated with the whole-home energy rating, the evaluation team verified the current ex ante method. For the most part, the characteristics of the user-defined reference home (UDRH) align well with REM/Rate software and other equivalent incentive programs. Likewise, installation statistics from 2009 are assumed to be accurate, and the Residential New Homes program has been given a total realization rate of 100% for both consumption and demand savings.

This program uses a different approach to program tracking than the other ELI programs. Those programs use program tracking database information as the basis for the ex ante and ex post impacts. This program's tracking database includes estimated savings from the Home Energy Rating System (HERS) rating. These values are adjusted later based on the REM/Rate software that reviews how the home was actually built. In many cases, this review reduces the impacts associated with the program. However, these adjustments are not included in the program tracking database. As such, because the HERS rating information was higher than the monthly reporting impacts (772 MWh versus 754 MWh in the monthly reports), the ex post value was set to equal the ex ante value.

LIPA currently uses its own method of rating the energy performance of a home. This is based on ENERGY STAR's previous Score rating system, with the addition of an updated reference home. We recommend that when the new ENERGY STAR standards become active, that LIPA consider updating their rating system and minimum requirements to be consistent with the new national protocols.

2.3 Renewables Portfolio Impacts

2.3.1 Small Wind

The Small Wind program seeks to address economic barriers to wind energy by offering rebates, building partnerships and training market actors. Ex post savings from Small Wind makes up 0.5% of renewable program net MW goals and 1% of net MWh goals. This program did not meet its MW and MWh goals, achieving 4% of MW goals and 3% of MWh goals. Our evaluation does not include an assessment of the factors that contributed to achieving program goals. Going forward, we will conduct process assessments and possibly measurement and verification activities to identify and analyze factors that influence program performance.

Small Wind is a newly instituted program which had only completed three projects at the close of 2009. For two of the sites, we found some deviation between the three to four months of available performance data compared to projected performance. However, the aggregate performance was found to be nearly identical to the projected performance, resulting in an energy realization rate of 99%.

Table **13** provides a summary of Small Wind program results.

Table 13. Small Wind Net Impacts

Small Wind	kW Impacts	kWh Impacts
Ex Ante	2.8	34,420
Ex Post	2.8	34,055
Realization Rate	**100%**	**99%**

Notably, one of the wind turbines suffered a broken prop and is not currently working. Due to the small number of projects, the evaluation team has not penalized LIPA for this equipment failure. This small data set shows a one out of three failure rate, which is likely not representative of a future failure rate. It is indicative, however, that a service factor may need to be applied should continued equipment failures be observed.

We provide explanations of our results from our analysis below:

- The evaluation results show very similar performance to preliminary estimates projected by LIPA. This indicates that the current ex ante methodology of projecting performance is accurate and should be continued.
- The demand impact of wind resources is one area of potential further research. The evaluation team analyzed average wind speed during July & August from 2PM-7PM. This revealed an average hub wind speed of 6 m/s. By reviewing the power curves, this equates to a similar demand reduction as that claimed by LIPA. As such, the demand realization rate is 100%. However, LIPA should consider whether to claim any demand savings for wind, given its intermittent availability and low coincidence to summer peaking utilities. If LIPA chooses to continue to claim demand savings, the evaluation team recommends increased data collection to analyze the production rates during LIPA's highest demand periods.
- In discussions with LIPA, we found that measurement and verification (M&V) results are captured by the program and that the program uses 30 year typical meteorological year data to forecast savings. However, the program does not appear to be revising the program tracking database to reflect the estimates of savings from M&V activities. Typically programs that have an M&V component adjust claimed savings based on actual measured and verified performance. After one year, a program typically performs a "true up" when the program pays out the remainder of the incentive. However, for this program there does not seem to be a formal process for assuring the true up is updated in the program tracking database. The evaluation team strongly recommends that LIPA adopt this practice to increase the defensibility of savings claims. While this evaluation has shown that this adjustment will not have a large impact on savings, future projects may show larger variation between projected and actual performance. It is important to claim savings based on the best available data, which for this program is the M&V results. We recommend that this adjustment occurs when the payment true up occurs.
- The evaluation team recommends that, where cost effective, LIPA install interval metering and anemometers with logging capability on a sample of sites for increased M&V accuracy. This will allow for a more accurate understanding of actual wind profiles at hub height at the installation site. Additionally, this will allow for a true up of the systems rated power curve with the actual power curve. If this type of monitoring is capable of interval logging, LIPA can analyze wind production on its peak day(s).

2.3.2 Solar Pioneer & Entrepreneur

The Solar Pioneer & Entrepreneur Program is intended to foster the growth of photovoltaic (PV) installations on Long Island. Most PV systems require a large initial capital investment. By offering cash rebates, LIPA reduces the initial capital investment and shortens the payback period of the project. State and federal tax credits further improve customer economics. Ex post savings from Solar Pioneer and Entrepreneur make up 141% of MW goals, and 113% of MWh goals for the renewables programs. This program exceeded its MW and MWh goals, achieving 146% of MW and 137% of MWh goals. Our evaluation does not include an assessment of the factors that contributed to achieving program goals. Going forward, we will conduct process assessments and possibly measurement and verification activities to identify and analyze factors that influence program performance.

LIPA also offers a "Net Metering" program for all PV installations. At times, a net metered customer's PV system may generate more electric energy than their consumption. When this occurs, the electric meter will spin in reverse. The excess electricity is returned to the LIPA system. At the end of each month, the net metered customer is billed only for the net consumption, that is, the amount of electricity consumed, less the amount of electricity produced. At the end of the year, if the customer has produced more than it has used, then it will receive payment from LIPA at their avoided cost.

Table 14 reviews the rebates and caps available through LIPA for photovoltaic installations. The Solar Pioneer program is intended for residential customers, while the Solar Entrepreneur program is intended for municipal and commercial customers.

Table 14. 2009 Solar Pioneer & Entrepreneur Incentives

Measure	Incentive	kW Range	Cap
Solar Pioneer - Residential	$3.50/Watt	0-10 kW	10 kW or $27,500
Solar Entrepreneur - Municipal	$4.50/Watt	First 10 kW	100 kW or $195,000
Solar Entrepreneur - Municipal	$2.50/Watt	>10 to 50 kW	
Solar Entrepreneur - Municipal	$1.00/Watt	>50 to 100 kW	
Solar Entrepreneur - Commercial	$3.50/Watt	First 10 kW	100 kW or $137,500
Solar Entrepreneur - Commercial	$1.50/Watt	>10 to 50 kW	
Solar Entrepreneur - Commercial	$1.00/Watt	>50 to 100 kW	

The evaluation team collected all relevant information available to evaluate the energy and demand savings claimed by the Solar Pioneer & Entrepreneur program. Of particular value was a primary research report, conducted by Steven Winter Associates[7]. This study evaluated the real time performance of systems funded by the program. Within this report, performance was found to be affected by a number of factors, including orientation, tilt, shading, systems being turned off, failed inverters, variations in applied versus installed equipment size, type, and efficiency, etc. As would be expected, these factors resulted in a slightly lower real world performance than projected performance. However, at a realization rate of 88% for energy and 93% for demand, the ex post performance is reasonably close to the ex ante performance. Below we present our estimates for energy and demand savings impacts.

Table 15. Solar Pioneer & Entrepreneur Summary of Results

Solar Pioneer & Entrepreneur	MW Impacts	MWh Impacts
Ex Ante	3.3	7,048
Ex Post	3.1	6,202
Realization Rate	**93%**	**88%**

[7] Steven Winter Associates, "Performance Evaluation Study of Photovoltaic Systems Installed through the Long Island Power Authority's Clean Energy Initiative Solar Pioneer Program: Report on 2007 and 2008 PV System Evaluations". Two reports submitted to LIPA in October 2008 and May 2009 respectively. The evaluation team identified these reports as technically sound.

Both LIPA values and evaluation data are available as of 2000. We found a noticeable trend of realization rates stabilizing from 2006 to 2008 in the evaluation data. Based on this trend, our results apply the findings from only these years to the 2009 evaluation. To use older data would penalize current performance based on early lessons learned and not reflect the most current program procedures.

Long term monitoring has recently been installed on a sample of completed projects. The evaluation team recommends analyzing this data, when available in 2010, and updating the realization rate to reflect the analysis results.

Demand and Energy Saving Assessments

There are a number of factors that influence savings, including differences in installed capacity, tilt and orientation, equipment efficiency, inverter efficiency, and equipment failure. Since the program ex ante values account for most of these values to estimate savings, the ex post realization rates are based on discrepancies between ex ante values used by LIPA and real world observations and measurements as documented in the Steven Winter Associates report. Below we provide demand (Table 16) and energy savings (Table 17) assessments for the program.

For demand savings, the ex post evaluation multiplied ex ante MW values by the average overall efficiency of 93% to obtain the ex post demand impacts. The evaluation team noticed an incongruity in the database. The summer coincidence factor changed from 0.5 to 0.65 in May 2005. This is likely due to LIPA updating program savings claims as better data became available. While a coincidence factor of 0.65 is reasonable[8], the evaluation team recommends further research to validate this value.

Table 16. Solar Pioneer & Entrepreneur Demand Components Realization Rates

Installation Year	Installed Capacity	Tilt & Orientation	DC Equipment	Inverter	Equipment Failure	Line Loss Adjustment	Overall
2006	100%	96%	101%	99%	98%	101%	**95%**
2007	103%	98%	100%	99%	96%	101%	**97%**
2008	90%	96%	101%	100%	100%	101%	**88%**
Average	**98%**	**97%**	**101%**	**99%**	**98%**	**101%**	**93%**

The percents in Table 16 are the LIPA program values divided by the measured values from the Steven Winters report for that item and year.

The Steven Winter report calculates realization rates for a number of different demand components. Since LIPA already adjusts for many of these factors, these rates are presented here as the ratio of the ex post derating factors to the ex ante derating factors. For example, LIPA derated for inverter efficiency by a factor of 0.95 in each year. The average actual inverter efficiency was 94% in 2006 and 2007 and 95% in 2008, resulting in an inverter efficiency realization rate of 99%.

[8] NYSERDA uses a coincidence factor of .70. .

We found an error in the line loss adjustment factor for demand. The demand line losses are 9.2% and the program database used a 1.092 multiplier to adjust for losses. However the correct multiplier is 1/(1-0.092), or 1.1013 (resulting in a realization rate of 101% as seen in Table 16). This same error was not made on the energy line loss adjustment factor.

Similar to the demand calculations, we used the Steven Winter report to adjust the ex ante energy savings using their evaluation measurements of these values. As with demand, we present the ratio of the ex post derating factors to the ex ante derating factors. The ex post evaluation multiplied the ex ante MWh values by the average overall efficiency of 0.88 (Table 17) to obtain ex post energy impacts.

Table 17. Solar Pioneer & Entrepreneur Energy Components Realization Rates

Installation Year	Installed Capacity	Tilt & Orientation	Shading	DC Equipment	Inverter	Equipment Failure	Overall
2006	100%	96%	94%	101%	99%	98%	**88%**
2007	103%	98%	94%	100%	99%	96%	**90%**
2008	90%	96%	98%	101%	100%	100%	**86%**
Average	**98%**	**97%**	**95%**	**101%**	**99%**	**98%**	**88%**

The evaluation team noticed a trend of increasing ex post performance, relative to ex ante performance. Although not known for certain, we believe that this can be credited to incorporating evaluation results and lessons learned in program administration into future iterations of the program. The evaluation team commends LIPA and encourages these practices.

Factors that Influence Energy and Demand Savings

Below we review some of these factors that influence both demand reduction and energy savings. To determine ex-post demand savings, the evaluation team accounted for field measured and observed variations in installed capacity, tilt, orientation, equipment efficiency, inverter efficiency, and failed equipment. To determine ex-post energy savings, we accounted for the same factors affecting demand as well as the total amount of sun the system receives, and observed shading obstructions that decrease the effectiveness of the arrays. Below we review select factors that influence demand reduction and energy savings.

Equipment Efficiency - There are losses associated with the system's performance before the direct current reaches the inverter. These losses must be taken into account when determining the total demand output of a system.

Inverter Efficiency - Every photovoltaic panel is rated in direct current (DC) watts. This rating is determined by testing the panel under standard laboratory conditions. This value is the starting point in evaluating the amount of energy a PV array can produce. However, since almost every electrical piece of equipment found in residential, municipal, commercial and industrial locations runs on alternating current (AC) power, the electricity produced by PV panels must be converted from DC power to AC power. This requires the use of a DC to AC inverter. There are losses associated with such a unit, so the total power produced by the PV panel is reduced when the electricity is converted to AC. While the average industry standard inverter efficiency is 95%, the finding in the Steven Winter report indicated the measured efficiencies of each inverter in the LIPA sample was 94%.

Shading, Tilt, and Orientation - While energy performance adjusts for additional shading observed on site, demand does not. The evaluation team determined that this increased shading would not likely affect the coincident demand, which occurs when the angle of the summer sun is relatively high. Shading obstructions will rarely be directly above the panels, obstructing the afternoon sun. However, shading obstructions will affect energy savings.

We recommend that the planning and design contractor carry out the following activities:

- Update the demand line loss factor to a multiplier of 1.1013.
- Continue to evaluate system performance. In addition to informing future programs, ex-post site work can identify and fix issues such as failed inverters, systems switched off, and other issues.
- Use monitoring currently being installed to identify the most appropriate coincidence factor.
- Use monitoring currently being installed to re-evaluate realization rates in 2010.

3. Impact Evaluation Supporting Documents

Below we provide supporting documents for the 2009 program year impact evaluation results provided in Volume I.

A. Technical Reference Manual

This section provides measure realization rates (i.e. expected (or Ex-ante) per-unit measure impacts divided by evaluation per-unit measure impacts) for program measures installed in the 2009 program year as well as revised savings algorithms for a subset of program measures deemed to be in need of updating. These Technical Reference Manuals (TRMs) are provided for the following programs: Commercial Efficiency Program, Energy Efficient Products, Residential Energy Affordability Partnership (REAP), Cool Homes, and Home Performance Direct. Each TRM details measure specific energy savings and algorithms for these programs. Following the TRM chapters, this section also provides a review of the Commercial Efficiency program's measure specific realization rates, as well as a review of the Commercial Efficiency program's Project Screening tool.

B. Commercial Efficiency Program TRM

Program: *CCP* **Category:** *Compressed Air*

Measure: **Air Recievers for Load/No Load Compressors - 3 Gal/CFM**

Description: This measure involves the installation of a receiver rated at 3 gallons per cfm compressed air. An air receiver limits the number of cycles for a load-unload compressor by acting as a buffer during high-demand periods. The baseline for this measure is a 1 gal/cfm air receiver downstream of a load/unload compressor.

Incentive: $2/Gal per compressor CFM

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references seem reasonable and no major changes are recommended. The evaluation team ran a simulation to estimate the savings that would be realized by increasing the compressed air storage from 1 gal/cfm to 3 gal/cfm. The values used in this analysis were referenced from Efficiency Vermont's Compressed Air Storage program as well as values used in the Advanced Management of Compressed Air Systems Training Program. CCP's report concludes that air storage of 3 gal/cfm will save about 7.8% compared to 1 gal/cfm of storage. The evaluation team' estimated savings are 9% which is within a reasonable discrepancy; therefore the evaluation team found that the value CCP uses is reasonable. The CCP report cites a value of 0.94 as the conversion from the nominal HP of a compressor to its full load kW. This value inherently assumes a motor efficiency of 79.4% which the evaluation team believes to be too low. After compiling information on a number of motors, the evaluation team determined that a reasonable average motor efficiency is 91.1% which translates to a conversion factor of 0.74. This change lowers both the energy savings and demand savings reported in the program. The evaluation team believes that having a variable "On Hours" value which can be changed by the user to more closely resemble the conditions present at the equipment installation locations will help enhance the program. The default of 4,104 hrs represents an on time of about 47%, which seems reasonable as an average on time for a wide range of compressors.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	4.84	3.79	78%
Coincident Demand [kW]	4.60	3.60	78%
Consumption [kWh]	19860	15567	78%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / HOURS$	OK
Consumption:	$\Delta kWh = 0.74 \times HP \times HOURS \times (CFb - CFe)$	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	4104	C-4	4104	N/A	OK
HP to kW Conversion [kW/hp	0.94	C-4	0.7368	C-6	Updated
CFb [N/A]	0.909	C-5	0.909	C-6	OK
CFe [N/A]	0.831	C-5	0.831	C-6	OK
Summer Coincidence Factor	0.95	C-4	0.95	N/A	OK
Freeridership %	0.34	C-4	0.34	N/A	OK
Spillover %	0	C-4	0	N/A	OK

Program: *CCP* **Category:** *Compressed Air*

Measure: **Air Recievers for Load/No Load Compressors - 5 Gal/CFM**

Description: This measure involves the installation of a receiver rated at 5 gallons per cfm compressed air. An air receiver limits the number of cycles for a load-unload compressor by acting as a buffer during high-demand periods. The baseline for this measure is a 1 gal/cfm air receiver downstream of a load/unload compressor.

Incentive: $3/Gal per compressor CFM

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references seem reasonable and no major changes are recommended. The evaluation team ran a simulation to estimate the savings that would be realized by increasing the compressed air storage from 1 gal/cfm to 5 gal/cfm. The values used in this analysis were referenced from Efficiency Vermont's Compressed Air Storage program as well as values used in the Advanced Management of Compressed Air Systems Training Program. CCP's report concludes that air storage of 5 gal/cfm will save about 10.3% compared to 1 gal/cfm of storage. The evaluation team' estimated savings are 10.5% which is within a reasonable discrepancy; therefore the evaluation team found that the value CCP uses is reasonable. The CCP report cites a value of 0.94 as the conversion from the nominal HP of a compressor to its full load kW. This value inherently assumes a motor efficiency of 79.4% which the evaluation team believes to be too low. After compiling information on a number of motors, the evaluation team determined that a reasonable average motor efficiency is 91.1% which translates to a conversion factor of 0.74. This change lowers both the energy savings and demand savings reported in the program. The evaluation team believes that having a variable "On Hours" value which can be changed by the user to more closely resemble the conditions present at the equipment installation locations will help enhance the program. The default of 4,104 hrs represents an on time of about 47%, which seems reasonable as an average on time for a wide range of compressors.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	6.39	5.01	78%
Coincident Demand [kW]	6.07	4.76	78%
Consumption [kWh]	26225	20556	78%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / HOURS	OK
Consumption:	ΔkWh = 0.74 x HP x HOURS x (CFb – CFe)	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	4104	C-4	4104	N/A	OK
HP to kW Conversion [kW/hp	0.94	C-4	0.7368	C-6	Updated
CFb [N/A]	0.909	C-5	0.909	C-6	OK
CFe [N/A]	0.806	C-5	0.806	C-6	OK
Summer Coincidence Factor	0.95	C-4	0.95	N/A	OK
Freeridership %	0.34	C-4	0.34	N/A	OK
Spillover %	0	C-4	0	N/A	OK

Program: *CCP* **Category:** *Compressed Air*

Measure: **Cycling Refrigerated Dryers**

Description: This measure involves the installation of a refrigerated dryer that cycles on and off based on cfm demand downstream. The baseline for this measure is a standard, non-cycling refrigerated dryer. Through the CCP, cycling dryers that are rated up to 500 cfm at CAGI standards are eligible.

Incentive: $6/CFM

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used in this program cite proprietary "Optimal Energy" analyses which the evaluation team does not have access to; therefore a line by line analysis of values was not possible. The evaluation team was however able to calculate our own values based on market research and years of experience acquired through hands on project work. Using our proprietary spreadsheets, the evaluation team was able to determine a new savings factor. We believe this savings factor, which is significantly lower than CCP's value, is defensible and should be used in the program. Therefore the demand savings remain the same at 0 kW and the energy savings decreased.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	2848	1358	48%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = 0$	OK
Consumption:	$\Delta kWh = SF \times CFM = 19.65 \times CFM$	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
SF [kWh/CFM]	14.66	C-3	6.99	C-6	Updated
Summer Coincidence Factor	0	N/A	0	N/A	OK
Freeridership %	0.34	C-4	0.34	N/A	OK
Spillover %	0	C-4	0	N/A	OK

Program: *CCP* **Category:** *Compressed Air*

Measure: **Efficient Air Compressors - Variable Displacement**

Description: This measure involves the installation of an efficient air compressor with variable-displacement control. The baseline for this measure is an oil-injected rotary screw compressor with modulating control. Only compressors less than 100 hp and 145 psi are eligible. CCP incentivizes air compressors on an individual basis; not per system as a whole. Based on the number of operating hours used in the current LIPA calculation, the evaluation team has inferred that a three-shift, 5-day schedule has been assumed, for consumption purposes.

Incentive: $60/hp

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. We compared these values to the values used in National Grid's and NYSERDA's compressed air programs. The energy savings values are similar but the demand savings are not. To be completely defensible, we recommend using the values from NGRID's and NYSERDA's programs in place of those currently being used. LIPA provided the evaluation team with the database containing all of the installations which had been paid out in 2009 and their associated savings. The evaluation team calculated the savings using the updated values and compared them to the savings LIPA claims. The results are that the energy savings realization rate is just under 100% while the demand energy savings realization rate is over 200%.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.72	3.79	220%
Coincident Demand [kW]	1.38	3.03	220%
Consumption [kWh]	16382	15808	96%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = .12 x HP	Updated
Consumption:	ΔkWh = SF x HP	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Demand Savings [kW/hp]	0.0527	C-1	0.116	C-6	Updated
Summer Coincidence Factor	0.8	C-2	0.8	N/A	OK
Freeridership %	0.18	C-2	0.18	N/A	OK
Spillover %	0.07	C-2	0.07	N/A	OK
Operating Hours [h]	4104	C-1	4176	C-6	OK
SF [kWh/hp]	502	C-1	484.4	C-6	OK

Program: *CCP* **Category:** *Compressed Air*

Measure: **Efficient Air Compressors - Variable Speed**

Description: This measure involves the installation of an efficient air compressor with variable-speed control. The baseline for this measure is an oil-injected rotary screw compressor with modulating control. Only compressors less than 100 hp and 145 psi are eligible. CCP incentivizes air compressors on an individual basis; not per system as a whole. Based on the number of operating hours used in the current LIPA calculation, the evaluation team has inferred that a three-shift, 5-day schedule has been assumed, for consumption purposes.

Incentive: $95/hp

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. We compared these values to the values used in National Grid's and NYSERDA's compressed air programs. The energy savings values are similar but the demand savings are not. To be completely defensible, we recommend using the values from NGRID's and NYSERDA's programs in place of those currently being used. LIPA provided the evaluation team with the database containing all of the installations which had been paid out in 2009 and their associated savings. The evaluation team calculated the savings using the updated values and compared them to the savings LIPA claims. The results are that the energy savings realization rate is just over 120% while the demand energy savings realization rate is almost 400%.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.05	8.03	392%
Coincident Demand [kW]	1.64	6.42	392%
Consumption [kWh]	27889	33515	120%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = .12 \times HP$	Updated
Consumption:	$\Delta kWh = SF \times HP$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	4104	C-1	4176	C-6	OK
SF [kWh/hp]	717	C-1	861.6	C-6	OK
Demand Savings [kW/hp]	0.0527	C-1	0.206	C-6	Updated
Summer Coincidence Factor	0.8	C-2	0.8	N/A	OK
Freeridership %	0.17	C-2	0.17	N/A	OK
Spillover %	0.08	C-2	0.08	N/A	OK

Program: *CCP* **Category:** *Compressed Air*

Measure: **Variable Frequency Drive Refrigerated Dryers**

Description: This measure involves the installation of a refrigerated dryer with a variable-frequency drive (VFD) that adjusts dryer current based on cfm demand downstream. The baseline for this measure is a standard, non-cycling refrigerated dryer. Through the CCP, VFD dryers that are rated up to 500 cfm at CAGI standards are eligible.

Incentive: $6/CFM

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used in this program cite proprietary "Optimal Energy" analyses which the evaluation team does not have access to; therefore a line by line analysis of values was not possible. The evaluation team was however able to calculate our own values based on market research and years of experience acquired through hands on project work. Using our proprietary spreadsheets, the evaluation team was able to determine a new savings factor. We believe this savings factor, which is significantly lower than CCP's value, is defensible and should be used in the program. Therefore the demand savings remain the same at 0 kW and the energy savings decreased.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	561	267	48%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = 0$	OK
Consumption:	$\Delta kWh = SF \times CFM = 19.65 \times CFM$	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
SF [kWh/CFM]	14.66	C-3	6.99	C-6	Updated
Summer Coincidence Factor	0	N/A	0	N/A	OK
Freeridership %	0.25	C-4	0.25	N/A	OK
Spillover %	0	C-4	0	N/A	OK

Program: *CCP* **Category:** *HVAC*

Measure: **Air Cooled Chiller with Condenser > 30 tons to < 300 tons (Full Load EER = 10, IPLV EER = 12)**

Description: This measure involves the installation of an air-cooled chiller between 30 tons and 300 ton capacity of 10 FL EER/12 IPLV EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9.56 FL EER/10.41 IPLV EER efficiency.

Incentive: $25/ton plus $5 per 0.1 EER above base

Conclusion: Updated

Reasoning: The evaluation team verified the code reference to confirm baseline equipment efficiency. However, since the program's reference for annual cooling hours could not be found, the evaluation team used the recommended equivalent full-load cooling hours (EFLCH) from ASHRAE via Energy Star for New York, NY. Lower deemed consumption savings reflects this difference in annual operating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	4.97	4.97	100%
Coincident Demand [kW]	3.58	3.58	100%
Consumption [kWh]	15107	14970	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = tons * 12 * (1/EERbaseFL - 1/EEReffFL)	OK
Consumption:	ΔkWh = tons * 12 * (1/EERbaseIPLV - 1/EEReffIPLV) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	1200000	N/A	1200000	H-8	OK
Baseline FL EER	9.56	H-2	9.56	H-16	OK
Efficient FL EER	10	N/A	10	N/A	OK
Baseline IPLV EER	10.41	H-2	10.41	H-16	OK
Efficient IPLV EER	12	N/A	12	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Dual Enthalpy Economizer for cooling < 5.4 tons (Fixed Damper baseline)**

Description: This measure involves the installation of a dual-enthalpy economizer on a cooling system less than 5.4 tons that previously contained no economizer (fixed damper baseline). Consumption savings are realized during periods of the year that provide "free cooling," such as swing periods in the Spring and Fall. There are no demand savings for this measure.

Incentive: $250/unit

Conclusion: Updated

Reasoning: Details on the current LIPA methodology could not be found from program documents. A building modeling approach was referenced, but details on the inputs could not be obtained. The evaluation team also used a building modeling approach, as it is believed to be the most effective method of capturing details that cannot be easily quantified, such as building thermal mass and cycling behavior of central air units. Using statistics from the 2009 CCP program, an average installed tonnage (for installs less than 5.4) was obtained and used to determine a typical building size based on a 400 sf/ton rule of thumb. The average installed efficiency was also input into the model created in eQuest. Long Island weather was assigned, and a typical Monday-Friday, 7am-6pm schedule was applied to each zone. Occupied and unoccupied setpoints were typical for a small office or equivalently-sized commercial building. The evaluation team believes these inputs are sound and are more specific to Long Island weather as compared to the existing LIPA model, which was based on LaGuardia airport. The consumption savings discrepancy reflects these differences in the two models. There are no demand savings for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	1986	516	26%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = 0$	OK
Consumption:	ΔkWh = free cooling hours * tons * 12/EER	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.05	H-45	0.05	H-45	Reasonable Based on Engr. Judgment
Spillover %	0	H-45	0	H-45	Reasonable Based on Engr. Judgment
Cooling capacity [ton]	4.57	H-46	4.57	H-46	OK
System EER	12.63	H-46	12.63	H-46	OK
Coincidence Factor	0	N/A	0	N/A	OK

Program: *CCP* **Category:** *HVAC*

Measure: **Dual Enthalpy Economizer for cooling > 5.4 tons (Dry Bulb Economizer baseline)**

Description: According to the savings algorithm document for this program, this measure involves the installation of a dual-enthalpy economizer on a cooling system greater than 5.4 tons that previously contained an economizer controlled by outdoor drybulb temperature. However, the evaluation team believes this is too stringent a baseline, and the measure should feature a fixed damper baseline. Consumption savings are realized during periods of the year that provide "free cooling," such as swing periods in the Spring and Fall. There are no demand savings for this measure.

Incentive: $250/unit

Conclusion: Updated

Reasoning: Details on the current LIPA methodology could not be found from program documents. A building modeling approach was referenced, but details on the inputs could not be obtained. The evaluation team believes that, though the savings algorithm document states that the current program mandates a dry bulb economizer baseline for this capacity range, the current program savings reflect a fixed damper baseline. This reasoning is based on engineering judgment and past economizer analyses-- the savings between two economizer types would not be this exaggerated. The evaluation team used a building modeling approach with a fixed damper baseline. Building modeling is the most effective method of capturing details that cannot be easily quantified, such as building thermal mass and cycling behavior of central air units. Using statistics from the 2009 CCP program, an average installed tonnage (for installs greater than 5.4) was obtained and used to determine a typical building size based on a 400 sf/ton rule of thumb. The average installed efficiency was also inputted into the model created in eQuest. Long Island weather was assigned, and a typical Monday-Friday, 7am-6pm schedule was applied to each zone. Occupied and unoccupied setpoints were typical for a small office or equivalently-sized commercial building. The evaluation team believes these inputs are sound and are more specific to Long Island weather as compared to the existing LIPA model, which was based on LaGuardia airport. There are no demand savings for this measure. In summary, the evaluation team recommends that the savings algorithm document and measure as a whole are updated to feature a fixed damper baseline.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	3978	1751	44%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = 0$	OK
Consumption:	ΔkWh = free cooling hours * tons * 12/EER	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.05	H-45	0.05	H-45	Reasonable Based on Engr. Judgment
Spillover %	0	H-45	0	H-45	Reasonable Based on Engr. Judgment
Cooling capacity [ton]	11.8	H-46	11.8	H-46	OK
System EER	11.53	H-46	11.53	H-46	OK
Coincidence Factor	0	N/A	0	N/A	OK

Program: *CCP* **Category:** *HVAC*

Measure: **Ground Source Heat Pump < 150 ton (59 deg F entering water)**

Description: This measure involves the installation of a ground-source heat pump less than 150 tons with 59 degree F entering condenser water. ASHRAE recommends a baseline of 16.2 EER, which represents the incentivized efficiency for this unit. The baseline is assumed an equivalently-sized air-source heat pump.

Incentive: $80/ton

Conclusion: Updated

Reasoning: A range of incentivized efficiencies could not be found among program documents. The evaluation team referenced the in-house savings analysis for an equivalent NYSERDA prescriptive measure to determine a likely incentivized efficiency. Baseline conditions represent a water-source heat pump, and they were determined from program documents from LIPA and reaffirmed with ASHRAE 90.1 2004 standards. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so ERS used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. The consumption savings discrepancy reflects this difference in operating hours. The evaluation team recommends dividing this measure into multiple size categories to reflect ASHRAE 90.1 classifications.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	4.67	4.67	100%
Coincident Demand [kW]	3.36	3.36	100%
Consumption [kWh]	6570	8145	124%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours + Capacity/1000 * (1/COPbase - 1/COPeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	240000	N/A	240000	H-1	OK
Baseline EER	12	H-15	12	H-15	Updated
Efficient EER	16.2	N/A	16.2	N/A	OK
Baseline COP	4.2	H-2	4.2	H-15	OK
Efficient COP	4.6	N/A	4.6	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated

Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	OK

Program: *CCP* **Category:** *HVAC*

Measure: **Ground Source Heat Pump < 150 ton (77 deg F entering water)**

Description: This measure involves the installation of a ground-source heat pump less than 150 tons with 77 degree F entering condenser water. ASHRAE recommends a baseline of 13.4 EER, which represents the incentivized efficiency for this unit. The baseline is assumed an equivalently-sized air-source heat pump.

Incentive: $80/ton

Conclusion: Updated

Reasoning: A range of incentivized efficiencies could not be found among program documents. The evaluation team referenced the in-house savings analysis for an equivalent NYSERDA prescriptive measure to determine a likely incentivized efficiency. Baseline conditions represent a water-source heat pump, and they were determined from program documents from LIPA and reaffirmed with ASHRAE 90.1 2004 standards. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. The consumption savings discrepancy reflects this difference in operating hours. The evaluation team recommends dividing this measure into multiple size categories to reflect ASHRAE 90.1 classifications.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.88	1.88	100%
Coincident Demand [kW]	1.35	1.35	100%
Consumption [kWh]	3509	5111	146%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours + Capacity/1000 * (1/COPbase - 1/COPeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	240000	N/A	240000	H-1	OK
Baseline EER	12	H-15	12	H-15	Updated
Efficient EER	13.4	N/A	13.4	N/A	OK
Baseline COP	4.2	H-2	4.2	H-15	OK
Efficient COP	4.6	N/A	4.6	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated

Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	OK

Program: *CCP* **Category:** *HVAC*

Measure: **Packaged AC < 65,000 Btu/h (14 SEER)**

Description: This measure involves the installation of a small packaged air conditioner (< 65,000 Btu/h) of 14 SEER efficiency. The ASHRAE 90.1 2004 code baseline for this capacity is 12 SEER.

Incentive: $125/ton

Conclusion: Updated

Reasoning: The evaluation team recommends use of ASHRAE 90.1 2004 as code baseline, as the New York state energy code was updated in April 2008 to employ the 2004 version. Current deemed savings appear to incorporate the ASHRAE 90.1 1999 baseline, and savings are therefore exaggerated. As a result, the recommended higher baseline SEER lowers deemed consumption savings. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE. As a result, lower EFLCH is reflected in reduced consumption savings. The evaluation team recommends that the CCP reevaluates the baseline and incentivized conditions in the savings algorithm document, as the baseline EER is greater than the baseline SEER.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.25	0.51	200%
Coincident Demand [kW]	0.18	0.37	200%
Consumption [kWh]	1458	745	51%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EERerff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEERerff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	60000	N/A	60000	H-1	OK
Baseline SEER	10.5	H-2	12	H-15	Updated
Efficient SEER	14	N/A	14	H-1	OK
Baseline EER	11	N/A	10.5	N/A	Updated
Efficient EER	11.6	N/A	11.6	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Packaged AC < 65,000 Btu/h (15 SEER)**

Description: This measure involves the installation of a small packaged air conditioner (< 65,000 Btu/h) of 15 SEER efficiency. The ASHRAE 90.1 2004 code baseline for this capacity is 12 SEER.

Incentive: $230/ton

Conclusion: Updated

Reasoning: The evaluation team recommends use of ASHRAE 90.1 2004 as code baseline, as the New York state energy code was updated in April 2008 to employ the 2004 version. Current deemed savings appear to incorporate the ASHRAE 90.1 1999 baseline, and savings are therefore exaggerated. As a result, the recommended higher baseline SEER lowers deemed consumption savings. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE. As a result, lower EFLCH is reflected in reduced consumption savings. The evaluation team recommends that the CCP reevaluates the baseline and incentivized conditions in the savings algorithm document, as the baseline EER is greater than the baseline SEER.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.41	0.66	162%
Coincident Demand [kW]	0.29	0.48	162%
Consumption [kWh]	1748	1032	59%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	60000	N/A	60000	H-1	OK
Baseline SEER	10.5	H-2	12	H-15	Updated
Efficient SEER	15	N/A	15	N/A	OK
Baseline EER	11	N/A	10.5	N/A	Updated
Efficient EER	12	N/A	12	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Packaged Heat Pump < 65,000 Btu/h (14 SEER/8 HSPF)**

Description: This measure involves the installation of a small packaged heat pump (< 65,000 Btu/h) of 14 SEER/8 HSPF efficiency. The ASHRAE 90.1 2004 code baseline for this capacity is 12 SEER/7.4 HSPF.

Incentive: $125/ton

Conclusion: Updated

Reasoning: The evaluation team recommends use of ASHRAE 90.1 2004 as code baseline, as the New York state energy code was updated in April 2008 to employ the 2004 version. Current deemed savings appear to incorporate the ASHRAE 90.1 1999 baseline, and savings are therefore exaggerated. As a result, the recommended higher baseline SEER and HSPF lowers deemed consumption savings. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. As a result, lower EFLCH and EFLHH is reflected in reduced consumption savings. The evaluation team recommends that the CCP reevaluates the baseline and incentivized conditions in the savings algorithm document, as the baseline EER is greater than the baseline SEER.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.25	0.51	200%
Coincident Demand [kW]	0.18	0.37	200%
Consumption [kWh]	2354	1979	84%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * cooling hours + Capacity/1000 * (1/HSPFbase - 1/HSPFeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	60000	N/A	60000	H-1	OK
Baseline SEER	10.5	H-2	12	H-15	Updated
Efficient SEER	14	N/A	14	N/A	OK
Baseline HSPF	7.1	H-2	7.4	H-15	Updated
Efficient HSPF	8	N/A	8	N/A	OK
Baseline EER	11	N/A	10.5	N/A	Updated

Efficient EER	11.6	N/A	11.6	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Packaged Heat Pump < 65,000 Btu/h (15 SEER/8.5 HSPF)**

Description: This measure involves the installation of a small packaged heat pump (< 65,000 Btu/h) of 15 SEER/8.5 HSPF efficiency. The ASHRAE 90.1 2004 code baseline for this capacity is 12 SEER/7.4 HSPF.

Incentive: $230/ton

Conclusion: Updated

Reasoning: The evaluation team recommends use of ASHRAE 90.1 2004 as code baseline, as the New York state energy code was updated in April 2008 to employ the 2004 version. Current deemed savings appear to incorporate the ASHRAE 90.1 1999 baseline, and savings are therefore exaggerated. As a result, the recommended higher baseline SEER and HSPF lowers deemed consumption savings. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. As a result, lower EFLCH and EFLHH is reflected in reduced consumption savings. The evaluation team recommends that the CCP reevaluates the baseline and incentivized conditions in the savings algorithm document, as the baseline EER is greater than the baseline SEER.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.25	0.51	200%
Coincident Demand [kW]	0.18	0.37	200%
Consumption [kWh]	3074	3187	104%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * cooling hours + Capacity/1000 * (1/HSPFbase - 1/HSPFeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	60000	N/A	60000	H-1	OK
Baseline SEER	10.5	H-2	12	H-15	Updated
Efficient SEER	15	N/A	15	N/A	OK
Baseline HSPF	7.1	H-2	7.4	H-15	Updated
Efficient HSPF	8.5	N/A	8.5	N/A	OK
Baseline EER	11	N/A	10.5	N/A	Updated

Efficient EER	11.6	N/A	11.6	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Programmable Thermostat**

Description: This measure involves the installation of a programmable thermostat that automatically raises or lowers the temperature setpoint during periods of no occupancy. The baseline for this measure is a manually-adjustable thermostat. Though both heating and cooling savings are possible for this measure, the current LIPA program appears to determine only cooling savings through its current algorithm. Therefore, only cooling savings are considered for this measure.

Incentive: $50/unit

Conclusion: Updated

Reasoning: The evaluation team determined average commercial tonnages and EERs from NYSERDA prescriptive measure calculations. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so ERS used EFLCH from ASHRAE for New York, NY. Additionally, the average percent saved was determined through an Energy Star savings calculator for programmable thermostats. Approximate savings of 25% for cooling systems were determined from this tool. Higher consumption savings reflect this difference in average predicted savings. There are no demand savings for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	416	412	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = 0	OK
Consumption:	ΔkWh = (12/EER) * tons * cooling hours * % save	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freerider Rate	0.4	H-44	0.4	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Connected EER	11	N/A	11	H-1	OK
Connected Capacity [ton]	17	N/A	17	H-1	OK
Equiv. full-load [h]	1099	H-3	1089	H-6	Updated
Percent savings [%]	0.18	H-18	0.255	H-19	Updated

Program: *CCP* **Category:** *HVAC*

Measure: **Split AC < 65,000 Btu/h (14 SEER)**

Description: This measure involves the installation of a small split air conditioner (< 65,000 Btu/h) of 14 SEER efficiency. The ASHRAE 90.1 2004 code baseline for this capacity is 12 SEER.

Incentive: $125/ton

Conclusion: Updated

Reasoning: The evaluation team recommends use of ASHRAE 90.1 2004 as code baseline, as the New York state energy code was updated in April 2008 to employ the 2004 version. Current deemed savings appear to incorporate the ASHRAE 90.1 1999 baseline, and savings are therefore exaggerated. As a result, the recommended higher baseline SEER lowers deemed consumption savings. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings. The evaluation team recommends that the CCP reevaluates the baseline and incentivized conditions in the savings algorithm document, as the baseline EER is greater than the baseline SEER.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.41	0.66	162%
Coincident Demand [kW]	0.29	0.48	162%
Consumption [kWh]	1413	700	50%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	60000	N/A	60000	H-1	OK
Baseline SEER	10.5	H-2	12	H-15	Updated
Efficient SEER	14	N/A	14	H-1	OK
Baseline EER	11	N/A	10.5	N/A	Updated
Efficient EER	12	N/A	12	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split AC < 65,000 Btu/h (15 SEER)**

Description: This measure involves the installation of a small split air conditioner (< 65,000 Btu/h) of 15 SEER efficiency. The ASHRAE 90.1 2004 code baseline for this capacity is 12 SEER.

Incentive: $230/ton

Conclusion: Updated

Reasoning: The evaluation team recommends use of ASHRAE 90.1 2004 as code baseline, as the New York state energy code was updated in April 2008 to employ the 2004 version. Current deemed savings appear to incorporate the ASHRAE 90.1 1999 baseline, and savings are therefore exaggerated. As a result, the recommended higher baseline SEER lowers deemed consumption savings. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings. The evaluation team recommends that the CCP reevaluates the baseline and incentivized conditions in the savings algorithm document, as the baseline EER is greater than the baseline SEER.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.59	0.84	143%
Coincident Demand [kW]	0.42	0.61	143%
Consumption [kWh]	1943	1225	63%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEERreff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	60000	N/A	60000	H-1	OK
Baseline SEER	10.5	H-2	12	H-15	Updated
Efficient SEER	15	N/A	15	N/A	OK
Baseline EER	11	N/A	10.5	N/A	Updated
Efficient EER	12.5	N/A	12.5	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split Heat Pump < 65,000 Btu/h (14 SEER/8.5 HSPF)**

Description: This measure involves the installation of a small split heat pump (< 65,000 Btu/h) of 14 SEER/8.5 HSPF efficiency. The ASHRAE 90.1 2004 code baseline for this capacity is 12 SEER/7.4 HSPF.

Incentive: $125/ton

Conclusion: Updated

Reasoning: The evaluation team recommends use of ASHRAE 90.1 2004 as code baseline, as the New York state energy code was updated in April 2008 to employ the 2004 version. Current deemed savings appear to incorporate the ASHRAE 90.1 1999 baseline, and savings are therefore exaggerated. As a result, the recommended higher baseline SEER and HSPF lowers deemed consumption savings. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. As a result, lower EFLCH and EFLHH is reflected in reduced consumption savings. The evaluation team recommends that the CCP reevaluates the baseline and incentivized conditions in the savings algorithm document, as the baseline EER is greater than the baseline SEER.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.41	0.66	162%
Coincident Demand [kW]	0.29	0.48	162%
Consumption [kWh]	2791	2907	104%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * cooling hours + Capacity/1000 * (1/HSPFbase - 1/HSPFeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	60000	N/A	60000	H-1	OK
Baseline SEER	10.5	H-2	12	H-15	Updated
Efficient SEER	14	N/A	14	N/A	OK
Baseline HSPF	7.1	H-2	7.4	H-15	Updated
Efficient HSPF	8.5	N/A	8.5	N/A	OK
Baseline EER	11	N/A	10.5	N/A	Updated

Efficient EER	12	N/A	12	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split Heat Pump < 65,000 Btu/h (15 SEER/9 HSPF)**

Description: This measure involves the installation of a small split heat pump (< 65,000 Btu/h) of 15 SEER/9 HSPF efficiency. The ASHRAE 90.1 2004 code baseline for this capacity is 12 SEER/7.4 HSPF.

Incentive: $230/ton

Conclusion: Updated

Reasoning: The evaluation team recommends use of ASHRAE 90.1 2004 as code baseline, as the New York state energy code was updated in April 2008 to employ the 2004 version. Current deemed savings appear to incorporate the ASHRAE 90.1 1999 baseline, and savings are therefore exaggerated. As a result, the recommended higher baseline SEER and HSPF lowers deemed consumption savings. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. As a result, lower EFLCH and EFLHH is reflected in reduced consumption savings. The evaluation team recommends that the CCP reevaluates the baseline and incentivized conditions in the savings algorithm document, as the baseline EER is greater than the baseline SEER.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.59	0.84	143%
Coincident Demand [kW]	0.42	0.61	143%
Consumption [kWh]	3589	4138	115%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * cooling hours + Capacity/1000 * (1/HSPFbase - 1/HSPFeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Efficient SEER	15	N/A	15	N/A	OK
Baseline HSPF	7.1	H-2	7.4	H-15	Updated
Efficient HSPF	9	N/A	9	N/A	OK
Baseline EER	11	N/A	10.5	N/A	Updated
Efficient EER	12.5	N/A	12.5	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated

Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	60000	N/A	60000	H-1	OK
Baseline SEER	10.5	H-2	12	H-15	Updated

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged AC > 135,000 Btu/h to < 240,000 Btu/h (11.5 EER)**

Description: This measure involves the installation of a split or packaged air-cooled air conditioning unit between 135,000 Btu/h and 240,000 Btu/h capacity of 11.5 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9.7 EER efficiency.

Incentive: $80/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline SEER value recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. These values matched for a non-electric-heat AC unit. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	3.16	3.16	100%
Coincident Demand [kW]	2.27	2.27	100%
Consumption [kWh]	3472	3440	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	180000	N/A	180000	H-1	OK
Baseline EER	9.5	H-15	9.5	H-15	OK
Efficient EER	11.66	N/A	11.66	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged AC > 135,000 Btu/h to < 240,000 Btu/h (12 EER)**

Description: This measure involves the installation of a split or packaged air-cooled air conditioning unit between 135,000 Btu/h and 240,000 Btu/h capacity of 12 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9.7 EER efficiency.

Incentive: $100/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline SEER value recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. These values matched for a non-electric-heat AC unit. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	3.65	3.65	100%
Coincident Demand [kW]	2.63	2.63	100%
Consumption [kWh]	4010	3973	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	180000	N/A	180000	H-1	OK
Baseline EER	9.5	H-15	9.5	H-15	OK
Efficient EER	12.09	N/A	12.09	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged AC > 240,000 Btu/h to < 760,000 Btu/h (10 EER)**

Description: This measure involves the installation of a split or packaged air-cooled air conditioning unit between 240,000 Btu/h and 760,000 Btu/h capacity of 10.8 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9.5 EER efficiency.

Incentive: $50/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline SEER value recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. These values matched for a non-electric-heat AC unit. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.05	2.05	100%
Coincident Demand [kW]	1.48	1.48	100%
Consumption [kWh]	2252	2232	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	240000	N/A	240000	H-1	OK
Baseline EER	9.3	H-15	9.3	H-15	OK
Efficient EER	10.8	N/A	10.8	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged AC > 240,000 Btu/h to < 760,000 Btu/h (10.5 EER)**

Description: This measure involves the installation of a split or packaged air-cooled air conditioning unit between 240,000 Btu/h and 760,000 Btu/h capacity of 10.5 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9.5 EER efficiency.

Incentive: $90/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline SEER value recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. These values matched for a non-electric-heat AC unit. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	3.23	3.23	100%
Coincident Demand [kW]	2.33	2.33	100%
Consumption [kWh]	3554	3522	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	240000	N/A	240000	H-1	OK
Baseline EER	9.3	H-15	9.3	H-15	OK
Efficient EER	10.2	N/A	10.2	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged AC > 65,000 Btu/h to < 135,000 Btu/h (11.5 EER)**

Description: This measure involves the installation of a split or packaged air-cooled air conditioning unit between 65,000 Btu/h and 135,000 Btu/h capacity of 11.5 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 10.3 EER efficiency.

Incentive: $80/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline SEER value recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. These values matched for a non-electric-heat AC unit. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.98	0.98	100%
Coincident Demand [kW]	0.71	0.71	100%
Consumption [kWh]	1077	1067	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	90000	N/A	90000	H-1	OK
Baseline EER	10.1	H-15	10.1	H-15	OK
Efficient EER	11.5	N/A	11.5	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged AC > 65,000 Btu/h to < 135,000 Btu/h (12 EER)**

Description: This measure involves the installation of a split or packaged air-cooled air conditioning unit between 65,000 Btu/h and 135,000 Btu/h capacity of 12 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 10.3 EER efficiency.

Incentive: $110/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline SEER value recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. These values matched for a non-electric-heat AC unit. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.72	1.72	100%
Coincident Demand [kW]	1.24	1.24	100%
Consumption [kWh]	1886	1869	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	90000	N/A	90000	H-1	OK
Baseline EER	10.1	H-15	10.1	H-15	OK
Efficient EER	12.85	N/A	12.85	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged AC > 760,000 Btu/h to < 3,000,000 Btu/h (10.2 EER)**

Description: This measure involves the installation of a split or packaged air-cooled air conditioning unit between 760,000 Btu/h and 3,000,000 Btu/h capacity of 10.2 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9.2 EER efficiency.

Incentive: $25/ton plus $5 per 0.1 EER above base

Conclusion: Updated

Reasoning: The evaluation team checked the baseline SEER value recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. These values matched for a non-electric-heat AC unit. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	8.47	8.47	100%
Coincident Demand [kW]	6.10	6.10	100%
Consumption [kWh]	9309	9224	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	720000	N/A	720000	H-1	OK
Baseline EER	9	H-15	9	H-15	OK
Efficient EER	10.2	N/A	10.2	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged AC > 760,000 Btu/h to < 3,000,000 Btu/h (9.7 EER)**

Description: This measure involves the installation of a split or packaged air-cooled air conditioning unit between 760,000 Btu/h and 3,000,000 Btu/h capacity of 9.7 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9.2 EER efficiency.

Incentive: $25/ton plus $5 per 0.1 EER above base

Conclusion: Updated

Reasoning: The evaluation team checked the baseline SEER value recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. These values matched for a non-electric-heat AC unit. A rule of thumb was used to convert SEER to EER where necessary. The program's current reference to annual equivalent full-load cooling hours (EFLCH) could not be found, so the evaluation team used an EFLCH recommendation for New York, NY from ASHRAE via Energy Star. As a result, lower EFLCH is reflected in reduced consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	7.84	7.84	100%
Coincident Demand [kW]	5.65	5.65	100%
Consumption [kWh]	8618	8539	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	720000	N/A	720000	H-1	OK
Baseline EER	9	H-15	9	H-15	OK
Efficient EER	9.7	N/A	9.7	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged Heat Pump > 135,000 Btu/h to < 240,000 Btu/h (11.5 EER)**

Description: This measure involves the installation of a split or packaged air-cooled heat pump between 135,000 Btu/h and 240,000 Btu/h capacity of 11.5 EER/3.2 COP efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9.3 EER/3.1 COP efficiency.

Incentive: $80/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline cooling and heating efficiencies recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. The CCP program actually recommends a more conservative EER than the code; this contributes to higher consumption savings recommended by the evaluation team. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. As a result, higher EFLHH is reflected in increased recommended consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.97	3.72	125%
Coincident Demand [kW]	2.14	2.67	125%
Consumption [kWh]	3786	5164	136%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours + Capacity/1000 * (1/COPbase - 1/COPeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	180000	N/A	180000	H-1	OK
Baseline EER	9.5	H-48	9.1	H-15	Updated
Efficient EER	11.5	N/A	11.5	N/A	OK
Baseline COP	3.1	H-48	3.1	H-15	OK
Efficient COP	3.2	N/A	3.2	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged Heat Pump > 240,000 Btu/h (10.5 EER)**

Description: This measure involves the installation of a split or packaged air-cooled heat pump greater than 240,000 Btu/h capacity of 10.5 EER/3.2 COP efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 9 EER/3.1 COP efficiency.

Incentive: $50/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline cooling and heating efficiencies recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. The CCP program actually recommends a more conservative EER than the code; this contributes to higher consumption savings recommended by the evaluation team. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. As a result, higher EFLHH is reflected in increased recommended consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.65	3.97	150%
Coincident Demand [kW]	1.91	2.86	150%
Consumption [kWh]	3619	5819	161%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours + Capacity/1000 * (1/COPbase - 1/COPeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	240000	N/A	240000	H-1	OK
Baseline EER	9.3	H-48	8.8	H-15	Updated
Efficient EER	10.5	N/A	10.5	N/A	OK
Baseline COP	3.1	H-48	3.1	H-15	OK
Efficient COP	3.2	N/A	3.2	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Split/Packaged Heat Pump > 65,000 Btu/h to < 135,000 Btu/h (11.5 EER)**

Description: This measure involves the installation of a split or packaged air-cooled heat pump between 65,000 Btu/h and 135,000 Btu/h capacity of 11.5 EER/3.4 COP efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 10.1 EER/3.2 COP efficiency.

Incentive: $80/ton

Conclusion: Updated

Reasoning: The evaluation team checked the baseline cooling and heating efficiencies recommended by the CCP program with the ASHRAE 90.1 2004 code baseline. The CCP program actually recommends a more conservative EER than the code; this contributes to higher consumption savings recommended by the evaluation team. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. As a result, higher EFLHH is reflected in increased recommended consumption savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.98	1.14	117%
Coincident Demand [kW]	0.70	0.82	117%
Consumption [kWh]	1553	2260	145%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours + Capacity/1000 * (1/COPbase - 1/COPeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	90000	N/A	90000	H-1	OK
Baseline EER	10.1	H-48	9.9	H-15	Updated
Efficient EER	11.5	N/A	11.5	N/A	OK
Baseline COP	3.2	H-48	3.2	H-15	OK
Efficient COP	3.4	N/A	3.4	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Water Cooled Chiller, > 150 ton to < 300 ton (Full Load kW/ton = 0.63, IPLV kW/ton = 0.51)**

Description: This measure involves the installation of a water-cooled chiller between 150 and 300 ton capacity, with a minimum FL kW/ton of 0.63 (IPLV kW/ton = 0.51). The ASHRAE 90.1 2004 code baseline for this capacity is 0.72 kW/ton FL (0.71 kW/ton IPLV).

Incentive: $15/ton plus $2/ton per each 0.01 kW/ton below base

Conclusion: Updated

Reasoning: The evaluation team verified the code reference to confirm baseline equipment efficiency. However, since the program's reference for annual cooling hours could not be found, the evaluation team used the recommended equivalent full-load cooling hours (EFLCH) from ASHRAE via Energy Star for New York, NY. Lower deemed consumption savings reflects this difference in annual operating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	24.30	24.30	100%
Coincident Demand [kW]	17.50	17.50	100%
Consumption [kWh]	35608	35284	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = tons * (kW/ton,baseFL - kW/ton,effFL)	OK
Consumption:	ΔkWh = tons * (kW/ton IPLV base - kW/ton IPLV eff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	300	N/A	300	H-8	OK
Baseline FL EER	0.72	H-2	0.72	H-15	OK
Efficient FL EER	0.63	N/A	0.63	N/A	OK
Baseline IPLV EER	0.63	H-2	0.63	H-15	OK
Efficient IPLV EER	0.51	N/A	0.51	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Water Cooled Chiller, > 30 ton to < 150 ton (Full Load kW/ton = 0.72, IPLV kW/ton = 0.62)**

Description: This measure involves the installation of a water-cooled chiller between 30 and 150 ton capacity, with a minimum FL kW/ton of 0.72 (IPLV kW/ton = 0.62). The ASHRAE 90.1 2004 code baseline for this capacity is 0.72 kW/ton FL (0.62 kW/ton IPLV).

Incentive: $15/ton plus $8/ton per each 0.01 kW/ton below base

Conclusion: Updated

Reasoning: The evaluation team verified the code reference to confirm baseline equipment efficiency. However, since the program's reference for annual cooling hours could not be found, the evaluation team used the recommended equivalent full-load cooling hours (EFLCH) from ASHRAE via Energy Star for New York, NY. Lower deemed consumption savings reflects this difference in annual operating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	9.45	9.45	100%
Coincident Demand [kW]	6.80	6.80	100%
Consumption [kWh]	8902	8821	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = tons * (kW/ton,baseFL - kW/ton,effFL)	OK
Consumption:	ΔkWh = tons * (kW/ton IPLV base - kW/ton IPLV eff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Baseline IPLV EER	0.68	H-2	0.68	H-15	OK
Efficient IPLV EER	0.62	N/A	0.62	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	150	N/A	150	H-8	OK
Baseline FL EER	0.79	H-2	0.79	H-15	OK
Efficient FL EER	0.72	N/A	0.72	N/A	OK

Program: *CCP* **Category:** *HVAC*

Measure: **Water Cooled Chiller, > 300 ton to < 1000 ton (Full Load kW/ton = 0.56, IPLV kW/ton = 0.51)**

Description: This measure involves the installation of a water-cooled chiller between 300 and 1000 ton capacity, with a minimum FL kW/ton of 0.56 (IPLV kW/ton = 0.51). The ASHRAE 90.1 2004 code baseline for this capacity is 0.639 kW/ton FL (0.628 kW/ton IPLV).

Incentive: $6/ton plus $4/ton per each 0.01 kW/ton below base

Conclusion: Updated

Reasoning: The evaluation team checked the code reference to confirm baseline equipment efficiency. The evaluation team found lower part-load and full-load efficiencies in the ASHRAE 90.1 2004 Handbook, thereby giving higher consumption and demand savings, respectively, as compared to the program. Additionally, since the program's reference for annual cooling hours could not be found, the evaluation team used the recommended equivalent full-load cooling hours (EFLCH) from ASHRAE via Energy Star for New York, NY. Discrepancies in consumption and demand savings reflect these differences in efficiencies and annual operating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	9.94	9.94	100%
Coincident Demand [kW]	7.16	7.16	100%
Consumption [kWh]	25717	25483	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = tons * (kW/ton,baseFL - kW/ton,effFL)	OK
Consumption:	ΔkWh = tons * (kW/ton IPLV base - kW/ton IPLV eff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	650	N/A	650	H-8	OK
Baseline FL EER	0.577	H-2	0.577	H-15	Updated
Efficient FL EER	0.56	N/A	0.56	N/A	OK
Baseline IPLV EER	0.55	H-2	0.55	H-15	Updated
Efficient IPLV EER	0.51	N/A	0.51	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Water Cooled Chiller, > 300 ton to < 1000 ton (Full Load kW/ton = 0.575, IPLV kW/ton = 0.51) with R134 and VFD**

Description: This measure involves the installation of a water-cooled chiller between 300 and 1000 ton capacity, with R134 refrigerant and integrated VFD controls and a minimum FL kW/ton of 0.575 (IPLV kW/ton = 0.51). The ASHRAE 90.1 2004 code baseline for this capacity is 0.639 kW/ton FL (0.628 kW/ton IPLV).

Incentive: $6/ton plus $4/ton per each 0.01 kW/ton below base

Conclusion: Updated

Reasoning: The evaluation team checked the code reference to confirm baseline equipment efficiency. The evaluation team found lower part-load and full-load efficiencies in the ASHRAE 90.1 2004 Handbook, thereby giving higher consumption and demand savings, respectively, as compared to the program. Additionally, since the program's reference for annual cooling hours could not be found, the evaluation team used the recommended equivalent full-load cooling hours (EFLCH) from ASHRAE via Energy Star for New York, NY. Discrepancies in consumption and demand savings reflect these differences in efficiencies and annual operating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	4.68	4.68	100%
Coincident Demand [kW]	3.37	3.37	100%
Consumption [kWh]	25717	25483	99%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = tons * (kW/ton,baseFL - kW/ton,effFL)	OK
Consumption:	ΔkWh = tons * (kW/ton IPLV base - kW/ton IPLV eff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	650	N/A	650	H-8	OK
Baseline FL EER	0.577	H-2	0.577	H-15	Updated
Efficient FL EER	0.575	N/A	0.575	N/A	OK
Baseline IPLV EER	0.55	H-2	0.55	H-15	Updated
Efficient IPLV EER	0.51	N/A	0.51	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Water or Evaporative Cooled DX Unitary AC > 360,000 Btu/h to < 3,600,000 Btu/h (14 EER)**

Description: This measure involves the installation of a water- or evaporative-cooled air conditioning unit between 360,000 Btu/h and 3,600,000 Btu/h capacity of 14 EER efficiency. The ASHRAE 90.1 2004 code baseline at this capacity is 11 EER efficiency.

Incentive: $40/ton plus $5 per 0.1 EER above base

Conclusion: Updated

Reasoning: The evaluation team verified the code reference to confirm baseline equipment efficiency. A rule of thumb was used to convert SEER to EER where necessary. However, since the program's reference for annual cooling hours could not be found, the evaluation team used the recommended equivalent full-load cooling hours (EFLCH) from ASHRAE via Energy Star for New York, NY. Lower deemed consumption savings reflects this difference in annual operating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	6.86	6.31	92%
Coincident Demand [kW]	4.94	4.54	92%
Consumption [kWh]	7536	6873	91%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	360000	N/A	360000	N/A	OK
Baseline EER	10.8	H-2	11	H-15	Updated
Efficient EER	14	N/A	14	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *HVAC*

Measure: **Water Source Heat Pump < 360,000 Btu/h (86 deg F entering water)**

Description: This measure involves the installation of a water-source heat pump less than 30 tons with 86 degree F entering condenser water. ASHRAE recommends a baseline of 12 EER, which represents the incentivized efficiency for this unit. The baseline is assumed an equivalently-sized air-source heat pump.

Incentive: $80/ton

Conclusion: Updated

Reasoning: A range of incentivized efficiencies could not be found among program documents. The evaluation team referenced the in-house savings analysis for an equivalent NYSERDA prescriptive measure to determine a likely incentivized efficiency. Baseline conditions were determined from program documents from LIPA and reaffirmed with ASHRAE 90.1 2004 standards. The program's current reference to annual equivalent full-load cooling hours (EFLCH) and heating hours (ELFHH) could not be found, so the evaluation team used EFLCH and ELFHH recommendations for heat pumps in New York, NY from an Energy Star savings calculator. The consumption savings discrepancy reflects this difference in operating hours. The evaluation team recommends dividing this measure into multiple size categories to reflect ASHRAE 90.1 classifications.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.57	2.57	100%
Coincident Demand [kW]	1.85	1.85	100%
Consumption [kWh]	4268	5863	137%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours + Capacity/1000 * (1/COPbase - 1/COPeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.1	H-44	0.1	H-44	Reasonable Based on Engr. Judgment
Spillover %	0	H-44	0	H-44	Reasonable Based on Engr. Judgment
Capacity [Btu/h]	240000	N/A	240000	H-1	OK
Baseline EER	12	H-15	12	H-15	Updated
Efficient EER	14	H-1	14	H-1	OK
Baseline COP	4.2	H-2	4.2	H-15	OK
Efficient COP	4.6	N/A	4.6	N/A	OK
Equiv. Full Load Cooling [h]	1099	H-3	1089	H-6	Updated

Equiv. Full Load Heating [h]	1100	H-7	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.72	N/A	OK

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Combination Oven**

Description: This measure involves the installation of high-efficiency electric combination oven/steamers that meet Energy Star requirements. An Energy Star-approved combination oven features a cooking efficiency of 60% or greater, whereas the baseline features a cooking efficiency of 44% according to Energy Star research. Savings are calculated on a per-unit basis.

Incentive: $1000/unit

Conclusion: Updated

Reasoning: The evaluation team found the referenced FSTC savings tool to verify the baseline and incentivized demand values used in the LIPA algorithm. The evaluation team reran the tool with default inputs, which represent an average combination oven, but obtained results different from the current program. The evaluation team also verified the operating hours with FSTC research. However, for combination ovens of small, medium, and large size, an average of 6 hr/day is listed. The evaluation team's recommended operating hours reflect this schedule. The discrepancy in consumption savings reflects this difference in operating hours used in each calculation.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	4.25	4.20	99%
Coincident Demand [kW]	4.12	4.07	99%
Consumption [kWh]	18564	7862	42%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / Operating Hours	OK
Consumption:	ΔkWh = kWhbaseline – kWhefficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	4368	K-6	1872	K-5	Updated
Baseline Demand [kW]	8.62	K-6	8.8	K-6	Updated
Efficient Demand [kW]	4.37	K-6	4.6	K-6	Updated
Coincidence Factor	0.97	K-3	0.97	K-3	Reasonable Based on Engr. Judgment
Freeridership %	0.05	K-4	0.05	K-4	Reasonable Based on Engr. Judgment
Spillover %	0.05	K-4	0.05	K-4	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Convection Oven**

Description: This measure involves the installation of high-efficiency electric convection ovens that meet Energy Star requirements. An Energy Star-approved convection oven features a cooking efficiency of 70% or greater, whereas the baseline model features a cooking efficiency of 65% based on FSTC research. Operating hours reflect a convection oven of medium size. Savings are calculated on a per-unit basis.

Incentive: $350/unit

Conclusion: Updated

Reasoning: The evaluation team found the referenced FSTC savings tool to verify the baseline and incentivized demand values used in the LIPA algorithm. The evaluation team reran the tool with default inputs, which represent an average convection oven, but obtained results different from the current program. The evaluation team also verified the operating hours with FSTC research. However, for convection ovens of small, medium, and large size, an average of 6 hr/day is listed. The evaluation team's recommended operating hours reflect this schedule. The discrepancy in consumption savings reflects this difference in operating hours used in each calculation.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.42	0.40	94%
Coincident Demand [kW]	0.41	0.39	94%
Consumption [kWh]	1855	749	40%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / Operating Hours	OK
Consumption:	ΔkWh = kWhbaseline – kWhefficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	4368	K-5	1872	K-5	Updated
Baseline Demand [kW]	2.6717	K-7	2.8	K-7	Updated
Efficient Demand [kW]	2.24702	K-7	2.4	K-7	Updated
Coincidence Factor	0.97	K-3	0.97	K-3	Reasonable Based on Engr. Judgment
Freeridership %	0.05	K-4	0.05	K-4	Reasonable Based on Engr. Judgment
Spillover	0.05	K-4	0.05	K-4	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Electric Fryer**

Description: This measure involves the installation of high-efficiency electric fryers that meet Energy Star requirements. An Energy Star-approved electric fryer features a cooking efficiency of 80% or greater, whereas the baseline model features a cooking efficiency of 75% according to FSTC research. Savings are calculated on a per-unit basis.

Incentive: $200/unit

Conclusion: Updated

Reasoning: The evaluation team found the referenced FSTC savings tool to verify the baseline and incentivized demand values used in the LIPA algorithm. The evaluation team reran the tool with default inputs, which represent an average electric fryer, but obtained results different from the current program. The evaluation team also verified the operating hours with FSTC research. The current algorithm relies on load shape data specific to Long Island; however, ERS decided to provide a sanity check for this value. Per FSTC research, an electric fryer runs approximately 12 hrs/day, 6 days/week, 52 wks/year. The evaluation team's recommended operating hours reflect this schedule. Discrepancies in demand and consumption reflect differences in FSTC tool outputs and fryer operating hours, respectively.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.21	0.17	81%
Coincident Demand [kW]	0.21	0.17	81%
Consumption [kWh]	932	636	68%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / Operating Hours	OK
Consumption:	ΔkWh = kWhbaseline – kWhefficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	4464	K-3	3744	K-10	Updated
Baseline Demand [kW]	3.74686	K-11	3.1	K-11	Updated
Efficient Demand [kW]	3.50112	K-11	2.9	K-11	Updated
Coincidence Factor	1	K-3	0.97	K-3	Updated
Freeridership %	0.25	K-4	0.25	K-4	Reasonable Based on Engr. Judgment
Spillover %	0.1	K-4	0.1	K-4	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Electric Griddle**

Description: This measure involves the installation of high-efficiency electric griddles that meet Energy Star requirements. An Energy Star-approved electric griddle features a cooking efficiency of 70% or greater, whereas the baseline model features a cooking efficiency of 60% according to FSTC research. All calculations assume a griddle length of three feet. Savings are calculated on a per-unit basis.

Incentive: $300/unit

Conclusion: Updated

Reasoning: The evaluation team found the referenced FSTC savings tool to verify the baseline and incentivized demand values used in the LIPA algorithm. The evaluation team reran the tool with default inputs, which represent an average 3-foot electric griddle, but obtained results different from the current program. The evaluation team also verified the operating hours with FSTC research. The current algorithm relies on load shape data specific to Long Island; however, ERS decided to provide a sanity check for this value. Per FSTC research, an electric griddle runs approximately 12 hrs/day, 6 days/week, 52 wks/year. The evaluation team's recommended operating hours reflect this schedule. Discrepancies in demand and consumption savings reflect differences in FSTC tool outputs and griddle operating hours, respectively.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.57	0.50	87%
Coincident Demand [kW]	0.57	0.49	85%
Consumption [kWh]	2556	1872	73%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / Operating Hours	OK
Consumption:	ΔkWh = kWhbaseline – kWhefficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	4464	K-3	3744	K-8	Updated
Baseline Demand [kW]	4.0056	K-9	4	K-9	Updated
Efficient Demand [kW]	3.43302	K-9	3.5	K-9	Updated
Coincidence Factor	1	K-3	0.97	N/A	Updated
Freeridership %	0.05	K-4	0.05	K-4	Reasonable Based on Engr. Judgment
Spillover %	0.05	K-4	0.05	K-4	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Electric Steamer**

Description: This measure involves the installation of high-efficiency electric steamer cookers that meet Energy Star requirements. An Energy Star-approved steamer features a cooking efficiency of 50% or greater, whereas the baseline features a cooking efficiency of 26% according to Energy Star research. All deemed savings calculations represent an average of 3, 4, 5, and 6 pan steamer models. Savings are calculated on a per-unit basis.

Incentive: $750/unit

Conclusion: Updated

Reasoning: The evaluation team found the referenced Energy Star savings tool to verify the baseline and incentivized demand values used in the LIPA algorithm. The evaluation team reran the tool with default inputs, which represent an average electric steamer, but obtained results different from the current program. Discrepancies in demand and consumption savings reflect these differences in FSTC tool outputs.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.05	1.11	105%
Coincident Demand [kW]	1.02	1.07	105%
Consumption [kWh]	4604	4827	105%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh$ / Operating Hours	OK
Consumption:	$\Delta kWh = kWh_{baseline} - kWh_{efficient}$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	4368	K-1	4368	K-1	OK
Baseline Demand [kW]	2.32	K-2	2.46	K-2	Updated
Efficient Demand [kW]	1.08	K-2	1.16	K-2	Updated
Coincidence Factor	0.97	K-3	0.97	K-3	Reasonable Based on Engr. Judgment
Freeridership %	0.25	K-4	0.25	K-4	Reasonable Based on Engr. Judgment
Spillover %	0.1	K-4	0.1	K-4	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Insulated Holding Cabinet 1/2**

Description: This measure involves the installation of 10 cubic-foot insulated hot food holding cabinets that meet Energy Star requirements. An Energy Star-approved holding cabinet features a normalized demand of 40 W/ft3 or less, whereas the baseline model features 100 W/ft3 according to FSTC. Savings are calculated on a per-unit basis.

Incentive: $200/unit

Conclusion: Updated

Reasoning: The evaluation team found the referenced FSTC savings tool to verify the baseline and incentivized demand values used in the LIPA algorithm. The evaluation team reran the tool with default inputs, which represent an insulated holding cabinet of average size (15 ft3), but obtained results different from the current program. Discrepancies in demand and consumption savings reflect differences in the FSTC tool outputs.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.23	0.45	200%
Coincident Demand [kW]	0.22	0.43	200%
Consumption [kWh]	1232	2464	200%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / Operating Hours	OK
Consumption:	ΔkWh = kWhbaseline – kWhefficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	5475	K-13	5475	K-12	OK
Baseline Demand [kW]	0.7	K-13	1	K-13	Updated
Efficient Demand [kW]	0.4	K-13	0.4	K-13	OK
Coincidence Factor	0.965	K-3	0.965	K-3	Reasonable Based on Engr. Judgment
Freeridership %	0.35	K-4	0.35	K-4	Reasonable Based on Engr. Judgment
Spillover %	0.1	K-4	0.1	K-4	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Insulated Holding Cabinet 3/4**

Description: This measure involves the installation of 15 cubic-foot insulated hot food holding cabinets that meet Energy Star requirements. An Energy Star-approved holding cabinet features a normalized demand of 40 W/ft3 or less, whereas the baseline model features 100 W/ft3 according to FSTC. Savings are calculated on a per-unit basis.

Incentive: $250/unit

Conclusion: Updated

Reasoning: The evaluation team found the referenced FSTC savings tool to verify the baseline and incentivized demand values used in the LIPA algorithm. The evaluation team reran the tool with default inputs, which represent an insulated holding cabinet of average size (15 ft3), but obtained results different from the current program. Discrepancies in demand and consumption savings reflect differences in the FSTC tool outputs.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.34	0.68	200%
Coincident Demand [kW]	0.33	0.65	200%
Consumption [kWh]	1848	3696	200%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / Operating Hours	OK
Consumption:	ΔkWh = kWhbaseline – kWhefficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	5475	K-13	5475	K-12	OK
Baseline Demand [kW]	1.05	K-13	1.5	K-13	Updated
Efficient Demand [kW]	0.6	K-13	0.6	K-13	OK
Coincidence Factor	0.965	K-3	0.965	K-3	Reasonable Based on Engr. Judgment
Freeridership %	0.35	K-4	0.35	K-4	Reasonable Based on Engr. Judgment
Spillover %	0.1	K-4	0.1	K-4	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Insulated Holding Cabinet Full**

Description: This measure involves the installation of 20 cubic-foot insulated hot food holding cabinets that meet Energy Star requirements. An Energy Star-approved holding cabinet features a normalized demand of 40 W/ft3 or less, whereas the baseline model features 100 W/ft3 according to FSTC. Savings are calculated on a per-unit basis.

Incentive: $300/unit

Conclusion: Updated

Reasoning: The evaluation team found the referenced FSTC savings tool to verify the baseline and incentivized demand values used in the LIPA algorithm. The evaluation team reran the tool with default inputs, which represent an insulated holding cabinet of average size (15 ft3), but obtained results different from the current program. Discrepancies in demand and consumption savings reflect differences in the FSTC tool outputs.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.45	1.28	283%
Coincident Demand [kW]	0.43	1.23	283%
Consumption [kWh]	2464	6981	283%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / Operating Hours	OK
Consumption:	ΔkWh = kWhbaseline – kWhefficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]	5475	K-13	5475	K-12	OK
Baseline Demand [kW]	1.05	K-13	1.5	K-13	Updated
Efficient Demand [kW]	0.6	K-13	0.5333	K-13	Updated
Coincidence Factor	0.965	K-3	0.965	K-3	Reasonable Based on Engr. Judgment
Freeridership %	0.35	K-4	0.35	K-4	Reasonable Based on Engr. Judgment
Spillover %	0.1	K-4	0.1	K-4	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Kitchen Equipment*

Measure: **Low Flow Pre-Rinse Spray Valve**

Description: This measure involves the replacement of a standard flow pre-rinse spray valve with a low flow equivalent (< 1.6 gpm, at 60 psi). Pre-rinse spray valves are used to remove food from dishes before placement into a dishwasher. Baseline conditions on average feature 3.2 gpm at 60 psi. Valve usage for a medium-traffic restaurant was extracted from the listed reference. Savings are calculated on a per-unit basis.

Incentive: $30/valve

Conclusion: OK

Reasoning: The evaluation team found the referenced FSTC tool to verify the baseline and rebated pre-rinse flowrates involved in the deemed savings calculation. Additionally, run hours was verified from a CEE program study for medium-traffic restaurants. All other values were extracted from the default conditions in the FSTC tool. In summary, the evaluation team has verified the terms involved in the deemed savings calculation and finds no discrepancy.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	19.02	19.02	100%
Coincident Demand [kW]	1.90	1.90	100%
Consumption [kWh]	10269	10269	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / Operating Hours	OK
Consumption:	ΔkWh = (base flow - efficient flow) * ΔT / boiler efficiency	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
New device flowrate [gpm]	1.6	K-14	1.6	K-14	OK
Old device flowrate [gpm]	3.2	K-15	3.2	K-15	OK
Usage per day [h]	1.5	K-15	1.5	K-15	OK
Temperature rise [F]	70	K-14	70	K-14	OK
Boiler efficiency	0.95	K-14	0.95	K-14	OK
Coincidence Factor	0.1	N/A	0.1	N/A	OK
Freeridership %	0	N/A	0	N/A	OK
Spillover %	0.1	N/A	0.1	N/A	OK

Program: *CCP* **Category:** *Lighting*

Measure: **Controls Lighting - Ceiling / Remote Mounted Occupancy Sensors**

Description: This measure involves installing ceiling or remote mounted occupancy sensors on fluorescent lighting systems. Each eligible unit must be a hard-wired, passive infrared and/or ultrasonic detector. Installations must comply with manufacturer's guidelines on coverage and maximum controlled watts. Installations with manual "ON" overrides are not eligible.

Incentive: $35 per control

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The % saved watts values used to calculate the energy savings are not referenced. The evaluation team compared these values to the values used in three other programs currently running in nearby states. Only two of the seven measures in the CCP program were found to be part of surrounding programs. The values from these two measures did match those used in the CCP program. The evaluation team also conducted some market research on the non-found measures to determine if the values used in the CCP program are reasonable. The results were that the values were reasonable, so the evaluation team is not recommending any changes to these values. The evaluation team had access to CCP's savings database. The evaluation team used this database to determine the savings values and realization rates reported in this document. Upon reviewing the values in this database, no major incongruities were discovered. The evaluation team recommends further research to fine tune the savings values for this measure. This will make the values more defensible and the program sounder. Since the same % saved values are used, the realization rates for both the energy savings and demand savings are 100% It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture..

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.16	0.16	100%
Coincident Demand [kW]	0.12	0.12	100%
Consumption [kWh]	826	826	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWconnected x SVG	OK
Consumption:	ΔkWh = kWconnected x HOURS x SVG	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
HOURS		L-7		L-5	OK
SVG	0.4	L-7	0.4	L-5	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	OK
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Controls Lighting - Daylight Controlled Dimming of Fluorescent Systems**

Description: This measure involves installing daylight controlled dimming of fluorescent lighting systems. Each eligible unit must consist of a photo sensor that controls a minimum of 4 dimming ballasts and fluorescent lamps. Dimming must be continuous or stepped at 4 or more levels. Fixtures controlled ON/OFF are NOT eligible.

Incentive: $40 per ballast

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The % saved watts values used to calculate the energy savings are not referenced. The evaluation team compared these values to the values used in three other programs currently running in nearby states. Only two of the seven measures in the CCP program were found to be part of surrounding programs. The values from these two measures did match those used in the CCP program. The evaluation team also conducted some market research on the non-found measures to determine if the values used in the CCP program are reasonable. The results were that the values were reasonable, so the evaluation team is not recommending any changes to these values. The evaluation team had access to CCP's savings database. The evaluation team used this database to determine the savings values and realization rates reported in this document. Upon reviewing the values in this database, no major incongruities were discovered. The evaluation team recommends further research to fine tune the savings values for this measure. This will make the values more defensible and the program sounder. Since the same % saved values are used, the realization rates for both the energy savings and demand savings are 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.03	0.03	100%
Coincident Demand [kW]	0.02	0.02	100%
Consumption [kWh]	123	123	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kW_{connected} \times SVG$	OK
Consumption:	$\Delta kWh = kW_{connected} \times HOURS \times SVG$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
HOURS		L-7		L-5	OK
SVG	0.5	L-7	0.5	L-5	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Controls Lighting - Fluorescent Fixture Mounted Daylight Sensor**

Description: This measure involves installing fluorescent fixture mounted daylight sensors. Each eligible unit must be mounted on and control a fluorescent fixture based on available daylight.

Incentive: $30 per control

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The % saved watts values used to calculate the energy savings are not referenced. The evaluation team compared these values to the values used in three other programs currently running in nearby states. Only two of the seven measures in the CCP program were found to be part of surrounding programs. The values from these two measures did match those used in the CCP program. The evaluation team also conducted some market research on the non-found measures to determine if the values used in the CCP program are reasonable. The results were that the values were reasonable, so the evaluation team is not recommending any changes to these values. The evaluation team had access to CCP's savings database. The evaluation team used this database to determine the savings values and realization rates reported in this document. Upon reviewing the values in this database, no major incongruities were discovered. The evaluation team recommends further research to fine tune the savings values for this measure. This will make the values more defensible and the program sounder. Since the same % saved values are used, the realization rates for both the energy savings and demand savings are 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.03	0.03	100%
Coincident Demand [kW]	0.02	0.02	100%
Consumption [kWh]	132	132	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kWconnected \times SVG$	OK
Consumption:	$\Delta kWh = kWconnected \times HOURS \times SVG$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
HOURS		L-7		L-5	OK
SVG	0.25	L-7	0.25	L-5	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Controls Lighting - Fluorescent Fixture Mounted Occupancy Sensor with on/off**

Description: This measure involves installing fluorescent fixture mounted occupancy sensors. Each eligible unit must be mounted on and control a fluorescent fixture with an on/off control.

Incentive: $35 per control

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The % saved watts values used to calculate the energy savings are not referenced. The evaluation team compared these values to the values used in three other programs currently running in nearby states. Only two of the seven measures in the CCP program were found to be part of surrounding programs. The values from these two measures did match those used in the CCP program. The evaluation team also conducted some market research on the non-found measures to determine if the values used in the CCP program are reasonable. The results were that the values were reasonable, so the evaluation team is not recommending any changes to these values. The evaluation team had access to CCP's savings database. The evaluation team used this database to determine the savings values and realization rates reported in this document. Upon reviewing the values in this database, no major incongruities were discovered. The evaluation team recommends further research to fine tune the savings values for this measure. This will make the values more defensible and the program sounder. Since the same % saved values are used, the realization rates for both the energy savings and demand savings are 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.02	100%
Coincident Demand [kW]	0.02	0.02	100%
Consumption [kWh]	104	104	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kWconnected \times SVG$	OK
Consumption:	$\Delta kWh = kWconnected \times HOURS \times SVG$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
HOURS		L-7		L-5	OK
SVG	0.25	L-7	0.25	L-5	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Controls Lighting - Wall Mounted Occupancy Sensors**

Description: This measure involves installing wall mounted occupancy sensors on fluorescent lighting systems. Each eligible unit must be a wall mounted, hard-wired passive infrared and/or ultrasonic detector. Not eligible if installed in rest rooms, locker rooms, stairwells, or rooms greater than 250 square feet.

Incentive: $15 per control

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The % saved watts values used to calculate the energy savings are not referenced. The evaluation team compared these values to the values used in three other programs currently running in nearby states. Only two of the seven measures in the CCP program were found to be part of surrounding programs. The values from these two measures did match those used in the CCP program. The evaluation team also conducted some market research on the non-found measures to determine if the values used in the CCP program are reasonable. The results were that the values were reasonable, so the evaluation team is not recommending any changes to these values. The evaluation team had access to CCP's savings database. The evaluation team used this database to determine the savings values and realization rates reported in this document. Upon reviewing the values in this database, no major incongruities were discovered. The evaluation team recommends further research to fine tune the savings values for this measure. This will make the values more defensible and the program sounder. Since the same % saved values are used, the realization rates for both the energy savings and demand savings are 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.06	0.06	100%
Coincident Demand [kW]	0.05	0.05	100%
Consumption [kWh]	288	288	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kW_{connected} \times SVG$	OK
Consumption:	$\Delta kWh = kW_{connected} \times HOURS \times SVG$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
HOURS		L-7		L-5	OK
SVG	0.25	L-7	0.25	L-5	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - 2 T8 or T5 Lamps, Elect. Ballast, Hi-Eff**

Description: This measure involves the installation of high efficiency fixtures with two T8 or T5 lamps and electric ballasts. This measure is meant for new recessed or surface mounted fixtures with electronic ballasts. Each eligible fixture must consist of ballast and not more than 2 lamps. Overall fixture efficiency must meet or exceed 75% for parabolic louvered fixtures and 83% for fixtures with a prismatic lens.

Incentive: $10 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 11 watts per fixture while the algorithm document cites a value of 2 watts per fixture. That is a difference of 9 watts. This discrepancy and results in an over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.01	0.01	51%
Coincident Demand [kW]	0.01	0.00	51%
Consumption [kWh]	38	17	45%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	11	L-7	5	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - 2 T8 or T5 Lamps, Low Power Elect. Ballast, Hi-Eff**

Description: This measure involves the installation of high efficiency fixtures with two T8 or T5 lamps and low power electric ballasts. This measure is meant for new recessed or surface mounted fixtures with electronic ballasts. Each eligible fixture must consist of a low power electronic ballast (Ballast Factor <0.85) and not more than 2 lamps. Overall fixture efficiency must meet or exceed 75% for parabolic louvered fixtures and 83% for fixtures with a prismatic lens.

Incentive: $20 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts value used in the database did not match the value cited in the savings algorithm document. The database uses a value of 8 watts per fixture while the algorithm document cites a value of 4 watts per fixture. That is a difference of 4 watts; a discrepancy which results in an over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The value found in the CCP algorithm document was found to be different than the value used in those programs. Conversely, the value used in the database was found to match the value used in those other programs. Since the value used in the CCP report is not cited from any specific sources, the evaluation team recommends using the value from those other programs (whose values have been researched and are defensible). Since this saved wattage value is an exact match of the value used to calculate savings initially, the savings remain unchanged. Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.01	0.01	100%
Coincident Demand [kW]	0.01	0.01	100%
Consumption [kWh]	23	23	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	8	L-7	8	L-5	OK
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - 2 Tandem Wired 4 ft. Fixtures, Specular Reflectors**

Description: This measure involves the installation of two high efficiency tandem wired 4' fixtures with specular reflectors. Each eligible unit must include a new fixture with a minimum reflectivity of 87%. Fixtures must use HPT8 or T5 lamps and electronic ballasts. This measure is intended for industrial applications, not general office lighting.

Incentive: $15 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 60 watts per fixture while the algorithm document cites a value of 3 watts per fixture. That is a difference of 57 watts. This is a large discrepancy and results in a large over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.06	0.01	11%
Coincident Demand [kW]	0.04	0.00	11%
Consumption [kWh]	216	22	10%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kWsave \times WHFd$	OK
Consumption:	$\Delta kWh = kWsave \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	60	L-7	6	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - 3 T8 or T5 Lamps, Elect. Ballast, Hi-Eff**

Description: This measure involves the installation of high efficiency fixtures with three T8 or T5 lamps and electric ballasts. This measure is meant for new recessed or surface mounted fixtures with electronic ballast. Each eligible fixture must consist of ballast and not more than 3 lamps. Overall fixture efficiency must meet or exceed 75% for parabolic louvered fixtures and 83% for fixtures with a prismatic lens.

Incentive: $10 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 24 watts per fixture while the algorithm document cites a value of 5 watts per fixture. That is a difference of 19 watts. This is a large discrepancy and results in a large over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.01	37%
Coincident Demand [kW]	0.02	0.01	37%
Consumption [kWh]	87	29	33%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	24	L-7	8	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - 3 T8 or T5 Lamps, Elect. Ballast, Low Glare**

Description: This measure involves the installation of high efficiency fixtures with three T8 or T5 lamps, electric ballasts, and low glare technologies. This measure is meant for new low-glare recessed or surface mounted fixture with electronic ballasts. Overall fixture efficiency must meet or exceed 60% for parabolic fixtures. Lighting must be designed and installed to meet IES Standard RP-1 Preferred criteria.

Incentive: $20 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 24 watts per fixture while the algorithm document cites a value of 5 watts per fixture. That is a difference of 19 watts. This is a large discrepancy and results in a large over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.01	37%
Coincident Demand [kW]	0.02	0.01	37%
Consumption [kWh]	69	23	33%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kWsave \times WHFd$	OK
Consumption:	$\Delta kWh = kWsave \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	24	L-7	8	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - 3 T8 or T5 Lamps, Low Power Elect. Ballast, Hi-Eff**

Description: This measure involves the installation of high efficiency fixtures with three T8 or T5 lamps and low power electric ballasts. This measure is meant for new recessed or surface mounted fixtures with electronic ballasts. Each eligible fixture must consist of a low power electronic ballast (Ballast Factor <0.85) and not more than 3 lamps. Overall fixture efficiency must meet or exceed 75% for parabolic louvered fixtures and 83% for fixtures with a prismatic lens.

Incentive: $20 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 11 watts per fixture while the algorithm document cites a value of 2 watts per fixture. That is a difference of 9 watts. This is a large discrepancy and results in a large over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.01	0.01	81%
Coincident Demand [kW]	0.01	0.01	81%
Consumption [kWh]	35	25	73%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	11	L-7	8	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - Ceramic Metal Halide Fixture**

Description: This measure involves the installation of high efficiency ceramic metal halide fixtures. For high ceiling retail, industrial applications, each eligible unit must include a metal halide lamp with ceramic arc tube technology. For replacement applications, the new fixture must be a one-for-one replacement of incandescent, mercury vapor, high pressure sodium, or halogen fixtures. Ceramic metal halide wattage must be less than the existing lamp wattage.

Incentive: $45 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be much different than those used in those other programs. The evaluation team believes that the saved watts value discrepancy is due to a different baseline lighting system used in the CCP program than those used in the surrounding programs. We believe that the baseline systems used to calculate energy savings in the CCP program are outdated. The "Energy Independence and Security Act of 2007" was signed by President Bush in 2007 which mandated on Jan. 1, 2009 that probe start metal hallide fixtures be illegal in most situations. Since we believe probe start metal halide fixtures to be the baseline in the CCP calculations, updating this baseline will change the saved watts value drastically. Therefore we recommend using the values from those other programs whose values have been researched and are defensible. Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.21	0.02	10%
Coincident Demand [kW]	0.15	0.02	10%
Consumption [kWh]	799	71	9%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kWsave \times WHFd$	OK
Consumption:	$\Delta kWh = kWsave \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	224	L-7	20	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - Ceramic Metal Halide Track Lighting**

Description: This measure involves the installation of high efficiency ceramic metal halide track lighting. Each eligible unit must consist of a ceramic metal halide lamp with remote ballast in a down light, directional, accent or track lighting application. The maximum lamp wattage is 100 watts.

Incentive: $45 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be much different than those used in those other programs. The evaluation team believes that the saved watts value discrepancy is due to a different baseline lighting system used in the CCP program than those used in the surrounding programs. We believe that the baseline systems used to calculate energy savings in the CCP program are outdated. The "Energy Independence and Security Act of 2007" was signed by President Bush in 2007 which mandated on Jan. 1, 2009 that probe start metal hallide fixtures be illegal in most situations. Since we believe probe start metal halide fixtures to be the baseline in the CCP calculations, updating this baseline will change the saved watts value drastically. Therefore we recommend using the values from those other programs whose values have been researched and are defensible. Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.10	0.01	13%
Coincident Demand [kW]	0.08	0.01	13%
Consumption [kWh]	440	52	12%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kWsave \times WHFd$	OK
Consumption:	$\Delta kWh = kWsave \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	111	L-7	13	L-5	Updated
HOURS		L-7		L-5	OK
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - Hard-Wired (Pin Base) CFLs and Ballast**

Description: This measure involves the installation of high efficiency hard-wired (pin base) CFLs and ballasts. The fixture efficiency must meet or exceed 75%. Only new fixtures with electronic ballasts qualify. Roadway or street lighting does not qualify. The total unit must have a minimum of 125 watts.

Incentive: $40 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.06	0.06	98%
Coincident Demand [kW]	0.05	0.05	98%
Consumption [kWh]	221	194	88%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	67	L-7	58.7	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - Integrated Ballast Metal Halide PAR lamp**

Description: This measure involves the installation of high efficiency integrated ballast metal halide PAR lamps. Each eligible unit must consist of a ceramic metal halide PAR lamp with and integrated ballast. For replacement of applications, lamps must replace standard incandescent or halogen PAR lamps of greater wattage.

Incentive: $20 per lamp

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be much different than those used in those other programs. The evaluation team believes that the saved watts value discrepancy is due to a different baseline lighting system used in the CCP program than those used in the surrounding programs. We believe that the baseline systems used to calculate energy savings in the CCP program are outdated. The "Energy Independence and Security Act of 2007" was signed by President Bush in 2007 which mandated on Jan. 1, 2009 that probe start metal hallide fixtures be illegal in most situations. Since we believe probe start metal halide fixtures to be the baseline in the CCP calculations, updating this baseline will change the saved watts value drastically. Therefore we recommend using the values from those other programs whose values have been researched and are defensible. Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.06	0.01	22%
Coincident Demand [kW]	0.04	0.01	22%
Consumption [kWh]	234	47	20%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	65	L-7	13	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - Open Non-recessed Fixture, 4 ft, Specular Reflector**

Description: This measure involves the installation of high efficiency open non-recessed 4' fixtures with specular reflectors. Each eligible unit must include a new fixture with a minimum reflectivity of 87%. Fixtures must use HPT8 or T5 lamps and electronic ballasts. This measure is intended for industrial applications, not general office lighting.

Incentive: $15 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 39 watts per fixture while the algorithm document cites a value of 4 watts per fixture. That is a difference of 35 watts. This is a large discrepancy and results in a large over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.04	0.01	35%
Coincident Demand [kW]	0.03	0.01	35%
Consumption [kWh]	125	39	31%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = kWsave \times WHFd$	OK
Consumption:	$\Delta kWh = kWsave \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	39	L-7	12.2	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - Open Non-recessed Fixture, 8 ft, Specular Reflector**

Description: This measure involves the installation of high efficiency tandem wired 8' fixtures with specular reflectors. Each eligible unit must include a new fixture with a minimum reflectivity of 87%. Fixtures must use HPT8 or T5 lamps and electronic ballasts. This measure is intended for industrial applications, not general office lighting.

Incentive: $20 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 46 watts per fixture while the algorithm document cites a value of 4 watts per fixture. That is a difference of 42 watts. This is a large discrepancy and results in a large over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.04	0.01	30%
Coincident Demand [kW]	0.03	0.01	30%
Consumption [kWh]	193	51	27%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	46	L-7	12.2	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - Recessed Indirect Fluorescent Fixtures T8 or T5**

Description: This measure involves the installation of high efficiency recessed indirect fluorescent fixtures using T8 or T5 lamps. Each eligible unit must be recessed containing no more than 3 lamps with an indirect or indirect/direct distribution. The overall fixture efficiency must meet or exceed 80%.

Incentive: $20 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 49 watts per fixture while the algorithm document cites a value of 6 watts per fixture. That is a difference of 43 watts. This is a large discrepancy and results in a large over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.05	0.01	28%
Coincident Demand [kW]	0.03	0.01	28%
Consumption [kWh]	159	40	25%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	49	L-7	12.2	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - T8 or T5 Fluorescent Lamps and Ballasts**

Description: This measure involves the installation of high efficiency T8 or T5 Fluorescent Lamps and ballasts. The fixture efficiency must meet or exceed 75%. Only new fixtures with electronic ballasts qualify. Roadway or street lighting does not qualify. The total unit must have a minimum of 125 watts.

Incentive: $35 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.18	0.23	124%
Coincident Demand [kW]	0.14	0.17	124%
Consumption [kWh]	657	728	111%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	199	L-7	218.5	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Non-Controls Lighting - T8 or T5 Lamps, Elect. Ballast, Indirect**

Description: This measure involves the installation of high efficiency indirect fixtures with T8 or T5 Lamps, and electric ballasts. Each eligible fixture must consist of a four-foot section containing not more than 3 lamps, with an indirect or indirect/direct light distribution. Overall fixture efficiency must meet or exceed 80%. Lighting should be designed and installed to meet IES standard RP-1 MAXIMUM criteria.

Incentive: $20 per fixture

Conclusion: Updated

Reasoning: The evaluation team verified the algorithms and references used in the program. The references used seem reasonable and no changes are recommended. The evaluation team completed a careful analysis of the energy and demand savings. We discovered that the saved watts values used in the database did not match the values cited in the savings algorithm document. The database uses a value of 17 watts per fixture while the algorithm document cites a value of 13 watts per fixture. That is a difference of 4 watts. This discrepancy results in an over estimation and reporting of savings. The saved watts values referenced in the algorithms document are not referenced by any source. The evaluation team compared these values to the values used in three other programs currently running in nearby states. The values found in the CCP algorithm document were found to be close to those used in those other programs. Since the values used in the CCP report are not cited from any specific sources, the evaluation team recommends using the values from those other programs (whose values have been researched and are defensible). Furthermore, the on-hours values found in the database did not match the on-hours quoted in CCP's algorithms document. The evaluation team recommends the program to be consistent and use the same values they cite in their documentation in their database calculations. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.01	80%
Coincident Demand [kW]	0.01	0.01	80%
Consumption [kWh]	65	46	72%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = kWsave x WHFd	OK
Consumption:	ΔkWh = kWsave x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
kWSave	17	L-7	12.2	L-5	Updated
HOURS		L-7		L-5	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.08	L-3	0.08	L-3	Reasonable Based on Engr. Judgment
Spillover %	0	L-3	0	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Corridor, Restroom, Support area**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density must be done using the space-by-space method for the following space types: Corridors, Restrooms, Support areas. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.14	0.14	100%
Coincident Demand [kW]	0.11	0.11	100%
Consumption [kWh]	366	366	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ((WSFbase – WSFefficient) / 1000) x SF x WHFd	OK
Consumption:	ΔkWh = ((WSFbase – WSFefficient) / 1000)x SF x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Gymnasium playing surface**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density must be done using the space-by-space method for the following space type: Gymnasium playing surface. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	22.33	22.33	100%
Coincident Demand [kW]	16.75	16.75	100%
Consumption [kWh]	65418	65418	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = ((WSFbase - WSFefficient) / 1000) \times SF \times WHFd$	OK
Consumption:	$\Delta kWh = ((WSFbase - WSFefficient) / 1000) \times SF \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Industrial work, <20' ceiling height**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density must be done using the building area method for the following space type: Industrial work, <20' ceiling height. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	6.18	6.18	100%
Coincident Demand [kW]	4.64	4.64	100%
Consumption [kWh]	23351	23351	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ((WSFbase – WSFefficient) / 1000) x SF x WHFd	OK
Consumption:	ΔkWh = ((WSFbase – WSFefficient) / 1000)x SF x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Industrial work, >=20' ceiling height**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density must be done using the building area method for the following space type: Industrial work, >=20' ceiling height. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. The only differences between these two years are: there is no "Manufacturing" label in the 2007 code, the "Other" category jumps from .6 to 1 in the Building Area method and from 1 to 1.1 in the Space by Space method, and the "Industrial work, >=20' ceiling height" category jumps from 1.3 to 1.7. It seems that LIPA had tried to update their program to reflect the updated code. The application on the LIPA CCP website cites that the "Industrial work, >=20' ceiling height" has been updated to the 2007 code, but the old value of 1.3 is still used. This value should be updated to 1.7. The evaluation team had access to CCP's savings database and used this database to determine the savings values and realization rates reported in this document. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	19.02	28.82	152%
Coincident Demand [kW]	14.26	21.62	152%
Consumption [kWh]	71813	108844	152%

Savings Algorithms

Algorithm **Conclusion**

Demand:	ΔkW = ((WSFbase – WSFefficient) / 1000) x SF x WHFd	OK
Consumption:	ΔkWh = ((WSFbase – WSFefficient) / 1000)x SF x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Kitchen**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density must be done using the space-by-space method for the following space type: Kitchen. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.89	0.89	100%
Coincident Demand [kW]	0.67	0.67	100%
Consumption [kWh]	2826	2826	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ((WSFbase – WSFefficient) / 1000) x SF x WHFd	OK
Consumption:	ΔkWh = ((WSFbase – WSFefficient) / 1000)x SF x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Mall, arcade or atrium**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density must be done using the space-by-space method for the following space types: Malls, Arcades or Atriums. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.23	0.23	100%
Coincident Demand [kW]	0.17	0.17	100%
Consumption [kWh]	689	689	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ((WSFbase – WSFefficient) / 1000) x SF x WHFd	OK
Consumption:	ΔkWh = ((WSFbase – WSFefficient) / 1000)x SF x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Medical and clincal care**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density must be done using the space-by-space method for the following space types: Medical and Clinical Care Areas. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	27.14	27.14	100%
Coincident Demand [kW]	20.35	20.35	100%
Consumption [kWh]	98515	98515	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = ((WSFbase - WSFefficient) / 1000) \times SF \times WHFd$	OK
Consumption:	$\Delta kWh = ((WSFbase - WSFefficient) / 1000) \times SF \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Museum**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density may be done using the space-by-space method or the building area method for the following space type: Museum. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	22.00	22.00	100%
Coincident Demand [kW]	16.50	16.50	100%
Consumption [kWh]	40125	40125	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ((WSFbase – WSFefficient) / 1000) x SF x WHFd	OK
Consumption:	ΔkWh = ((WSFbase – WSFefficient) / 1000)x SF x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Office**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density may be done using the space-by-space method or the building area method for the following space type: Office. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.41	2.41	100%
Coincident Demand [kW]	1.81	1.81	100%
Consumption [kWh]	6891	6891	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = ((WSFbase - WSFefficient) / 1000) \times SF \times WHFd$	OK
Consumption:	$\Delta kWh = ((WSFbase - WSFefficient) / 1000) \times SF \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Retail sales, wholesale showroom**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density may be done using the space-by-space method or the building area method for the following space types: Retail sales, Wholesale Showrooms. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	13.74	13.74	100%
Coincident Demand [kW]	10.30	10.30	100%
Consumption [kWh]	46800	46800	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ((WSFbase – WSFefficient) / 1000) x SF x WHFd	OK
Consumption:	ΔkWh = ((WSFbase – WSFefficient) / 1000)x SF x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - School**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density must be done using the building area method for the following space type: School. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	112.97	112.97	100%
Coincident Demand [kW]	84.73	84.73	100%
Consumption [kWh]	278653	278653	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = ((WSFbase – WSFefficient) / 1000) \times SF \times WHFd$	OK
Consumption:	$\Delta kWh = ((WSFbase – WSFefficient) / 1000) \times SF \times HOURS \times WHFe$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Lighting*

Measure: **Performance Lighting - Storage, industrial and commercial**

Description: This measure involves the installation of lighting fixtures at lighting power density levels 10% (Tier 1) and 30% (Tier 2) below the required code for New York (NYSECCC 2007). Calculating the installed lighting power density may be done using the space-by-space method or the building area method for the following space types: Storage, Industrial and Commercial. Installing fixtures at lower lighting power densities lowers the overall energy required to light a space. The same amount of light may be achieved by using higher efficiency and efficacy technologies.

Incentive: $0.4/Watt Saved for 10% Above Code; $0.8/Watt Saved for 30% Above Code

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The evaluation team found that the algorithm for energy savings is incorrect. The CCP Algorithms documents states that the energy savings is the product of the demand savings, hours and the waste heat factor for energy savings. Since the demand savings includes a waste heat factor, using this factor again in the energy calculation is a double claim of the waste heat savings. The evaluation team found that the values in the database do not make this mistake so the evaluation team believes the documentation should be updated to reflect the correct algorithm. The evaluation team found that the baseline LPD (watts/sq ft, or WSF as it is written in the CCP documentation) is referenced from New York State Code 2002. The evaluation team recommends updating this to New York State Code 2007. Upon reviewing the values in this database, one incongruity was discovered. The hours quoted in the database do not match those quoted for the different space types in the documentation. The energy [kWh] savings, however, are based on the correct hours found in the documentation and not those found quoted in the database. The evaluation team believes that the hours in the database should be changed to match those used in the energy savings calculations. Updating the baseline values leads to an increase in both the demand and energy savings, resulting in realization rates greater than 100%. It should be noted that certain values in the term-by-term evaluation have been left blank, since these values are expected to vary with each installed fixture.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	6.99	6.99	100%
Coincident Demand [kW]	5.24	5.24	100%
Consumption [kWh]	20809	20809	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ((WSFbase – WSFefficient) / 1000) x SF x WHFd	OK
Consumption:	ΔkWh = ((WSFbase – WSFefficient) / 1000)x SF x HOURS x WHFe	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
WSFBase		L-7		L-5	OK
WSFEfficient		N/A		N/A	OK
WHFe	1.12	L-1	1.12	L-1	OK
WHFd	1.31	L-1	1.31	L-1	OK
Summer Coincidence Factor	0.75	L-2	0.75	L-2	Reasonable Based on Engr. Judgment
Freeridership %	0.15	L-3	0.15	L-3	Reasonable Based on Engr. Judgment
Spillover %	0.07	L-3	0.07	L-3	Reasonable Based on Engr. Judgment

Program: *CCP* **Category:** *Motors and VFDs*

Measure: **Electrically Commutated Motors (ECMs) on HVAC Supply Fans, Fan Powered Boxes, and Fan Coils - Cooling and Heating**

Description: This measure involves the replacement of standard (permanent split capacitor (PSC)) motor with a more efficient electrically commutated motor (ECM) on various HVAC equipment. ECMs are only feasible for fractional or near-fractional motor horsepowers. This measure involves ECMs only associated with both heating and cooling system fans.

Incentive: $150/unit

Conclusion: Insufficient Information Available

Reasoning: The evaluation team was unable to obtain references used to determine current program savings. Electronically Commutated Motors (ECMs) have begun to penetrate the market to a point that they are now mandated for fan-powered terminal boxes < 1 hp in the state of California. The evaluation team recommends reassessing this measure, and specifically the baseline, at the end of every year of the program moving forward.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.20	0.20	100%
Coincident Demand [kW]	0.20	0.20	100%
Consumption [kWh]	535	535	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.16	H-45	0.16	H-45	Reasonable Based on Engr. Judgment
Spillover %	0.08	H-45	0.08	H-45	Reasonable Based on Engr. Judgment
Coincidence Factor	1	M-12	1	M-12	OK

Program: *CCP* **Category:** *Motors and VFDs*

Measure: **Electrically Commutated Motors (ECMs) on HVAC Supply Fans, Fan Powered Boxes, and Fan Coils - Cooling only**

Description: This measure involves the replacement of standard (permanent split capacitor (PSC)) motor with a more efficient electrically commutated motor (ECM) on various HVAC equipment. ECMs are only feasible for fractional or near-fractional motor horsepowers. This measure involves ECMs associated with cooling systems only.

Incentive: $150/unit

Conclusion: Insufficient Information Available

Reasoning: The evaluation team was unable to obtain references used to determine current program savings. Electronically Commutated Motors (ECMs) have begun to penetrate the market to a point that they are now mandated for fan-powered terminal boxes < 1 hp in the state of California. The evaluation team recommends reassessing this measure, and specifically the baseline, at the end of every year of the program moving forward.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.20	0.20	100%
Coincident Demand [kW]	0.20	0.20	100%
Consumption [kWh]	242	242	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freerider Rate	0.16	H-45	0.16	H-45	Reasonable Based on Engr. Judgment
Spillover %	0.08	H-45	0.08	H-45	Reasonable Based on Engr. Judgment
Freeridership %	0.16	M-12	0.16	M-12	OK
Spillover %	0.08	M-12	0.08	M-12	OK
Coincidence Factor	1	M-12	1	M-12	OK

Program: *CCP* **Category:** *Motors and VFDs*

Measure: **Electrically Commutated Motors (ECMs) on HVAC Supply Fans, Fan Powered Boxes, and Fan Coils - Heating only**

Description: This measure involves the replacement of standard (permanent split capacitor (PSC)) motor with a more efficient electrically commutated motor (ECM) on various HVAC equipment. ECMs are only feasible for fractional or near-fractional motor horsepowers. This measure involves ECMs only associated with heating system fans; therefore, there are no demand savings for this measure.

Incentive: $150/unit

Conclusion: Insufficient Information Available

Reasoning: The evaluation team was unable to obtain references used to determine current program savings. Electronically Commutated Motors (ECMs) have begun to penetrate the market to a point that they are now mandated for fan-powered terminal boxes < 1 hp in the state of California. The evaluation team recommends reassessing this measure, and specifically the baseline, at the end of every year of the program moving forward. There are no demand savings for heating only.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	293	293	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.16	H-45	0.16	H-45	Reasonable Based on Engr. Judgment
Spillover %	0.08	H-45	0.08	H-45	Reasonable Based on Engr. Judgment
Freeridership %	0.16	M-12	0.16	M-12	OK
Spillover %	0.08	M-12	0.08	M-12	OK
Coincidence Factor	1	M-12	1	M-12	OK

Program: *CCP* **Category:** *Motors and VFDs*

Measure: **Premium Efficiency Motors**

Description: This measure involves the installation of NEMA premium efficient motors instead of lower efficiency motors. The more efficient a motor is, the less energy is will consume during operation to provide the same amount of useful work. The baseline for this measure are motors meeting the federally mandated base efficiency motors, cited from EPACT 1992 (though ERS believes CCP used motor efficiency values from EPACT 2005). To be eligible for incentives, customers must install motors meeting or exceeding the NEMA standards from 2003.

Incentive: Varies based on motor size

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. It was found that the references used to determine motor efficiencies are outdated. The evaluation team recommends using the newest versions of these references for future citations. The algorithm document for CCP cites using EPACT 1992 for baseline motor efficiencies. The most current EPACT Standard is from 2005, and the evaluation team recommends citing this newer EPACT document for this program. When the evaluation team analyzed the efficiency values from the differing years, it was discovered that the values were exactly the same. Since it is highly unlikely that motor efficiency values did not change in the nearly 10 years that had passed, the evaluation team believes that the CCP program is using motor efficiency values from EPACT 2005 while citing the use of EPACT 1992. The evaluation team believes that the documentation should be updated to reflect this. Similarly, CCP uses NEMA Standards Publication MGI-2003 to determine minimum efficiency values for qualifying efficient motors when NEMA Standards Publication MGI-2006 is currently available. The evaluation team analyzed the values from these differing years and found that there are variations. The evaluation team believes that CCP should be updated to use the most recent version of these efficiency standards.To calculate savings the evaluation team analyzed all of the efficient motor installations paid in 2009. ODC provided the evaluation team with the database containing all the information required for this analysis. The result was that the savings were equal. This is because values for the baseline motor consumption did not change and the efficient energy consumption values are determined by the efficiency of the motor installed (and not the changed NEMA values) which is inputted into the database. Since the savings are based on these unchanged values, the savings remained the same and the realization rates are 100%. The evaluation team recommends updating the "On Hours" table found in this measure which only includes 3 columns (HVAC Pump, Ventilation Fan, and Other) to 4 columns (HVAC Pump - heating, HVAC Pump - cooling, HVAC Pump - unknown uses, Ventilation Fan). An inconsistency, which was discovered as the evaluation team analyzed the program, is that there are 4 motor installations which do not meet the efficiency criteria. These motors, one being a 200 hp and three being 75 hp, fall below the NEMA efficiency standard from 2003 yet still qualified for incentives in this program. CCP should look further into these installations and determine the reasoning behind approving them for incentives.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.60	0.60	100%
Coincident Demand [kW]	0.48	0.48	100%
Consumption [kWh]	2394	2394	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = (kWbase – kWefficient) = HP x 0.746 x (1/ηbase - 1/ηefficient) x RLF	OK
Consumption:	ΔkWh = (kWbase – kWefficient) x HOURS = HP x 0.746 x (1/ηbase - 1/ηefficient) x RLF x HOURS	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Operating Hours [h]		M-1		M-1	OK
ηbase		M-2		M-2	OK
ηefficient		M-3		M-3	OK
RLF	0.75	M-4	0.75	M-4	OK
Summer Coincidence Factor	0.8	M-5	0.8	M-5	OK
Freeridership %	0.3	M-6	0.3	M-6	OK
Spillover %	0.3	M-6	0.3	M-6	OK

Program: *CCP* **Category:** *Motors and VFDs*

Measure: **Variable Frequency Drive (VFD)**

Description: This measure involves the installation of variable frequency drives on motors which were previously not controlled (constant flow) or had inlet guide controls, outlet damper controls or throttle valve controls. VFDs save energy by ramping down the speed of motors to match the application need. The power draw of a motor is proportional to the speed of the motor by the affinity law. Running motors are lower speeds has the potential to save a great deal of energy.

Incentive: Varies based on motor size

Conclusion: OK

Reasoning: The evaluation team verified the algorithms and references used in the program. The citations appear to be reasonable and no changes are recommended. However, The evaluation team does recommend changing the stock efficiency table. The current table contains only one column of efficiencies for motors ranging from 5 hp to 25 hp at 1800 RPM. The evaluation team recommends adding 5 more columns to accommodate ODP and TEFC motors at 1200 rpm, 1800 rpm and 3600 rpm. Also, the evaluation team recommends updating the "On Hours" table found in this measure which only includes 3 columns (Cooling Motors Pumping Chilled Water, Heating Motors Pumping Heated Water and Ventilation Fan) to 4 columns (HVAC Pump - heating, HVAC Pump - cooling, HVAC Pump - unknown uses, Ventilation Fan). The evaluation team compared the percent savings (% Savings) values found in the CCP report to those used in PSNH's program. The evaluation team averaged the values for all building types for fans with outlet dampers, cooling pumps with throttle valves and heating pumps with throttle valves. CCP's values were similar to those used in PSNH's program therefore these values have been deemed reasonable. To calculate savings the evaluation team analyzed all of the VFD motor installations paid in 2009. ODC provided the evaluation team with the database containing all the information required for this analysis. The evaluation team averaged the savings from the database and used these average values for this evaluation. The evaluation team found one major inconsistency within this program. First, the on-hours for each motor were calculated by dividing the energy savings by the demand savings for each line item. The evaluation team found that none of the on-hours match the values presented in the algorithms document. The evaluation team looked at the program application (available online) to see if there is a section to fill in the on-hours for each individual installation, but no such section was found. The evaluation team then looked into the possibility that hours values quoted in the CCP database are averages of a number of installations at different location types. Analyzing the database further, it was found that there are multiple entries for the same type of motor installations, making it seem that each new line item (of the same type of motor installation) is for a different space type. Since no data was provided in the database to help determine space types the evaluation team could not update these values in our energy analysis. CCP should look at these values and correct them to match those found in the algorithms document.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	7.35	7.35	100%
Coincident Demand [kW]	5.29	5.29	100%
Consumption [kWh]	20665	20665	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkWh = HP x DSAVE	OK
Consumption:	ΔkWh = HP x ESAVE	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
ESAVE [kW/hp]		M-10		M-10	OK
DSAVE [kWh/hp]		M-10		M-10	OK
On Hours		M-10		M-10	OK
Summer Coincidence Factor	0.8	M-5	0.8	M-5	OK
Freeridership %	0.1	M-11	0.1	M-11	OK
Spillover %	0	M-11	0	M-11	OK

C. Energy Efficient Products TRM

Program: *Energy Efficient Products* **Category:** *HVAC*

Measure: **Room Air Conditioner < 6,000 Btu/h**

Description: This measure involves the installation of an Energy Star-rated room air conditioner less than 6000 Btu/h in capacity. The baseline for this measure is a Room A/C unit with an EER representative of a conventional, non-Energy Star-qualified unit. Room air conditioners are assumed to feature full-load efficiency for all run hours.

Incentive: $50/unit

Conclusion: Updated

Reasoning: The evaluation team was unable to determine the algorithm used to quantify deemed savings in the current program. Using baseline and Energy Star-rated efficiencies from an Energy Star savings calculator for room air conditioners, the recommended algorithm incorporates the equations used in deemed savings calculations for equivalently-sized commercial equipment. Operating hours for New York City were also extracted from this savings calculator. Only coincident savings were reported in the available documentation from LIPA; it was not possible to calculate non-coincident demand for the existing program.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]		0.05	
Coincident Demand [kW]	0.05	0.04	80%
Consumption [kWh]	29	13	44%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / FL Cooling Hrs	Updated
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * hours	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Capacity [Btu/h]	5500	N/A	5500	H-21	OK
Baseline EER		N/A	9.8	H-22	Insufficient Information Available
Efficient EER		N/A	10.8	H-22	Insufficient Information Available
Equiv. Full Load Cooling [h]		N/A	262	H-30	Insufficient Information Available
Coincidence Factor		N/A	0.8	H-30	Insufficient Information Available

Program: *Energy Efficient Products* **Category:** *HVAC*

Measure: **Room Air Conditioner > 6,000 Btu/h**

Description: This measure involves the installation of an Energy Star-rated room air conditioner less than 6000 Btu/h in capacity. The baseline for this measure is a Room A/C unit with an EER representative of a conventional, non-Energy Star-qualified unit. Room air conditioners are assumed to feature full-load efficiency for all run hours.

Incentive: $35/unit

Conclusion: Updated

Reasoning: The evaluation team was unable to determine the algorithm used to quantify deemed savings in the current program. Using baseline and Energy Star-rated efficiencies from an Energy Star savings calculator for room air conditioners, the recommended algorithm incorporates the equations used in deemed savings calculations for equivalently-sized commercial equipment. Operating hours for New York City were also extracted from this savings calculator. Only coincident savings were reported in the available documentation from LIPA; it was not possible to calculate non-coincident demand for the existing program.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]		0.06	
Coincident Demand [kW]	0.07	0.05	76%
Consumption [kWh]	39	16	42%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh$ / FL Cooling Hrs	Updated
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * hours	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Capacity [Btu/h]	7000	N/A	7000	H-21	OK
Baseline EER		N/A	9.8	H-22	Insufficient Information Available
Efficient EER		N/A	10.8	H-22	Insufficient Information Available
Equiv. Full Load Cooling [h]		N/A	262	H-30	Insufficient Information Available
Coincidence Factor		N/A	0.8	H-40	Insufficient Information Available

Program: *Energy Efficient Products* **Category:** *Lighting*

Measure: **Energy Star CFLs**

Description: This measure involves the installation of energy star rated CFLs over non energy star CFLs or incandescent technologies. A list of qualified CFLs may be found on the Energy Star website.

Incentive: Incentive amount unavailable

Conclusion: Updated

Reasoning: The evaluation team evaluated the deemed consumption savings obtained from program statistics. There were no references cited in any of the documents presented to the evaluation team, therefore the citations were not verified. The evaluation team recommends using savings values determined by Energy Star since these values are citable and defensible. Comparing the values obtained from ENERGY STAR to those currently being used in the program, the realization rate for the demand savings is near 180% while the realization rate for the energy savings is near 110%.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.05	0%
Coincident Demand [kW]	0.00	0.01	180%
Consumption [kWh]	50	54	108%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
On Hours			1022	RES-16	Insufficient Information Available
Summer Coincidence Factor		N/A	0.11	RES-16	Reasonable Based on Engr. Judgment
Freeridership %	0.215	L-4	0.215	L-4	Insufficient Information Available
Spillover %	0.04	L-4	0.04	L-4	Insufficient Information Available

Program: *Energy Efficient Products* **Category:** *Lighting*

Measure: **Energy Star Fixtures**

Description: This measure involves the installation of Energy Star rated lighting fixtures over non energy star fixtures. Energy Star rated lighting fixtures are generally more efficient and efficacious than non-Energy Star rated lighting fixtures, therefore saving energy. A list of qualified Energy Star rated lighting fixtures may be found on the Energy Star website.

Incentive: Incentive amount unavailable

Conclusion: Updated

Reasoning: The evaluation team evaluated the deemed consumption savings obtained from program statistics. There were no references cited in any of the documents presented to the evaluation team, therefore the citations were not verified. The evaluation team recommends using savings values determined by Energy Star since these values are citable and defensible. Comparing the values obtained from ENERGY STAR to those currently being used in the program, the realization rate for the demand savings is near 170% while the realization rate for the energy savings is near 110%.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.08	0%
Coincident Demand [kW]	0.01	0.01	171%
Consumption [kWh]	77	82	107%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
On Hours			1022	RES-16	Insufficient Information Available
Summer Coincidence Factor		N/A	0.11		Reasonable Based on Engr. Judgment
Freeridership %	0.017	L-4	0.017	L-4	Insufficient Information Available
Spillover %	0.032	L-4	0.032	L-4	Insufficient Information Available

Program: *Energy Efficient Products* **Category:** *Lighting*

Measure: **LED Holiday Lights**

Description: This measure involves the implementation of LED holiday lighting fixtures over the conventional incandescent versions. LED lights provide the same amount of lumen output at a much reduced power consumption.

Incentive: Incentive amount unavailable

Conclusion: OK

Reasoning: The evaluation team evaluated the deemed consumption savings obtained from program statistics. There were no references cited in any of the documents presented to the evaluation team, therefore these were not verified. The evaluation team found the values used are reasonable. Using these values results in realization rates of just over 100% for energy savings and demand savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	9	9	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Summer Coincidence Factor		N/A	0		Reasonable Based on Engr. Judgment
Freeridership %	0.026	L-4	0.026	L-4	Insufficient Information Available
Spillover %	0.071	L-4	0.071	L-4	Insufficient Information Available

Program: *Energy Efficient Products* **Category:** *Residential*

Measure: **2007 CEE Tier 2 Clothes Washer**

Description: This measure involves the installation of CEE Tier 2-approved clothes washer that meets efficiency criteria set forth in 2007. The baseline for this measure is a standard clothes washer of equivalent size and type (top or front-load). The 2007 CEE Tier 2 required a Modified Energy Factor (MEF) greater than 2.0. An average of typical CEE Tier 2-rated and standard clothes washThe evaluation team were used to evaluate savings for this measure.

Incentive: $50/unit

Conclusion: Updated

Reasoning: The evaluation team evaluated the savings values included in program documentation. The values seem reasonable compared to those values used in an Energy Star Savings Calculator available from EPA's Energy Star Website. The Energy Star savings calculator uses market research of efficient and standard units to determine savings. The calculator is a good measure of the energy savings seen on a national level. The methodology employed by this LIPA Program calculates the demand savings as the coincident demand savings; it was not possible to calculate non-coincident savings. The evaluation team believes that LIPA's values closer match the regional reality on Long Island. Therefore no changes are recommended to either the demand or energy savings values, resulting in realization rates of 100%.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			
Coincident Demand [kW]	0.01	0.01	100%
Consumption [kWh]	110	110	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Annual kWh Savings	130.9	RES-9	130.9	RES-12	Reasonable Based on Engr. Judgment
Summer Coincidence Factor		N/A	0.06	V-1	Updated
Freeridership %	0.3	RES-9	0.3	N/A	Reasonable Based on Engr. Judgment
Spillover %	0.2	RES-9	0.2	N/A	Reasonable Based on Engr. Judgment

Program: *Energy Efficient Products* **Category:** *Residential*

Measure: **2007 Energy Star Clothes Washer**

Description: This measure involves the installation of an Energy Star-approved clothes washer that meets efficiency criteria set forth in 2007. The baseline for this measure is a standard clothes washer of equivalent size and type (top or front-load). The 2007 Energy Star program required a Modified Energy Factor (MEF) between 1.72 and 1.99. An average of typical Energy Star-rated and standard clothes washThe evaluation team were used to evaluate savings for this measure.

Incentive: $50/unit

Conclusion: Updated

Reasoning: The evaluation team evaluated the savings values included in program documentation. The values seem reasonable compared to those values used in an Energy Star Savings Calculator available from EPA's Energy Star Website. The Energy Star savings calculator uses market research of efficient and standard units to determine savings. The methodology employed by this LIPA Program calculates the demand savings as the coincident demand savings; it was not possible to calculate non-coincident savings. The calculator is a good measure of the energy savings seen on a national level. The evaluation team believes that LIPA's values closer match the regional reality on Long Island. Therefore no changes are recommended to either the demand or energy savings values, resulting in realization rates of 100%.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			
Coincident Demand [kW]	0.01	0.01	100%
Consumption [kWh]	48	48	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Annual kWh Savings	73	RES-9	73	RES-12	Reasonable Based on Engr. Judgment
Summer Coincidence Factor		N/A	0.06	V-1	Updated
Freeridership %	0.4	RES-9	0.4	N/A	Reasonable Based on Engr. Judgment
Spillover %	0.1	RES-9	0.1	N/A	Reasonable Based on Engr. Judgment

Program: *Energy Efficient Products* **Category:** *Residential*

Measure: **2008 Energy Star Clothes Washer**

Description: This measure involves the installation of an Energy Star-approved clothes washer that meets efficiency criteria set forth in 2008. The baseline for this measure is a standard clothes washer of equivalent size and type (top or front-load). The 2008 Energy Star program required a Modified Energy Factor (MEF) greater than 2.2. An average of typical Energy Star-rated and standard clothes washThe evaluation team were used to evaluate savings for this measure.

Incentive: $50/unit

Conclusion: Updated

Reasoning: The evaluation team evaluated the savings values included in program documentation. The values seem reasonable compared to those values used in an Energy Star Savings Calculator available from EPA's Energy Star Website. The Energy Star savings calculator uses market research of efficient and standard units to determine savings. The calculator is a good measure of the energy savings seen on a national level. The methodology employed by this LIPA Program calculates the demand savings as the coincident demand savings; it was not possible to calculate non-coincident savings. The evaluation team believes that LIPA's values closer match the regional reality on Long Island. Therefore no changes are recommended to either the demand or energy savings values, resulting in realization rates of 100%.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			
Coincident Demand [kW]	0.02	0.02	100%
Consumption [kWh]	146	146	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Annual kWh Savings	156.7	RES-9	156.7	RES-12	Reasonable Based on Engr. Judgment
Summer Coincidence Factor		N/A	0.06	V-1	Updated
Freeridership %	0.2	RES-9	0.2	N/A	Reasonable Based on Engr. Judgment
Spillover %	0.2	RES-9	0.2	N/A	Reasonable Based on Engr. Judgment

Program: *Energy Efficient Products* **Category:** *Residential*

Measure: **Energy Star Dehumidifier**

Description: This measure involves the installation of an Energy Star-approved dehumidifier. Energy Star-rated dehumidifiThe evaluation team typically feature efficiencies 15% greater than conventional units, depending on unit size. The baseline for this measure is a conventional (non-Energy Star) dehumidifier.

Incentive: $10/unit

Conclusion: Updated

Reasoning: The evaluation team evaluated the savings values included in program documentation. The values seem reasonable but were not cited with valid references. Updated values are referenced from an Energy Star Savings Calculator available from EPA's Energy Star Website. These values are recommended for use in this program. The Energy Star savings calculator uses market research of efficient and standard units to determine savings. The methodology employed by this LIPA Program calculates the demand savings as the coincident demand savings; it was not possible to calculate non-coincident savings. Since the methodology employed initially calculates the non-coincident demand, a summer coincident demand factor was needed to present the summer coincident demand savings. The evaluation team researched this value and presented it in this report.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]		0.27	
Coincident Demand [kW]	0.13	0.21	159%
Consumption [kWh]	78	155	199%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Annual kWh Savings	98.7	RES-9	182.9	RES-13	Updated
Summer Coincidence Factor		N/A	0.8	H-30	Updated
Freeridership %	0.3	RES-9	0.3	N/A	Reasonable Based on Engr. Judgment
Spillover %	0.15	RES-9	0.15	N/A	Reasonable Based on Engr. Judgment

Program: *Energy Efficient Products* **Category:** *Residential*

Measure: **Energy Star Dishwasher**

Description: This measure involves the installation of an Energy Star-approved dishwasher, as a new installation or replacement of a preexisting dishwasher of 13+ years. Energy Star-rated dishwashThe evaluation team use at least 41% less energy than standard models. The baseline for this measure represents an average of conventional (non-Energy Star) dishwashThe evaluation team.

Incentive: Incentive amount unavailable

Conclusion: Updated

Reasoning: The evaluation team evaluated the savings values included in program documentation. The values do not seem reasonable and are not cited with valid references. Updated values are referenced from an Energy Star Savings Calculator available from EPA's Energy Star Website. These values are recommended for use in this program. The Energy Star savings calculator uses market research of efficient and standard units to determine savings. The evaluation team believes that the energy savings value used for this program is too low while no demand savings value is quoted. The evaluation team believes that a simple mistake could have been made when inputting the energy savings value into the spreadsheet tool used (typing in 6 kWh savings instead of say 65 kWh savings). Furthermore, since no demand savings value is presented cannot verify its accuracy. Therefore the realization rate for demand savings could not be determined while the realization rate for energy savings is close to 1,200%.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]		0.22	
Coincident Demand [kW]		0.00	
Consumption [kWh]	4	48	1234%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0.5	RES-9	0.5	N/A	Reasonable Based on Engr. Judgment
Spillover %	0.15	RES-9	0.15	N/A	Reasonable Based on Engr. Judgment
Annual kWh Savings	6	RES-9	74	RES-14	Updated
Summer Coincidence Factor		N/A	0.000371	RES-17	Updated

Program: *Energy Efficient Products* **Category:** *Residential*

Measure: **Energy Star Refrigerator**

Description: This measure involves the installation of an Energy Star-approved refrigerator as a new installation or replacement of a preexisting refrigerator of 13+ years. The EEP program also requires that the refrigerator is less than 7.75 cubic feet in volume. Energy Star mandates that approved refrigerators save 20% energy consumption or more when compared with federal-standard units. The baseline for this measure represents an average of federal standard units of various defrost types and freezer positions.

Incentive: $75/unit

Conclusion: OK

Reasoning: The evaluation team evaluated the savings values included in program documentation. The values seem reasonable but were not cited with valid references. Updated values are referenced from an Energy Star Savings Calculator available from EPA's Energy Star Website. These values are recommended for use in this program. The Energy Star savings calculator uses market research of efficient and standard units to determine savings. The methodology employed by this LIPA Program calculates the demand savings as the coincident demand savings; it was not possible to calculate non-coincident savings. Since the methodology employed initially calculates the non-coincident demand, a summer coincident demand factor was needed to present the summer coincident demand savings. The evaluation team researched this value and presented it in this report.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			
Coincident Demand [kW]	0.01	0.01	100%
Consumption [kWh]	104	104	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Annual kWh Savings	124.5	RES-9	124.5	RES-11	Reasonable Based on Engr. Judgment
Summer Coincidence Factor		N/A	1	V-1	Updated
Freeridership %	0.2	RES-9	0.2	N/A	Reasonable Based on Engr. Judgment
Spillover %	0.1	RES-9	0.1	N/A	Reasonable Based on Engr. Judgment

Program: *Energy Efficient Products* **Category:** *Residential*

Measure: **Pool Pumps: Two Speed**

Description: This measure invloves the installation of a two speed motor on a pool pump instead of a constant speed motor. Two speed motors are able to react to the changing demand of a pool pump application by being able to ramp its speed down. During times of low demand, i.e. low pool traffic or low pool filter resistance, the motor runs at its lower speed. During times of high demand, i.e. high pool traffic or large pool pump resistance, the motor runs at its higher speed. The energy saved is realized during times when the motor runs at a lower speed.

Incentive: $75/unit

Conclusion: OK

Reasoning: The evaluation team evaluated the savings values included in program documentation. The values seem reasonable but are not cited with valid references. The evaluation team performed a basic energy analysis using values from a PG&E pool pump energy savings study. The values from this analysis verified the values used in the program, therefore the program energy savings values have been deemed reasonable. Therefore the demand savings and energy savings have remained the same with realization rates at 100%. The evaluation team recommends further research to measure the pre and post conditions to fine tune the savings values used in the program. This will make the values more defensible and the program more sound. The methodology employed by this LIPA Program calculates the demand savings as the coincident demand savings; it was not possible to calculate non-coincident savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			
Coincident Demand [kW]	0.42	0.42	100%
Consumption [kWh]	401	401	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Annual kWh Savings	478.6	RES-9	478.6	RES-15	Reasonable Based on Engr. Judgment
Summer Coincidence Factor		N/A	0.6	V-1	Updated
Freeridership %	0.2	RES-9	0.2	N/A	Reasonable Based on Engr. Judgment
Spillover %	0.1	RES-9	0.1	N/A	Reasonable Based on Engr. Judgment

Program: *Energy Efficient Products* **Category:** *Residential*

Measure: **Pool Pumps: Variable Speed**

Description: This measure invloves the installation of a variable speed drive motor on a pool pump instead of a constant speed motor. Variable speed drive motors are able to react to the changing demand of a pool pump application by being able to ramp their speeds down. During times of low demand, i.e. low pool traffic or low pool filter resistance, the motor ramps down to a lower speed. During times of high demand, i.e. high pool traffic or large pool pump resistance, the motor ramps up to a higher speed. The energy saved is realized during times when the motor runs at reduced speeds.

Incentive: $200/unit

Conclusion: OK

Reasoning: The evaluation team evaluated the savings values included in program documentation. The values seem reasonable but are not cited with valid references. The evaluation team performed a basic energy analysis using in house analysis spreadsheets and values obtained from market research. The values from this analysis verified the values used in the program, therefore the program energy savings values have been deemed reasonable. Therefore the demand savings and energy savings have remained the same with realization rates at 100%. The evaluation team recommends further research to measure the pre and post conditions to fine tune the savings values used in the program. This will make the values more defensible and the program more sound. The methodology employed by this LIPA Program calculates the demand savings as the coincident demand savings; it was not possible to calculate non-coincident savings.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			
Coincident Demand [kW]	0.42	0.42	100%
Consumption [kWh]	866	866	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	Unknown	Insufficient Information Available
Consumption:	Unknown	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Annual kWh Savings	1032.2	RES-9	1032.2	RES-15	Reasonable Based on Engr. Judgment
Summer Coincidence Factor		N/A	0.6	V-1	Updated
Freeridership %	0.2	RES-9	0.2	N/A	Reasonable Based on Engr. Judgment
Spillover %	0.1	RES-9	0.1	N/A	Reasonable Based on Engr. Judgment

D. REAP TRM

Program: *REAP* **Category:** *Building Envelope*

Measure: **Attic Insulation (REAP)**

Description: This measure involves the replacement of existing attic insulation with insulation that features an R-value recommended by Energy Star. The baseline for this measure is the preexisting insulation's R value, or an R value of 3, whichever is higher. Incentivized attic insulation was assumed to feature an R-value that meets Energy Star standards (between 38 and 60). Savings were calculated on a per-square-foot basis, using R-49 as an average incentivized rating. According to program documents, only deemed heating savings are considered for this measure. This measure is fully incentivized by the REAP program, given the home meets annual income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the algorithms and assumptions associated with this measure. Only heating savings appeared to be considered; for consistency, only heating savings were evaluated for this measure. Savings were calculated on a per-square-foot basis as a function of the number of heating degree days on Long Island and the preexisting and installed insulation R values. The evaluation team agrees with the algorithm, but has recommended a more up-to-date estimate of heating degree days on Long Island using averaged NOAA data. The evaluation team also recommends reassessing the number of annual heating hours at the end of each year of the program, as this affects deemed savings. The consumption savings discrepancy reflects the difference in HDD. Line loss and coincidence factors were confirmed accurate. Following LIPA methodology, only the demand line loss factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	90%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	0	0	90%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / heating hours	OK
Consumption:	ΔkWh = sf * adjustment factor * heating degree days * 24 * (1/Rbase - 1/Rnew) / 3413	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Existing Insulation R-Value	38	B-6	38	B-6	OK
Installed Insulation R-Value	49	B-3	49	B-3	OK
Heating Degree Days	4980	H-46	4492	H-28	Updated
Equiv. Full Load Heating [h]	833	H-46	833	H-46	Reasonable Based on Engr. Judgment
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0	H-46	0	H-46	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *Building Envelope*

Measure: **Wall Insulation (REAP)**

Description: This measure involves the replacement of existing wall insulation with insulation that features an R-value recommended by Energy Star. The baseline for this measure is the preexisting insulation's R value, or an R value of 4, whichever is higher. incentivized wall insulation was assumed to feature an R-value that meets Energy Star standards (between 13 and 15). Savings were calculated on a per-square-foot basis, using R-14 as an average incentivized rating. According to program documents, only deemed heating savings are considered for this measure. This measure is fully incentivized by the REAP program, given the home meets annual income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the algorithms and assumptions associated with this measure. Only heating savings appeared to be considered; for consistency, only heating savings were evaluated for this measure. Savings were calculated on a per-square-foot basis as a function of the number of heating degree days on Long Island and the preexisting and installed insulation R values. The evaluation team agrees with the algorithm, but has recommended a more up-to-date estimate of heating degree days on Long Island using averaged NOAA data. The evaluation team also recommends reassessing the number of annual heating hours at the end of each year of the program, as this affects deemed savings. The consumption savings discrepancy reflects the difference in HDD. Line loss and coincidence factors were confirmed accurate. Following LIPA methodology, only the demand line loss factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.01	0.00	90%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	4	4	90%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / heating hours	OK
Consumption:	ΔkWh = sf * adjustment factor * heating degree days * 24 * (1/Rbase - 1/Rnew) / 3413	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Existing Insulation R-Value	4	H-46	4	H-46	OK
Installed Insulation R-Value	14	B-3	14	B-3	OK
Heating Degree Days	4980	H-46	4492	H-28	Updated
Equiv. Full Load Heating [h]	833	H-46	833	H-46	Reasonable Based on Engr. Judgment
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0	H-46	0	H-46	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *HVAC*

Measure: **Air Sealing - Cooling**

Description: This measure involves steps taken to reduce infiltration through home windows and doors. The air sealing measure of the REAP program follows the same methodology as specified in the Home Performance Direct program. HPD mandates that at least 10% cfm50 reduction must be documented before incentives are awarded. The baseline for this measure is the preexisting home envelope without air-sealing measures. Only cooling savings are considered for this specific measure. This measure is fully incentivized by the REAP program, given the home meets annual income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the current savings algorithms and term assumptions used to determine deemed savings. The current algorithm uses the cfm reduction multiplied with cooling degree data for Long Island to determine cooling-only savings associated with air sealing. The evaluation team agrees with the algorithms and term assumptions, except for the cooling degree day value. NOAA historical data was averaged to obtain a more up-to-date cooling degree day estimate for Long Island. The consumption savings discrepancy reflects the difference in HDD. Line loss and coincidence factors were confirmed as accurate. Following LIPA methodology, only the demand line loss factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.08	0.19	235%
Coincident Demand [kW]	0.05	0.15	314%
Consumption [kWh]	63	97	154%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / cooling hours * line loss factor	OK
Consumption:	ΔkWh = cfm reduced * adjustment factor * 0.018 * 60 * 24 * cooling degree days / (3413 * COP)	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline infiltration [cfm]	4867	H-32	4867	H-32	OK
Post infiltration [cfm]	4380	H-32	4380	H-32	OK
Cooling Degree Days	1052	H-46	1318	H-28	Updated
Equiv. Full Load Cooling [h]	833	H-46	547	H-24	Updated
Central Air Efficiency	2	H-46	2	H-46	Reasonable Based on Engr. Judgment

Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0.56	H-46	0.75	H-31	Updated

Program: *REAP* **Category:** *HVAC*

Measure: **Air Sealing - Heating**

Description: This measure involves steps taken to reduce infiltration through home windows and doors. The air sealing measure of the REAP program follows the same methodology as specified in the Home Performance Direct program. HPD mandates that at least 10% cfm50 reduction must be documented before incentives are awarded. The baseline for this measure is the preexisting home envelope without air-sealing measures. Only heating savings are considered for this specific measure. This measure is fully incentivized by the REAP program, given the home meets annual income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the current savings algorithms and term assumptions used to determine deemed savings. The current algorithm uses the cfm reduction multiplied with heating degree data for Long Island to determine heating-only savings associated with air sealing. The evaluation team agrees with the algorithms and term assumptions, except for the heating degree day value. NOAA historical data was averaged to obtain a more up-to-date heating degree day estimate for Long Island. The consumption savings discrepancy reflects the difference in HDD. Line loss and coincidence factors were confirmed as accurate. Following LIPA methodology, only the demand line loss factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.00	0.00	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	393	360	91%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / heating hours * line loss factor	OK
Consumption:	ΔkWh = cfm reduced * adjustment factor * 0.018 * 60 * 24 * heating degree days / (3413 * COP)	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline infiltration [cfm]	4867	H-32	4867	H-32	OK
Post infiltration [cfm]	4380	H-32	4380	H-32	OK
Heat pump efficiency	1.5	H-46	1.5	N/A	Reasonable Based on Engr. Judgment
Heating Degree Days	4910	H-46	4492	H-28	Updated

Program: *REAP* **Category:** *HVAC*

Measure: **Duct Sealing - Cooling**

Description: This measure involves the repair of cooling ducts to reduce leakage of conditioned air in unconditioned spaces. The duct reapir measure of the REAP program follows the same methodology as specified in the Home Performance Direct program. HPD mandates that at least 10% cfm50 reduction must be documented before incentives are awarded. The baseline for this measure is the preexisting duct system without any duct repair measures. Only cooling savings are considered for this specific measure. This measure is fully incentivized by the REAP program, given the home meets annual income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the current savings algorithms and term assumptions used to determine deemed savings. However, the algorithm consists of an unreferenced kWh savings value multiplied by the quantity installed. This value represents the per-unit consumption savings listed by the program. For evaluated savings, NOAA historical data was averaged to obtain a cooling degree day estimate for Long Island. Next, a DOE study was referenced to determine a typical savings %. Annual full-load cooling hours were referenced to determine demand savings. The consumption savings discrepancy reflects the difference in HDD. Line loss and coincidence factors were confirmed accurate. Following LIPA methodology, only the demand line loss factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.13	0.89	700%
Coincident Demand [kW]	0.07	0.67	937%
Consumption [kWh]	70	444	634%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / cooling hours * line loss factor	OK
Consumption:	ΔkWh = cfm reduced * adjustment factor * 0.018 * 60 * 24 * cooling degree days / (3413 * COP)	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Total cooling load [Btu/h]		N/A	50000	H-25	Insufficient Information Available
Cooling system airflow [cfm]		N/A	2000	H-25	Insufficient Information Available
Cooling Degree Days		N/A	1318	H-28	Insufficient Information Available
System SEER		N/A	10	H-2	Insufficient Information Available
Coincidence Factor	0.56	H-46	0.75	H-31	Updated
Average % Savings		N/A	0.065	H-33	Insufficient Information Available
Cooling season hours	603.5	H-46	547	H-24	Updated
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *HVAC*

Measure: **Duct Sealing - Heating**

Description: This measure involves the repair of heating ducts to reduce leakage of conditioned air in unconditioned spaces. The duct reapir measure of the REAP program follows the same methodology as specified in the Home Performance Direct program. HPD mandates that at least 10% cfm50 reduction must be documented before incentives are awarded. The baseline for this measure is the preexisting duct system without any duct repair measures. Only heating savings are considered for this specific measure. This measure is fully incentivized by the REAP program, given the home meets annual income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the current savings algorithms and term assumptions used to determine deemed savings. However, the algorithm consists of an unreferenced kWh savings value multiplied by the quantity installed. This value represents the per-unit consumption savings listed by the program. For evaluated savings, NOAA historical data was averaged to obtain a heating degree day estimate for Long Island. Next, a DOE study was referenced to determine a typical savings %. Annual full-load heating hours were referenced to determine demand savings. The consumption savings discrepancy reflects the difference in HDD. Line loss and coincidence factors were confirmed as accurate. Following LIPA methodology, only the demand line loss factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.13	0.36	282%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	283	777	275%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / heating hours * line loss factor	OK
Consumption:	ΔkWh = cfm reduced * adjustment factor * 0.018 * 60 * 24 * heating degree days / (3413 * COP)	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Total heating load [Btu/h]		N/A	64000	H-25	Insufficient Information Available
Heating system airflow [cfm]		N/A	698.2	H-25	Insufficient Information Available
Heating Degree Days		N/A	4492	H-28	Insufficient Information Available
System HSPF		N/A	6.8	H-2	Insufficient Information Available
Equiv. Full Load Heating [h]	2398	H-46	2337	H-17	Insufficient Information Available
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Average % Savings		N/A	0.065	H-33	Insufficient Information Available

Program: *REAP* **Category:** *HVAC*

Measure: **Programmable Thermostat (REAP)**

Description: This measure involves the installation of a programmable thermostat that automatically raises or lowers the temperature setpoint during periods of no occupancy. The baseline for this measure is a manually-adjustable thermostat. Though both heating and cooling savings are possible for this measure. This measure is fully incentivized by the REAP program, given the home meets annual income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: OK

Reasoning: The evaluation team obtained the current savings algorithm, which appears to use historical billing savings to determine kWh consumption savings. An annual dollars saved estimate was extracted from Energy Star; the evaluation team believes this represents typical savings of a number of homes. Demand savings were taken as simply the consumption savings divided by the number of hours per year. Line loss and coincidence factors were confirmed accurate. Following LIPA methodology, only the demand line loss factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.17	0.17	100%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	1385	1385	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / 8760$	OK
Consumption:	ΔkWh = Dollars saved / \$ per kWh	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Estimated $ Saved	180	H-47	180	H-47	OK
Estimated $/kWh	0.13	H-46	0.13	H-46	Reasonable Based on Engr. Judgment
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0	H-46	0	N/A	OK

Program: *REAP* **Category:** *Lighting*

Measure: **CFLs - Screw in and Hardwired**

Description: This measure involves the replacement of screw-in and hardwired CFLs over incandescent technologies. This measure is fully incentivized by the REAP program, given the home meets annual income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team evaluated the savings obtained from program statistics. The algorithms and values used in the program were compared to values used in an Energy Star energy savings calculator. The analysis concluded that the algorithms and values used are reasonable and no changes are recommended. There are 11 line items in the REAP lighting database with mismatching values of installed bulb quantities compared to baseline bulb quanitites. Three of these have differences of 59 and one has a difference of 71. The rest have differences of 4 or less. The items with 4 bulb discrepancies or less may be ignored since these might actually reflect a lowering of the amount of bulbs necessary to illuminate a space, but the four discrepancies of 59 or more need to be corrected. The evaluation team believes that a simple data entry mistake is the most probable explanation for such high differences. The enrollment IDs of these are: D015397242, D015509106, D016050503, and D016322858. The evaluation team also noticed that REAP only takes into account line losses for demand savings and not for energy savings. We followed REAP's formatting and only took into account the line loss factor for demand at the measure level. We will take into account the line loss factor for energy savings at a program level.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.14	0.14	100%
Coincident Demand [kW]	0.01	0.01	100%
Consumption [kWh]	216	216	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = (exist qty * kWold – inst. qty * kWnew) * line loss factor	OK
Consumption:	ΔkWh = (exist. qty * kWold - inst. qty * kWnew) * hours per day * 365	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Coincidence Factor	0.08	H-46	0.08	H-46	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *Residential*

Measure: **DHW Pipe Insulation**

Description: This measure involves the application of insulation to domestic hot water pipes near a home water heater. The baseline for this measure is the uninsulated pipe. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the algorithms and deemed savings associated with this measure. Due to unknown inputs into the algorithm, however, each term could not be fully evaluated. Instead, the evaluation team used D.O.E. software 3E-Plus to calculate the heat loss for both insulated and uninsulated pipe, and used the difference to determine savings. A water heater coincidence factor was obtained from an equivalent study of homes in Minnesota. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. Details such as insulation type, insulation thickness, and pipe length were unknown, so typical values were assumed for each. Current program savings were obtained from REAP documentation, but several inputs remain unknown. The evaluation team recommends calculation of deemed savings on a per-linear-foot basis in the future, so as to enable an apples-to-apples evaluation. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.02	99%
Coincident Demand [kW]	0.01	0.01	95%
Consumption [kWh]	118	47	40%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh$ * line loss factor / hrs	Updated
Consumption:	$\Delta kWh =$ (Qloss,base - Qloss,eff) * hrs * length / EF	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
% Electric Heat		N/A	0.38	RES-25	Updated
Hot Water Temperature [F]		N/A	120	N/A	Insufficient Information Available
Ambient Temperature [F]		N/A	65	N/A	Insufficient Information Available
Pipe Diameter [in]		N/A	0.75	N/A	Insufficient Information Available
Pipe Length [ft]		N/A	6	N/A	Insufficient Information Available
Standby Hours	5427	H-46	6570	RES-1	Updated
Uninsulated Heat Loss [Btu/h/		N/A	41.86	RES-18	Insufficient Information Available
Insulated Heat Loss [Btu/h/ft]		N/A	12.88	RES-18	Insufficient Information Available
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Energy Factor		N/A	0.9	N/A	Insufficient Information Available
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated

Program: *REAP* **Category:** *Residential*

Measure: **DHW Temperature Turndown**

Description: This measure involves the reduction of domestic hot water temperature at the water heater. Typically, manufacturers set water heaters at a default temperature above 130 F; studies have shown that 120 F is a sufficient hot water temperature for most homes. The baseline for this measure is a hot water heater set at 130 F. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the algorithms and deemed savings associated with this measure. Due to unknown inputs into the algorithm, however, each term could not be fully evaluated. Most importantly, the DHW temperatures before and after turndown are unknown. Subsequently, the evaluation team determined savings through simple analysis. A standard water heater energy factor was assumed, and a water heater coincidence factor was obtained from an equivalent study of homes in Minnesota. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. Current program savings were obtained from REAP documentation, but several inputs remain unknown. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.12	488%
Coincident Demand [kW]	0.01	0.05	897%
Consumption [kWh]	75	240	321%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh$ * line loss factor / hrs	Updated
Consumption:	$\Delta kWh =$ Usage * (Tbase - Treduc) / EF	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
% Electric Heat		N/A	0.38	RES-25	Updated
Pre DHW Temp [F]		N/A	130	N/A	Insufficient Information Available
Daily Usage [gal/day]		N/A	64	RES-6	Insufficient Information Available
Standby Hrs	5427	H-46	6570	RES-1	Updated
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Energy Factor		N/A	0.9	N/A	Insufficient Information Available
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated
Post DHW Temp [F]		N/A	120	N/A	Insufficient Information Available
Ambient Temperature [F]		N/A	65	N/A	Insufficient Information Available

Program: *REAP* **Category:** *Residential*

Measure: **Electric Water Heater Insulation Jacket**

Description: This measure involves the application of an insulating jacket to a residential electric water heater. The baseline for this measure is the preexisting water heater without any additional insulation. Due to unknown efficiency conditions for this measure, the evaluation team investigated other residential efficiency programs, and found a minimum jacket R-value of 6 is required for incentives. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Insufficient Information Available

Reasoning: The evaluation team obtained the algorithms and deemed savings associated with this measure. Due to unknown inputs into the algorithm, however, each term could not be fully evaluated. Instead, the evaluation team cited studies that model the standby heat loss coefficient for a typical residential water heater. Additionally, an average savings percentage for this measure was obtained from a separate D.O.E. study. A water heater coincidence factor was obtained from an equivalent study of homes in Minnesota. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. Current program savings were obtained from REAP documentation, but several inputs remain unknown. The evaluation team recommends calculation of deemed savings on a per-square-foot basis in the future, so as to enable an apples-to-apples evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.01	68%
Coincident Demand [kW]	0.00	0.00	66%
Consumption [kWh]	340	68	20%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Ualoss * (Thw - Tamb) * % sav / EF / 3412	Insufficient Information Available
Consumption:	ΔkWh = ΔkW * standby hours	Insufficient Information Available

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
% Electric Heat		N/A	0.38	RES-25	Updated
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Hot Water Temperature [F]		N/A	135	RES-1	Insufficient Information Available
Ambient Temperature [F]		N/A	65	RES-1	Insufficient Information Available
Standby Heat Loss UA		N/A	3.655	RES-1	Insufficient Information Available
Savings %		N/A	0.325	RES-2	Insufficient Information Available
Standby Hours [h]	5427	H-46	6570	RES-1	Updated
Energy Factor		N/A	0.9	N/A	Insufficient Information Available
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated

Program: *REAP* **Category:** *Residential*

Measure: **Low Flow Showerhead**

Description: This measure involves the installation of low-flow showerheads. Showerheads are often the greatest end use of hot water that could benefit from a low-flow device. The baseline for this measure is the preexisting showerhead. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: The evaluation team obtained the algorithms, assumptions, and deemed savings associated with this measure. However, various term assumptions were unknown; these affect the amount of annual hot water usage used in the savings calculation. Assumptions were made to reflect a typical home in the REAP program. The evaluation team referenced typical baseline and efficient showerhead flow rates. Additionally, the average portion of hot water per shower and annual shower hours were obtained from a separate study. It was assumed that there are no demand savings for this measure. A water heater coincidence factor was obtained from an equivalent study of homes in Minnesota. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. Current program savings were obtained from REAP documentation, but several inputs remain unknown. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.70	0.47	68%
Coincident Demand [kW]	0.17	0.11	65%
Consumption [kWh]	2130	945	44%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh * line loss factor / hrs	Updated
Consumption:	ΔkWh = Annual Hours * Flow Reduction * (Tdhw - Tin) / EF	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
% Electric Heat		N/A	0.38	RES-25	Updated
Hot Water Temperature [F]	120	N/A	120	N/A	OK
Inlet Temperature [F]	60	H-46	58	RES-1	Updated
Baseline Showerhead [gpm]	5.5	RES-4	5.5	RES-4	OK
Efficient Showerhead [gpm]	2.73	RES-19	2.73	RES-19	OK
Fraction Hot Water Used	0.75	H-46	0.73	RES-5	Updated
Annual Usage [h]	87.5	H-46	121.7	RES-5	Updated
Standby Hrs	5427	H-46	6570	RES-1	Updated
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated
Energy Factor		N/A	0.9	N/A	Insufficient Information Available

Program: *REAP* **Category:** *Residential*

Measure: **Refrigerator Removal (15 cu. ft)**

Description: This measure involves the removal of a preexisting refrigerator. The baseline for this measure was taken as the federal standard from 1997, as Energy Star recommends a 12-year end of life. Based on 2009 installation statistics obtained from LIPA, only top-mount, side-by-side, and bottom-mount-freezer models were considered. Baseline conditions represent an average of these three types. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: OK

Reasoning: The evaluation team obtained the algorithms and efficient model conditions associated with this measure. Additionally, baseline and efficient conditions were gathered from LIPA install statistics. The evaluation team's recommended savings were calculated as the difference between averaged baseline and efficient consumption for top-mount, side-by-side, and bottom-mount freezer refrigerator models via an Energy Star calculator. Demand savings were taken as consumption savings divided by annual run hours. The coincidence factor of 0.75 was verified based on engineering judgment. The evaluation team recommends strict adherence to Energy Star recommendations as they are updated, so as to maintain consistency between REAP and other LIPA programs such as Energy Efficient Products. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.17	0.17	100%
Coincident Demand [kW]	0.13	0.13	100%
Consumption [kWh]	1394	1394	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh$ * line loss factor / hrs	OK
Consumption:	$\Delta kWh =$ kWh removed equip	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline Unit kWh	1394.2	RES-26	1394.2	RES-26	OK
Operating Hours [h]	8760	RES-11	8760	RES-11	OK
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-46	1	N/A	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *Residential*

Measure: **Refrigerator Removal (19 cu. ft)**

Description: This measure involves the removal of a preexisting refrigerator. The baseline for this measure was taken as the federal standard from 1997, as Energy Star recommends a 12-year end of life. Based on 2009 installation statistics obtained from LIPA, only top-mount, side-by-side, and bottom-mount-freezer models were considered. Baseline conditions represent an average of these three types. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: OK

Reasoning: The evaluation team obtained the algorithms and efficient model conditions associated with this measure. Additionally, baseline and efficient conditions were gathered from LIPA install statistics. The evaluation team's recommended savings were calculated as the difference between averaged baseline and efficient consumption for top-mount, side-by-side, and bottom-mount freezer refrigerator models via an Energy Star calculator. Demand savings were taken as consumption savings divided by annual run hours. The coincidence factor of 0.75 was verified based on engineering judgment. The evaluation team recommends strict adherence to Energy Star recommendations as they are updated, so as to maintain consistency between REAP and other LIPA programs such as Energy Efficient Products. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.20	0.20	100%
Coincident Demand [kW]	0.15	0.15	100%
Consumption [kWh]	1589	1589	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh * line loss factor / hrs	OK
Consumption:	ΔkWh = kWh removed equip	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline Unit kWh	1588.8	RES-26	1588.8	RES-26	OK
Operating Hours [h]	8760	RES-11	8760	RES-11	OK
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-46	1	N/A	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *Residential*

Measure: **Refrigerator Removal (21 cu. ft)**

Description: This measure involves the removal of a preexisting refrigerator. The baseline for this measure was taken as the federal standard from 1997, as Energy Star recommends a 12-year end of life. Based on 2009 installation statistics obtained from LIPA, only top-mount, side-by-side, and bottom-mount-freezer models were considered. Baseline conditions represent an average of these three types. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: OK

Reasoning: The evaluation team obtained the algorithms and efficient model conditions associated with this measure. Additionally, baseline and efficient conditions were gathered from LIPA install statistics. The evaluation team's recommended savings were calculated as the difference between averaged baseline and efficient consumption for top-mount, side-by-side, and bottom-mount freezer refrigerator models via an Energy Star calculator. Demand savings were taken as consumption savings divided by annual run hours. The coincidence factor of 0.75 was verified based on engineering judgment. The evaluation team recommends strict adherence to Energy Star recommendations as they are updated, so as to maintain consistency between REAP and other LIPA programs such as Energy Efficient Products. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.21	0.21	100%
Coincident Demand [kW]	0.16	0.16	100%
Consumption [kWh]	1666	1666	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh * line loss factor / hrs	OK
Consumption:	ΔkWh = kWh removed equip	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline Unit kWh	1665.7	RES-26	1665.7	RES-26	OK
Operating Hours [h]	8760	RES-11	8760	RES-11	OK
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-46	1	N/A	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *Residential*

Measure: **Refrigerator Replacement (15 cu. ft)**

Description: This measure involves the replacement of preexisting refrigerators with more efficient models. The baseline for this measure was taken as the federal standard from 1997, as Energy Star recommends a 12-year end of life. The efficient model was assumed to feature Energy Star recommendations that represent a 20% reduction in energy as compared to the industry standard. Based on 2009 installation statistics obtained from LIPA, only top-mount, side-by-side, and bottom-mount-freezer models were considered. Baseline and efficient conditions represent an average of these three types. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: There were no savings algorithms available for this measure; however, the evaluation team believes savings are simply the consumption and demand of the removed refrigerator. Baseline conditions for the current LIPA program were available from 2009 install statistics. Demand savings were taken as consumption savings divided by annual run hours. The coincidence factor of 0.75 was verified based on engineering judgment. The evaluation team recommends strict adherence to Energy Star recommendations as they are updated, so as to maintain consistency between REAP and other LIPA programs such as Energy Efficient Products. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.13	0.12	93%
Coincident Demand [kW]	0.10	0.09	93%
Consumption [kWh]	1040	969	93%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh * line loss factor / hrs	Updated
Consumption:	ΔkWh = kWh base - kWh efficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline Unit kWh	1394.2	RES-26	1394.2	RES-26	OK
Efficient Unit kWh	354	RES-26	424.8	RES-11	Updated
Demand Savings [kW]	0.21	H-46		N/A	Updated
Operating Hours [h]		N/A	8760	RES-11	Insufficient Information Available
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-46	1	N/A	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *Residential*

Measure: **Refrigerator Replacement (19 cu. ft)**

Description: This measure involves the replacement of preexisting refrigerators with more efficient models. The baseline for this measure was taken as the federal standard from 1997, as Energy Star recommends a 12-year end of life. The efficient model was assumed to feature Energy Star recommendations that represent a 20% reduction in energy as compared to the industry standard. Based on 2009 installation statistics obtained from LIPA, only top-mount, side-by-side, and bottom-mount-freezer models were considered. Baseline and efficient conditions represent an average of these three types. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: There were no savings algorithms available for this measure; however, the evaluation team believes savings are simply the consumption and demand of the removed refrigerator. Baseline conditions for the current LIPA program were available from 2009 install statistics. Demand savings were taken as consumption savings divided by annual run hours. The coincidence factor of 0.75 was verified based on engineering judgment. The evaluation team recommends strict adherence to Energy Star recommendations as they are updated, so as to maintain consistency between REAP and other LIPA programs such as Energy Efficient Products. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.15	0.14	94%
Coincident Demand [kW]	0.11	0.11	94%
Consumption [kWh]	1216	1139	94%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh$ * line loss factor / hrs	Updated
Consumption:	$\Delta kWh =$ kWh base - kWh efficient	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline Unit kWh	1588.8	RES-26	1588.8	RES-26	OK
Efficient Unit kWh	373	RES-26	449.7	RES-11	Updated
Demand Savings [kW]	0.27	H-46		N/A	Updated
Operating Hours [h]		N/A	8760	RES-11	Insufficient Information Available
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-46	1	N/A	Reasonable Based on Engr. Judgment

Program: *REAP* **Category:** *Residential*

Measure: **Refrigerator Replacement (21 cu. ft)**

Description: This measure involves the replacement of preexisting refrigerators with more efficient models. The baseline for this measure was taken as the federal standard from 1997, as Energy Star recommends a 12-year end of life. The efficient model was assumed to feature Energy Star recommendations that represent a 20% reduction in energy as compared to the industry standard. Based on 2009 installation statistics obtained from LIPA, only top-mount, side-by-side, and bottom-mount-freezer models were considered. Baseline and efficient conditions represent an average of these three types. This measure is in association with the Residential Energy Affordability Partnership, and is therefore at no cost to customers who meet the given income requirements.

Incentive: Full cost if house meets income requirements

Conclusion: Updated

Reasoning: There were no savings algorithms available for this measure; however, the evaluation team believes savings are simply the consumption and demand of the removed refrigerator. Baseline conditions for the current LIPA program were available from 2009 install statistics. Demand savings were taken as consumption savings divided by annual run hours. The coincidence factor of 0.75 was verified based on engineering judgment. The evaluation team recommends strict adherence to Energy Star recommendations as they are updated, so as to maintain consistency between REAP and other LIPA programs such as Energy Efficient Products. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Per LIPA methodology, only the demand line level factor was applied for this measure; the consumption line losses will be accounted for in the program-level savings evaluation. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.15	0.15	100%
Coincident Demand [kW]	0.11	0.11	100%
Consumption [kWh]	1208	1204	

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh * \text{line loss factor} / \text{hrs}$	Updated
Consumption:	$\Delta kWh = kWh_{base} - kWh_{efficient}$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline Unit kWh	1665.7	RES-26	1665.7	RES-26	OK
Efficient Unit kWh	457.5	RES-26	462	RES-11	Updated
Demand Savings [kW]	0.27	H-46		N/A	Updated
Operating Hours [h]		N/A	8760	RES-11	Insufficient Information Available
Line Loss Factor	1.09218	H-46	1.09218	H-46	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-46	1	N/A	Reasonable Based on Engr. Judgment

E. Cool Homes TRM

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Air Source Heat Pump (SEER > 14.5 and EER > 12 and HSPF > 8.2)**

Description: This measure involves the home installation of a split air-source heat pump with minimum efficiencies of 14.5 SEER, 12 EER, and 8.2 HSPF. The baseline for this measure is a conventional heat pump which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. Full-load heating hours were determined from the savings calculator for Energy Star-rated heat pumps in New York City. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. All savings values incorporate freeridership and spillover factors.

Incentive: $250/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Full-load heating hours were determined from an Energy Star savings calculator for split air-source heat pumps in New York City. No baseline heating efficiency was available for the current Cool Homes program; therefore, the baseline referenced in an equivalent measure from the CCP program was used to establish a baseline HSPF. The high consumption realization rate reflects the difference in annual heating hours between Energy Star and the current LIPA reference.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.15	1.15	100%
Coincident Demand [kW]	1.15	1.15	100%
Consumption [kWh]	1268	2377	188%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * cooling hours + Capacity/1000 * (1/HSPFbase - 1/HSPFeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	38842	H-23	38842	H-25	OK
Baseline Percent Oversize	0.65	H-24	0.65	H-24	OK
Baseline SEER	13	H-24	13	H-42	OK
Baseline EER	11.29	H-24	11.29	H-24	OK
Baseline HSPF	7.7	H-2	7.7	H-42	OK

Baseline % Running 24/7	0.37	H-24	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-24	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-24	0.632	H-24	OK
Baseline Adjustment Factor	1.4732	H-24	1.4732	N/A	OK
Rebated Tonnage	3.5	H-24	3.5	N/A	OK
Rebated Percent Oversize	0.08	N/A	0.08	N/A	OK
Rebated SEER	14.25	H-41	14.25	H-41	OK
Rebated EER	12.08	H-41	12.08	H-41	OK
Rebated HSPF	8.63	H-41	8.63	H-41	OK
Rebated % Running 24/7	0.664	H-24	0.664	H-24	OK
Rebated % Cycling at Peak	0.207	H-24	0.207	H-24	OK
Rebated Duty Cycle	0.616	H-24	0.616	H-24	OK
Equiv. full-load cooling [h]	547	H-24	547	H-24	OK
Equiv. full-load heating [h]	1100	H-7	2337	H-6	Updated
Rebated Adjustment Factor	1.4465	H-24	1.4465	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Air Source Heat Pump (SEER > 15 and EER > 12.5 and HSPF > 8.5)**

Description: This measure involves the home installation of a split air-source heat pump with minimum efficiencies of 15 SEER, 12.5 EER, and 8.5 HSPF. The baseline for this measure is a conventional heat pump which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. Full-load heating hours were determined from the savings calculator for Energy Star-rated heat pumps in New York City. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. All savings values incorporate freeridership and spillover factors.

Incentive: $400/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Full-load heating hours were determined from an Energy Star savings calculator for split air-source heat pumps in New York City. No baseline heating efficiency was available for the current Cool Homes program; therefore, the baseline referenced in an equivalent measure from the CCP program was used to establish a baseline HSPF. The high consumption realization rate reflects the difference in annual heating hours between Energy Star and the current LIPA reference.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.29	1.29	100%
Coincident Demand [kW]	1.29	1.29	100%
Consumption [kWh]	1551	2817	182%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * cooling hours + Capacity/1000 * (1/HSPFbase - 1/HSPFeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	38842	H-23	38842	H-25	OK
Baseline Percent Oversize	0.65	H-24	0.65	H-24	OK
Baseline SEER	13	H-24	13	H-42	OK
Baseline EER	11.29	H-24	11.29	H-24	OK
Baseline HSPF	7.7	H-2	7.7	H-42	OK
Baseline % Running 24/7	0.37	H-24	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-24	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-24	0.632	H-24	OK
Baseline Adjustment Factor	1.4732	H-24	1.4732	N/A	OK
Rebated Tonnage	3.5	H-24	3.5	N/A	OK
Rebated Percent Oversize	0.08	N/A	0.08	N/A	OK
Rebated SEER	15.15	H-41	15.15	H-41	OK
Rebated EER	12.72	H-41	12.72	H-41	OK
Rebated HSPF	8.78	H-41	8.78	H-41	OK
Rebated % Running 24/7	0.664	H-24	0.664	H-24	OK
Rebated % Cycling at Peak	0.207	H-24	0.207	H-24	OK
Rebated Duty Cycle	0.616	H-24	0.616	H-24	OK
Equiv. full-load cooling [h]	547	H-24	547	H-24	OK
Equiv. full-load heating [h]	1100	H-7	2337	H-6	Updated
Rebated Adjustment Factor	1.4465	H-24	1.4465	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Air Source Heat Pump (SEER > 16 and EER > 13 and HSPF > 8.5)**

Description: This measure involves the home installation of a split air-source heat pump with minimum efficiencies of 16 SEER, 13 EER, and 8.5 HSPF. The baseline for this measure is a conventional heat pump which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. Full-load heating hours were determined from the savings calculator for Energy Star-rated heat pumps in New York City. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. All savings values incorporate freeridership and spillover factors.

Incentive: $600/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Full-load heating hours were determined from an Energy Star savings calculator for split air-source heat pumps in New York City. No baseline heating efficiency was available for the current Cool Homes program; therefore, the baseline referenced in an equivalent measure from the CCP program was used to establish a baseline HSPF. The high consumption realization rate reflects the difference in annual heating hours between Energy Star and the current LIPA reference.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.33	1.33	100%
Coincident Demand [kW]	1.33	1.33	100%
Consumption [kWh]	2112	3648	173%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * cooling hours + Capacity/1000 * (1/HSPFbase - 1/HSPFeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	1.4465	H-24	1.4465	N/A	OK
Design Cooling Load [Btu/h]	38842	H-23	38842	H-25	OK
Baseline Percent Oversize	0.65	H-24	0.65	H-24	OK
Baseline SEER	13	H-24	13	H-42	OK
Baseline EER	11.29	H-24	11.29	H-24	OK
Baseline HSPF	7.7	H-2	7.7	H-42	OK
Baseline % Running 24/7	0.37	H-24	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-24	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-24	0.632	H-24	OK
Baseline Adjustment Factor	1.4732	H-24	1.4732	N/A	OK
Rebated Tonnage	3.5	H-24	3.5	N/A	OK
Rebated Percent Oversize	0.08	N/A	0.08	N/A	OK
Rebated SEER	17.65	H-41	17.65	H-41	OK
Rebated EER	12.92	H-41	12.92	H-41	OK
Rebated HSPF	9.05	H-41	9.05	H-41	OK
Rebated % Running 24/7	0.664	H-24	0.664	H-24	OK
Rebated % Cycling at Peak	0.207	H-24	0.207	H-24	OK
Rebated Duty Cycle	0.616	H-24	0.616	H-24	OK
Equiv. full-load cooling [h]	547	H-24	547	H-24	OK
Equiv. full-load heating [h]	1100	H-7	2337	H-6	Updated

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Air Source Heat Pump: Contractor Incentive (SEER > 13)**

Description: This measure involves the home installation of a split air-source heat pump with a minimum efficiency of 13 SEER. The baseline for this measure is a conventional heat pump which meets code standards. This specific evaluation assesses the deemed savings for the contractor incentive offered for this measure. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. Full-load heating hours were determined from the savings calculator for Energy Star-rated heat pumps in New York City. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. All savings values incorporate freeridership and spillover factors.

Incentive: $150/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Full-load heating hours were determined from an Energy Star savings calculator for split air-source heat pumps in New York City. No baseline heating efficiency was available for the current Cool Homes program; therefore, the baseline referenced in an equivalent measure from the CCP program was used to establish a baseline HSPF. The high consumption realization rate reflects the difference in annual heating hours between Energy Star and the current LIPA reference.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.29	1.29	100%
Coincident Demand [kW]	1.29	1.29	100%
Consumption [kWh]	1625	2922	180%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * cooling hours + Capacity/1000 * (1/HSPFbase - 1/HSPFeff) * heating hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	38842	H-23	38842	H-25	OK
Baseline Percent Oversize	0.65	H-24	0.65	H-24	OK
Baseline SEER	13	H-24	13	H-42	OK
Baseline EER	11.29	H-24	11.29	H-24	OK
Baseline HSPF	7.7	H-2	7.7	H-42	OK
Base % Running Continuously	0.37	H-24	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-24	0.501	H-24	OK
Duty Cycle for Baseline Units	0.632	H-24	0.632	H-24	OK
Baseline Adjustment Factor	1.4732	H-24	1.4732	N/A	OK
Rebated Tonnage	3.5	H-24	3.5	N/A	OK
Rebated Percent Oversize	0.08	N/A	0.08	N/A	OK
Rebated SEER	15.47	H-41	15.47	H-41	OK
Rebated EER	12.72	H-41	12.72	H-41	OK
Rebated HSPF	8.81	H-41	8.81	H-41	OK
New % Running Continuously	0.664	H-24	0.664	H-24	OK
Rebated % Cycling at Peak	0.207	H-24	0.207	H-24	OK
Duty Cycle for Rebated Units	0.616	H-24	0.616	H-24	OK
Equiv. full-load cooling [h]	547	H-24	547	H-24	OK
Equiv. full-load heating [h]	1100	H-7	2337	H-6	Updated
Rebated Adjustment Factor	1.4465	H-24	1.4465	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Ductless Mini Split System (SEER >= 14.5 and EER >= 11.5)**

Description: This measure involves the home installation of a ductless mini split system with minimum efficiencies of 14.5 SEER and 11.5 EER. The baseline for this measure is a conventional unit which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. All savings values incorporate freeridership and spillover factors.

Incentive: $250/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Subsequently, realization rates for both consumption and demand for this measure are equal to 1.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.03	0.03	100%
Coincident Demand [kW]	0.03	0.03	100%
Consumption [kWh]	9	9	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Baseline Adjustment Factor	1.474	H-26	1.474	N/A	OK
Rebated Tonnage	0.75	H-26	0.75	N/A	OK
Rebated Percent Oversize	0.52	N/A	0.523	N/A	OK
Design Cooling Load [Btu/h]	5908	H-23	5908	H-25	OK
Baseline Percent Oversize	0.65	H-26	0.65	H-24	OK
Baseline SEER	13	H-26	13	H-42	OK
Baseline EER	11.29	H-26	11.29	H-24	OK
Baseline % Running 24/7	0.37	H-26	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-26	0.501	H-24	OK

Baseline Duty Cycle	0.632	H-26	0.632	H-24	OK
Rebated SEER	14.5	N/A	14.5	N/A	OK
Rebated EER	11.5	N/A	11.5	N/A	OK
Rebated % Running 24/7	0.438	H-26	0.438	H-24	OK
Rebated % Cycling at Peak	0.433	H-26	0.433	H-24	OK
Rebated Duty Cycle	0.646	H-26	0.646	H-24	OK
Equiv. full-load hours [h]	547	H-26	547	H-24	OK
Rebated Adjustment Factor	1.6075	H-26	1.6075	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Ductless Mini Split System (SEER >= 15 and EER >= 12)**

Description: This measure involves the home installation of a ductless mini split system with minimum efficiencies of 15 SEER and 12 EER. The baseline for this measure is a conventional unit which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. All savings values incorporate freeridership and spillover factors.

Incentive: $400/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Subsequently, realization rates for both consumption and demand for this measure are equal to 1.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.05	0.05	100%
Coincident Demand [kW]	0.05	0.05	100%
Consumption [kWh]	35	35	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	5908	H-23	5908	H-25	OK
Baseline Percent Oversize	0.65	H-26	0.65	H-24	OK
Baseline SEER	13	H-26	13	H-42	OK
Baseline EER	11.29	H-26	11.29	H-24	OK
Baseline % Running 24/7	0.37	H-26	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-26	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-26	0.632	H-24	OK
Baseline Adjustment Factor	1.474	H-26	1.474	N/A	OK
Rebated Tonnage	0.75	H-26	0.75	N/A	OK

Rebated Percent Oversize	0.523	N/A	0.523	N/A	OK
Rebated SEER	15.5	H-41	15.5	H-41	OK
Rebated EER	12	H-41	12	H-41	OK
Rebated % Running 24/7	0.438	H-26	0.438	H-24	OK
Rebated % Cycling at Peak	0.433	H-26	0.433	H-24	OK
Rebated Duty Cycle	0.646	H-26	0.646	H-24	OK
Equiv. full-load hours [h]	547	H-26	547	H-24	OK
Rebated Adjustment Factor	1.6075	H-26	1.6075	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Ductless Mini Split System (SEER >= 16 and EER >= 12.5)**

Description: This measure involves the home installation of a ductless mini split system with minimum efficiencies of 16 SEER and 12.5 EER. The baseline for this measure is a conventional unit which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. All savings values incorporate freeridership and spillover factors.

Incentive: $600/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Subsequently, realization rates for both consumption and demand for this measure are equal to 1.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.11	0.11	100%
Coincident Demand [kW]	0.11	0.11	100%
Consumption [kWh]	152	152	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Rebated Duty Cycle	0.646	H-26	0.646	H-24	OK
Equiv. full-load hours [h]	547	H-26	547	H-24	OK
Rebated Adjustment Factor	1.6075	H-26	1.6075	N/A	OK
Design Cooling Load [Btu/h]	5908	H-23	5908	H-25	OK
Baseline Percent Oversize	0.65	H-26	0.65	H-24	OK
Baseline SEER	13	H-26	13	H-42	OK
Baseline EER	11.29	H-26	11.29	H-24	OK
Baseline % Running 24/7	0.37	H-26	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-26	0.501	H-24	OK

Baseline Duty Cycle	0.632	H-26	0.632	H-24	OK
Baseline Adjustment Factor	1.474	H-26	1.474	N/A	OK
Rebated Tonnage	0.75	H-26	0.75	N/A	OK
Rebated Percent Oversize	0.523	N/A	0.523	N/A	OK
Rebated SEER	22.55	H-41	22.55	H-41	OK
Rebated EER	13.33	H-41	13.33	H-41	OK
Rebated % Running 24/7	0.438	H-26	0.438	H-24	OK
Rebated % Cycling at Peak	0.433	H-26	0.433	H-24	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Ductless Mini Split System: Contractor Incentive (SEER > 13)**

Description: This measure involves the home installation of a ductless mini split system with a minimum efficiency of 13 SEER. The baseline for this measure is a conventional unit which meets code standards. This specific evaluation assesses the deemed savings for the contractor incentive offered for this measure. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. All savings values incorporate freeridership and spillover factors.

Incentive: $150/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Subsequently, realization rates for both consumption and demand for this measure are equal to 1.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.11	0.11	100%
Coincident Demand [kW]	0.11	0.11	100%
Consumption [kWh]	152	152	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	5908	H-23	5908	H-25	OK
Baseline Percent Oversize	0.65	H-26	0.65	H-24	OK
Baseline SEER	13	H-26	13	H-42	OK
Baseline EER	11.29	H-26	11.29	H-24	OK
Baseline % Running 24/7	0.37	H-26	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-26	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-26	0.632	H-24	OK
Baseline Adjustment Factor	1.474	H-26	1.474	N/A	OK

Rebated Tonnage	0.75	H-26	0.75	N/A	OK
Rebated Percent Oversize	0.523	N/A	0.523	N/A	OK
Rebated SEER	22.49	H-41	22.49	H-41	OK
Rebated EER	13.3	H-41	13.3	H-41	OK
Rebated % Running 24/7	0.438	H-26	0.438	H-24	OK
Rebated % Cycling at Peak	0.433	H-26	0.433	H-24	OK
Rebated Duty Cycle	0.646	H-26	0.646	H-24	OK
Equiv. full-load hours [h]	547	H-26	547	H-24	OK
Rebated Adjustment Factor	1.6075	H-26	1.6075	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **ECM Fan on Efficient Gas Furnace with AFUE > 90%**

Description: This measure involves the installation of an efficient natural gas furnace (AFUE > 90%) with an electronically commutated motor (ECM) on the furnace fan. The baseline for this measure is an equivalently-sized gas furnace that meets code baseline efficiency and features a standard efficiency permanent split capacitor (PSC) motor. Electrical savings are realized only during heating hours; therefore, there are no peak demand savings for this measure.

Incentive: $200/unit

Conclusion: Updated

Reasoning: The evaluation team was unable to obtain the algorithms and references behind the current program's deemed kWh and kW savings. Instead, a field study that determined ECM savings for over 80 furnaces in the state of Wisconsin was referenced. Since Wisconsin weather and Long Island weather are different, heating degree day (HDD) data was used to normalize kWh savings; this ratio was multiplied by the average number of HDDs for Queens, NY, for the years 2007-2009. Full-load heating hours were estimated from ASHRAE data and used to determine demand savings. Freerider and spillover rates were not available for this measure; therefore, the net savings and gross savings are equal for this measure. It was assumed that there are no peak demand savings for this measure, since savings are realized only during heating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.23	0.16	68%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	381	286	75%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / heating hours	Updated
Consumption:	Unknown	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Heating Degree Days		N/A	4492	H-28	Updated
Annual heating hours [h]		N/A	1800	H-17	Updated
Coincidence Factor	0	N/A	0	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **ECM Fan on Efficient Oil Furnace with AFUE > 83%**

Description: This measure involves the installation of an efficient heating oil furnace (AFUE > 90%) with an electronically commutated motor (ECM) on the furnace fan. The baseline for this measure is an equivalently-sized oil furnace that meets code baseline efficiency and features a standard efficiency permanent split capacitor (PSC) motor. Electrical savings are realized only during heating hours; therefore, there are no peak demand savings for this measure.

Incentive: $200/unit

Conclusion: Updated

Reasoning: The evaluation team was unable to obtain the algorithms and references behind the current program's deemed kWh and kW savings. Instead, a field study that determined ECM savings for over 80 furnaces in the state of Wisconsin was referenced. Since Wisconsin weather and Long Island weather are different, heating degree day (HDD) data was used to normalize kWh savings; this ratio was multiplied by the average number of HDDs for Queens, NY, for the years 2007-2009. Full-load heating hours were estimated from ASHRAE data and used to determine demand savings. Freerider and spillover rates were not available for this measure; therefore, the net savings and gross savings are equal for this measure. It was assumed that there are no peak demand savings for this measure, since savings are realized only during heating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.23	0.16	68%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	381	286	75%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / heating hours	Updated
Consumption:	Unknown	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Heating Degree Days		N/A	4492	H-28	Updated
Annual heating hours [h]		N/A	1800	H-17	Updated
Coincidence Factor	0	N/A	0	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **ECM Fan on Efficient Propane Furnace with AFUE > 90%**

Description: This measure involves the installation of an efficient propane furnace (AFUE > 90%) with an electronically commutated motor (ECM) on the furnace fan. The baseline for this measure is an equivalently-sized propane furnace that meets code baseline efficiency and features a standard efficiency permanent split capacitor (PSC) motor. Electrical savings are realized only during heating hours; therefore, there are no peak demand savings for this measure.

Incentive: $200/unit

Conclusion: Updated

Reasoning: The evaluation team was unable to obtain the algorithms and references behind the current program's deemed kWh and kW savings. Instead, a field study that determined ECM savings for over 80 furnaces in the state of Wisconsin was referenced. Since Wisconsin weather and Long Island weather are different, heating degree day (HDD) data was used to normalize kWh savings; this ratio was multiplied by the average number of HDDs for Queens, NY, for the years 2007-2009. Full-load heating hours were estimated from ASHRAE data and used to determine demand savings. Freerider and spillover rates were not available for this measure; therefore, the net savings and gross savings are equal for this measure. It was assumed that there are no peak demand savings for this measure, since savings are realized only during heating hours.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.23	0.16	68%
Coincident Demand [kW]	0.00	0.00	100%
Consumption [kWh]	381	286	75%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / heating hours	Updated
Consumption:	Unknown	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Heating Degree Days		N/A	4492	H-28	Updated
Annual heating hours [h]		N/A	1800	H-17	Updated
Coincidence Factor	0	N/A	0	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Home A/C Tune-Up**

Description: This measure involves the repair of an existing residential air conditioning system by an approved contractor. Specifically, this measure involves the addition or removal of refrigerant to or from the current A/C circuit in order to optimize system performance. A system balance to optimize airflow is also a major component of this measure. Measure specifics are decided upon system inspection and completion of the CheckMe! diagnostic test. The existing system was assigned an average SEER of approximately 12 based on 2009 Cool Homes install statistics.

Incentive: $100/tuneup

Conclusion: OK

Reasoning: The evaluation team obtained the savings algorithm spreadsheet currently used for residential A/C tuneups in the Cool Homes program. Many of the equations and terms incorporate field research previously conducted for LIPA, and are likewise specific to Long Island weather and home size. The evaluation team has no comparable alternative to this data; therefore these values were determined to be sufficient for accurate deemed savings calculation. It should be noted that all savings values incorporate coincidence, freerider, and spillover factors based on research of the Long Island area.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.43	0.43	100%
Coincident Demand [kW]	0.43	0.43	100%
Consumption [kWh]	414	414	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 / EER * (existing % on at peak - repaired % on at peak)	OK
Consumption:	ΔkWh = Capacity/1000 / SEER * (existing adjust. factor - repaired adjust. factor) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	21818	H-23	21818	H-23	OK
Existing Percent Oversize	0.65	H-27	0.65	H-27	OK
Existing SEER	12.02	H-41	12.02	H-41	OK
Existing EER	10.48	H-27	10.48	H-27	OK
Base % Running Continuously	0.37	H-27	0.37	H-27	OK
Existing % Cycling at Peak	0.501	H-27	0.501	H-27	OK
Duty Cycle for Existing Units	0.632	H-27	0.632	H-27	OK
Existing Adjustment Factor	1.527	H-27	1.527	H-27	OK
System Capacity [ton]	3	H-27	3	H-27	OK

New % Running Continuously	0.215	H-27	0.215	H-27	OK
Repaired % Cycling at Peak	0.656	H-27	0.656	H-27	OK
Duty Cycle for Repaired Units	0.529	H-27	0.529	H-27	OK
Equiv. full-load hours [h]	547	H-27	547	H-27	OK
Repaired Adjustment Factor	1.141	H-27	1.141	H-27	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **New Geothermal/Geocolumn Heat Pump Installation (13 < EER < 16)**

Description: This measure involves the installation of a new geothermal heat pump with an EER between 13 and 16. The baseline for this measure is a new air-cooled split heat pump of equivalent size. The incentivized efficiency was determined from a weighted average of equipment installed in 2009 through the Cool Homes program. For this measure only demand savings associated with cooling have been evaluated.

Incentive: $700/unit

Conclusion: Updated

Reasoning: The evaluation team obtained the savings algorithm associated with this measure, but was unable to obtain the references and term definitions used in the deemed savings calculation. Identifying the unlabeled values in the algorithm itself proved challenging. For example, a number of adjustment factors (freerider, spillover) were present in the kW and kWh equations but could not be fully identified. As such, the evaluation team used code baseline for an equivalently-sized air-source heat pump to determine baseline efficiency. No program requirements were available for the heating mode; the evaluation team extrapolated estimated efficient COP based on cooling EER ratios among equipment listed in ASHRAE 90.1 2004. Operating hours were determined from ASHRAE estimates for New York City. Freerider and spillover factors were not available for this measure; therefore, the gross and net savings are equal. A coincidence factor was found for similarly-sized heat pumps in the Commercial Construction Program (CCP). The primary reason for low demand realization rates is the current program's use of an unrealistically low baseline cooling efficiency; the evaluation team recommends that this is reassessed.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.52	0.43	28%
Coincident Demand [kW]	1.09	0.32	30%
Consumption [kWh]	1157	724	63%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Capacity [ton]	3.5	H-24	3.5	N/A	OK
Baseline EER	10	H-29	12	H-15	Updated
Efficient EER	15	H-41	15	H-41	OK

Equiv. Full Load Cooling [h]	678	H-29	967	H-17	Updated
Baseline COP	3.2	H-15	3.2	H-15	OK
Efficient COP	3.3	N/A	3.3	N/A	OK
Equiv. Full Load Heating [h]	1100	N/A	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.75	H-31	Updated

Program: *Cool Homes* **Category:** *HVAC*

Measure: **New Geothermal/Geocolumn Heat Pump Installation (16 < EER < 19)**

Description: This measure involves the installation of a new geothermal heat pump with an EER between 16 and 19. The baseline for this measure is a new air-cooled split heat pump of equivalent size. The incentivized efficiency was determined from a weighted average of equipment installed in 2009 through the Cool Homes program. For this measure only demand savings associated with cooling have been evaluated.

Incentive: $800/unit

Conclusion: Updated

Reasoning: The evaluation team obtained the savings algorithm associated with this measure, but was unable to obtain the references and term definitions used in the deemed savings calculation. Identifying the unlabeled values in the algorithm itself proved challenging. For example, a number of adjustment factors (freerider, spillover) were present in the kW and kWh equations but could not be fully identified. As such, the evaluation team used code baseline for an equivalently-sized air-source heat pump to determine baseline efficiency. No program requirements were available for the heating mode; the evaluation team extrapolated estimated efficient COP based on cooling EER ratios among equipment listed in ASHRAE 90.1 2004. Operating hours were determined from ASHRAE estimates for New York City. Freerider and spillover factors were not available for this measure; therefore, the gross and net savings are equal. A coincidence factor was found for similarly-sized heat pumps in the Commercial Construction Program (CCP). The primary reason for low demand realization rates is the current program's use of an unrealistically low baseline cooling efficiency; the evaluation team recommends that this is reassessed.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.08	1.22	59%
Coincident Demand [kW]	1.50	0.91	61%
Consumption [kWh]	2105	2755	131%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Capacity [ton]	3.5	H-24	3.5	N/A	OK
Baseline EER	10	H-29	12	H-15	Updated
Efficient EER	18.41	H-41	18.41	H-41	OK

Equiv. Full Load Cooling [h]	678	H-29	967	H-17	Updated
Baseline COP	3.2	H-15	3.2	H-15	OK
Efficient COP	3.83	N/A	3.83	N/A	OK
Equiv. Full Load Heating [h]	1100	N/A	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.75	H-31	Updated

Program: *Cool Homes* **Category:** *HVAC*

Measure: **New Geothermal/Geocolumn Heat Pump Installation (EER > 19)**

Description: This measure involves the installation of a new geothermal heat pump with an EER greater than 19. The baseline for this measure is a new air-cooled split heat pump of equivalent size. The incentivized efficiency was determined from a weighted average of equipment installed in 2009 through the Cool Homes program. For this measure only demand savings associated with cooling have been evaluated.

Incentive: $1000/unit

Conclusion: Updated

Reasoning: The evaluation team obtained the savings algorithm associated with this measure, but was unable to obtain the references and term definitions used in the deemed savings calculation. Identifying the unlabeled values in the algorithm itself proved challenging. For example, a number of adjustment factors (freerider, spillover) were present in the kW and kWh equations but could not be fully identified. As such, the evaluation team used code baseline for an equivalently-sized air-source heat pump to determine baseline efficiency. No program requirements were available for the heating mode; the evaluation team extrapolated estimated efficient COP based on cooling EER ratios among equipment listed in ASHRAE 90.1 2004. Operating hours were determined from ASHRAE estimates for New York City. Freerider and spillover factors were not available for this measure; therefore, the gross and net savings are equal. A coincidence factor was found for similarly-sized heat pumps in the Commercial Construction Program (CCP). The primary reason for low demand realization rates is the current program's use of an unrealistically low baseline cooling efficiency; the evaluation team recommends that this is reassessed.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.72	1.81	67%
Coincident Demand [kW]	1.96	1.36	69%
Consumption [kWh]	2771	3867	140%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Capacity [ton]	3.5	H-24	3.5	N/A	OK
Baseline EER	10	H-29	12	H-15	Updated
Efficient EER	24.82	H-41	24.82	H-41	OK

Equiv. Full Load Cooling [h]	678	H-29	967	H-17	Updated
Baseline COP	3.2	H-15	3.2	H-15	OK
Efficient COP	4.1	N/A	4.1	N/A	OK
Equiv. Full Load Heating [h]	1100	N/A	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.75	H-31	Updated

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Replacement Geothermal/Geocolumn Heat Pump Installation (13 < EER < 16)**

Description: This measure involves the installation of a new geothermal heat pump in place of a preexisting geothermal heat pump. This measure specifically pertains to systems with an EER between 13 and 16. The baseline for this measure is an existing geothermal heat pump of equivalent size. The incentivized efficiency was determined from a weighted average of equipment installed in 2009 through the Cool Homes program. For this measure only demand savings associated with cooling have been evaluated.

Incentive: $200/unit

Conclusion: Updated

Reasoning: The evaluation team obtained the savings algorithm associated with this measure, but was unable to obtain the references and term definitions used in the deemed savings calculation. Identifying the unlabeled values in the algorithm itself proved challenging. For example, a number of adjustment factors (freerider, spillover) were present in the kW and kWh equations but could not be fully identified. As such, the evaluation team used the ASHRAE 90.1 1989 baseline for an equivalently-sized geothermal heat pump to determine baseline efficiency; the 1989 standard was used to reflect the efficiency of preexisting equipment. No program requirements were available for the heating mode; the evaluation team extrapolated estimated efficient COP based on cooling EER ratios among equipment listed in ASHRAE 90.1. Operating hours were determined from ASHRAE estimates for New York City. Freerider and spillover factors were not available for this measure; therefore, the gross and net savings are equal. A coincidence factor was found for similarly-sized heat pumps in the Commercial Construction Program (CCP). The primary reason for low demand realization rates is the current program's use of an unrealistically low baseline cooling efficiency; the evaluation team recommends that this is reassessed.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.41	0.92	65%
Coincident Demand [kW]	1.02	0.69	68%
Consumption [kWh]	1086	1238	114%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Capacity [ton]	3.5	H-24	3.5	N/A	OK
Baseline EER	10	H-29	11	H-43	Updated
Efficient EER	14.5	N/A	14.5	N/A	OK
Equiv. Full Load Cooling [h]	678	H-29	967	H-17	Updated
Baseline COP	3.2	H-15	3.2	H-15	OK
Efficient COP	3.3	N/A	3.3	N/A	OK
Equiv. Full Load Heating [h]	1100	N/A	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.75	H-31	Updated

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Replacement Geothermal/Geocolumn Heat Pump Installation (16 < EER < 19)**

Description: This measure involves the installation of a new geothermal heat pump in place of a preexisting geothermal heat pump. This measure specifically pertains to systems with an EER between 16 and 19. The baseline for this measure is an existing geothermal heat pump of equivalent size. The incentivized efficiency was determined from a weighted average of equipment installed in 2009 through the Cool Homes program. For this measure only demand savings associated with cooling have been evaluated.

Incentive: $250/unit

Conclusion: Updated

Reasoning: The evaluation team obtained the savings algorithm associated with this measure, but was unable to obtain the references and term definitions used in the deemed savings calculation. Identifying the unlabeled values in the algorithm itself proved challenging. For example, a number of adjustment factors (freerider, spillover) were present in the kW and kWh equations but could not be fully identified. As such, the evaluation team used the ASHRAE 90.1 1989 baseline for an equivalently-sized geothermal heat pump to determine baseline efficiency; the 1989 standard was used to reflect the efficiency of preexisting equipment. No program requirements were available for the heating mode; the evaluation team extrapolated estimated efficient COP based on cooling EER ratios among equipment listed in ASHRAE 90.1. Operating hours were determined from ASHRAE estimates for New York City. Freerider and spillover factors were not available for this measure; therefore, the gross and net savings are equal. A coincidence factor was found for similarly-sized heat pumps in the Commercial Construction Program (CCP). The primary reason for low demand realization rates is the current program's use of an unrealistically low baseline cooling efficiency; the evaluation team recommends that this is reassessed.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.95	1.42	73%
Coincident Demand [kW]	1.40	1.06	76%
Consumption [kWh]	2018	2964	147%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Equiv. Full Load Heating [h]	1100	N/A	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.75	H-31	Updated
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Capacity [ton]	3.5	H-24	3.5	N/A	OK
Baseline EER	10	H-29	11	H-43	Updated
Efficient EER	17.5	N/A	17.5	N/A	OK
Equiv. Full Load Cooling [h]	678	H-29	967	H-17	Updated
Baseline COP	3.2	H-15	3.2	H-15	OK
Efficient COP	3.83	N/A	3.83	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Replacement Geothermal/Geocolumn Heat Pump Installation (EER > 19)**

Description: This measure involves the installation of a new geothermal heat pump in place of a preexisting geothermal heat pump. This measure specifically pertains to systems with an EER greater than 19. The baseline for this measure is an existing geothermal heat pump of equivalent size. The incentivized efficiency was determined from a weighted average of equipment installed in 2009 through the Cool Homes program. For this measure only demand savings associated with cooling have been evaluated.

Incentive: $350/unit

Conclusion: Updated

Reasoning: The evaluation team obtained the savings algorithm associated with this measure, but was unable to obtain the references and term definitions used in the deemed savings calculation. Identifying the unlabeled values in the algorithm itself proved challenging. For example, a number of adjustment factors (freerider, spillover) were present in the kW and kWh equations but could not be fully identified. As such, the evaluation team used the ASHRAE 90.1 1989 baseline for an equivalently-sized geothermal heat pump to determine baseline efficiency; the 1989 standard was used to reflect the efficiency of preexisting equipment. No program requirements were available for the heating mode; the evaluation team extrapolated estimated efficient COP based on cooling EER ratios among equipment listed in ASHRAE 90.1. Operating hours were determined from ASHRAE estimates for New York City. Freerider and spillover factors were not available for this measure; therefore, the gross and net savings are equal. A coincidence factor was found for similarly-sized heat pumps in the Commercial Construction Program (CCP). The primary reason for low demand realization rates is the current program's use of an unrealistically low baseline cooling efficiency; the evaluation team recommends that this is reassessed.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	2.66	2.07	78%
Coincident Demand [kW]	1.91	1.55	81%
Consumption [kWh]	2731	4143	152%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (1/EERbase - 1/EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/EERbase - 1/EEReff) * cooling hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Capacity [ton]	3.5	H-24	3.5	N/A	OK
Baseline EER	10	H-29	11	H-43	Updated
Efficient EER	19	N/A	19	N/A	OK
Equiv. Full Load Cooling [h]	678	H-29	967	H-17	Updated
Baseline COP	3.2	H-15	3.2	H-15	OK
Efficient COP	4.1	N/A	4.1	N/A	OK
Equiv. Full Load Heating [h]	1100	N/A	2337	H-6	Updated
Coincidence Factor	0.72	H-4	0.75	H-31	Updated
Freeridership %	0	N/A	0	N/A	Insufficient Information Available
Spillover %	0	N/A	0	N/A	Insufficient Information Available
Capacity [ton]	3.5	H-24	3.5	N/A	OK
Baseline EER	10	H-29	11	H-15	Updated
Efficient EER	24.04	H-41	24.04	H-41	OK
Equiv. Full Load Cooling [h]	678	H-29	967	H-17	Updated
Coincidence Factor	0.72	H-4	0.75	H-31	Updated

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Split Central AC - Contractor Incentive (SEER > 13)**

Description: This measure involves the home installation of a split central air conditioning unit with a minimum efficiency of 13 EER. The baseline for this measure is a conventional unit which meets code standards. This specific evaluation assesses the deemed savings for the contractor incentive offered for this measure. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. All savings values incorporate freeridership and spillover factors.

Incentive: $150/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Subsequently, realization rates for both consumption and demand for this measure are equal to 1.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.34	1.34	100%
Coincident Demand [kW]	1.34	1.34	100%
Consumption [kWh]	555	555	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	38842	H-23	38842	H-25	OK
Baseline Percent Oversize	0.65	H-24	0.65	H-24	OK
Baseline SEER	13	H-24	13	H-42	OK
Baseline EER	11.29	H-24	11.29	H-24	OK
Baseline % Running 24/7	0.37	H-24	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-24	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-24	0.632	H-24	OK
Baseline Adjustment Factor	1.4732	H-24	1.4732	N/A	OK

Rebated Tonnage	3.5	H-24	3.5	N/A	OK
Rebated Percent Oversize	0.08	N/A	0.08	N/A	OK
Rebated SEER	16.07	H-41	16.07	H-41	OK
Rebated EER	13	H-41	13	H-41	OK
Rebated % Running 24/7	0.664	H-24	0.664	H-24	OK
Rebated % Cycling at Peak	0.207	H-24	0.207	H-24	OK
Rebated Duty Cycle	0.616	H-24	0.616	H-24	OK
Equiv. full-load hours [h]	547	H-24	547	H-24	OK
Rebated Adjustment Factor	1.4465	H-24	1.4465	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Split Central AC (SEER > 14.5 and EER > 12)**

Description: This measure involves the home installation of a split central air conditioning unit with minimum efficiencies of 14.5 SEER and 12 EER. The baseline for this measure is a conventional unit which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. All savings values incorporate freeridership and spillover factors.

Incentive: $250/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Subsequently, realization rates for both consumption and demand for this measure are equal to 1.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.16	1.16	100%
Coincident Demand [kW]	1.16	1.16	100%
Consumption [kWh]	295	295	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	38842	H-23	38842	H-25	OK
Baseline Percent Oversize	0.65	H-24	0.65	H-24	OK
Baseline SEER	13	H-15	13	H-42	OK
Baseline EER	11.29	H-24	11.29	H-24	OK
Baseline % Running 24/7	0.37	H-24	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-24	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-24	0.632	H-24	OK
Baseline Adjustment Factor	1.4732	H-24	1.4732	N/A	OK
Rebated Tonnage	3.5	H-24	3.5	N/A	OK
Rebated Percent Oversize	0.08	N/A	0.08	N/A	OK

Rebated SEER	14.33	H-41	14.33	H-41	OK
Rebated EER	12.14	H-41	12.14	H-41	OK
Rebated % Running 24/7	0.664	H-24	0.664	H-24	OK
Rebated % Cycling at Peak	0.207	H-24	0.207	H-24	OK
Rebated Duty Cycle	0.616	H-24	0.616	H-24	OK
Equiv. full-load hours [h]	547	H-24	547	H-24	OK
Rebated Adjustment Factor	1.4465	H-24	1.4465	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Split Central AC (SEER > 15 and EER > 12.5)**

Description: This measure involves the home installation of a split central air conditioning unit with minimum efficiencies of 15 SEER and 12.5 EER. The baseline for this measure is a conventional unit which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. All savings values incorporate freeridership and spillover factors.

Incentive: $400/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Subsequently, realization rates for both consumption and demand for this measure are equal to 1.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.34	1.34	100%
Coincident Demand [kW]	1.34	1.34	100%
Consumption [kWh]	503	503	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	38842	H-23	38842	H-25	OK
Baseline Percent Oversize	0.65	H-24	0.65	H-24	OK
Baseline SEER	13	H-15	13	H-42	OK
Baseline EER	11.29	H-24	11.29	H-24	OK
Baseline % Running 24/7	0.37	H-24	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-24	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-24	0.632	H-24	OK
Baseline Adjustment Factor	1.4732	H-24	1.4732	N/A	OK
Rebated Tonnage	3.5	H-24	3.5	N/A	OK

Rebated Percent Oversize	0.08	N/A	0.08	N/A	OK
Rebated SEER	15.69	H-41	15.69	H-41	OK
Rebated EER	12.96	H-41	12.96	H-41	OK
Rebated % Running 24/7	0.664	H-24	0.664	H-24	OK
Rebated % Cycling at Peak	0.207	H-24	0.207	H-24	OK
Rebated Duty Cycle	0.616	H-24	0.616	H-24	OK
Equiv. full-load hours [h]	547	H-24	547	H-24	OK
Rebated Adjustment Factor	1.4465	H-24	1.4465	N/A	OK

Program: *Cool Homes* **Category:** *HVAC*

Measure: **Split Central AC (SEER > 16 and EER > 13)**

Description: This measure involves the home installation of a split central air conditioning unit with minimum efficiencies of 16 SEER and 13 EER. The baseline for this measure is a conventional unit which meets code standards. Full-load cooling hours were determined from averaged field studies at multiple homes on Long Island. Demand savings incorporate a number of adjustment and coincidence factors that were determined from additional studies. The incentivized efficiency was determined from a weighted average of equipment installed during 2009 through the Cool Homes program. All savings values incorporate freeridership and spillover factors.

Incentive: $600/unit

Conclusion: Updated

Reasoning: The evaluation team verified the current algorithm's cooling load value from ACCA Manual J. The program currently incorporates multiply field studies performed on Long Island homes to determine parameters that affect savings, such as full-load cooling hours, line losses, and coincidence factors. The evaluation team has no comparable alternative to this data; therefore, these values were determined to be sufficient for accurate deemed savings calculation. Subsequently, realization rates for both consumption and demand for this measure are equal to 1.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	1.40	1.40	100%
Coincident Demand [kW]	1.40	1.40	100%
Consumption [kWh]	731	731	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Capacity/1000 * (base % on at peak / EER base - eff % on at peak / EEReff)	OK
Consumption:	ΔkWh = Capacity/1000 * (1/SEERbase - 1/SEEReff) * hours	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Design Cooling Load [Btu/h]	38842	H-23	38842	H-25	OK
Baseline Percent Oversize	0.65	H-24	0.65	H-24	OK
Baseline SEER	13	H-24	13	H-42	OK
Baseline EER	11.29	H-24	11.29	H-24	OK
Baseline % Running 24/7	0.37	H-24	0.37	H-24	OK
Baseline % Cycling at Peak	0.501	H-24	0.501	H-24	OK
Baseline Duty Cycle	0.632	H-24	0.632	H-24	OK
Baseline Adjustment Factor	1.4732	H-24	1.4732	N/A	OK
Rebated Tonnage	3.5	H-24	3.5	N/A	OK

Rebated Percent Oversize	0.08	N/A	0.08	N/A	OK
Rebated SEER	17.51	H-41	17.51	H-41	OK
Rebated EER	13.31	H-41	13.31	H-41	OK
Rebated % Running 24/7	0.664	H-24	0.664	H-24	OK
Rebated % Cycling at Peak	0.207	H-24	0.207	H-24	OK
Rebated Duty Cycle	0.616	H-24	0.616	H-24	OK
Equiv. full-load hours [h]	547	H-24	547	H-24	OK
Rebated Adjustment Factor	1.4465	H-24	1.4465	N/A	OK

F. Home Performance Direct TRM

Program: *Home Performance Direct* **Category:** *Building Envelope*

Measure: **Air Sealing**

Description: This measure involves steps taken to reduce infiltration through home windows and doors. The Home Performance Direct program mandates that at least 10% cfm50 reduction must be documented before incentives are awarded. The baseline for this measure is the preexisting home envelope without air-sealing measures.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the air sealing measure. The algorithm itself involves several sub-algorithms, each with multiple inputs that are unreferenced. In light of this, the evaluation team evaluated the general savings algorithm itself, and found no major issues with its logic. Several recommendations have been suggested for the program moving forward. First, the Building Performance Institute document referenced has been tracked down and verified as a legitimate reference. The evaluation team recommends adhering to the adjustment factors suggested in this report. These factors are dependent on the number of floors in a home; this data should be extracted as the average from the total number of air sealing projects. Unfortunately, that information was not available at the time of this writing. Next, savings are dependent on the overall efficiency of all HVAC systems associated with the measure. The evaluation team recommends extracting the average cooling and heating COPs from install statistics, and using a weighted total average based on heating degree day and cooling degree day data. Again, this data was not available at the time of this writing. Finally, the reduction in air leakage cfm affects savings; the evaluation team trusts that licensed contractors will determine an accurate cfm reduction. In summary, the savings algorithm incorporates sound engineering logic, and this measure has been given a realization rate of 100%. Deemed savings were not able to be determined due to lack of documentation concerning algorithm inputs. Recommendations have been suggested by the evaluation team for the HPD program moving forward.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			100%
Coincident Demand [kW]			100%
Consumption [kWh]			100%

Savings Algorithms

	Algorithm	Conclusion
Demand:		
Consumption:		

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion

Program: *Home Performance Direct* **Category:** *Building Envelope*

Measure: **Attic Access Insulation**

Description: This measure involves the addition of insulation around attic access areas, such as the pull-down stairs door. The objective of this measure is to reduce heat losses and gains around the attic access during the winter and summer, respectively. The baseline for this measure is the uninsulated attic access door.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the attic access insulation measure. The evaluation team finds no error with the current program's algorithm—it uses simple thermal circuit logic to determine the savings between pre and post conditions. Based on values found in the program algorithm document, pre and post conditions were determined, and a deemed savings calculation was made. An R-15 Therma-Dome insulation cover was assumed for this deemed savings calculation. The pre and post insulation R-values were investigated and verified as reasonable based on market research. Heating and cooling degree day data was obtained from NOAA historical weather data for LaGuardia airport. A coincidence factor for central HVAC units in CT was assumed for both the current program's and evaluation team's calculation. In summary, the evaluation team agrees with the current program's savings algorithm, and recommends that baseline conditions, as well as degree day data, are updated at the conclusion of each year of the program. This strategy will ensure an accurate reflection of envelope conditions on Long Island. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.02	100%
Coincident Demand [kW]	0.01	0.01	100%
Consumption [kWh]	136	136	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / 8760$	OK
Consumption:	$\Delta kWh = sf * (1/Rpre - 1/Rpost) * (CDD + HDD) * 24 / COP$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Existing R-Value	1.5	RES-21	1.5	RES-21	Reasonable Based on Engr. Judgment
Installed R-Value	15	RES-21	15	RES-21	Reasonable Based on Engr. Judgment
Cooling Degree Days	1318	H-28	1318	H-28	OK
Heating Degree Days	4492	H-28	4492	H-28	OK
Typical Covering Size [ft2]	8.33	N/A	8.33	N/A	OK
Overall HVAC COP	1.5	N/A	1.5	N/A	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-31	0.75	H-31	OK

Program: *Home Performance Direct* **Category:** *Building Envelope*

Measure: **Attic/Roof Insulation**

Description: This measure involves application of additional or new insulation to various attics or roofs, to increase the overall R-value and limit heat losses and gains during the winter and summer, respectively. The baseline for this measure is the attic or roof with preexisting or no insulation.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the attic/roof insulation measure. The evaluation team finds no error with the current program's algorithm—it uses simple thermal circuit logic to determine the savings between pre and post conditions. Based on values found in the program algorithm document, pre and post conditions were determined, and a deemed savings calculation was made. Eight inches of cellulose insulation was assumed for this deemed savings calculation. The pre and post insulation R-values were investigated and verified as reasonable based on market research. Heating and cooling degree day data was obtained from NOAA historical weather data for LaGuardia airport. A coincidence factor for central HVAC units in CT was assumed for both the current program's and evaluation team's calculation. In summary, the evaluation team agrees with the current program's savings algorithm, and recommends that baseline conditions, as well as degree day data, are updated at the conclusion of each year of the program. This strategy will ensure an accurate reflection of envelope conditions on Long Island. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.39	0.39	100%
Coincident Demand [kW]	0.29	0.29	100%
Consumption [kWh]	3419	3419	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / 8760$	OK
Consumption:	$\Delta kWh = sf * (1/Rpre - 1/Rpost) * (CDD + HDD) * 24 / COP$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Existing R-Value	3.6	RES-21	3.6	RES-21	Reasonable Based on Engr. Judgment
Installed R-Value	31.6	RES-21	31.6	RES-21	Reasonable Based on Engr. Judgment
Cooling Degree Days	1318	H-28	1318	H-28	OK
Heating Degree Days	4492	H-28	4492	H-28	OK
Typical Wall Size [ft2]	510	RES-21	510	RES-21	OK

Overall HVAC COP	1.5	N/A	1.5	N/A	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-31	0.75	H-31	OK

Program: *Home Performance Direct* **Category:** *Building Envelope*

Measure: **Basement/Floor Insulation**

Description: This measure involves application of additional or new insulation to various basements or floors, to increase the overall R-value and limit heat losses and gains during the winter and summer, respectively. The baseline for this measure is the basement or floor with preexisting or no insulation.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the basement/floor insulation measure. The evaluation team finds no error with the current program's algorithm—it uses simple thermal circuit logic to determine the savings between pre and post conditions. Based on values found in the program algorithm document, pre and post conditions were determined, and a deemed savings calculation was made. Six inches of fiberglass batt insulation was assumed for this deemed savings calculation. The pre and post insulation R-values were investigated and verified as reasonable based on market research. Heating and cooling degree day data was obtained from NOAA historical weather data for LaGuardia airport. A coincidence factor for central HVAC units in CT was assumed for both the current program's and evaluation team's calculation. In summary, the evaluation team agrees with the current program's savings algorithm, and recommends that baseline conditions, as well as degree day data, are updated at the conclusion of each year of the program. This strategy will ensure an accurate reflection of envelope conditions on Long Island. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.18	0.18	100%
Coincident Demand [kW]	0.13	0.13	100%
Consumption [kWh]	1550	1550	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / 8760	OK
Consumption:	ΔkWh = sf * (1/Rpre - 1/Rpost) * (CDD + HDD) * 24 / COP	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Installed R-Value	20.9	RES-21	20.9	RES-21	Reasonable Based on Engr. Judgment
Cooling Degree Days	1318	H-28	1318	H-28	OK
Heating Degree Days	4492	H-28	4492	H-28	OK
Buffer Factor	0.4	RES-21	0.4	RES-21	OK
Typical Wall Size [ft2]	816	RES-21	816	RES-21	OK
Overall HVAC COP	1.5	N/A	1.5	N/A	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-31	0.75	H-31	OK
Existing R-Value	4.5	RES-21	4.5	RES-21	Reasonable Based on Engr. Judgment

Program: *Home Performance Direct* **Category:** *Building Envelope*

Measure: **Doors**

Description: This measure involves the installation of storm doors or replacement doors, to increase the door R-value and reduce heat losses and gains during the winter and summer, respectively. The baseline for this measure is the preexisting door with any storm doors installed, if applicable.

Incentive: $10/unit

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the door replacement measure. The evaluation team finds no error with the current program's algorithm-it uses simple thermal circuit logic to determine the savings between pre and post conditions. Based on values found in the program algorithm document, pre and post conditions were determined, and a deemed savings calculation was made. A 1 ¾"-thick wood door was assumed in this deemed savings calculation. The pre and post door R-values were investigated and verified as reasonable based on market research. Heating and cooling degree day data was obtained from NOAA historical weather data for LaGuardia airport. A coincidence factor for central HVAC units in CT was assumed for both the current program's and evaluation team's calculation. In summary, the evaluation team agrees with the current program's savings algorithm, and recommends that baseline conditions, as well as degree day data, are updated at the conclusion of each year of the program. This strategy will ensure an accurate reflection of envelope conditions on Long Island. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.01	0.01	100%
Coincident Demand [kW]	0.01	0.01	100%
Consumption [kWh]	71	71	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / 8760$	OK
Consumption:	$\Delta kWh = sf * (1/Rpre - 1/Rpost) * (CDD + HDD) * 24 / COP$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Existing Door R-Value	3.2	RES-21	3.2	RES-21	Reasonable Based on Engr. Judgment
Installed Door R-Value	6	RES-21	6	RES-21	Reasonable Based on Engr. Judgment
Cooling Degree Days	1318	H-28	1318	H-28	OK
Heating Degree Days	4492	H-28	4492	H-28	OK
Typical Door Size [ft2]	17.78	N/A	17.78	N/A	OK

Overall HVAC COP	1.5	N/A	1.5	N/A	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-31	0.75	H-31	OK

Program: *Home Performance Direct* **Category:** *Building Envelope*

Measure: **Thermal Covering (Quilt)**

Description: This measure involves the application of a thermal cover on previously uninsulated areas of a home. The baseline for this measure is the uninsulated area without the thermal cover applied.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the thermal covering measure. The evaluation team finds no error with the current program's algorithm—it uses simple thermal circuit logic to determine the savings between pre and post conditions. Based on values found in the program algorithm document, pre and post conditions were determined, and a deemed savings calculation was made. The pre and post covering R-values were investigated and verified as reasonable based on market research. Heating and cooling degree day data was obtained from NOAA historical weather data for LaGuardia airport. A coincidence factor for central HVAC units in CT was assumed for both the current program's and evaluation team's calculation. In summary, the evaluation team agrees with the current program's savings algorithm, and recommends that baseline conditions, as well as degree day data, are updated at the conclusion of each year of the program. This strategy will ensure an accurate reflection of envelope conditions on Long Island. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.03	0.03	100%
Coincident Demand [kW]	0.02	0.02	100%
Consumption [kWh]	255	255	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / 8760$	OK
Consumption:	$\Delta kWh = sf * \text{buffer factor} * (1/Rpre - 1/Rpost) * (CDD + HDD) * 24 / COP$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Existing R-Value	1	RES-21	1	RES-21	Reasonable Based on Engr. Judgment
Installed R-Value	4	RES-21	4	RES-21	Reasonable Based on Engr. Judgment
Cooling Degree Days	1318	H-28	1318	H-28	OK
Heating Degree Days	4492	H-28	4492	H-28	OK
Typical Covering Size [ft2]	12.5	RES-21	12.5	RES-21	OK
Overall HVAC COP	1.5	N/A	1.5	N/A	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-31	0.75	H-31	OK

Program: *Home Performance Direct* **Category:** *Building Envelope*

Measure: **Wall Insulation**

Description: This measure involves the application of additional or new insulation to various walls, to increase the overall R-value and limit heat losses and gains during the winter and summer, respectively. The baseline for this measure is the wall with preexisting or no insulation.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the wall insulation measure. The evaluation team finds no error with the current program's algorithm—it uses simple thermal circuit logic to determine the savings between pre and post conditions. Based on values found in the program algorithm document, pre and post conditions were determined, and a deemed savings calculation was made. Four inches of cellulose insulation was assumed for this deemed savings calculation. The pre and post insulation R-values were investigated and verified as reasonable based on market research. Heating and cooling degree day data was obtained from NOAA historical weather data for LaGuardia airport. A coincidence factor for central HVAC units in CT was assumed for both the current program's and evaluation team's calculation. In summary, the evaluation team agrees with the current program's savings algorithm, and recommends that baseline conditions, as well as degree day data, are updated at the conclusion of each year of the program. This strategy will ensure an accurate reflection of envelope conditions on Long Island. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.25	0.25	100%
Coincident Demand [kW]	0.18	0.18	100%
Consumption [kWh]	2148	2148	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / 8760$	OK
Consumption:	$\Delta kWh = sf * (1/Rpre - 1/Rpost) * (CDD + HDD) * 24 / COP$	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Existing R-Value	3.711	RES-21	3.711	RES-21	Reasonable Based on Engr. Judgment
Installed R-Value	11.4	RES-21	11.4	RES-21	Reasonable Based on Engr. Judgment
Cooling Degree Days	1318	H-28	1318	H-28	OK
Heating Degree Days	4492	H-28	4492	H-28	OK
Buffer Factor	0.4	RES-21	0.4	RES-21	OK

Typical Wall Size [ft2]	1085	RES-21	1085	RES-21	OK
Overall HVAC COP	1.5	N/A	1.5	N/A	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-31	0.75	H-31	OK

Program: *Home Performance Direct* **Category:** *Building Envelope*

Measure: **Windows and Patio Doors**

Description: This measure involves the installation of replacement windows or patio doors, or the installation of new storm windows/doors on those preexisting. The objective is to increase the overall window/door R-value to reduce heat losses and gains during the winter and summer, respectively. The baseline for this measure is the preexisting window/door with any storm windows/doors installed, if applicable.

Incentive: $35/window

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the window/patio door replacement measure. The evaluation team finds no error with the current program's algorithm—it uses simple thermal circuit logic to determine the savings between pre and post conditions. Based on values found in the program algorithm document, pre and post conditions were determined, and a deemed savings calculation was made. A 3-Lite Slider window was assumed for this deemed savings calculation. The pre and post window R-values were investigated and verified as reasonable based on market research. Heating and cooling degree day data was obtained from NOAA historical weather data for LaGuardia airport. A coincidence factor for central HVAC units in CT was assumed for both the current program's and evaluation team's calculation. In summary, the evaluation team agrees with the current program's savings algorithm, and recommends that baseline conditions, as well as degree day data, are updated at the conclusion of each year of the program. This strategy will ensure an accurate reflection of envelope conditions on Long Island. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.05	0.05	100%
Coincident Demand [kW]	0.04	0.04	100%
Consumption [kWh]	428	428	100%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / 8760	OK
Consumption:	ΔkWh = sf * buffer factor * (1/Rpre - 1/Rpost) * (CDD + HDD) * 24 / COP	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Existing Door U-Value	1.3	RES-21	1.3	RES-21	Reasonable Based on Engr. Judgment
Installed Door U-Value	0.15	RES-21	0.15	RES-21	Reasonable Based on Engr. Judgment
Cooling Degree Days	1318	H-28	1318	H-28	OK
Heating Degree Days	4492	H-28	4492	H-28	OK
Typical Window Size [ft2]	13.67	RES-21	13.67	RES-21	OK
Overall HVAC COP	1.5	N/A	1.5	N/A	Reasonable Based on Engr. Judgment
Coincidence Factor	0.75	H-31	0.75	H-31	OK

Program: *Home Performance Direct* **Category:** *HVAC*

Measure: **Adjusted Thermostat**

Description: This measure involves either the replacement of a preexisting analog thermostat with an electronic, programmable thermostat, or the incorporation of a temperature setback on the preexisting thermostat. The baseline for this measure is the preexisting thermostat with no temperature setbacks. Both heating and cooling savings have been considered for this measure.

Incentive: Incentive amount unavailable

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the thermostat measure. The algorithm uses setback factors for pre (no adjustment) and post conditions, multiplied by heating and cooling loads, to determine deemed savings. The evaluation team finds no error with this algorithm. Instead, the reference for the pre and post setback factors was verified as reasonable from current savings estimates from Hydro Quebec, the author of the initial reference [RES-24]. The other variable that can greatly affect savings is the estimated building heating or cooling load. The evaluation team recommends that this is updated periodically to reflect current, typical Long Island weather and the envelope conditions of a typical home. Building energy modeling software could be used to estimate average building load. In summary, the savings algorithm incorporates sound engineering logic, and this measure has been given a realization rate of 100%. Deemed savings were not able to be determined due to lack of information concerning various term assumptions.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			100%
Coincident Demand [kW]			100%
Consumption [kWh]			100%

Savings Algorithms

	Algorithm	Conclusion
Demand:		
Consumption:		

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion

Program: *Home Performance Direct* **Category:** *HVAC*

Measure: **Duct Insulation**

Description: This measure involves the addition of insulation to central HVAC ducts located in unconditioned portions of the house. Insulation increases the overall duct R-value, thereby limiting heat loss in the winter and heat gain in the summer. The baseline for this measure is the preexisting ducts without any insulation. Both heating and cooling savings have been considered for this measure.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the duct insulation measure. The algorithm itself uses the difference between pre and post-install duct distribution efficiencies to determine deemed savings. Through engineering judgment, the evaluation team has determined this approach to be logically sound. The reference cited for the duct distribution efficiency, for example, has been verified as reasonably accurate [RES-23]. The duct distribution efficiency incorporates the overall duct R-value, the major metric that changes between pre- and post-conditions. Pre-retrofit equipment efficiencies have been determined from 1999 GAMA ratings; this has been determined as reasonable based on typical equipment life. The other variable that can greatly affect savings is the estimated building heating or cooling load. The evaluation team recommends that this is updated periodically to reflect current, typical Long Island weather and the envelope conditions of a typical home. Building energy modeling software could be used to estimate average building load. In summary, the savings algorithm incorporates sound engineering logic, and this measure has been given a realization rate of 100%. Deemed savings were not able to be determined due to lack of information concerning various term assumptions.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			100%
Coincident Demand [kW]			100%
Consumption [kWh]			100%

Savings Algorithms

	Algorithm	Conclusion
Demand:		
Consumption:		

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion

Program: *Home Performance Direct* **Category:** *HVAC*

Measure: **Duct Sealing**

Description: This measure involves steps taken to reduce leakage from residential ducts that supply conditioned air. The Home Performance Direct program mandates that a 10% reduction in cfm50 must be documented in order for the incentive to be awarded. Additional requirements are listed on the HPD application. The baseline for this measure is the preexisting ducts without any sealing measures implemented.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the duct sealing measure. The algorithm itself involves several sub-algorithms, each with multiple inputs that are unreferenced. In light of this, the evaluation team evaluated the general savings algorithm itself, and found no major issues with its logic. When available, references for the sub-algorithm inputs were tracked down and verified. The reference cited for the duct distribution efficiency, for example, has been verified as reasonably accurate [RES-23]. Pre-retrofit equipment efficiencies have been determined from 1999 GAMA ratings; this has been determined as reasonable based on typical equipment life. Post-retrofit efficiencies should incorporate nameplate data of installed equipment, taking into account any seasonal efficiency multipliers noted in the algorithm documentation. Finally, the last variable that can greatly affect savings is the estimated building heating or cooling load. The evaluation team recommends that this is updated periodically to reflect up-to-date, typical Long Island weather and envelope conditions of a typical home. Building energy modeling software could be used to estimate average building load. In summary, the savings algorithm incorporates sound engineering logic, and this measure has been given a realization rate of 100%. Deemed savings were not able to be determined due to lack of documentation concerning algorithm inputs. Recommendations have been suggested by the evaluation team for the HPD program moving forward.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			100%
Coincident Demand [kW]			100%
Consumption [kWh]			100%

Savings Algorithms

	Algorithm	Conclusion
Demand:		
Consumption:		

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion

Program: *Home Performance Direct* **Category:** *HVAC*

Measure: **System Upgrade**

Description: This measure involves the installation of more efficient HVAC equipment to replace preexisting, less efficient systems. This general measure covers equipment such as heat pumps, air conditioners, boilers, and furnaces. Program requirements vary by equipment type and can be found on the HPD application. The baseline for this measure is the GAMA or ARI efficiency ratings from 1999, to reflect the equipment's typical expected life.

Incentive: Incentive amount unavailable

Conclusion: OK

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the system upgrade measure. The algorithm itself is fairly straightforward: the difference in system efficiencies multiplied by the typical building heating or cooling load roughly represents the deemed savings. Additionally, the algorithm incorporates the reduction in expected heating or cooling building load due to system changeover. The evaluation team verified the pre-retrofit equipment efficiencies. These were referenced from ARI or GAMA ratings from 1999; the evaluation team believes this to be a legitimate source. Additionally, typical equipment life is reflected in the 1999 reference. Finally, the last variable that can greatly affect savings is the estimated building heating or cooling load. The evaluation team recommends that this is updated periodically to reflect current, typical Long Island weather and the envelope conditions of a typical home. Building energy modeling software could be used to estimate average building load. In summary, the savings algorithm incorporates sound engineering logic, and this measure has been given a realization rate of 100%. Deemed savings were not able to be determined due to countless possibilities for variable inputs. Recommendations have been suggested by the evaluation team for the HPD program moving forward.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]			100%
Coincident Demand [kW]			100%
Consumption [kWh]			100%

Savings Algorithms

	Algorithm	Conclusion
Demand:		
Consumption:		

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion

Program: *Home Performance Direct* **Category:** *Residential*

Measure: **DHW Tank Wrap**

Description: This measure involves the application of an insulating jacket to a residential water heater. The baseline for this measure is the preexisting water heater without any additional insulation. Due to unknown efficiency conditions for this measure, the evaluation team investigated other residential efficiency programs, and found a minimum jacket R-value of 6 is required for incentives.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: Updated

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the tank wrap measure. The algorithm itself incorporates a simple thermal circuit to determine the reduction in heat loss between the pre and post cases. However, no assumptions on the incentivized R-value could be found in program documentation. Instead, the evaluation team used the deemed savings value for an identical measure in the Residential Energy Affordability Partnership program. The evaluation team's approach involved studies that model the standby heat loss coefficient for a typical residential water heater. Additionally, an average savings percentage for this measure was obtained from a separate D.O.E. study. A water heater coincidence factor was obtained from an equivalent study of homes in Minnesota. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. The current program's algorithm itself uses sound engineering logic and has been verified; the evaluation team recommends reassessing the baseline conditions at the conclusion of each year of the program moving forward. Freeridership and spillover factors could not be found from program documentation; these have been assumed as zero, making net and gross savings identical.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.01	68%
Coincident Demand [kW]	0.00	0.00	66%
Consumption [kWh]	340	68	20%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = Ualoss * (Thw - Tamb) * % sav / EF / 3412	Updated
Consumption:	ΔkWh = ΔkW * standby hours	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Hot Water Temperature [F]		N/A	135	RES-1	Insufficient Information Available
Ambient Temperature [F]		N/A	65	RES-1	Insufficient Information Available
Standby Heat Loss UA		N/A	3.655	RES-1	Insufficient Information Available
Savings %		N/A	0.325	RES-2	Insufficient Information Available
Standby Hours [h]	5427	H-46	6570	RES-1	Updated
Energy Factor		N/A	0.9	N/A	Insufficient Information Available
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated
% Electric Heat		N/A	0.38	RES-25	Updated

Program: *Home Performance Direct* **Category:** *Residential*

Measure: **DHW Temperature Setback**

Description: This measure involves the reduction of domestic hot water temperature at the water heater. Typically, manufacturers set water heaters at a default temperature above 130 F; studies have shown that 120 F is a sufficient hot water temperature for most homes. The baseline for this measure is a hot water heater set at 130 F.

Incentive: No cost

Conclusion: Updated

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the hot water temperature setback measure. The evaluation team finds no error with the current program's algorithm—it uses sound engineering logic to determine savings associated with the difference between pre and post-setback DHW temperatures. However, there was not sufficient information from program documents to determine current program deemed savings. Instead, the evaluation team used the consumption and demand savings averages obtained from 2009 HPD install statistics. For recommended deemed savings, the evaluation team used simple engineering analysis to determine savings associated with a 10°F turndown. A standard water heater energy factor was assumed, and a water heater coincidence factor was obtained from an equivalent study of homes in Minnesota. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. Line loss and coincidence factors were taken as reasonable upon engineering judgment. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.38	0.11	29%
Coincident Demand [kW]	0.09	0.03	27%
Consumption [kWh]	791	240	30%

Savings Algorithms

	Algorithm	Conclusion
Demand:	ΔkW = ΔkWh / hrs	OK
Consumption:	ΔkWh = Usage * (Tbase - Treduc) / EF	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Pre DHW Temp [F]		N/A	130	N/A	Insufficient Information Available
Post DHW Temp [F]		N/A	120	RES-4	Insufficient Information Available
Ambient Temperature [F]		N/A	65	N/A	Insufficient Information Available
Daily Usage [gal/day]		N/A	64	RES-6	Insufficient Information Available
Standby Hrs	5427	H-46	6570	RES-1	Updated
Energy Factor		N/A	0.9	N/A	Insufficient Information Available
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated
% Electric Heat		N/A	0.38	RES-25	Updated

Program: *Home Performance Direct* **Category:** *Residential*

Measure: **Faucet Aerator**

Description: This measure involves the installation of faucet aerators in kitchens and bathrooms. Aerators reduce water flow, conserving both DHW energy and gallons of potable water. The baseline for this measure is the preexisting faucet without an aerator.

Incentive: Incentive amount unavailable

Conclusion: Updated

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the faucet aerator measure. The current program algorithm uses the percent reduction in faucet gpm to determine savings, through a multiplier of 8530 Btu/percentage point reduction. To assess this unreferenced value, the evaluation team used simple engineering analysis using typical faucet usage data obtained from references below. The efficient condition was determined from an average of installed aerators according to 2009 HPD statistics. A standard water heater energy factor was assumed, and a water heater coincidence factor was obtained from an equivalent study of homes in Minnesota. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure. In summary, the current program algorithm was compared with simple engineering analysis. It is difficult to determine reasons for the high realization rates, as the current program algorithm and inputs are unreferenced. The evaluation analysis used typical values obtained from the references below, and the kWh savings are reasonable compared to average quoted savings in Reference [RES-5]. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.05	0.06	125%
Coincident Demand [kW]	0.01	0.01	119%
Consumption [kWh]	150	123	82%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / hrs$	OK
Consumption:	$\Delta kWh =$ Annual Hours * Flow Reduction * (Tdhw - Tin) / EF	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
% Electric Heat		N/A	0.38	RES-25	Updated
Hot Water Temperature [F]		N/A	120	N/A	Insufficient Information Available
Inlet Temperature [F]		N/A	58	RES-1	Insufficient Information Available
Baseline Faucet [gpm]	4	RES-4	4	RES-4	OK
Efficient Faucet [gpm]	1.6	RES-19	1.6	RES-19	OK
% Hot Water Used		N/A	0.73	RES-5	Insufficient Information Available
Btu per % flow reduction	8530	RES-21		N/A	Updated
Annual Usage [h]		N/A	18.25	RES-5	Insufficient Information Available
Standby Hrs	5427	H-46	6570	RES-1	Updated
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated
Energy Factor		N/A	0.9	N/A	Insufficient Information Available

Program: *Home Performance Direct* **Category:** *Residential*

Measure: **Heating Pipe Insulation**

Description: This measure involves the application of insulation to hot water or steam pipes near a home boiler or water heater. The baseline for this measure is the uninsulated pipe.

Incentive: 75% of install cost for electric-heated (25% for oil or gas-heated)

Conclusion: Updated

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the heating pipe insulation measure. There was sufficient information in program documentation to determine deemed savings for the current LIPA program. Some assumptions were made in order to ensure an apples-to-apples comparison between deemed savings values. First, only hot water distribution is considered in this evaluation. Next, the pipe diameter is assumed 0.75 inches. Finally, based on a DOE recommendation of typical insulation installs, six linear feet of insulation is assumed. The evaluation team used DOE software 3E Plus with inputs of fiberglass insulation to determine pre and post heat losses. This difference was multiplied by annual non-standby hours and the total insulation area to determine savings. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. The current LIPA algorithm was difficult to verify, as the savings values per square foot insulation were not referenced in available program documentation. In summary, the evaluation team recommends reassessing the current program's normalized savings values with savings determined through conventional means such as DOE software. The high realization rates reflect differences in the current and evaluation team's algorithms. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.02	0.02	135%
Coincident Demand [kW]	0.00	0.00	130%
Consumption [kWh]	86	47	55%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / hrs$	OK
Consumption:	$\Delta kWh = (Qloss,base - Qloss,eff) * hrs * length / EF$	Updated

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Hot Water Temperature [F]		N/A	120	N/A	Insufficient Information Available
Ambient Temperature [F]		N/A	65	N/A	Insufficient Information Available
Savings [btu per sf]	150000	RES-21		RES-21	Updated
Pipe Diameter [in]	0.75	N/A	0.75	N/A	OK
Outer Diameter [in]	1.125	RES-21	1.125	RES-21	OK
Pipe Length [ft]	6	RES-20	6	RES-20	OK
Standby Hours	5427	H-46	6570	RES-1	Updated
Uninsulated Heat Loss [Btu/h/		N/A	41.86	RES-22	Insufficient Information Available
Insulated Heat Loss [Btu/h/ft]		N/A	12.88	RES-22	Insufficient Information Available
Energy Factor / AFUE		N/A	0.9	N/A	OK
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated
% Electric Heat		N/A	0.38	RES-25	Updated

Program: *Home Performance Direct* **Category:** *Residential*

Measure: **Low Flow Showerhead (HPD)**

Description: This measure involves the installation of low-flow showerheads. Showerheads are often the greatest end use of hot water that could benefit from a low-flow device. The baseline for this measure is the preexisting showerhead.

Incentive: Incentive amount unavailable

Conclusion: Updated

Reasoning: The evaluation team has obtained the algorithms and term-by-term assumptions associated with the low flow showerhead measure. The evaluation team finds no error with the current program's algorithm-it uses sound engineering logic to determine savings associated with the reduction in hot water gpm. However, there was not sufficient information from program documents to determine current program deemed savings. Instead, the evaluation team used the deemed savings value quoted for an identical measure in the Residential Energy Affordability Partnership program. For recommended savings, the evaluation team used simple engineering analysis to determine savings associated with a low flow showerhead. The efficient condition was determined from an average of installed showerheads according to 2009 REAP statistics. A standard water heater energy factor was assumed, and a water heater coincidence factor was obtained from an equivalent study of homes in Minnesota. Additionally, a factor representing the market penetration of electric water heaters nationally was used, as the program partially incentivizes gas and oil water heaters as well. Freerider and spillover rates could not be found from available program documentation; these were assumed as zero, and the net and gross savings are equal for this measure.

Deemed Net Savings Comparison

Savings	Current LIPA Program	ERS Recommendation	Realization Rate
Non-Coincident Demand [kW]	0.64	0.43	68%
Coincident Demand [kW]	0.15	0.10	65%
Consumption [kWh]	2130	945	44%

Savings Algorithms

	Algorithm	Conclusion
Demand:	$\Delta kW = \Delta kWh / hrs$	OK
Consumption:	$\Delta kWh =$ Annual Hours * Flow Reduction * (Tdhw - Tin) / EF	OK

Term-by-Term Evaluations

Term/Savings	LIPA Value	Reference	ERS Value	Reference	Conclusion
Hot Water Temperature [F]	120	N/A	120	N/A	OK
Inlet Temperature [F]	60	H-46	58	RES-1	Updated
Baseline Showerhead [gpm]	5.5	RES-4	5.5	RES-4	OK
Efficient Showerhead [gpm]	2.73	RES-19	2.73	RES-19	OK
% Hot Water Used	0.75	H-46	0.73	RES-5	Updated

Annual Usage [h]	87.5	H-46	121.7	RES-5	Updated
Standby Hrs	5427	H-46	6570	RES-1	Updated
Coincidence Factor	0.24	H-46	0.23	RES-3	Updated
% Electric Heat		N/A	0.38	RES-25	Updated
Energy Factor		N/A	0.9	N/A	Insufficient Information Available

G. TRM References

Reference ID	Available?	Reference Title	Public Reference Link
B-1	Yes	U.S. DOE Energy Savers: Insulation	http://www1.eere.energy.gov/consumer/tips/insulation.html
B-2	Yes	NFRC Certified Products Directory	http://cpd.nfrc.org/search/cpd/cpd_search_default.aspx?type=W
B-3	Yes	Energy Star Program Requirements for Residential Windows, Doors, and Skylights	http://www.energystar.gov/ia/partners/prod_development/archives/downloads/windows_doors/WindowsDoorsSkylightsProgRequirements7Apr09.pdf
B-4	Yes	"To Storm or Not To Storm: Measurement Method to Quantify Impact of Exterior Envelope Airtightness on Energy Usage Prior to Construction," ORNL Whitepaper	http://www.ornl.gov/sci/roofs+walls/staff/papers/To%20Storm%20or%20Not%20to%20Storm.pdf
B-5	No	In-House 8760 Analysis Based on Long Island Weather	
B-6	Yes	New York State Energy Code	http://public.leginfo.state.ny.us/menugetf.cgi?COMMONQUERY=LAWS
C-1	No	Optimal Energy, Inc. analysis 2007	
C-2	No	"2004 Energy Efficiency Annual Report," MA Electric Company, October 2005	
C-3	No	Optimal Energy 2007	
C-4	No	Optimal Energy 2008	
C-5	No	DOE part-load data for 50 facilities with compressors < 100 hp	
C-6	No	ERS In-House Compressor Analysis Spreadsheet	
H-1	Yes	NYSERDA Precriptive HVAC Deemed Savings Spreadsheet	
H-10	Yes	NYSERDA HVAC with Economizer Analysis	
H-11	Yes	"Electricity Use by New Furnaces: A Wisconsin Field Study"	
H-12	Yes	"Saving Energy with Efficient Residential Furnace Air Handlers: A Status Report and Program Recommendations"	
H-13	Yes	TRM User Manual	
H-14	No	“National Grid 2007 Commercial and Industrial Programs Free-ridership and Spillover Study, Final Executive Summary"	
H-15	Yes	ASHRAE Standard 90.1 2004	
H-16	Yes	California Title 24	
H-17	Yes	McQuay Geothermal Heat Pump Design Manual	http://www.mcquay.com/mcquaybiz/literature/lit_systems/AppGuide/AG_31-008_Geothermal_021607b.pdf

Reference ID	Available?	Reference Title	Public Reference Link
H-18	Yes	"Programmable Thermostats as Means of Generating Energy Savings: Some Pros and Cons"	http://www.mtcc1170.com/images/progthermdeny.pdf
H-19	Yes	Energy Star Savings Calculator for Programmable Thermostats	http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorProgrammableThermostat.xls
H-2	Yes	ASHRAE Standard 90.1 1999	
H-20	No	Analysis from Keyspan and Applied Energy Group, February 2006	
H-21	No	LIPA 2009-2010 Energy Efficient Products Writeup	
H-22	Yes	Energy Star Savings Calculator: Room Air Conditioner	http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls
H-23	No	ACCA Manual J	
H-24	No	LIPA Cool Homes Central Air Conditioner Algorithm Spreadsheet	
H-25	No	HVAC Equations, Data, and Rules of Thumb	
H-26	No	LIPA Cool Homes Ductless Mini Split Algorithm Spreadsheet	
H-27	No	LIPA Cool Homes Tune Up Algorithm Spreadsheet	
H-28	Yes	NOAA Historical Degree Day data	http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/
H-29	No	LIPA Cool Homes Geothermal Heat Pump Algorithm Spreadsheet	
H-3	No	1990 LILCO Load Research Data	
H-30	Yes	Final Report Coincidence Factor Study Residential Room Air Conditioners	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/117_RLW_CF%20Res%20RAC.pdf
H-31	Yes	CT Light and Power 2005 Coincidence Factor Study	www.ctsavesenergy.org/.../Executive%20Summary%20Coincident%20Peak%20Study.doc
H-32	No	Engineering Savings Algorithms: Airsealing and Ductsealing, Conservation Services Group, 2009	
H-33	Yes	Emerging Technologies: Improved Duct Sealing, ASHRAE Journal 2003	http://www.tiax.biz/aboutus/pdfs/ashrae_0501-03.pdf
H-34	Yes	"Estimating the Efficiency of an Existing Ventilation Fan," Richard Hiatt, NFEC	http://www.mainerural.org/energy/fieldguide/fanefficiency.pdf
H-35	Yes	Energy Star Ventilating Fans Key Product Criteria	http://www.energystar.gov/index.cfm?c=vent_fans.pr_crit_vent_fans

Reference ID	Available?	Reference Title	Public Reference Link
H-36	Yes	NMR Residential Lighting Markdown Impact Evaluation	http://www.ctsavesenergy.org/files/ResidentialMarkdown LightingExec Summary1-09.doc
H-37	Yes	U.S. DOE, "Maintaining Your Air Conditioner"	http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12390
H-38	Yes	Rocky Mountain Power 2009 Duct Insulation Incentive Program Application	http://homeenergysavings.net/Downloads/UT_DuctInsulationForm09.pdf
H-39	No	ERS 8760 Savings Analysis based on Long Island weather	
H-4	No	1991 LILCO Evaluation Report	
H-40	Yes	New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs	http://www.dps.state.ny.us/NY_Standard_Approach_for_Estimating_Energy_Savings_12-08.pdf
H-41	Yes	LIPA 2009 Cool Homes Installations Database	
H-42	Yes	Federal Manufacturing Standards 2004	http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/ac_fr_081704.pdf
H-43	Yes	ASHRAE 90.1 1989 Code Standards	
H-44	No	Optimal Energy, February 2000	
H-45	No	2004 MA Electric Co. Report	
H-46	Yes	LIPA Residential Energy Affordability Program Algorithm Documents	
H-47	Yes	Energy Star Programmable Thermostats savings estimate	http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=TH
H-48	Yes	LIPA 2009 CCP Algorithm Document	
H-5	Yes	Energy Star CAC Savings Calculator	http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/Calc_CAC.xls
H-6	Yes	Energy Star Heat Pump Savings Calculator	http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/ASHP_Sav_Calc.xls
H-7	No	NYSERDA	
H-8	Yes	NYSERDA Prescriptive Chiller Deemed Savings Spreadsheet	
H-9	Yes	NYSERDA Economizer Deemed Savings Calculator	
K-1	Yes	“FSTC Commercial Cooking Appliance Technology Assessment: Steamers”	http://www.fishnick.com/equipment/techassessment/8_steamers.pdf

Reference ID	Available?	Reference Title	Public Reference Link
K-10	Yes	"FSTC Commercial Cooking Appliance Technology Assessment: Fryers"	http://fishnick.com/equipment/techassessment/2_fryers.pdf
K-11	Yes	"FSTC Electric Fryer Life Cycle Cost Calculator"	http://www.fishnick.com/saveenergy/tools/calculators/efryercalc.php
K-12	Yes	"Life Cycle Cost Estimate for Energy Star Qualified Hot Food Holding Cabinets"	www.energystar.gov/ia/business/.../CalculatorHotFoodHoldingCabinet.xls
K-13	Yes	"FSTC Hot Food Holding Cabinet Life Cycle Cost Calculator"	http://www.fishnick.com/saveenergy/tools/calculators/holdcabcalc.php
K-14	Yes	"FSTC Pre-Rinse Spray Valve/Water Cost Calculator"	http://www.fishnick.com/savewater/tools/watercalculator/
K-15	Yes	"CEE Commercial Kitchens Initiative: Program Guidance on Pre-Rinse Spray Valves"	http://www.cee1.org/com/com-kit/prv-guides.pdf
K-2	Yes	"Life Cycle Cost Estimate for ENERGY STAR Qualified Electric Steam Cooker(s)"	http://www.energystar.gov/index.cfm?c=steamcookers.pr_steamcookers
K-3	No	ITRON loadshape data for cooking end use	
K-4	No	Optimal Energy, Inc., December 2006 and Itron cooking end use data.	
K-5	Yes	"FSTC Commercial Cooking Appliance Technology Assessment: Ovens"	http://fishnick.com/equipment/techassessment/7_ovens.pdf
K-6	Yes	"FSTC Electric Combination Oven Life Cycle Cost Calculator"	http://www.fishnick.com/saveenergy/tools/calculators/ecombicalc.php
K-7	Yes	"FSTC Electric Convection Oven Life Cycle Cost Calculator"	http://www.fishnick.com/saveenergy/tools/calculators/eovencalc.php
K-8	Yes	"FSTC Commercial Cooking Appliance Technology Assessment: Griddles"	http://www.fishnick.com/equipment/techassessment/3_griddles.pdf
K-9	Yes	"FSTC Electric Griddle Life Cycle Cost Calculator"	http://www.fishnick.com/saveenergy/tools/calculators/egridcalc.php
L-1	No	ASHRAE Lighting (Year Unknown)	
L-2	No	LILCO 1991 Load Impact Evaluation Report	
L-3	No	Optimal Energy Report, 2007	
L-4	No	LIPA Energy Efficient Products program statistics, 2009	
L-5	No	Survey of equivalent programs: NYSERDA, National Grid, eMaine	
L-7	No	"Impact Evaluation of LILCO's 1996 Electric Conservation and Load Management Plan"	
M-1	No	Southeastern NY Audit Data	
M-10	No	Proprietary Southeastern New York building energy audit data.	

Reference ID	Available?	Reference Title	Public Reference Link
M-11	No	Optimal Energy Inc, 2006	
M-12	No	MA Electric Company Annual Energy Efficiency Report 2004	
M-2	Yes	US Congress. "Energy Policy Act of 1992." 102th Congress H.R.776.ENR.	http://thomas.loc.gov/cgi-bin/query/z?c102:H.R.776.ENR:
M-3	No	NEMA Standards Publication MGI-2003, Table 12-12	
M-4	No	Esource Technology Atlas Series, Volume IV	
M-5	No	1991 Impact Evaluation Report, Volume I, "Underlying Load Shapes and Assumptions," Appendix 3. Adjustments per the memo "Recommendations on LILCO's 1996 Measurement Criteria & 1996 Evaluation Plan" from Raab Associates to the NYS PSC staff, dated 11/9/95.	
M-6	No	Optimal Energy, Inc., January 2007	
M-7	No	1990 LILCO Load Research Data	
M-8	No	NYSERDA	
M-9	No	"2004 Energy Efficiency Annual Report," MA Electric Company, October 2005	
N/A	No	Reference not needed or not available	
RES-1	Yes	EERE Water Heater Analysis Model	http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/D-2.pdf
RES-10	No	2009 LIPA Energy Star Labeled Homes program application	
RES-11	Yes	Energy Star Savings Calculator: Refrigerator	http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=RF
RES-12	Yes	Energy Star Savings Calculator: Clothes Washer	http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CW
RES-13	Yes	Energy Star Savings Calculator: Dehumidifier	http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=DE
RES-14	Yes	Energy Star Savings Calculator: Dishwasher	http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=DW
RES-15	No	ERS Pump Motor Spreadsheet Analysis	
RES-16	Yes	RESIDENTIAL LIGHTING MARKDOWN IMPACT EVALUATION, Nexus Market Research, January 20, 2009	http://www.ctsavesenergy.org/files/ResidentialMarkdown LightingExec Summary1-09.doc

References: Evaluation of 2009 LIPA ELI Prescriptive Measures

Reference ID	Available?	Reference Title	Public Reference Link
RES-17	Yes	Database for Energy Efficiency Resource Update Project Information and Final Results; A DEER Presentation at CALMAC; Meeting Pacific Energy Center, San Francisco; September 21, 2005	
RES-18	Yes	DOE 3E Plus Insulation Savings Calculator	http://www.pipeinsulation.org/
RES-19	Yes	LIPA REAP Installation Statistics, 2009	
RES-2	Yes	U.S. DOE, "Insulate Your Water Heater Tank for Energy Savings"	http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=13070
RES-20	Yes	DOE Energy Savers Booklet	http://www1.eere.energy.gov/consumer/tips/pdfs/energy_savers.pdf
RES-21	No	Conservation Services Group, LIPA Home Performance Direct program algorithms	
RES-22	No	DOE 3E-Plus Insulation Savings Software	http://www.pipeinsulation.org/pages_v4/download.html
RES-23	Yes	Comparison Between Predicted Duct Effectiveness from Proposed ASHRAE Standard 152P and Measured Field Data for Residential Forced Air Cooling Systems	http://www.ce.utexas.edu/prof/Siegel/papers/Siegel_etal_2003_draft.pdf
RES-24	Yes	Hydro Quebec: Electronic Thermostats: Comfort and Savings	http://www.hydroquebec.com/residential/thermostats/economies.html
RES-25	Yes	Residential EnergySMART Library	http://www.energyguide.com/library/EnergyLibraryTopic.asp?bid=austin&prd=10&TID=17240&SubjectID=8374
RES-26	Yes	2009 LIPA REAP Program Install Statistics	
RES-3	Yes	MN Municipal Utilities Study	www.mmua.org/html/CIP/CIPdocs/pt_loadcontrol95.doc
RES-4	Yes	U.S. DOE, "Reduce Hot Water Use for Energy Savings"	http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=13050
RES-5	Yes	Flex Your Power study	http://www.fypower.org/res/tools/products_results.html?id=100160
RES-6	Yes	U.S. DOE, Energy Cost Calculator for Electric and Gas Water Heaters	http://www1.eere.energy.gov/femp/technologies/eep_waterheaters_calc.html
RES-7	Yes	Typical Hot Water Factor Sheet	http://gasandhotwater.com.au/Typical%20common%20factor%20sheet.pdf
RES-8	Yes	"Cold Water Inlet Temperatures for Selected U.S. Locations"	http://www.gfxtechnology.com/WaterTemp.pdf
RES-9	No	LIPA Energy Efficient Products program statistics	
V-1	No	Efficiency Vermont Technical Reference Manual 2009	
V-2	Yes	USA Technologies manufacturer literature	http://www.usatech.com/energy_management/

Reference ID	Available?	Reference Title	Public Reference Link
V-3	Yes	Efficiency Vermont Vending Rebate Application	http://efficiencyvermont.com/stella/filelib/2010_VendingRebateApplication_FINAL.pdf
V-4	Yes	USI Vending Machine Fact Sheet	http://www.p2pays.org/energy/Vending.pdf

H. CEP Measure Specific Realization Rates

CEP Realization Rates by Measure

The following table summarizes the results of the measure-by-measure evaluation of the Commercial Efficiency Program. Appendix B provides further information by specific measure. Table 18 provides the page number associated with each measure for Appendix B.

Table 18. CEP Realization Rates by Measure

Category	Measure	2009 Installs	LIPA Consumption Savings (kWh)	Consumption (kWh) RR	Appendix A Page Number
Compressed Air	Air Receivers for Load/No Load Compressors - 3 Gal/CFM	0	19,860	78%	1
	Air Receivers for Load/No Load Compressors - 5 Gal/CFM	0	26,225	78%	3
	Cycling Refrigerated Dryers	30	2,848	48%	5
	Efficient Air Compressors - Variable Displacement	3	16,382	96%	6
	Efficient Air Compressors - Variable Speed	39	27,889	120%	7
	Variable Frequency Drive Refrigerated Dryers	1	561	48%	8
HVAC	Air Cooled Chiller with Condenser > 30 tons to < 300 tons (Full Load EER = 10, IPLV EER = 12)	0	15,107	88%	9
	Dual Enthalpy Economizer for cooling < 5.4 tons (Fixed Damper baseline)	47	1,986	26%	10
	Dual Enthalpy Economizer for cooling > 5.4 tons (Dry Bulb Economizer baseline)		3,978	44%	11
	Ground Source Heat Pump < 150 ton (59 deg F entering water)	0	6,570	124%	13

Category	Measure	2009 Installs	LIPA Consumption Savings (kWh)	Consumption (kWh) RR	Appendix A Page Number
	Ground Source Heat Pump < 150 ton (77 deg F entering water)	0	3,509	146%	15
	Packaged AC < 65,000 Btu/h (14 SEER)	11	1,458	51%	17
	Packaged AC < 65,000 Btu/h (15 SEER)	5	1,748	59%	18
	Packaged Heat Pump < 65,000 Btu/h (14 SEER/8 HSPF)	0	2,354	84%	19
	Packaged Heat Pump < 65,000 Btu/h (15 SEER/8.5 HSPF)	0	3,074	104%	21
	Programmable Thermostats	228	416	88%	23
	Split AC < 65,000 Btu/h (14 SEER)	6	1,413	50%	24
	Split AC < 65,000 Btu/h (15 SEER)	25	1,943	63%	25
	Split Heat Pump < 65,000 Btu/h (14 SEER/8.5 HSPF)	2	2,791	104%	26
	Split Heat Pump < 65,000 Btu/h (15 SEER/9 HSPF)	2	3,589	115%	27
	Split/Packaged AC > 135,000 Btu/h to < 240,000 Btu/h (11.5 EER)	47	3,472	99%	30
	Split/Packaged AC > 135,000 Btu/h to < 240,000 Btu/h (12 EER)	19	4,010	99%	31
	Split/Packaged AC > 240,000 Btu/h to < 760,000 Btu/h (10 EER)	59	2,252	99%	32
	Split/Packaged AC > 240,000 Btu/h to < 760,000 Btu/h (10.5 EER)	39	3,554	99%	33
	Split/Packaged AC > 65,000 Btu/h to < 135,000 Btu/h (11.5 EER)	116	1,077	99%	34

Category	Measure	2009 Installs	LIPA Consumption Savings (kWh)	Consumption (kWh) RR	Appendix A Page Number
	Split/Packaged AC > 65,000 Btu/h to < 135,000 Btu/h (12 EER)	0	1,886	99%	35
	Split/Packaged AC > 760,000 Btu/h to < 3,000,000 Btu/h (10.2 EER)	0	9,309	99%	36
	Split/Packaged AC > 760,000 Btu/h to < 3,000,000 Btu/h (9.7 EER)	3	8,618	99%	37
	Split/Packaged Heat Pump > 135,000 Btu/h to < 240,000 Btu/h (11.5 EER)	0	3,786	136%	38
	Split/Packaged Heat Pump > 240,000 Btu/h (10.5 EER)	0	3,619	161%	39
	Split/Packaged Heat Pump > 65,000 Btu/h to < 135,000 Btu/h (11.5 EER)	0	1,553	145%	40
	Water Cooled Chiller, > 150 ton to < 300 ton (Full Load kW/ton = 0.63, IPLV kW/ton = 0.51)	0	35,608	99%	41
	Water Cooled Chiller, > 30 ton to < 150 ton (Full Load kW/ton = 0.72, IPLV kW/ton = 0.62)	0	8,902	99%	42
	Water Cooled Chiller, > 300 ton to < 1000 ton (Full Load kW/ton = 0.56, IPLV kW/ton = 0.51)	0	25,717	99%	43
	Water Cooled Chiller, > 300 ton to < 1000 ton (Full Load kW/ton = 0.575, IPLV kW/ton = 0.51) with R134 and VFD	1	25,717	99%	44
	Water or Evaporative Cooled DX Unitary AC > 360,000 Btu/h to < 3,600,000 Btu/h (14 EER)	0	7,536	91%	45

Category	Measure	2009 Installs	LIPA Consumption Savings (kWh)	Consumption (kWh) RR	Appendix A Page Number
	Water Source Heat Pump < 360,000 Btu/h (86 deg F entering water)	0	4,268	137%	46
Kitchen Equipment	Combination Oven	0	18,564	42%	48
	Convection Oven	0	1,855	40%	49
	Electric Fryer	0	932	68%	50
	Electric Griddle	0	2,556	73%	51
	Electric Steamer	3	4,604	105%	52
	Insulated Holding Cabinet 1/2	0	1,232	200%	53
	Insulated Holding Cabinet 3/4	0	1,848	200%	54
	Insulated Holding Cabinet Full	0	2,464	283%	55
	Low Flow Pre-Rinse Spray Valve	0	10,269	100%	56
	Controls Lighting - Daylight Contrld Dimming of Fluorescent Systems	438	123	100%	59
	Controls Lighting - Fluorescent Fixture Mounted Daylight Sensor	1	132	100%	61
	Controls Lighting - Fluorescent Fixture Mounted Occupancy Sensor with on/off	2,183	104	100%	63
	Controls Lighting - Wall Mounted Occupancy Sensors	909	288	100%	65
	Non-Controls Lighting - 2 T8 or T5 Lamps, Elect. Ballast, Hi-Eff	2,882	38	45%	67
	Non-Controls Lighting - 2 T8 or T5 Lamps, Low Power Elect. Ballast, Hi-Eff	768	23	100%	69
	Non-Controls Lighting - 2 Tandem Wired 4 ft. Fixtures, Specular Reflectors	123	216	10%	71

Category	Measure	2009 Installs	LIPA Consumption Savings (kWh)	Consumption (kWh) RR	Appendix A Page Number
	Non-Controls Lighting - 3 T8 or T5 Lamps, Elect. Ballast, Hi-Eff	1,992	87	33%	73
	Non-Controls Lighting - 3 T8 or T5 Lamps, Elect. Ballast, Low Glare	64	69	33%	75
	Non-Controls Lighting - 3 T8 or T5 Lamps, Low Power Elect. Ballast, Hi-Eff	528	35	73%	77
	Non-Controls Lighting - Ceramic Metal Halide Fixture	1,405	799	9%	79
	Non-Controls Lighting - Ceramic Metal Halide Track Lighting	935	440	12%	81
	Non-Controls Lighting - Hard-Wired (Pin Base) CFLs and Ballast	17	221	88%	83
	Non-Controls Lighting - Integrated Ballast Metal Halide PAR lamp	142	234	20%	85
	Non-Controls Lighting - Open Non-recessed Fixture, 4 ft, Specular Reflector	169	125	31%	87
	Non-Controls Lighting - Open Non-recessed Fixture, 8 ft, Specular Reflector	259	193	27%	89
	Non-Controls Lighting - Recessed Indirect Fluorescent Fixtures T8 or T5	2,682	159	25%	91
	Non-Controls Lighting - T8 or T5 Fluorescent Lamps and Ballasts	4,731	657	111%	93
	Non-Controls Lighting - T8 or T5 Lamps, Elect. Ballast, Indirect	1,562	65	72%	95
	Performance Lighting - Corridor, Restroom, Support area	5	366	100%	97

Category	Measure	2009 Installs	LIPA Consumption Savings (kWh)	Consumption (kWh) RR	Appendix A Page Number
	Performance Lighting - Gymnasium playing surface	7	65,418	100%	99
	Performance Lighting - Industrial work, <20' ceiling height	59	23,351	100%	101
	Performance Lighting - Industrial work, >=20' ceiling height	34	71,813	152%	103
	Performance Lighting - Kitchen	1	2,826	100%	105
	Performance Lighting - Mall, arcade or atrium	0	689	100%	105
	Performance Lighting - Medical and clinical care	2	98,515	100%	109
	Performance Lighting - Museum	0	40,125	100%	111
	Performance Lighting - Office	2	6,891	100%	113
	Performance Lighting - Retail sales, wholesale showroom	17	46,800	100%	115
	Performance Lighting - School	0	278,653	100%	117
	Performance Lighting - Storage, industrial and commercial	87	20,809	100%	119
Motors and VFDs	Electrically Commutated Motors (ECMs) on HVAC Supply Fans, Fan Powered Boxes, and Fan Coils - Cooling and Heating	2	535	100%	121
	Electrically Commutated Motors (ECMs) on HVAC Supply Fans, Fan Powered Boxes, and Fan Coils - Cooling only		242	100%	122

Category	Measure	2009 Installs	LIPA Consumption Savings (kWh)	Consumption (kWh) RR	Appendix A Page Number
	Electrically Commutated Motors (ECMs) on HVAC Supply Fans, Fan Powered Boxes, and Fan Coils - Heating only		293	100%	123
	Premium Efficiency Motors	60	2,394	100%	124
	Variable Frequency Drive (VFD)	89	20,665	100%	126

I. Review of CEP Projects Screening Tool

As part of our due diligence component and documentation of our evaluation, we reviewed the screening tool in use by the CEP program for their projects. This tool is used to determine if custom projects are accepted or rejected by the program. During this section we refer to the screening tool as the "Model". This information does not refer to the benefit cost tool used for the ELI portfolio.

The evaluation team reviewed each of the components that make up benefits, benchmarking key assumptions against alternate data sources. The benefit components and their key assumptions are listed below:

- Value of the electricity saved through the life of the measure
  - Forecast of electric prices ($/kWh)
- Value of any demand reduction through the life of the measure
  - Forecast of generation, transmission, distribution prices ($/kW)
- Value of any other fuel impacts, either positive or negative through the life of the measure
  - Forecast of fuel prices ($/mmbtu)
- Value of any external factors not captured in the price of electricity

Key factors driving all of the valuations are the assumed life of the measure and the discount factor used to discount future savings. The Model determines the monetary value of the benefits in a net present value framework to compare cost streams, which is standard practice.

Forecast of electricity generation prices

The Model avoided electric cost calculation is based on a forecast of energy and demand electric prices over a 50 year time horizon in explicit $/kWh prices expressed in 2009 dollars. Practically speaking, no measure has a life longer than 20 years; therefore, a 20 year forecast is adequate for the analysis.

Comparison with other forecasts

While LIPA is in a unique position to evaluate and forecast their electric prices, it is instructive to compare the electric price represented in the Model with other comparable entities electric prices. The electric generation costs embedded in the Model are computed from a 2005 base year adjusted upward by a constant inflation factor. This method does not reflect price shocks that have occurred since 2005, including Katrina and dramatic increases in gas and oil prices, which have moved electric costs to a new price curve.

We compared the 20 year forecasts of electricity prices in the Model to the forecasts developed for the New England market, specifically for Massachusetts. The comparison suggests that the electric costs driving the LIPA Model are low and that LIPA should update the forecasts in the Model. While the definitions of the peak and off-peak periods do not exactly match, the trend unmistakably indicates the Model kWh prices for generation are low.

Table 19. Comparison of Electricity Price Forecasts

2010 Dollars	LIPA Model 2010 $/kWh	MA 2010 $/kWh	$/kWh Delta	LIPA Model NPV	MA NPV	NPV Delta
Summer peak	$0.0645	$.0794	81%	$0.597	$0.8302	72%
Summer off-peak	$0.0346	$.0578	60%	$0.325	$0.628	52%
Winter peak	$0.0443	$.0764	58%	$0.496	$0.805	62%
Winter off-peak	$0.0329	$.0588	56%	$0.328	$0.660	50%

Note: NPV: 2010-2019 @ 1.8% discount. The figures are above are calculated *without* line losses.

The evaluation team believes this comparison is reasonable. The New England forecasted pricing is derived from a comprehensive study entitled, "Avoided Energy Supply Costs in New England: 2009 Report", dated October 23, 2009 provided by Synapse Energy Economics, Inc. and was expressly commissioned for the purpose of identifying avoided electric costs for assessing energy efficiency impacts.

The long range forecasts for the New England and New York region are served by a similar fuel mix, in a similarly operated wholesale market.

- Both regions are highly dependent upon gas as the marginal fuel, although New York also includes oil in the marginal fuel mix.
- The comparison was made net of line losses to ensure an appropriate comparison of the underlying generation costs.

Further, the evaluation team compared the current LIPA default service rates to those of Massachusetts. LIPA's "Power" rate is slightly higher than the Massachusetts rate, which again indicates that LIPA's wholesale rates are not inherently lower than Massachusetts. Table 20 provides a review of LIPA, NSTAR and NGRID wholesale rates.

Table 20. Comparison of Wholesale Rates

LIPA Power Supply Charge 2010	NSTAR Large CI Q2-2010	NSTAR Small CI Q1-Q2 2010	NGRID Large CI	NGRID Small CI
$0.0990	$.08114	$0.9389	$.08651	$.0972

We recommend that energy costs be updated annually in the screening tool to reflect the latest in rapidly changing market conditions.

Electric Capacity

The Model appears to over-value capacity. Although the Model only captures one of three capacity components, the pricing assigned to it appears to be based on old ICAP market forecasts. This is because the tool uses 2005 capacity values. With the institution of the demand curve, recent capacity additions have resulted in significantly reduced capacity prices. Below is a comparison of regional capacity prices with the Model capacity prices.

Table 21. Comparison of Capacity Prices

	Model	NYISO ICAP 2010	NEMA 2010 Generation	NEMA 2010 Transmission	NEMA 2010 Distribution
$/kW, annualized	$177.49	$24.55	$67.06	$15.97	$79.21

The value of reducing demand on the system impacts three systems, each of which will have an independent $/kW price for each forecasted year:

- Generation -- reducing the demand on the actual power plant;
- Transmission -- reducing the demand on the major high voltage lines carrying power to a market;
- Distribution -- reducing demand on the local wires and substations.

For energy efficiency to realize a capacity benefit, the reduction in demand must be sustained to create an actual reduction in the power plants, transmission lines and substations built.

The Model includes a computation for a reduction on the generation system only. According to the Model notes, the capacity pricing is based on the ICAP market which is a driver of generation costs only. The choice to model only one capacity component is a policy decision. Some jurisdiction's avoided costs models include a value for all three capacity components. Some policy makers argue transmission and distribution costs are so 'lumpy' that the 0.5%-1% reductions of energy efficiency programs will not impact the cost structure of Transmission & Distribution and only include the generation capacity component as LIPA has done. LIPA should consider these factors when determining how to proceed.

Externalities

The Model incorporates an externality factor for electric generation which is computed as the net present value of a $0.0227/kWh annual adder applied throughout the life of the measure and for each energy period. The source of the $0.0227/kWh factor is not identified in the Model, but the impact of this factor is to increase the value of the energy benefits by about 20-40%, depending upon the load profile of the measure. The externality factor only applies to energy, so if significant benefits are also captured with capacity, the relative impact of externalities will be lower.

The decision of whether or not to include externalities is best made by LIPA management and New York policy makers. The recommendation of the evaluation team is that these numbers are frequently disallowed in cost effectiveness screenings and frequently challenged as being "soft" or difficult to substantiate with a high level of certainty. The evaluation team cautions LIPA that in Energy Efficiency Portfolio Standard (EEPS) proceedings, New York adopted the TRC benefit cost methodology, which does not include externalities. Certain exceptions may apply for certain programs that do not pass a TRC. The evaluation team recommends that LIPA consider removing externalities from the screening tool.

Discount Factor

In this era of extremely low interest rates, the Model's 6.7% real discount rate is probably high. The 6.7% rate is calculated using what appears to be the ratio of a prime rate (9.5%) and an inflation rate (2.9%), although neither factor is documented or referenced. The explicit inflation rate identified in the spreadsheet of 2.5% only applies to the cost of electricity.

As a benchmark, the Massachusetts utilities are using 3.7% as the nominal discount factor when netted of inflation at a rate of 1.9% results in a real discount rate of 1.8%. As another benchmark for long term investments, the 30 year US Treasury rates are trading for approximately 5%, trending at historical lows.

Assumed Measure Life

The assumed life of a measure has a direct impact on the calculation of benefits as it drives the number of years for which benefits can be claimed; the longer the life, the greater the benefit. While the sources of the measure life assumptions are not known (as they were part of the information which was not readily available from the previous planning and design contractor), the Model's measure life assumptions, within the context of the program design, are not unreasonable, with the exception of lighting measures, which appears to be high.

The following table compares the Model assumed measure lives to the lives of measures as recommended in a study authored by ERS, entitled, "Measure Life Study prepared for The Massachusetts Joint Utilities", October 2005. This study was updated in 2007 and reached very similar conclusions. This study defined measure life holistically, taking into account the equipment life of the measure (how long the equipment runs before failure), the expected remaining life of the existing equipment and persistence (degradation due to early retirement, business turnover, etc.).

Table 22 compares the Model measure life with the equipment life determined in the study. The table also provides the holistic measure lives for new construction and retrofit recommended by the study for comparison purposes. Most of the Northeast utilities have adopted measure life values from ERS's measure life study. The evaluation team recommends LIPA consider adopting these values.

Table 22. Measure Life by Model and ERS Study

Measure Description	Model "Measure Life"	ERS Study		
		Best Comparison Equipment Life	Retrofit Measure Life	New Construction Measure Life
Lighting Controls	15	10	9	10
Occupancy Sensors	10	10	9	10
Indirect Lighting	20	15	13	15
HID Lighting	20	15	13	15
Lighting Fixtures	20	15	13	15
Building Shell	20	20	NA	20
Motors	20	22	15	20

Measure Description	Model "Measure Life"	ERS Study		
		Best Comparison Equipment Life	Retrofit Measure Life	New Construction Measure Life
Chiller (equipment or systems)	25	23	NA	20
Unitary HVAC (equipment or systems)	15	15	13	15
EMS & HVAC Controls (cooling)	10	16	10	15
EMS & HVAC Controls (ventilation)	10	16	10	15
Variable Speed Drives (HVAC Systems)	15	28	13	15
Variable Speed Drives (non-HVAC systems)	15	28	13	15
Compressed Air	20	20	13	15
Retail Refrigeration	15	15	13	15
Industrial Refrigeration	20	23	18	20
Food Service	10	NA	NA	NA
Process Cooling	15	23	16	17
Process Equipment or Systems	15	Varies	NA	17
Ultrasonic Humidifiers	15	NA	NA	NA
Agricultural End Uses	15	NA	NA	NA
Engineered Refrigerant Pumps	15	NA	NA	NA

References for Electric Generation Cost

There were five main sources of data for generation costs. Below we present those sources:

"Avoided Energy Supply Costs in New England: 2009 Report", October 23, 2009; Synapse Energy Economics, Inc. http://www.synapse-energy.com/Downloads/SynapseReport.2009-10.AESC.AESC-Study-2009.09-020.pdf http://www.synapse-energy.com/Downloads/SynapseReport.2009-10.AESC.AESC-Study-2009.09-020-Appendices.pdf

Table 23. Avoided Cost Electricity (2009$) Results: Massachusetts, Statewide. Page Appendix B-9.

	Compare rates: New England/LIPA difference=NE-LIPA				The Model Values without Line Losses (Losses = 0%)					Massachusetts - No Line Losses			
	Summer On-Peak Energy	Summer Off-Peak Energy	Winter Off-Peak Energy	Winter Inter/Pk Energy	Summer On-Peak Energy	Summer Off-Peak Energy	Summer Intermed Energy	Winter Off-Peak Energy	Winter Intermed Energy	Summer On-Peak Energy	Summer Off-Peak Energy	Winter Off-Peak Energy	Winter Peak Energy
	%	%	%	%	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh
2010	81%	60%	56%	58%	0.0645	0.0346	0.0564	0.0329	0.0443	0.0794	0.0578	0.0588	0.0764
2011	80%	60%	54%	55%	0.0669	0.0360	0.0567	0.0340	0.0450	0.0839	0.0603	0.0635	0.0814
2012	77%	58%	51%	52%	0.0670	0.0369	0.0570	0.0350	0.0459	0.0872	0.0638	0.0685	0.0885
2013	73%	52%	49%	52%	0.0659	0.0364	0.0550	0.0357	0.0467	0.0903	0.0703	0.0731	0.0895
2014	75%	53%	49%	53%	0.0688	0.0377	0.0560	0.0368	0.0477	0.0917	0.0709	0.0745	0.0905
2015	73%	55%	50%	54%	0.0684	0.0389	0.0565	0.0376	0.0487	0.0938	0.0713	0.0756	0.0909
2016	73%	54%	50%	54%	0.0712	0.0390	0.0566	0.0386	0.0494	0.0974	0.0728	0.0773	0.0917
2017	66%	51%	48%	52%	0.0661	0.0388	0.0556	0.0389	0.0494	0.1003	0.0767	0.0804	0.0947
2018	64%	49%	47%	50%	0.0659	0.0388	0.0548	0.0392	0.0493	0.1024	0.0798	0.0830	0.0990
2019	63%	48%	46%	49%	0.0657	0.0389	0.0539	0.0394	0.0493	0.1050	0.0803	0.0856	0.1002
2020	63%	48%	46%	49%	0.0655	0.0389	0.0531	0.0396	0.0492	0.1045	0.0811	0.0852	0.1000
2021	63%	48%	47%	50%	0.0652	0.0388	0.0523	0.0397	0.0490	0.1028	0.0802	0.0841	0.0981
2022	62%	48%	46%	49%	0.0650	0.0388	0.0515	0.0399	0.0489	0.1043	0.0813	0.0859	0.0998
2023	60%	46%	46%	48%	0.0644	0.0387	0.0508	0.0400	0.0489	0.1078	0.0835	0.0873	0.1016
2024	56%	44%	45%	46%	0.0638	0.0385	0.0502	0.0402	0.0489	0.1135	0.0877	0.0898	0.1069
2025	55%	43%	44%	45%	0.0633	0.0384	0.0495	0.0403	0.0489	0.1161	0.0899	0.0917	0.1091
2026	53%	41%	43%	44%	0.0627	0.0382	0.0488	0.0403	0.0489	0.1188	0.0923	0.0937	0.1113
2027	51%	40%	42%	43%	0.0621	0.0380	0.0482	0.0404	0.0488	0.1216	0.0947	0.0958	0.1136
2028	50%	39%	41%	42%	0.0621	0.0380	0.0482	0.0404	0.0488	0.1246	0.0973	0.0980	0.1160
2029	49%	38%	40%	41%	0.0621	0.0380	0.0482	0.0404	0.0488	0.1276	0.0999	0.1002	0.1184
2030	48%	37%	39%	40%	0.0621	0.0380	0.0482	0.0404	0.0488	0.1307	0.1026	0.1025	0.1209
2031	46%	36%	39%	40%	0.0621	0.0380	0.0482	0.0404	0.0488	0.1338	0.1054	0.1048	0.1235
2032	45%	35%	38%	39%	0.0621	0.0380	0.0482	0.0404	0.0488	0.1371	0.1083	0.1072	0.1261
2033	44%	34%	37%	38%	0.0621	0.0380	0.0482	0.0404	0.0488	0.1404	0.1112	0.1096	0.1288
2034	43%	33%	36%	37%	0.0621	0.0380	0.0482	0.0404	0.0488	0.1438	0.1142	0.1121	0.1315

NEW YORK INDEPENDENT SYSTEM OPERATOR INSTALLED CAPACITY REFERENCE, MONTHLY AUCTION SUMMARY VALUES FOR 2009 AT: http://icap.nyiso.com/ucap/public/auc_view_monthly_selection.do

Table 24. NYISO ICAP Monthly Auction Summary Values for 2009

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
$1.61	$1.51	$1.50	$1.50	$3.01	$3.12	$3.01	$3.00	$3.01	$3.00	$1.55	$1.64

ANNUALIZED KW VALUE OF: $24.55/KW SOURCED FROM FEDERAL RESERVE 30 YEAR TREASURY NOTES AT: http://www.federalreserve.gov/releases/h15/data/Annual/H15_TCMNOM_Y30.txt

Table 25. US Government Securities/Treasury Constant Maturities/Nominal

DATE	APR
1977	7.75
1978	8.49
1979	9.28

1980	11.27
1981	13.45
1982	12.76
1983	11.18
1984	12.41
1985	10.79
1986	7.78
1987	8.59
1988	8.96
1989	8.45
1990	8.61
1991	8.14
1992	7.67
1993	6.59
1994	7.37
1995	6.88
1996	6.71
1997	6.61
1998	5.58
1999	5.87
2000	5.94
2001	5.49
2002	5.43
2003	ND
2004	ND
2005	ND
2006	4.91
2007	4.84
2008	4.28
2009	4.08

4. PROCESS EVALUATION SUPPORTING DOCUMENTS

Below we provide supporting documents for the 2009 program year Process Evaluation provided in Volume I.

J. Data Sources Used for Process Evaluation

Below we provide the data sources used for our process evaluation for the 2009 program year.

Table 26. Data Sources Used for Process Evaluation

Program	Data Source	Dates Performed
Commercial Efficiency	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Commercial Operations Manual • 2007 Siebel Program Requirements Definition Document • 2007 Siebel Process Diagrams • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings	February - March 2010
Energy Efficient Products	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Residential Operations Manual • 2007 Siebel Program Requirements Definition Document • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings	February - March 2010
Cool Homes	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Residential Operations Manual • 2007 Siebel Program Requirements Definition Document • 2007 Siebel Process Diagrams • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings Cool Homes Siebel Activity Plan • Cool Homes Procedures • Rebate Processing Procedure • Final Rebate Processing Flow Chart • 2009 Program Overview • 2009 Implementation Plan • 2009 Program Application Forms • Tune-up Contractor Participation Agreement • New Contractor Package	February - March 2010
Residential Energy Affordability Partnership (REAP)	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Residential Operations Manual • 2007 Siebel Program Requirements Definition Document • 2007 Siebel Process Diagrams • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings 2003 Process Evaluation of LIPA's Clean Energy Initiative REAP Program (Megdal & Associates) • 2008 Direct Program Implementation and Service Delivery RFP	February - March 2010
Home Performance Direct	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Residential Operations Manual • 2007 Siebel Program Requirements Definition Document • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings	February - March 2010
Home Performance with	Interview with program manager and review of program materials:	February -

Program	Data Source	Dates Performed
ENERGY STAR®	• LIPA Program Portfolio Marketing Plan - 2009 • Residential Operations Manual • 2007 Siebel Program Requirements Definition Document • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings	March 2010
Information & Education	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Residential Operations Manual • 2007 Siebel Program Requirements Definition Document • 2007 Siebel Process Diagrams • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings • 2009 Information & Education Program Data • 2008 LIPA Event Planning Services RFP • 2009 Program Implementation Spreadsheet	February - March 2010
Residential New Homes	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Residential Operations Manual • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings • Attitudes and Awareness Baseline Study – 2009 • Residential Baseline Study – 2004	February - March 2010
Solar Pioneer	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Renewable Energy Operations Manual • 2007 Siebel Program Requirements Definition Document • 2007 Siebel Process Diagrams • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings • Solar Process Flow • 2009 Program Application Forms • Market Specific fact Sheets	February - March 2010
Small Wind	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Renewable Energy Operations Manual • 2009 Program Application Forms • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings • LIPA Backyard Wind Initiative Data Request • 2009 LIPA Renewables presentation • 2009 Wind Program Rebate Processing Checklist • 2009 Wind Program Checklist • Wind Application Verification process • Wind processing procedure • Market Specific fact Sheets • 2010 Wind Marketing plan DRAFT	February - March 2010
LIPA*edge*	Interview with program manager and review of program materials: • LIPA Program Portfolio Marketing Plan - 2009 • Siebel Program Requirements Definition Document – Revised August, 2008 • 2007 Siebel Process Diagrams • Website (www.lipower.org) • Evaluation Team notes from Kick-off meetings • Program Application Forms	February - March 2010

K. Program-by-Program Implementation Models

The evaluation team created implementation models for each of the 11 programs evaluated in 2009. An implementation model is a graphic presentation of the intervention – what occurs and who undertakes the functional activities of the program. The models use a multi-level Visio document that has various functions in its rows, and key stakeholders in the columns. The functions, stakeholders and process flow models were determined through a review of the available program documentation and further refined based on our interviews with program managers. This model does not attempt to assess the effects of the program, which is typically done in an impact model and will be forthcoming in our future evaluation efforts.

The models are organized by function and stakeholders involved. Each model includes a series of functions which vary across programs, diverse stakeholders involved and detailed process flow models for various service delivery activities.

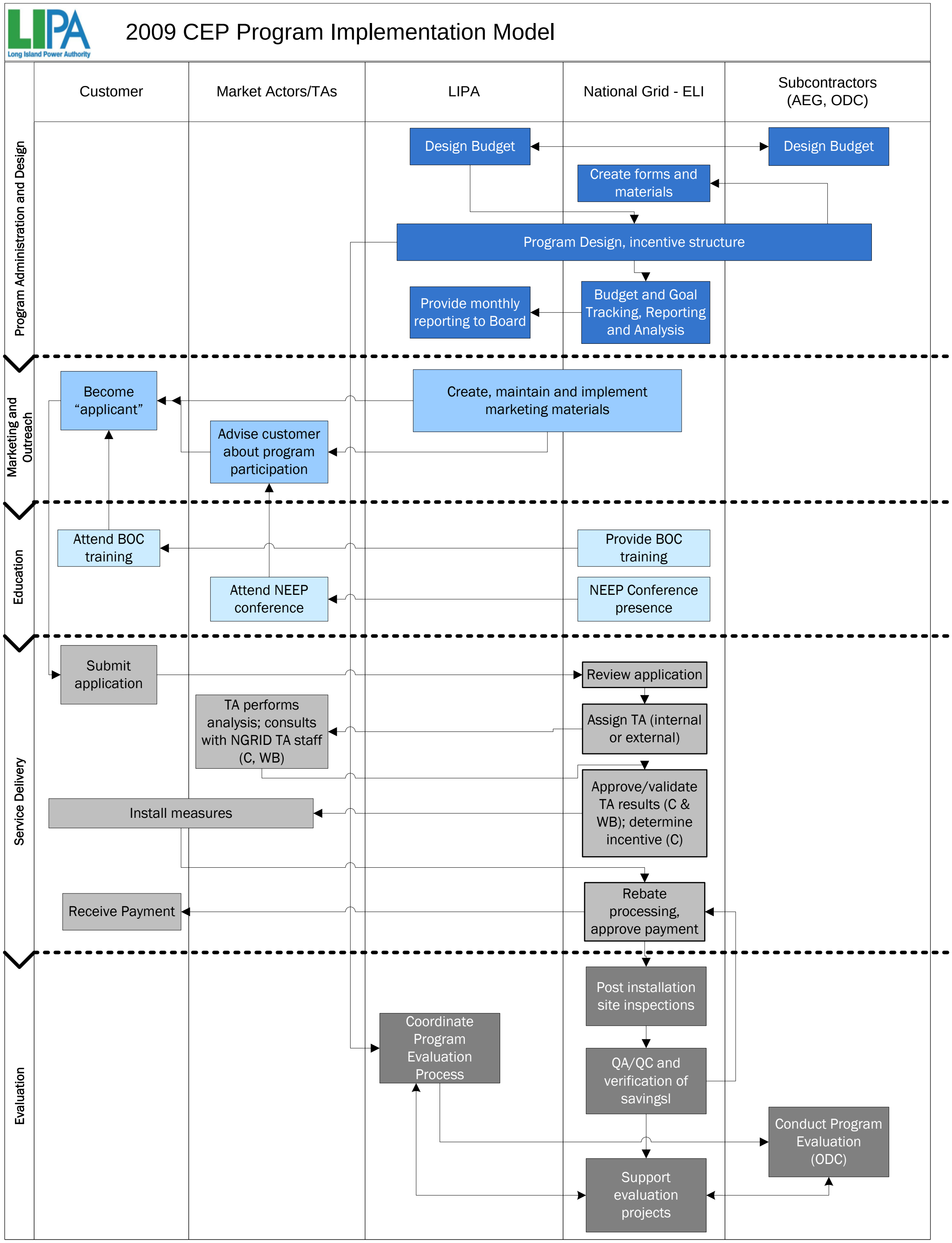
- Functions: These represent the discrete functions inherent in most programs. These functions include program administration and design, marketing and outreach, education, service delivery and evaluation. Service delivery encompasses activities that are directed towards intervention recipients and, for these models, is a catch-all for any activity not included in the other functions. These functional areas may vary across programs.
- Stakeholders: These include the various providers who are involved in or receive program delivery. Stakeholders include the customer, market actors, LIPA, National Grid (both employees of National Grid ELI staff and National Grid employees not affiliated directly with LIPA) and variety of subcontractors. Stakeholders vary across programs.
- In addition, each program contains additional "process flow models" that document service delivery processes in greater detail. For example, some of our models document rebate application process flows. The number and type of process flow models vary across programs.

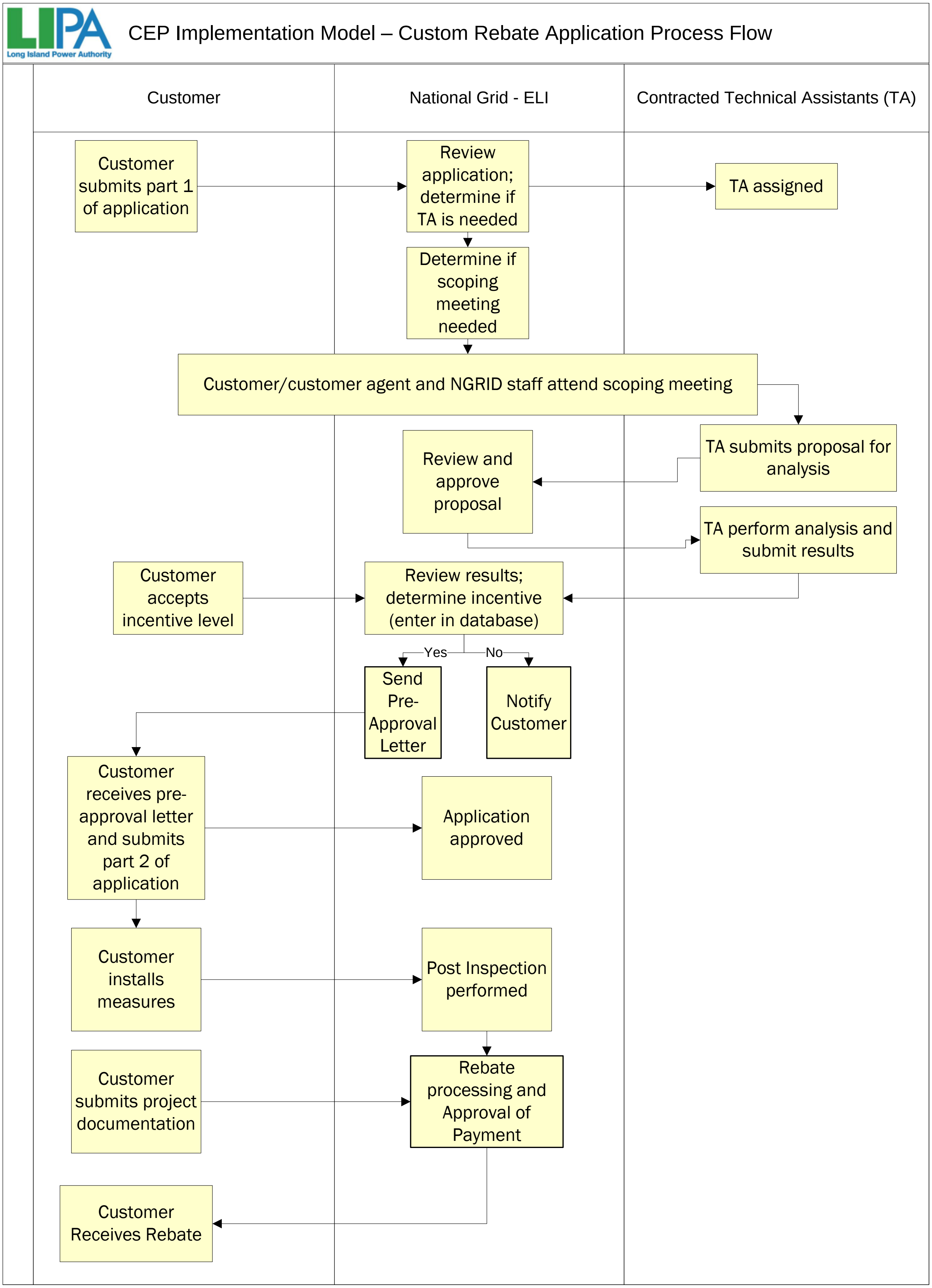
While each program has a unique implementation process and flow of information, we did identify several key points in each of the functions where stakeholder responsibilities are similar across all programs. These include:

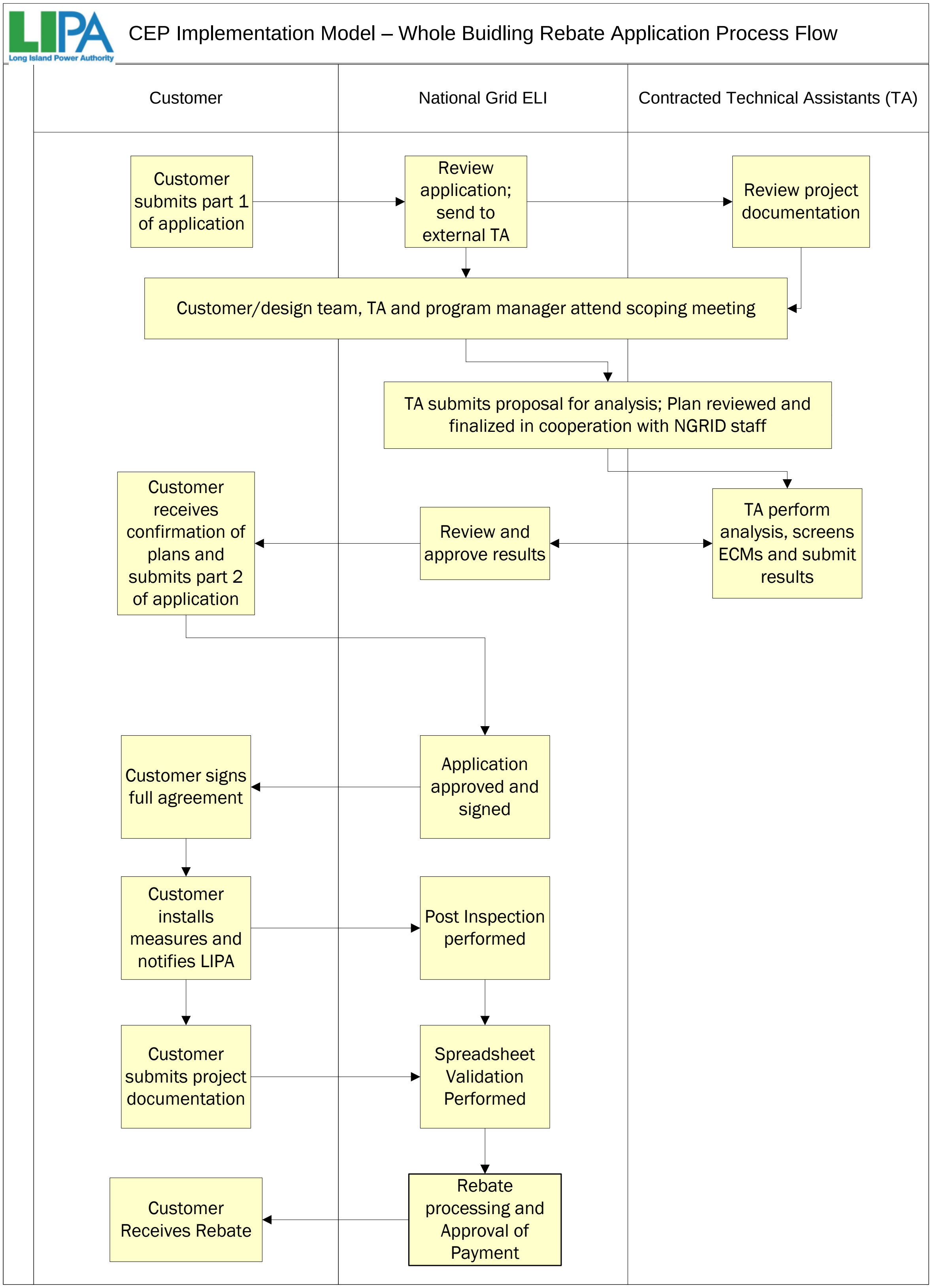
- Program Administration and Design: Optimal was the program planning contractor for 2009 and was responsible for program design, goals and incentive structure collaborating with both LIPA and National Grid ELI staff.
- Marketing & Outreach: Most often National Grid ELI staff are responsible for the creation and updating of program marketing materials, in some cases this is done in partnership with LIPA and/or implementation contractor staff. In all cases, LIPA staff is responsible for the final approval of the marketing materials. In addition, LIPA is responsible for maintaining the lipower.org website and holds a contract with an outside advertising agency for media buys.

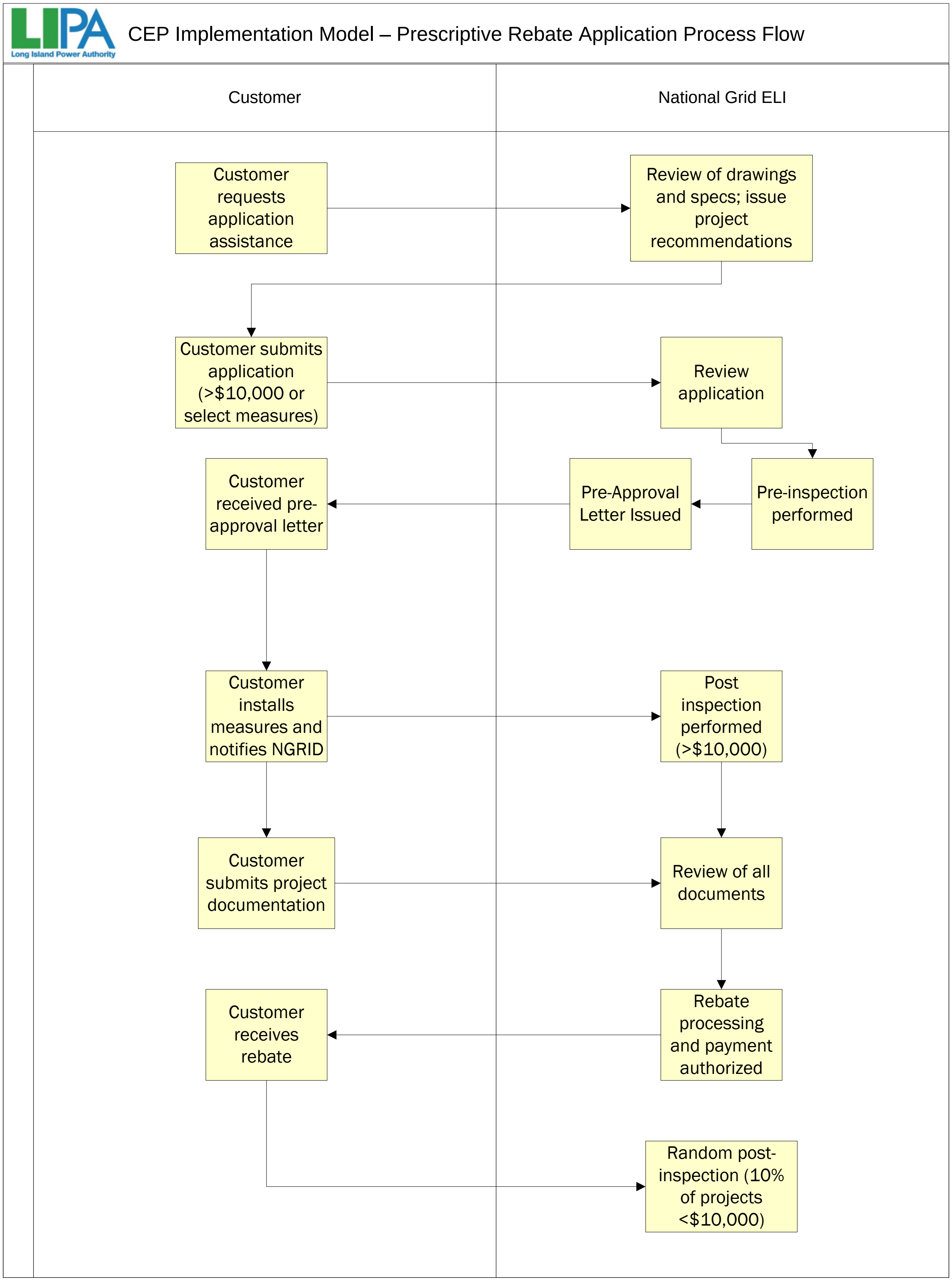
- Education: The implementation contractor, often with support from National Grid ELI staff, is responsible for market actor/trade ally training activities.
- Service Delivery (Customer Facing Activities): The implementation contractor is typically responsible for all “customer-facing” aspects of program delivery including performing audits, installations, marketing efforts, etc. One exception to this is the Commercial Efficiency program where National Grid is responsible for “customer-facing” activities.
- Service Delivery (QA/QC and Reporting): Where applicable, the implementation contactor conducts most of the quality control and verification activities for the programs, and provides weekly and/or monthly reports to National Grid staff, who reviews these reports and then provides this information to LIPA staff at scheduled monthly and quarterly meetings.
- Service Delivery (Rebates and Incentives): Where applicable, the implementation contractor collects and processes the payment information and submits prepared invoices to National Grid staff. National Grid is responsible for mailing payment to customers and contractors and in turn prepares and submits a reimbursement request to LIPA.

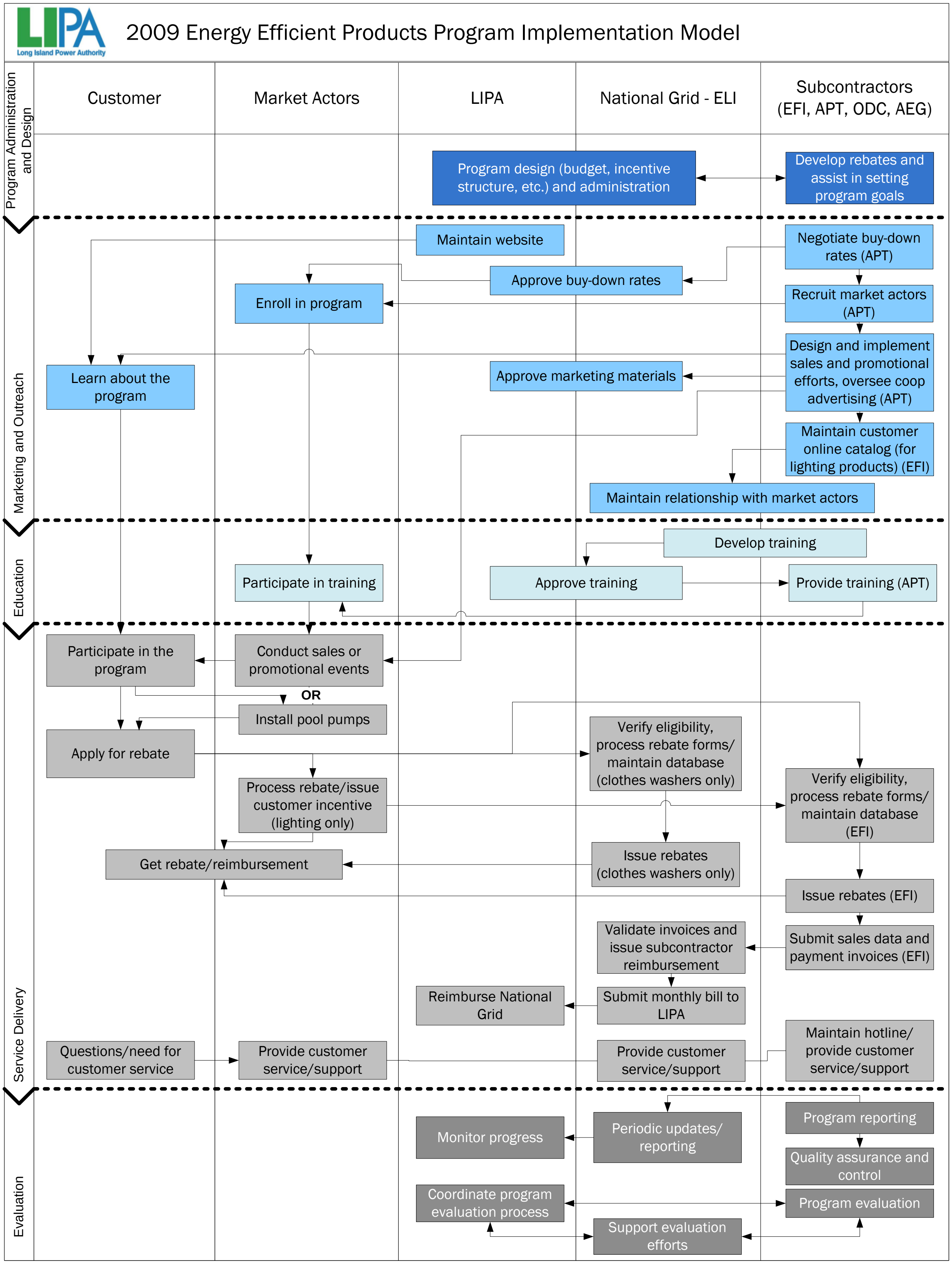
The program-by-program implementation models are included below.

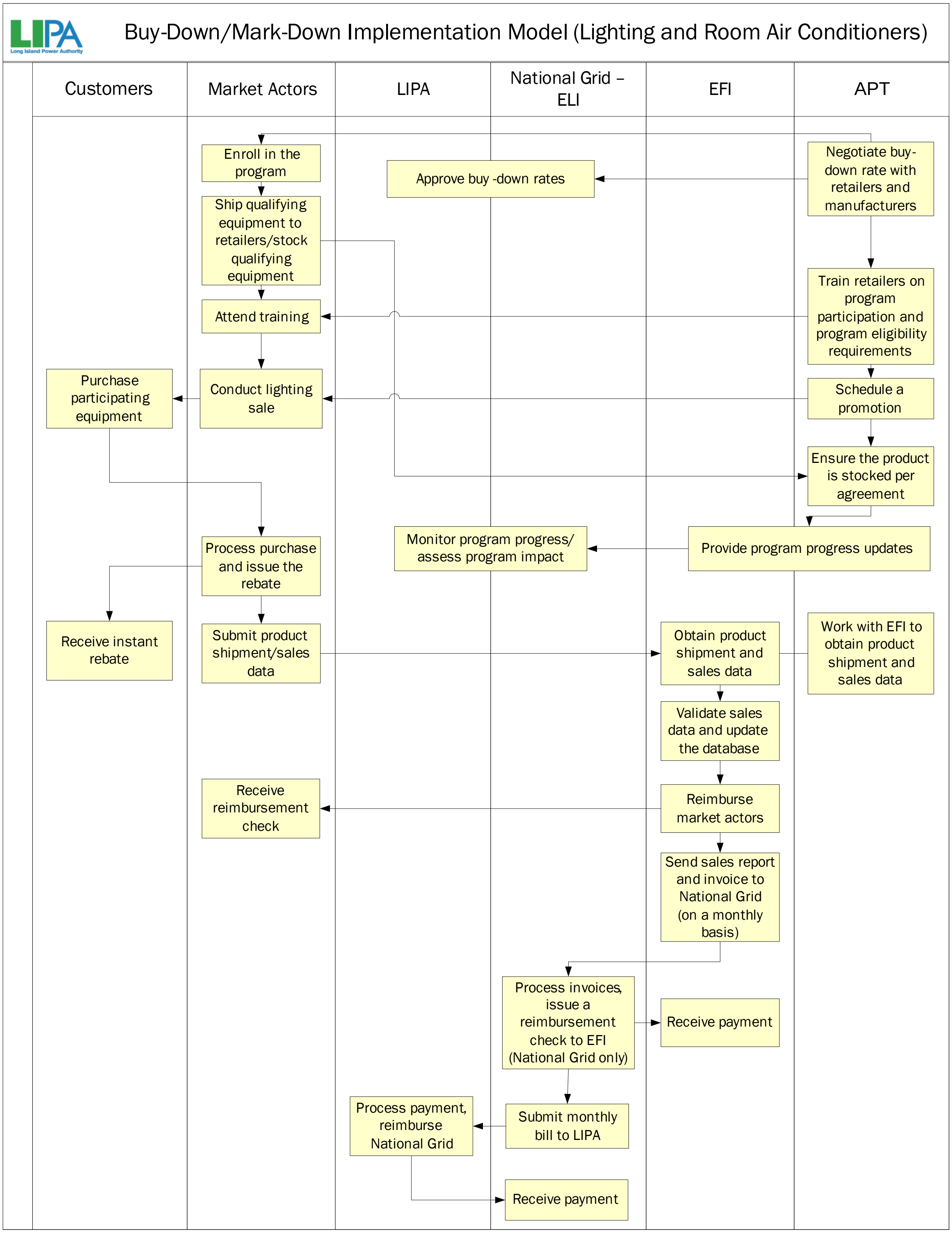

LIPA
Long Island Power Authority
2009 CEP Program Implementation Model
Customer
Market Actors/TAs
LIPA
National Grid - ELI
Subcontractors (AEG, ODC)
Program Administration and Design
Design Budget
Design Budget
Create forms and materials
Program Design, incentive structure
Provide monthly reporting to Board
Budget and Goal Tracking, Reporting and Analysis
Marketing and Outreach
Become "applicant"
Create, maintain and implement marketing materials
Advise customer about program participation
Education
Attend BOC training
Provide BOC training
Attend NEEP conference
NEEP Conference presence
Service Delivery
Submit application
Review application
TA performs analysis; consults with NGRID TA staff (C, WB)
Assign TA (internal or external)
Approve/validate TA results (C & WB); determine incentive (C)
Install measures
Rebate processing, approve payment
Receive Payment
Evaluation
Post installation site inspections
Coordinate Program Evaluation Process
QA/QC and verification of savingsl
Conduct Program Evaluation (ODC)
Support evaluation projects

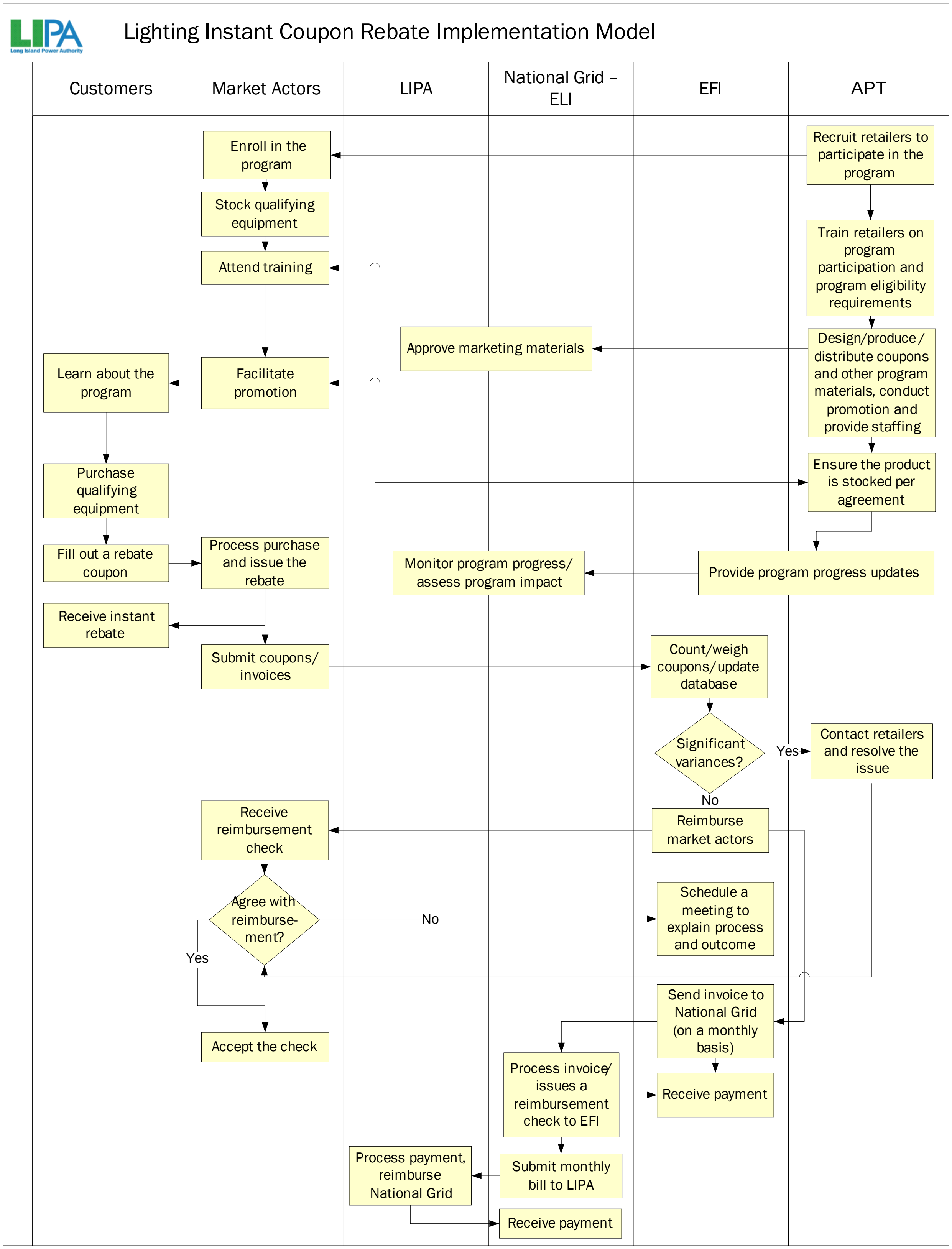

CEP Implementation Model – Custom Rebate Application Process Flow
Customer
National Grid - ELI
Contracted Technical Assistants (TA)
Customer submits part 1 of application
Review application; determine if TA is needed
TA assigned
Determine if scoping meeting needed
Customer/customer agent and NGRID staff attend scoping meeting
TA submits proposal for analysis
Review and approve proposal
TA perform analysis and submit results
Customer accepts incentive level
Review results; determine incentive (enter in database)
Yes
No
Send Pre-Approval Letter
Notify Customer
Customer receives pre-approval letter and submits part 2 of application
Application approved
Customer installs measures
Post Inspection performed
Customer submits project documentation
Rebate processing and Approval of Payment
Customer Receives Rebate

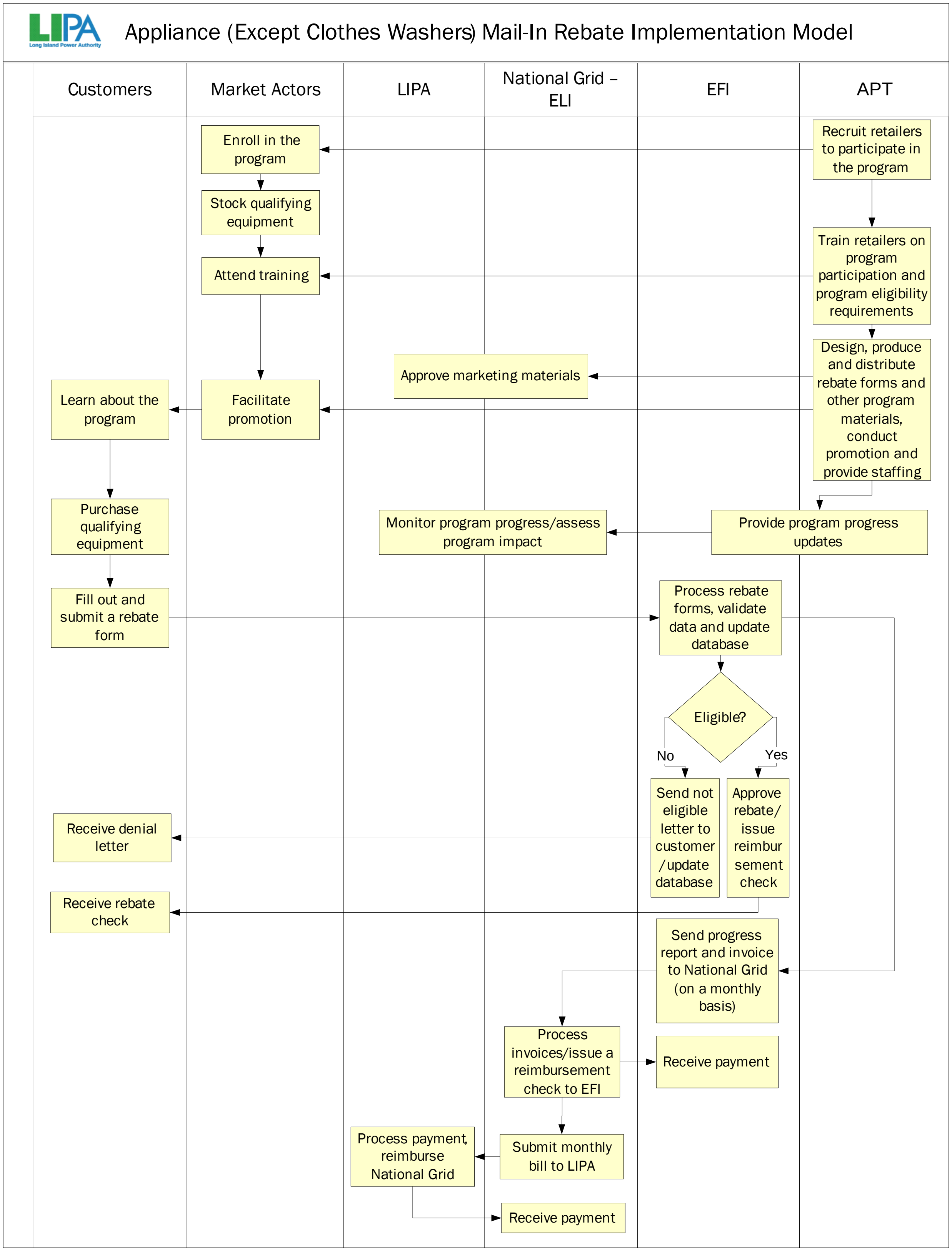

LIPA
Long Island Power Authority
CEP Implementation Model – Whole Buidling Rebate Application Process Flow
Customer
National Grid ELI
Contracted Technical Assistants (TA)
Customer submits part 1 of application
Review application; send to external TA
Review project documentation
Customer/design team, TA and program manager attend scoping meeting
TA submits proposal for analysis; Plan reviewed and finalized in cooperation with NGRID staff
Customer receives confirmation of plans and submits part 2 of application
Review and approve results
TA perform analysis, screens ECMs and submit results
Customer signs full agreement
Application approved and signed
Customer installs measures and notifies LIPA
Post Inspection performed
Customer submits project documentation
Spreadsheet Validation Performed
Customer Receives Rebate
Rebate processing and Approval of Payment

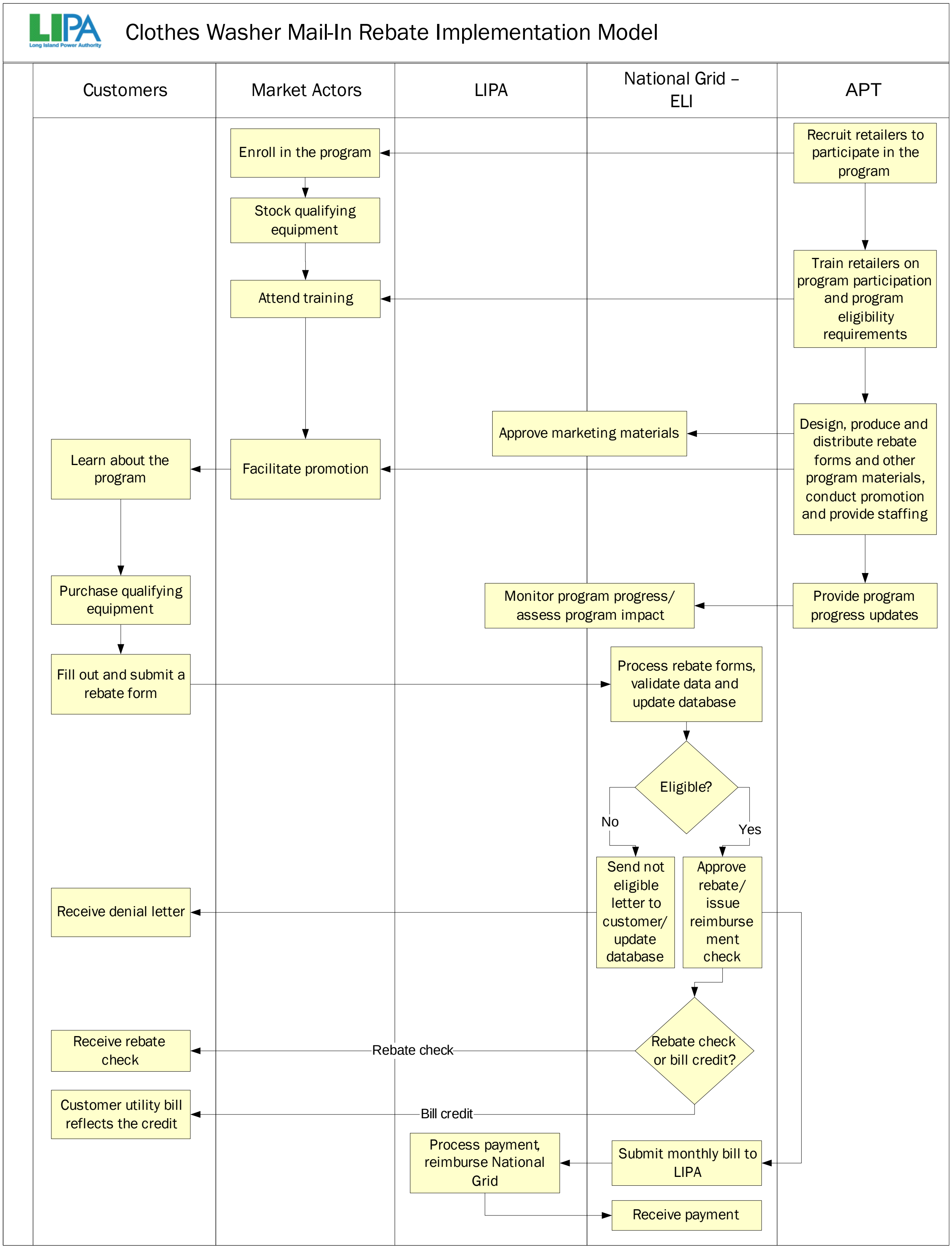

CEP Implementation Model – Prescriptive Rebate Application Process Flow
Customer
National Grid ELI
Customer requests application assistance
Review of drawings and specs; issue project recommendations
Customer submits application (>$10,000 or select measures)
Review application
Customer received pre-approval letter
Pre-Approval Letter Issued
Pre-inspection performed
Customer installs measures and notifies NGRID
Post inspection performed (>$10,000)
Customer submits project documentation
Review of all documents
Customer receives rebate
Rebate processing and payment authorized
Random post-inspection (10% of projects <$10,000)


2009 Energy Efficient Products Program Implementation Model
Program Administration and Design
Marketing and Outreach
Education
Service Delivery
Evaluation
Customer
Market Actors
LIPA
National Grid - ELI
Subcontractors (EFI, APT, ODC, AEG)
Program design (budget, incentive structure, etc.) and administration
Develop rebates and assist in setting program goals
Maintain website
Negotiate buy-down rates (APT)
Approve buy-down rates
Enroll in program
Recruit market actors (APT)
Learn about the program
Approve marketing materials
Design and implement sales and promotional efforts, oversee coop advertising (APT)
Maintain customer online catalog (for lighting products) (EFI)
Maintain relationship with market actors
Develop training
Participate in training
Approve training
Provide training (APT)
Participate in the program
Conduct sales or promotional events
OR
Install pool pumps
Apply for rebate
Verify eligibility, process rebate forms/ maintain database (clothes washers only)
Process rebate/issue customer incentive (lighting only)
Verify eligibility, process rebate forms/ maintain database (EFI)
Get rebate/reimbursement
Issue rebates (clothes washers only)
Issue rebates (EFI)
Validate invoices and issue subcontractor reimbursement
Submit sales data and payment invoices (EFI)
Reimburse National Grid
Submit monthly bill to LIPA
Questions/need for customer service
Provide customer service/support
Provide customer service/support
Maintain hotline/ provide customer service/support
Program reporting
Monitor progress
Periodic updates/ reporting
Quality assurance and control
Coordinate program evaluation process
Program evaluation
Support evaluation efforts

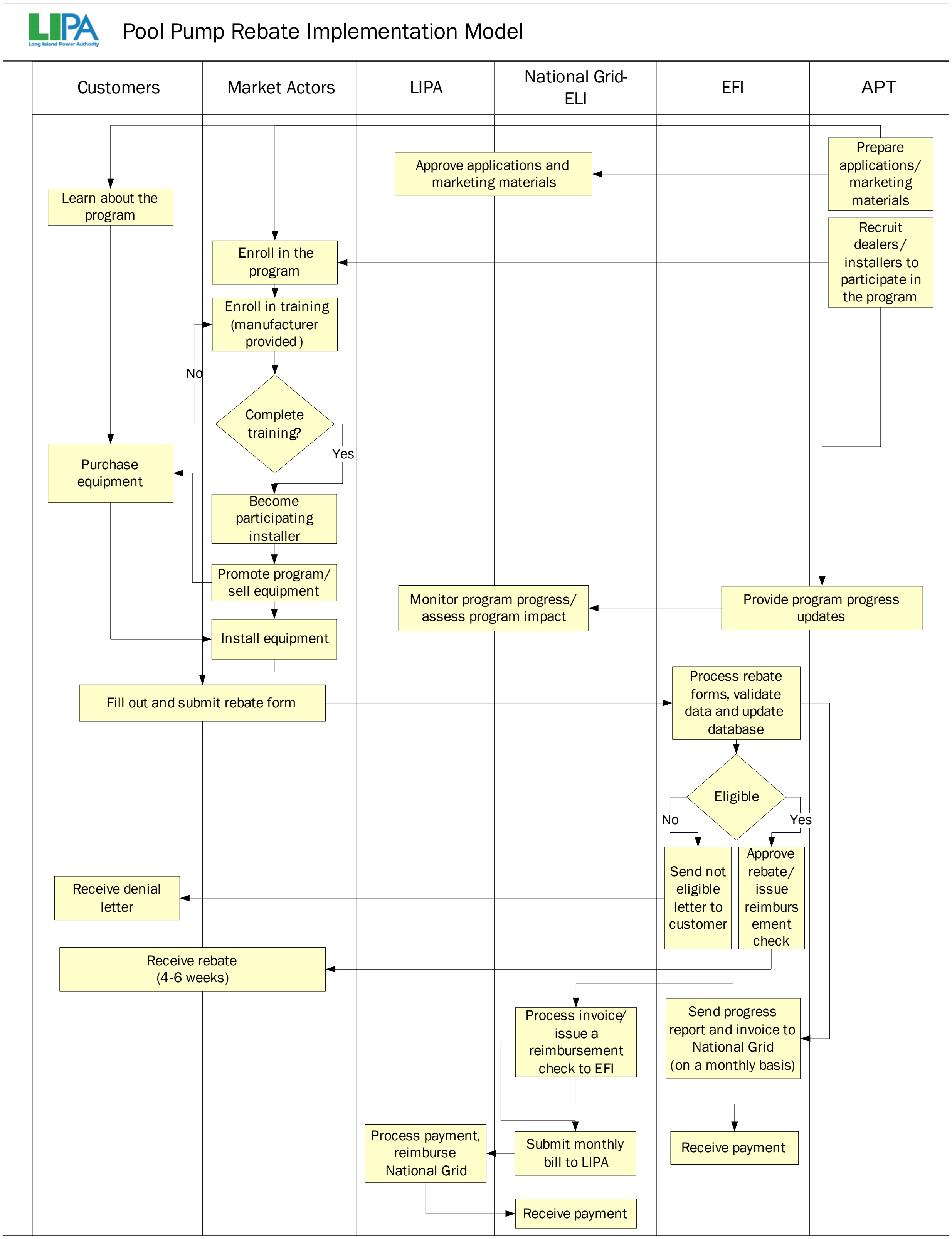

Buy-Down/Mark-Down Implementation Model (Lighting and Room Air Conditioners)
Customers
Market Actors
LIPA
National Grid – ELI
EFI
APT
Enroll in the program
Approve buy -down rates
Negotiate buy-down rate with retailers and manufacturers
Ship qualifying equipment to retailers/stock qualifying equipment
Train retailers on program participation and program eligibility requirements
Attend training
Purchase participating equipment
Conduct lighting sale
Schedule a promotion
Ensure the product is stocked per agreement
Process purchase and issue the rebate
Monitor program progress/ assess program impact
Provide program progress updates
Receive instant rebate
Submit product shipment/sales data
Obtain product shipment and sales data
Work with EFI to obtain product shipment and sales data
Validate sales data and update the database
Receive reimbursement check
Reimburse market actors
Send sales report and invoice to National Grid (on a monthly basis)
Process invoices, issue a reimbursement check to EFI (National Grid only)
Receive payment
Process payment, reimburse National Grid
Submit monthly bill to LIPA
Receive payment

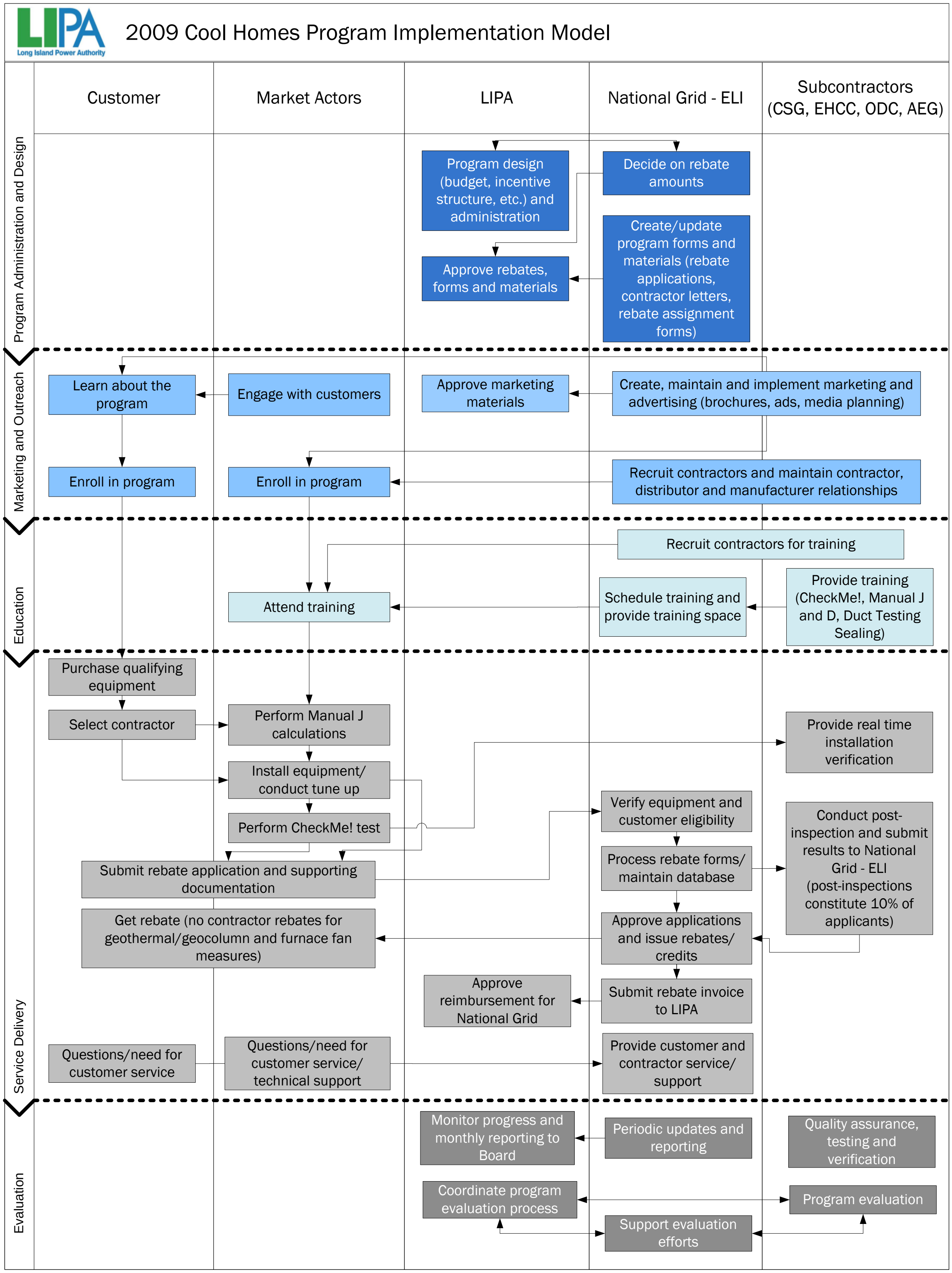

LIPA
Long Island Power Authority
Lighting Instant Coupon Rebate Implementation Model
Customers
Market Actors
LIPA
National Grid – ELI
EFI
APT
Enroll in the program
Recruit retailers to participate in the program
Stock qualifying equipment
Attend training
Train retailers on program participation and program eligibility requirements
Approve marketing materials
Design/produce/ distribute coupons and other program materials, conduct promotion and provide staffing
Learn about the program
Facilitate promotion
Purchase qualifying equipment
Ensure the product is stocked per agreement
Fill out a rebate coupon
Process purchase and issue the rebate
Monitor program progress/ assess program impact
Provide program progress updates
Receive instant rebate
Submit coupons/ invoices
Count/weigh coupons/update database
Significant variances?
Yes
Contact retailers and resolve the issue
No
Receive reimbursement check
Reimburse market actors
Agree with reimburse-ment?
No
Schedule a meeting to explain process and outcome
Yes
Send invoice to National Grid (on a monthly basis)
Accept the check
Process invoice/ issues a reimbursement check to EFI
Receive payment
Process payment, reimburse National Grid
Submit monthly bill to LIPA
Receive payment

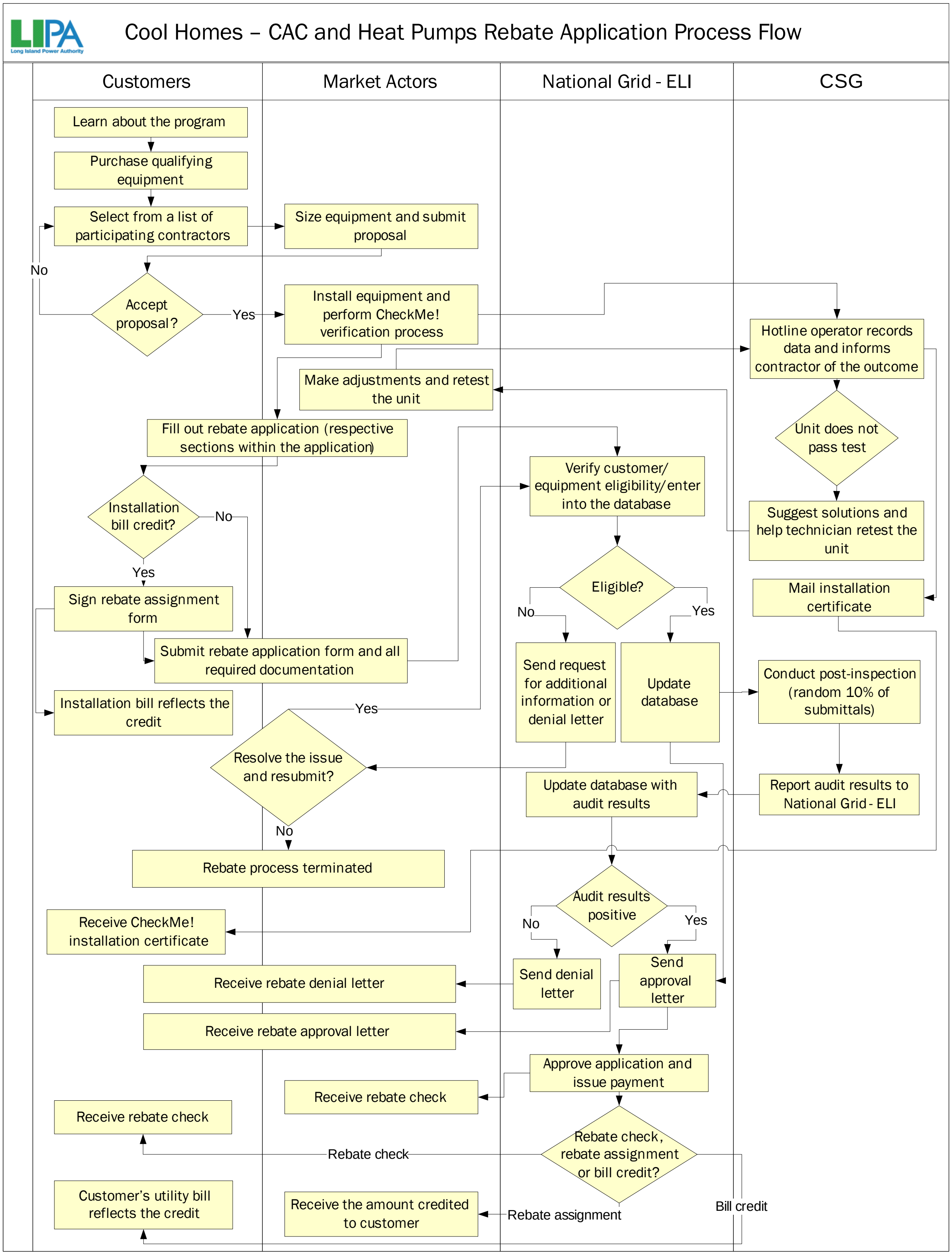

LIPA
Long Island Power Authority
Appliance (Except Clothes Washers) Mail-In Rebate Implementation Model
Customers
Market Actors
LIPA
National Grid – ELI
EFI
APT
Recruit retailers to participate in the program
Enroll in the program
Stock qualifying equipment
Train retailers on program participation and program eligibility requirements
Attend training
Design, produce and distribute rebate forms and other program materials, conduct promotion and provide staffing
Approve marketing materials
Facilitate promotion
Learn about the program
Purchase qualifying equipment
Monitor program progress/assess program impact
Provide program progress updates
Fill out and submit a rebate form
Process rebate forms, validate data and update database
Eligible?
No
Yes
Send not eligible letter to customer /update database
Approve rebate/ issue reimbursement check
Receive denial letter
Receive rebate check
Send progress report and invoice to National Grid (on a monthly basis)
Process invoices/issue a reimbursement check to EFI
Receive payment
Submit monthly bill to LIPA
Process payment, reimburse National Grid
Receive payment

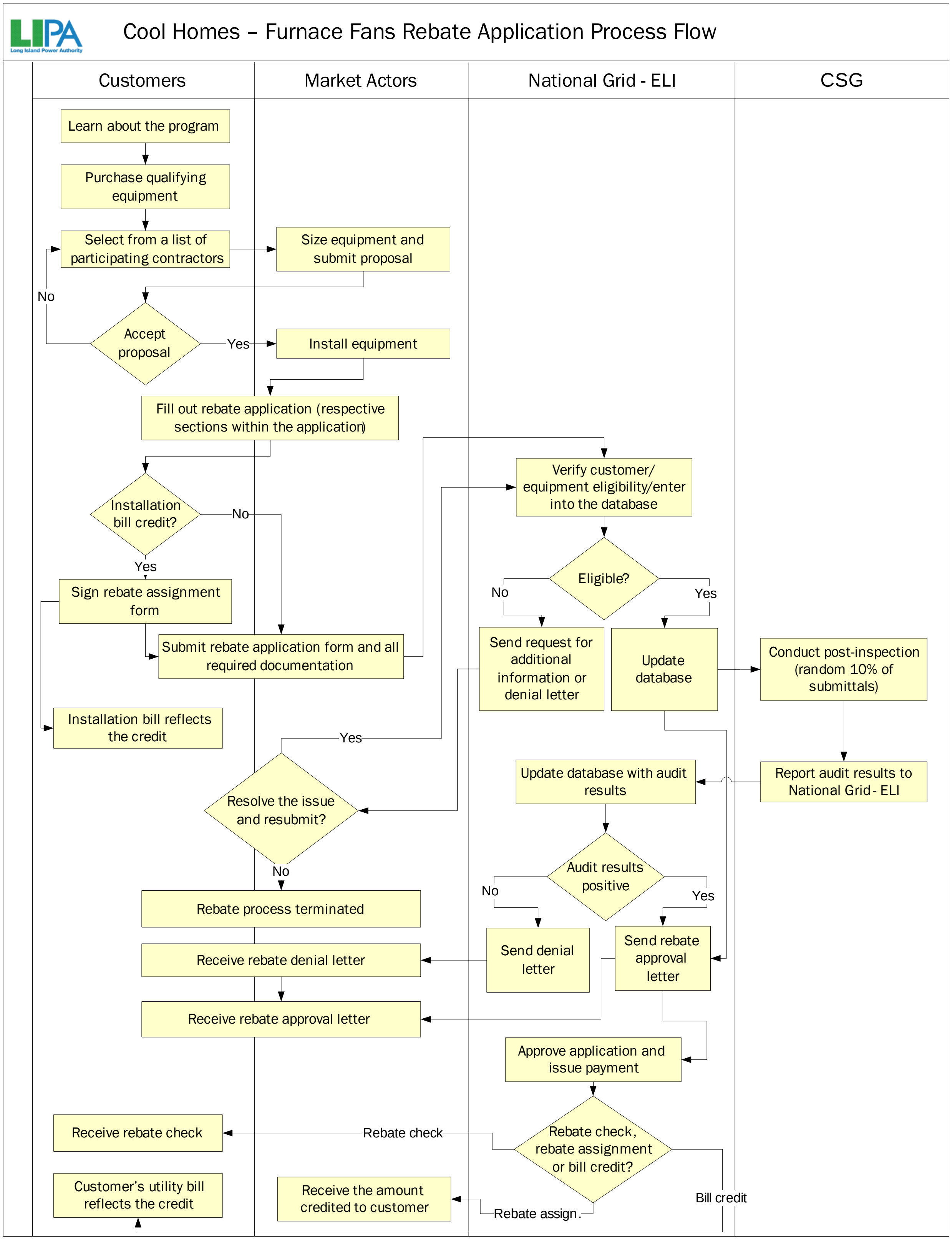


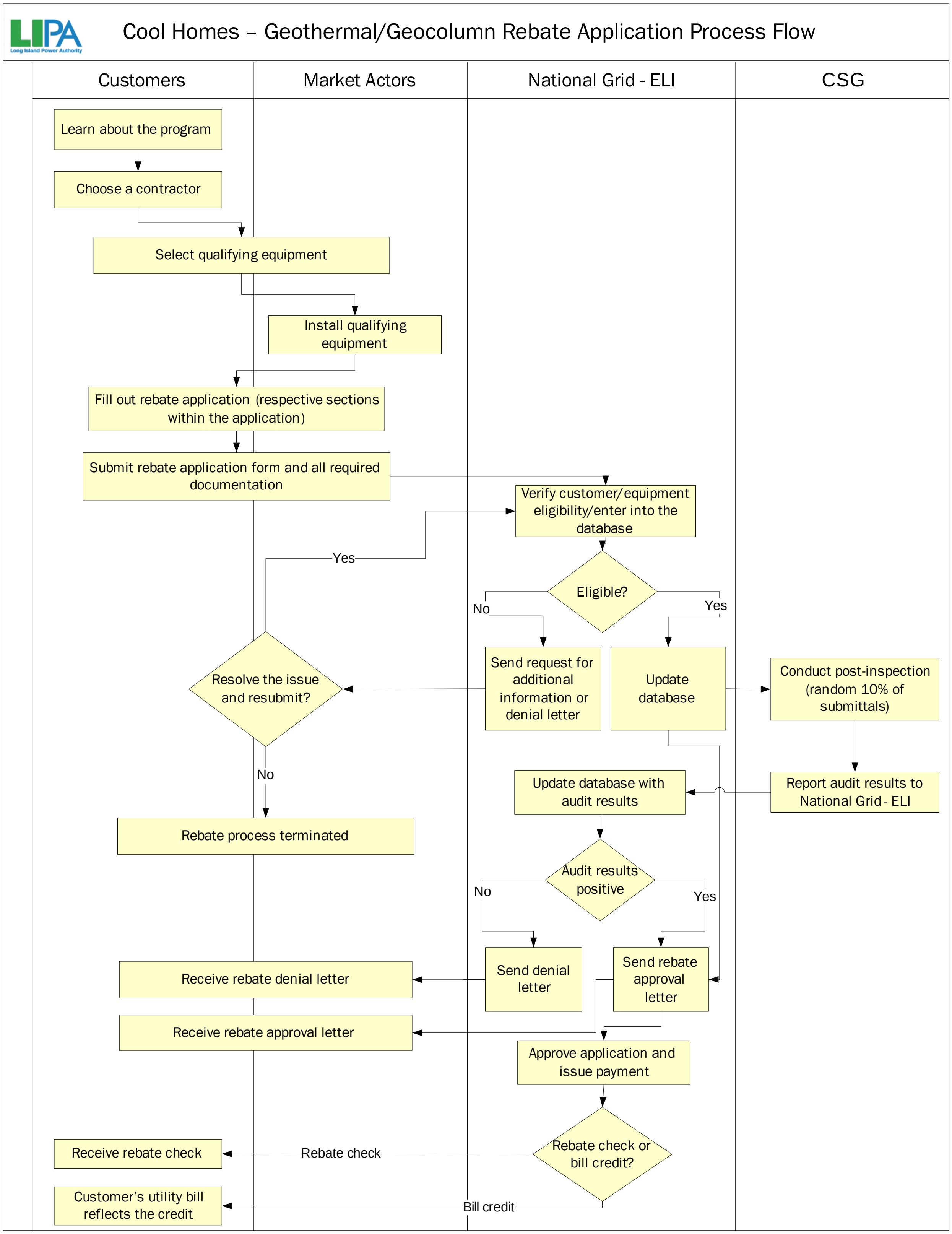
Clothes Washer Mail-In Rebate Implementation Model
Customers
Market Actors
LIPA
National Grid – ELI
APT
Recruit retailers to participate in the program
Enroll in the program
Stock qualifying equipment
Train retailers on program participation and program eligibility requirements
Attend training
Design, produce and distribute rebate forms and other program materials, conduct promotion and provide staffing
Approve marketing materials
Facilitate promotion
Learn about the program
Purchase qualifying equipment
Provide program progress updates
Monitor program progress/ assess program impact
Fill out and submit a rebate form
Process rebate forms, validate data and update database
Eligible?
No
Yes
Send not eligible letter to customer/ update database
Approve rebate/ issue reimburse ment check
Receive denial letter
Rebate check or bill credit?
Rebate check
Receive rebate check
Bill credit
Customer utility bill reflects the credit
Submit monthly bill to LIPA
Process payment, reimburse National Grid
Receive payment

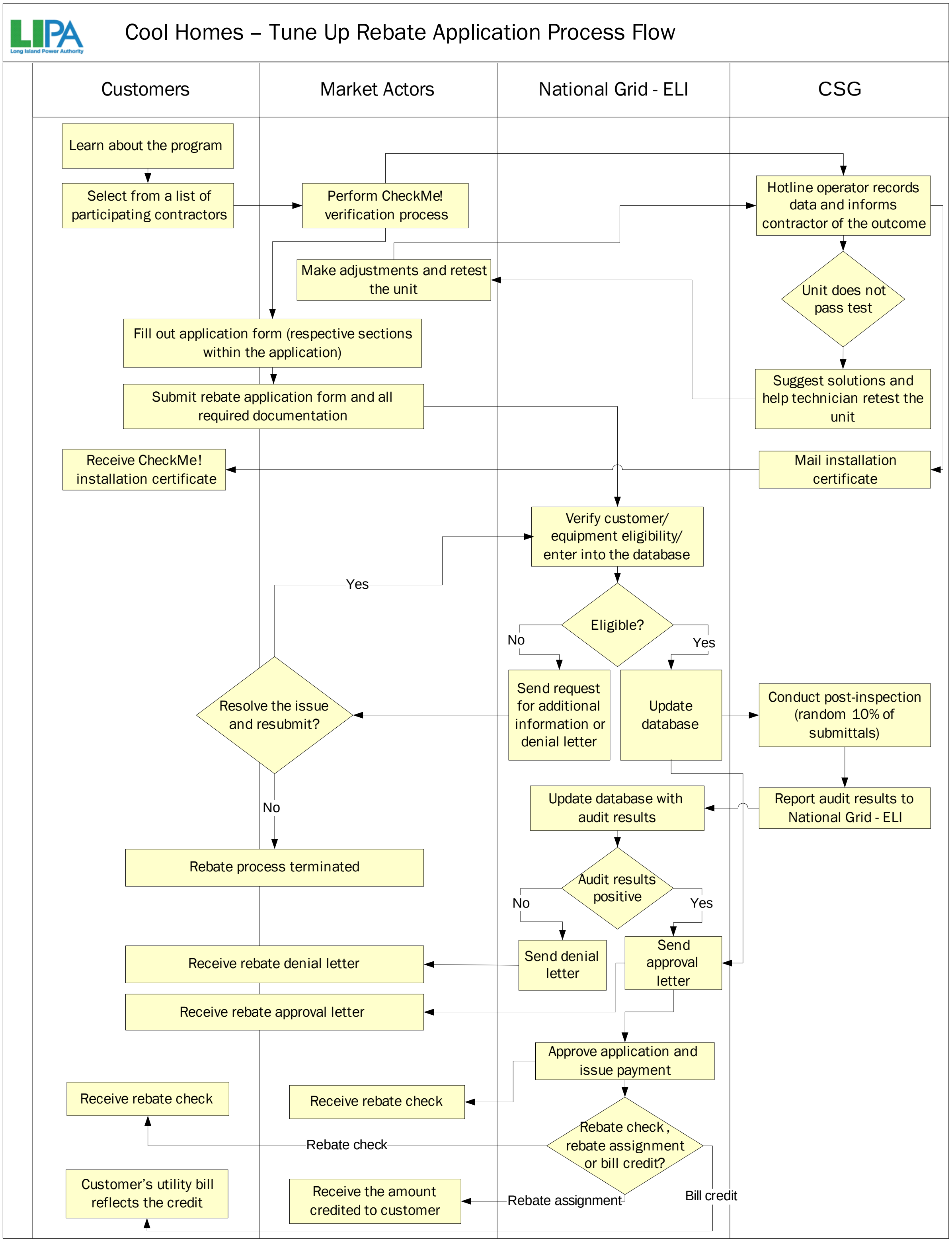

Pool Pump Rebate Implementation Model
Customers
Market Actors
LIPA
National Grid-ELI
EFI
APT
Prepare applications/ marketing materials
Approve applications and marketing materials
Learn about the program
Recruit dealers/ installers to participate in the program
Enroll in the program
Enroll in training (manufacturer provided)
No
Complete training?
Yes
Purchase equipment
Become participating installer
Promote program/ sell equipment
Monitor program progress/ assess program impact
Provide program progress updates
Install equipment
Fill out and submit rebate form
Process rebate forms, validate data and update database
Eligible
No
Yes
Send not eligible letter to customer
Approve rebate/ issue reimbursement check
Receive denial letter
Receive rebate (4-6 weeks)
Process invoice/ issue a reimbursement check to EFI
Send progress report and invoice to National Grid (on a monthly basis)
Process payment, reimburse National Grid
Submit monthly bill to LIPA
Receive payment
Receive payment

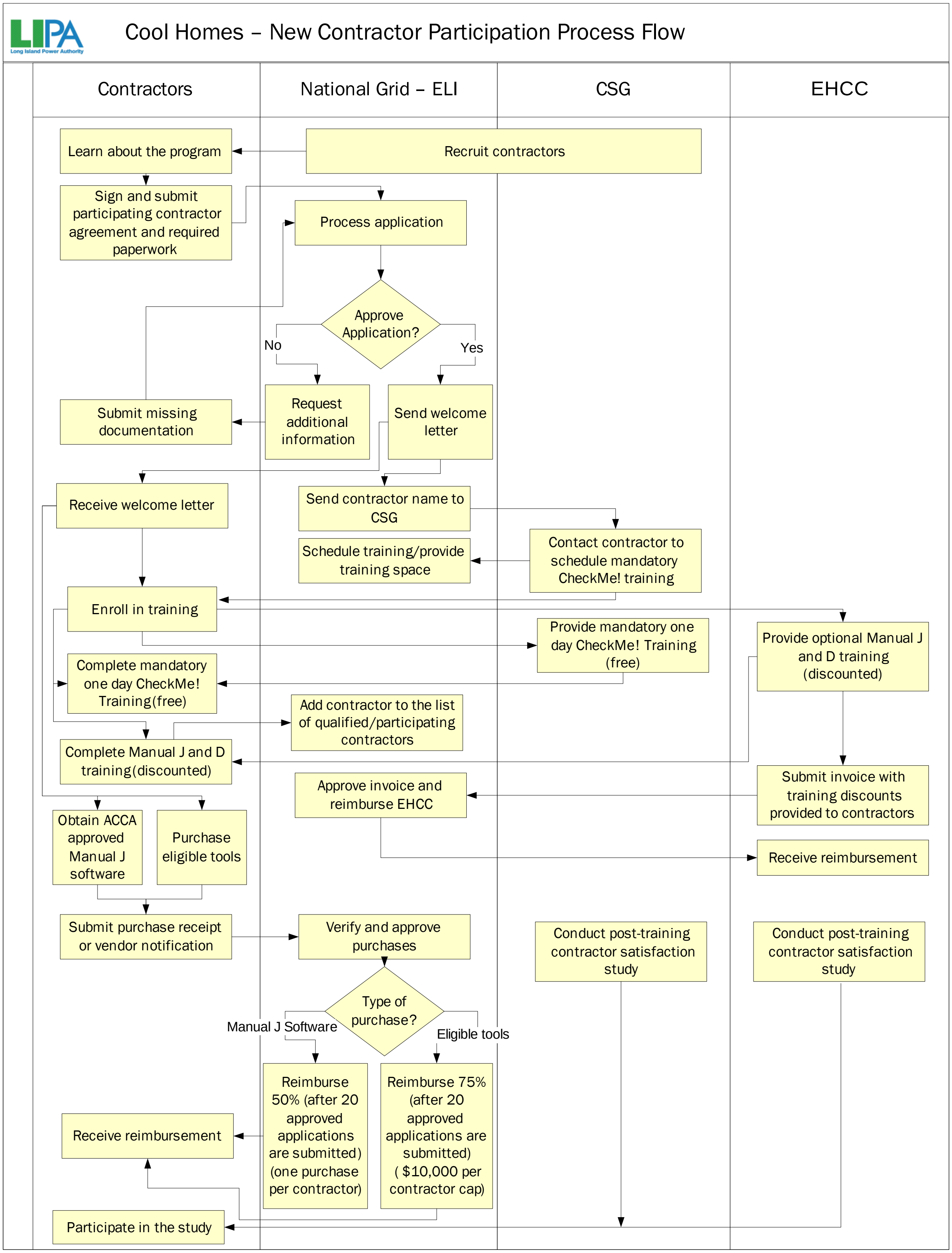

Long Island Power Authority
2009 Cool Homes Program Implementation Model
Customer
Market Actors
LIPA
National Grid - ELI
Subcontractors (CSG, EHCC, ODC, AEG)
Program Administration and Design
Program design (budget, incentive structure, etc.) and administration
Decide on rebate amounts
Create/update program forms and materials (rebate applications, contractor letters, rebate assignment forms)
Approve rebates, forms and materials
Marketing and Outreach
Learn about the program
Engage with customers
Approve marketing materials
Create, maintain and implement marketing and advertising (brochures, ads, media planning)
Enroll in program
Enroll in program
Recruit contractors and maintain contractor, distributor and manufacturer relationships
Education
Recruit contractors for training
Attend training
Schedule training and provide training space
Provide training (CheckMe!, Manual J and D, Duct Testing Sealing)
Service Delivery
Purchase qualifying equipment
Select contractor
Perform Manual J calculations
Install equipment/ conduct tune up
Perform CheckMe! test
Provide real time installation verification
Verify equipment and customer eligibility
Process rebate forms/ maintain database
Conduct post-inspection and submit results to National Grid - ELI (post-inspections constitute 10% of applicants)
Submit rebate application and supporting documentation
Get rebate (no contractor rebates for geothermal/geocolumn and furnace fan measures)
Approve applications and issue rebates/ credits
Approve reimbursement for National Grid
Submit rebate invoice to LIPA
Questions/need for customer service
Questions/need for customer service/ technical support
Provide customer and contractor service/ support
Evaluation
Monitor progress and monthly reporting to Board
Periodic updates and reporting
Quality assurance, testing and verification
Coordinate program evaluation process
Program evaluation
Support evaluation efforts

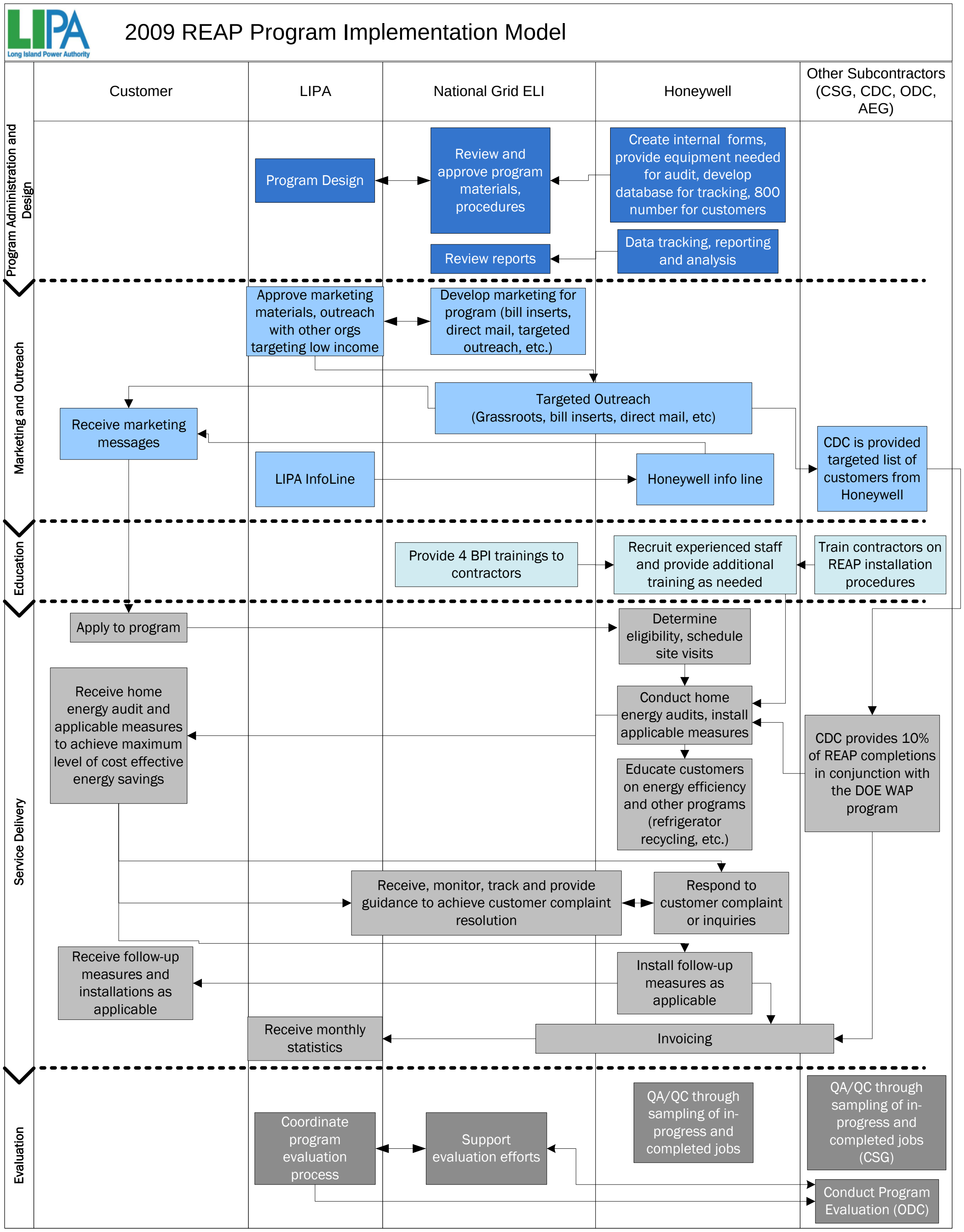

LIPA
Long Island Power Authority
Cool Homes – CAC and Heat Pumps Rebate Application Process Flow
Customers
Market Actors
National Grid - ELI
CSG
Learn about the program
Purchase qualifying equipment
Select from a list of participating contractors
Size equipment and submit proposal
No
Accept proposal?
Yes
Install equipment and perform CheckMe! verification process
Hotline operator records data and informs contractor of the outcome
Make adjustments and retest the unit
Unit does not pass test
Fill out rebate application (respective sections within the application)
Verify customer/ equipment eligibility/enter into the database
Installation bill credit?
No
Yes
Suggest solutions and help technician retest the unit
Eligible?
No
Yes
Sign rebate assignment form
Mail installation certificate
Submit rebate application form and all required documentation
Send request for additional information or denial letter
Update database
Installation bill reflects the credit
Yes
Conduct post-inspection (random 10% of submittals)
Resolve the issue and resubmit?
Update database with audit results
Report audit results to National Grid - ELI
No
Rebate process terminated
Audit results positive
No
Yes
Receive CheckMe! installation certificate
Send denial letter
Send approval letter
Receive rebate denial letter
Receive rebate approval letter
Approve application and issue payment
Receive rebate check
Receive rebate check
Rebate check
Rebate check, rebate assignment or bill credit?
Customer's utility bill reflects the credit
Receive the amount credited to customer
Rebate assignment
Bill credit

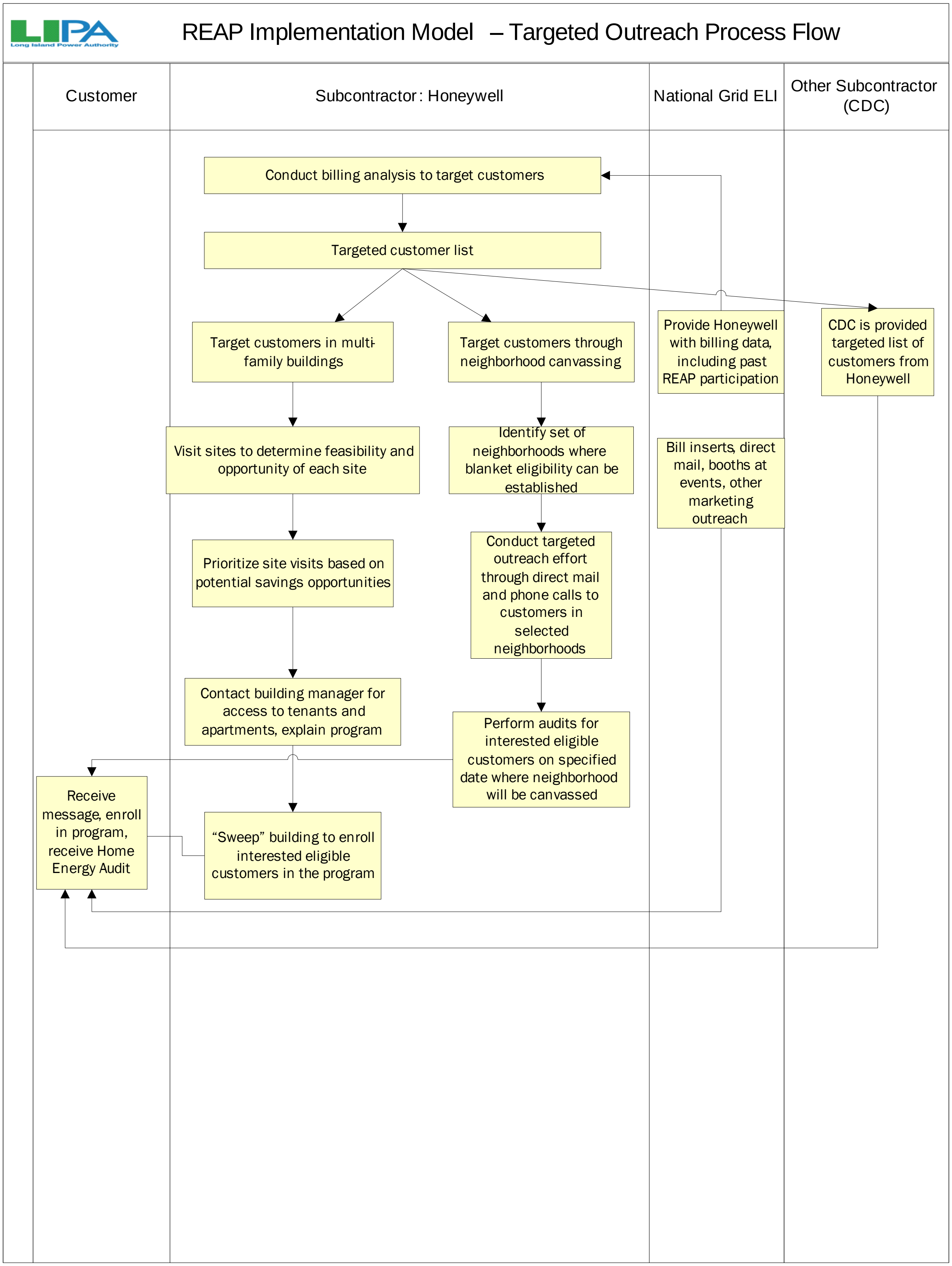

LIPA
Cool Homes – Furnace Fans Rebate Application Process Flow
Customers
Market Actors
National Grid - ELI
CSG
Learn about the program
Purchase qualifying equipment
Select from a list of participating contractors
Size equipment and submit proposal
No
Accept proposal
Yes
Install equipment
Fill out rebate application (respective sections within the application)
Verify customer/ equipment eligibility/enter into the database
Installation bill credit?
No
Yes
Eligible?
No
Yes
Sign rebate assignment form
Submit rebate application form and all required documentation
Send request for additional information or denial letter
Update database
Conduct post-inspection (random 10% of submittals)
Installation bill reflects the credit
Yes
Update database with audit results
Report audit results to National Grid - ELI
Resolve the issue and resubmit?
No
Audit results positive
No
Yes
Rebate process terminated
Send denial letter
Send rebate approval letter
Receive rebate denial letter
Receive rebate approval letter
Approve application and issue payment
Receive rebate check
Rebate check
Rebate check, rebate assignment or bill credit?
Customer's utility bill reflects the credit
Receive the amount credited to customer
Rebate assign.
Bill credit

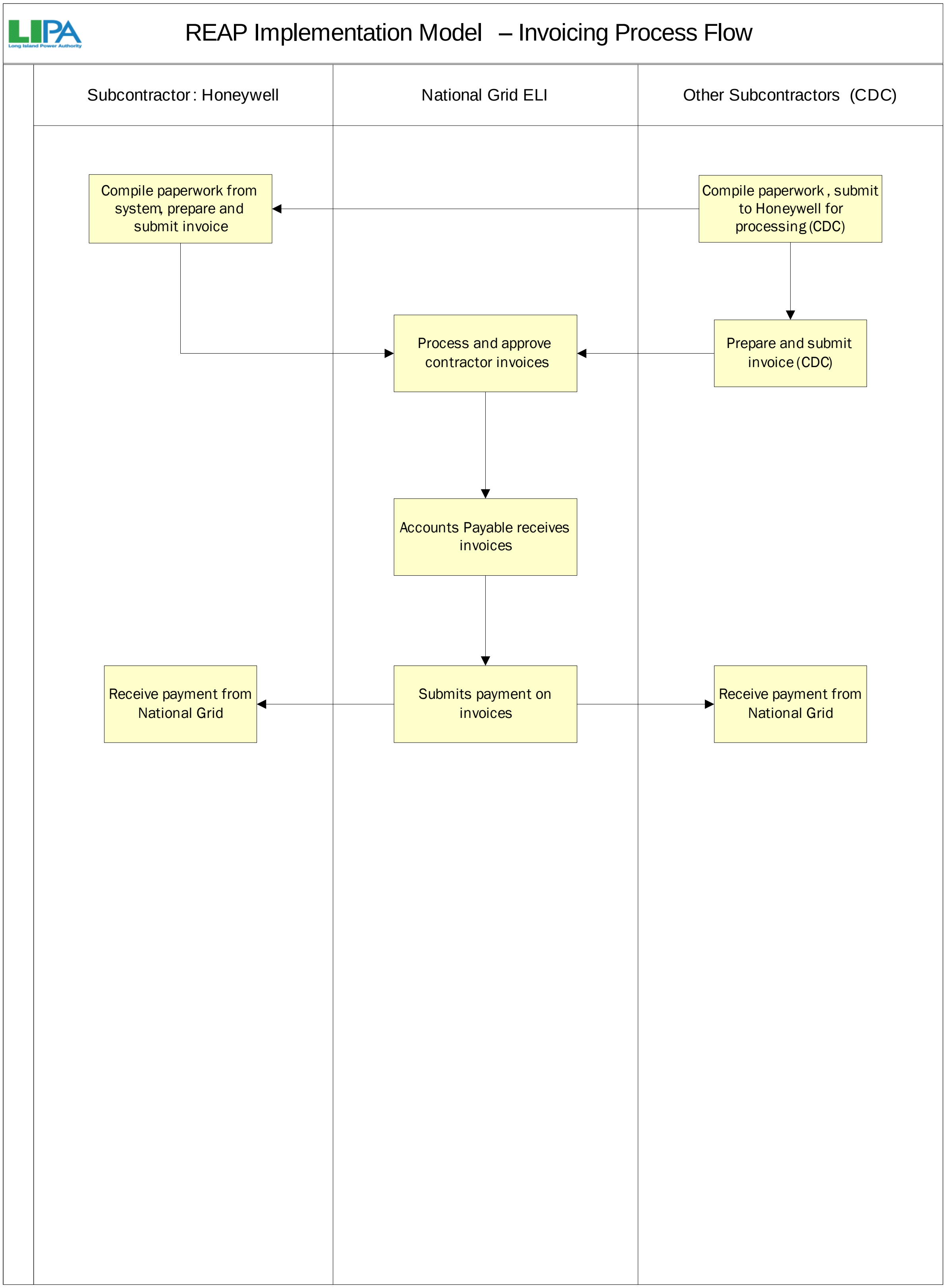

Cool Homes – Geothermal/Geocolumn Rebate Application Process Flow
Customers
Market Actors
National Grid - ELI
CSG
Learn about the program
Choose a contractor
Select qualifying equipment
Install qualifying equipment
Fill out rebate application (respective sections within the application)
Submit rebate application form and all required documentation
Verify customer/equipment eligibility/enter into the database
Eligible?
No
Yes
Send request for additional information or denial letter
Update database
Conduct post-inspection (random 10% of submittals)
Resolve the issue and resubmit?
Yes
No
Report audit results to National Grid - ELI
Update database with audit results
Rebate process terminated
Audit results positive
No
Yes
Send denial letter
Send rebate approval letter
Receive rebate denial letter
Receive rebate approval letter
Approve application and issue payment
Rebate check or bill credit?
Rebate check
Bill credit
Receive rebate check
Customer's utility bill reflects the credit

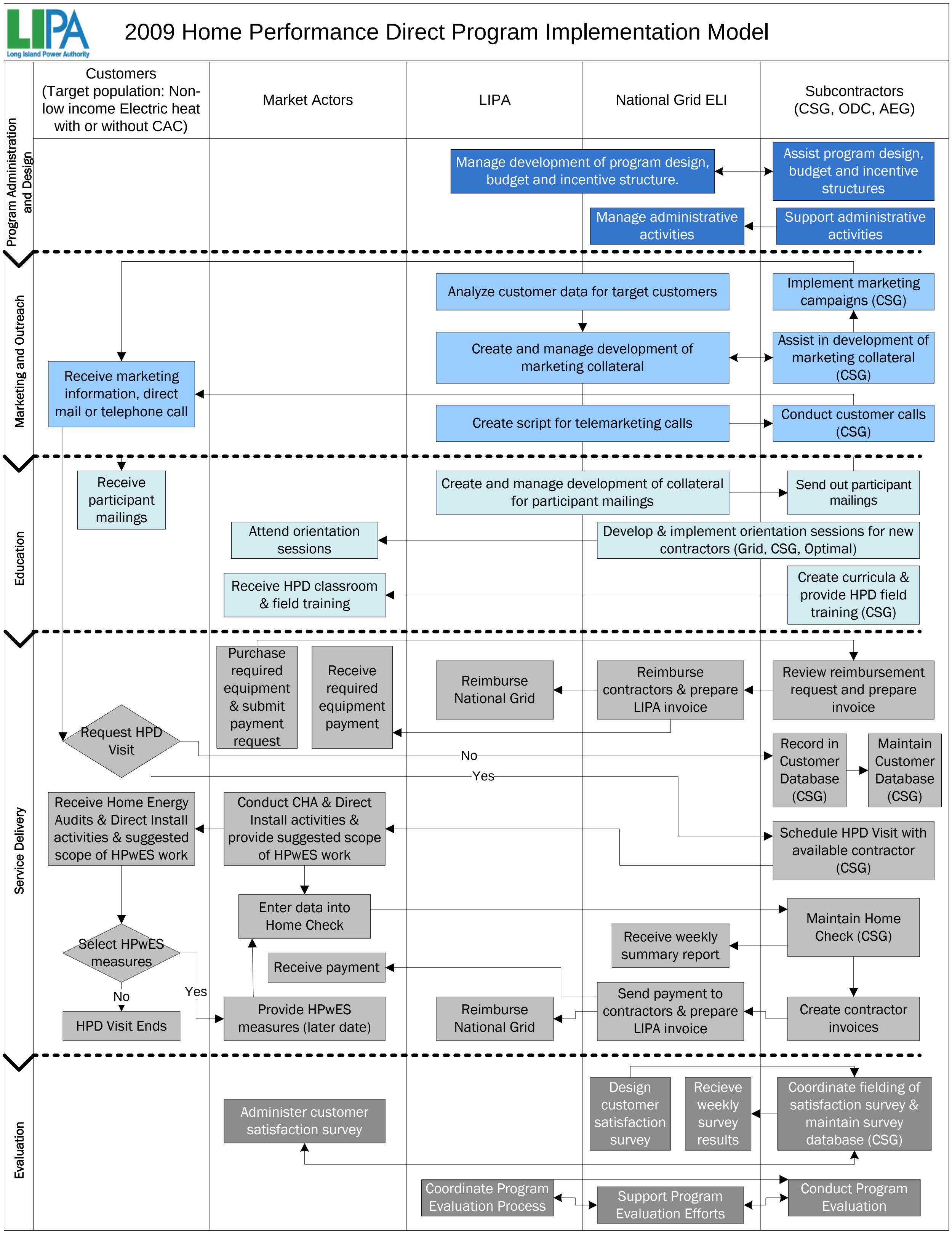

Cool Homes – Tune Up Rebate Application Process Flow
Customers
Market Actors
National Grid - ELI
CSG
Learn about the program
Select from a list of participating contractors
Perform CheckMe! verification process
Hotline operator records data and informs contractor of the outcome
Make adjustments and retest the unit
Unit does not pass test
Fill out application form (respective sections within the application)
Suggest solutions and help technician retest the unit
Submit rebate application form and all required documentation
Receive CheckMe! installation certificate
Mail installation certificate
Verify customer/ equipment eligibility/ enter into the database
Yes
Eligible?
No
Yes
Send request for additional information or denial letter
Update database
Conduct post-inspection (random 10% of submittals)
Resolve the issue and resubmit?
No
Update database with audit results
Report audit results to National Grid - ELI
Rebate process terminated
Audit results positive
No
Yes
Send denial letter
Send approval letter
Receive rebate denial letter
Receive rebate approval letter
Approve application and issue payment
Receive rebate check
Receive rebate check
Rebate check
Rebate check , rebate assignment or bill credit?
Customer's utility bill reflects the credit
Receive the amount credited to customer
Rebate assignment
Bill credit

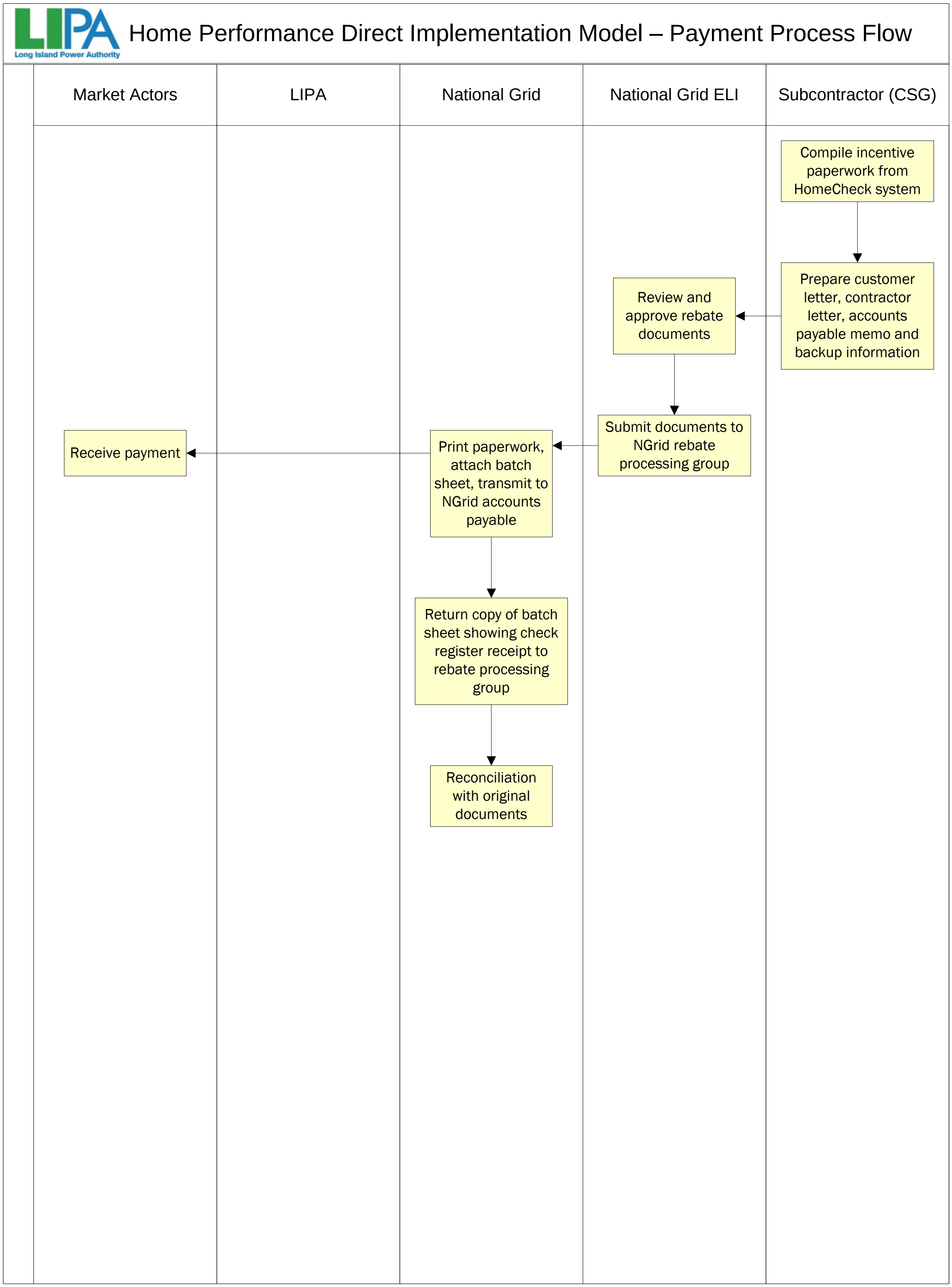

Cool Homes – New Contractor Participation Process Flow
Contractors
National Grid – ELI
CSG
EHCC
Learn about the program
Recruit contractors
Sign and submit participating contractor agreement and required paperwork
Process application
Approve Application?
No
Yes
Submit missing documentation
Request additional information
Send welcome letter
Receive welcome letter
Send contractor name to CSG
Schedule training/provide training space
Contact contractor to schedule mandatory CheckMe! training
Enroll in training
Provide mandatory one day CheckMe! Training (free)
Provide optional Manual J and D training (discounted)
Complete mandatory one day CheckMe! Training (free)
Add contractor to the list of qualified/participating contractors
Complete Manual J and D training (discounted)
Approve invoice and reimburse EHCC
Submit invoice with training discounts provided to contractors
Obtain ACCA approved Manual J software
Purchase eligible tools
Receive reimbursement
Submit purchase receipt or vendor notification
Verify and approve purchases
Conduct post-training contractor satisfaction study
Conduct post-training contractor satisfaction study
Type of purchase?
Manual J Software
Eligible tools
Reimburse 50% (after 20 approved applications are submitted) (one purchase per contractor)
Reimburse 75% (after 20 approved applications are submitted) ($10,000 per contractor cap)
Receive reimbursement
Participate in the study

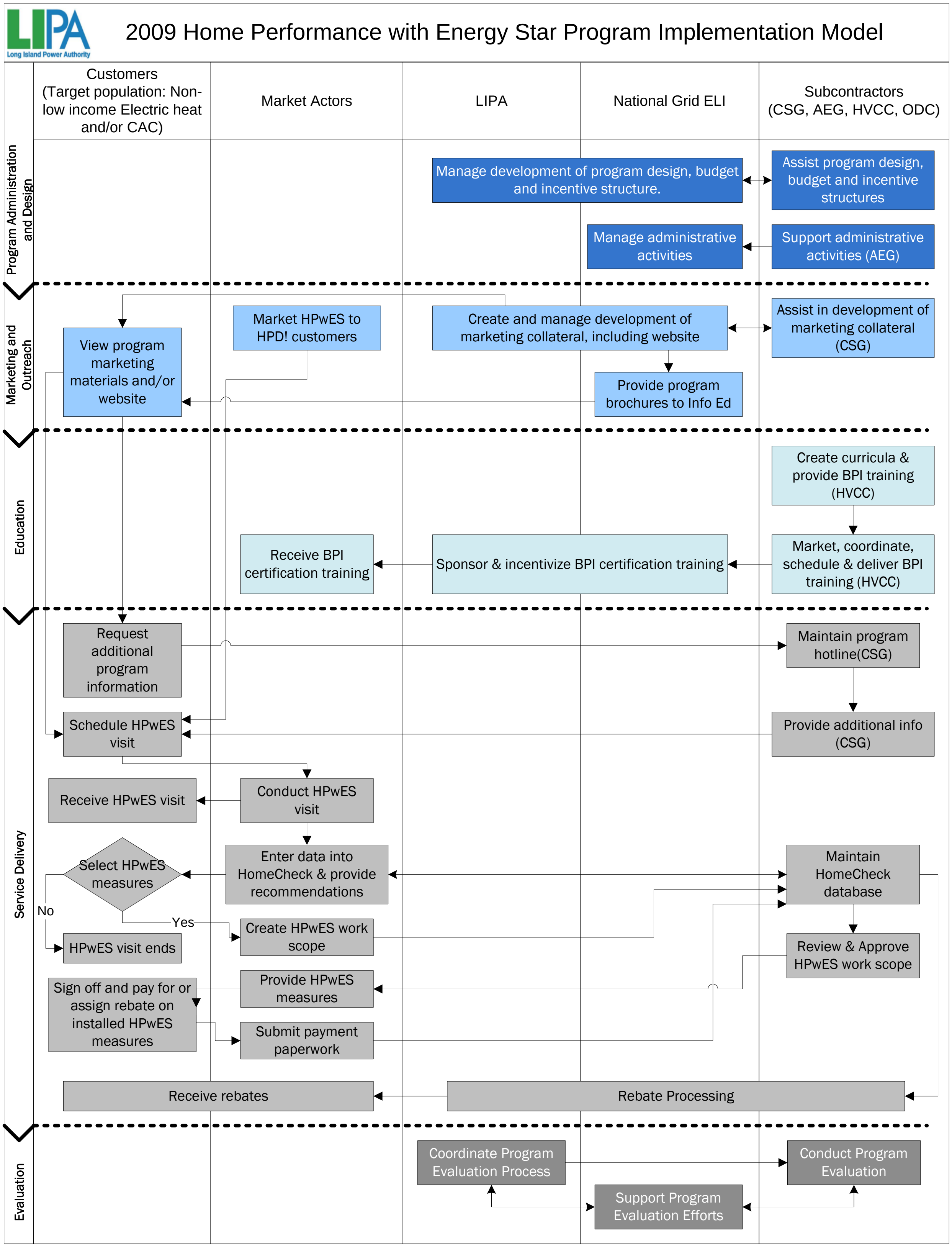

LIPA
Long Island Power Authority
2009 REAP Program Implementation Model
Customer
LIPA
National Grid ELI
Honeywell
Other Subcontractors (CSG, CDC, ODC, AEG)
Program Administration and Design
Program Design
Review and approve program materials, procedures
Create internal forms, provide equipment needed for audit, develop database for tracking, 800 number for customers
Review reports
Data tracking, reporting and analysis
Marketing and Outreach
Approve marketing materials, outreach with other orgs targeting low income
Develop marketing for program (bill inserts, direct mail, targeted outreach, etc.)
Targeted Outreach (Grassroots, bill inserts, direct mail, etc)
Receive marketing messages
CDC is provided targeted list of customers from Honeywell
LIPA InfoLine
Honeywell info line
Education
Provide 4 BPI trainings to contractors
Recruit experienced staff and provide additional training as needed
Train contractors on REAP installation procedures
Service Delivery
Apply to program
Determine eligibility, schedule site visits
Receive home energy audit and applicable measures to achieve maximum level of cost effective energy savings
Conduct home energy audits, install applicable measures
CDC provides 10% of REAP completions in conjunction with the DOE WAP program
Educate customers on energy efficiency and other programs (refrigerator recycling, etc.)
Receive, monitor, track and provide guidance to achieve customer complaint resolution
Respond to customer complaint or inquiries
Receive follow-up measures and installations as applicable
Install follow-up measures as applicable
Receive monthly statistics
Invoicing
Evaluation
QA/QC through sampling of in-progress and completed jobs
QA/QC through sampling of in-progress and completed jobs (CSG)
Coordinate program evaluation process
Support evaluation efforts
Conduct Program Evaluation (ODC)

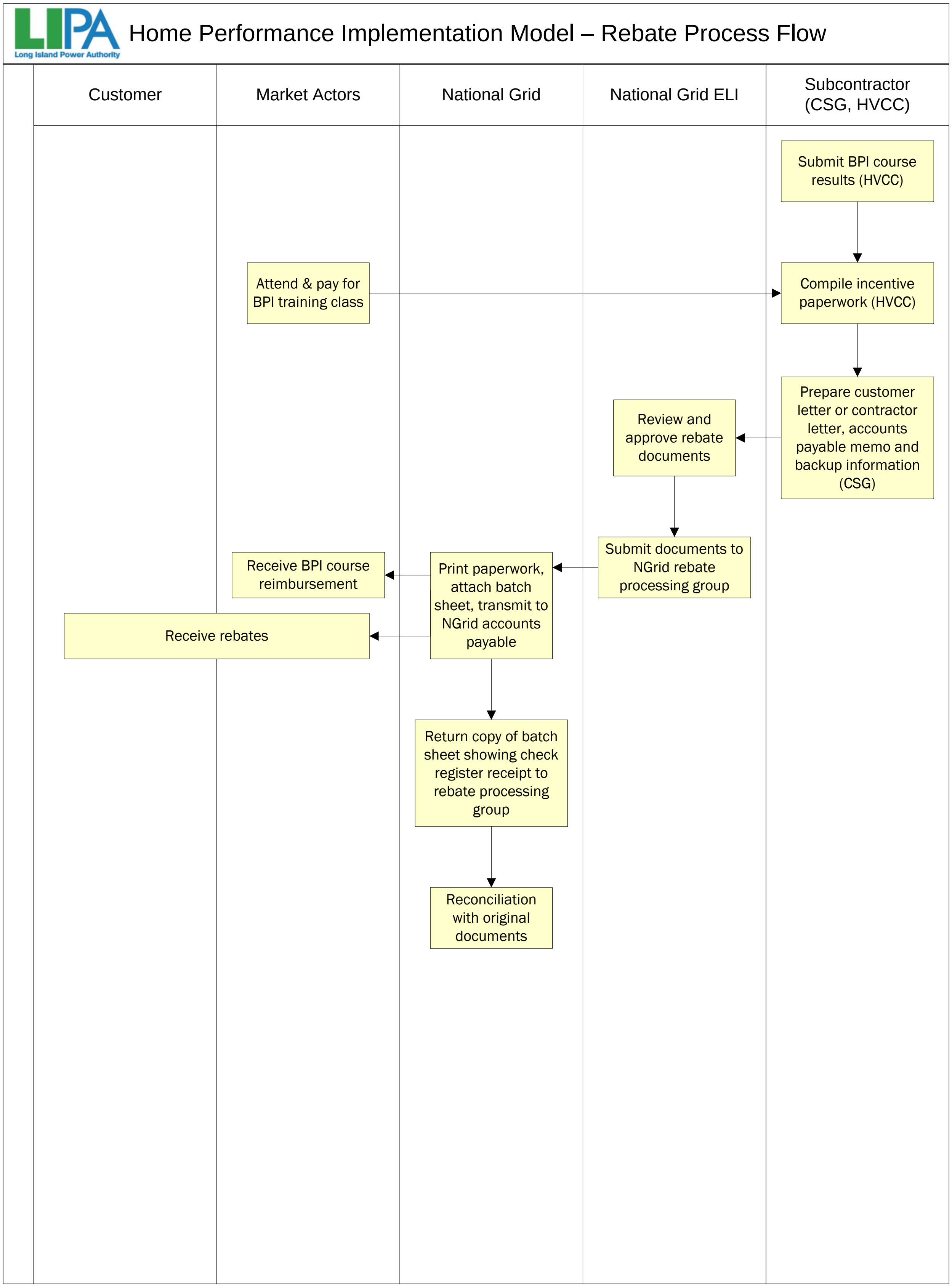

REAP Implementation Model – Targeted Outreach Process Flow
Customer
Subcontractor: Honeywell
National Grid ELI
Other Subcontractor (CDC)
Conduct billing analysis to target customers
Targeted customer list
Target customers in multi-family buildings
Target customers through neighborhood canvassing
Provide Honeywell with billing data, including past REAP participation
CDC is provided targeted list of customers from Honeywell
Visit sites to determine feasibility and opportunity of each site
Identify set of neighborhoods where blanket eligibility can be established
Bill inserts, direct mail, booths at events, other marketing outreach
Prioritize site visits based on potential savings opportunities
Conduct targeted outreach effort through direct mail and phone calls to customers in selected neighborhoods
Contact building manager for access to tenants and apartments, explain program
Perform audits for interested eligible customers on specified date where neighborhood will be canvassed
Receive message, enroll in program, receive Home Energy Audit
"Sweep" building to enroll interested eligible customers in the program

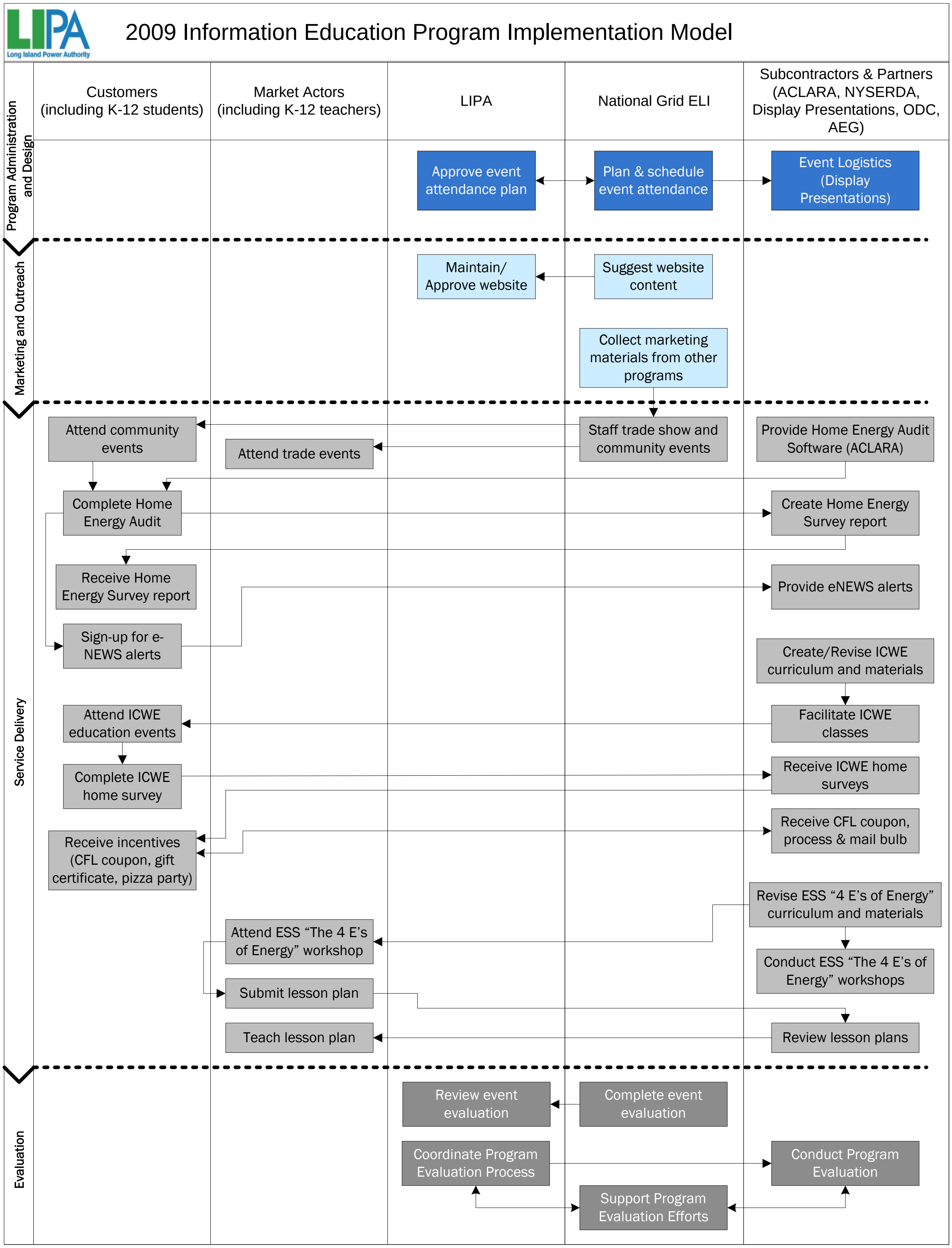

REAP Implementation Model – Invoicing Process Flow
Subcontractor: Honeywell
National Grid ELI
Other Subcontractors (CDC)
Compile paperwork from system, prepare and submit invoice
Compile paperwork, submit to Honeywell for processing (CDC)
Process and approve contractor invoices
Prepare and submit invoice (CDC)
Accounts Payable receives invoices
Receive payment from National Grid
Submits payment on invoices
Receive payment from National Grid

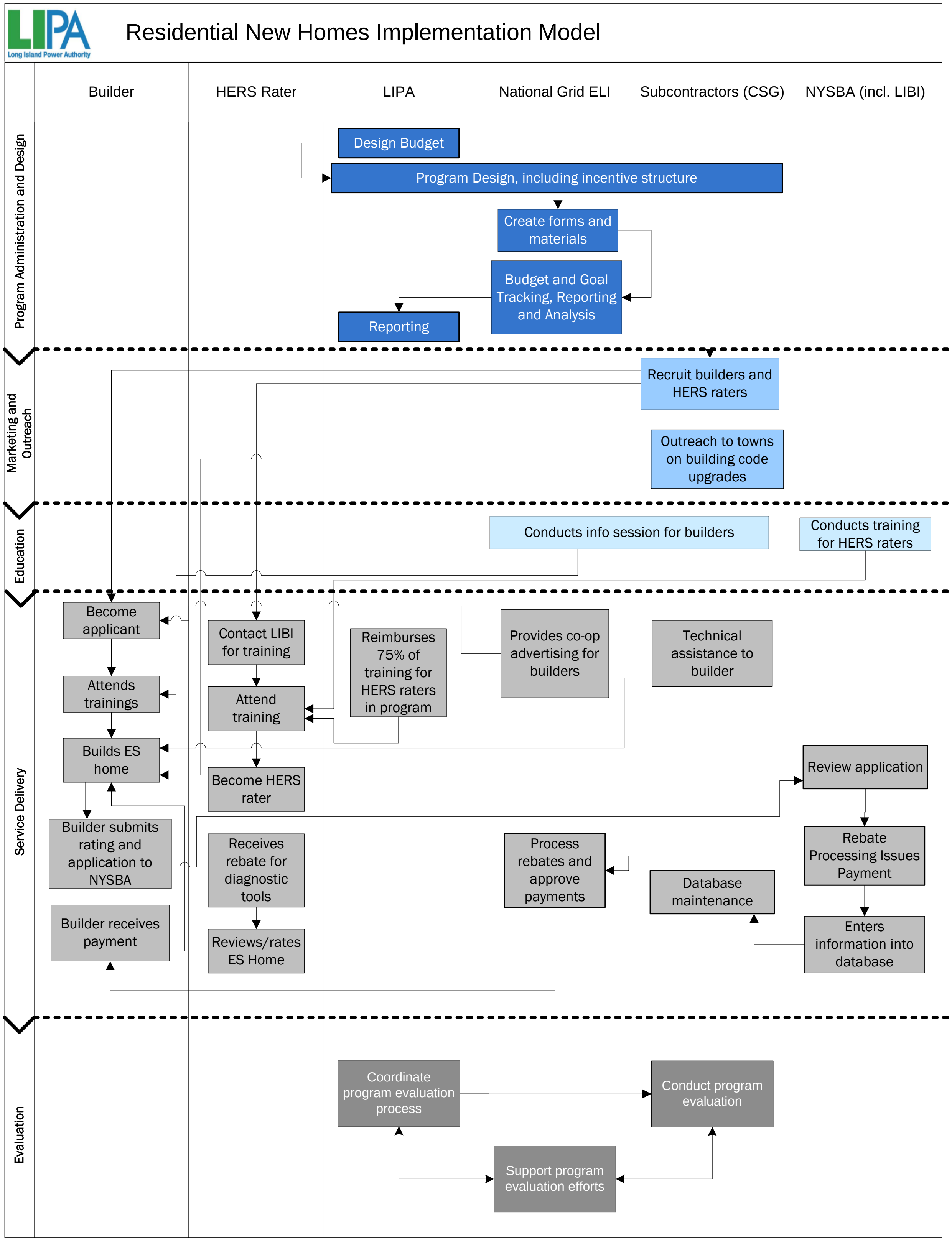

LIPA
Long Island Power Authority
2009 Home Performance Direct Program Implementation Model
Customers (Target population: Non-low income Electric heat with or without CAC)
Market Actors
LIPA
National Grid ELI
Subcontractors (CSG, ODC, AEG)
Program Administration and Design
Manage development of program design, budget and incentive structure.
Assist program design, budget and incentive structures
Manage administrative activities
Support administrative activities
Marketing and Outreach
Analyze customer data for target customers
Implement marketing campaigns (CSG)
Create and manage development of marketing collateral
Assist in development of marketing collateral (CSG)
Receive marketing information, direct mail or telephone call
Create script for telemarketing calls
Conduct customer calls (CSG)
Education
Receive participant mailings
Create and manage development of collateral for participant mailings
Send out participant mailings
Attend orientation sessions
Develop & implement orientation sessions for new contractors (Grid, CSG, Optimal)
Receive HPD classroom & field training
Create curricula & provide HPD field training (CSG)
Service Delivery
Purchase required equipment & submit payment request
Receive required equipment payment
Reimburse National Grid
Reimburse contractors & prepare LIPA invoice
Review reimbursement request and prepare invoice
Request HPD Visit
No
Yes
Record in Customer Database (CSG)
Maintain Customer Database (CSG)
Receive Home Energy Audits & Direct Install activities & suggested scope of HPwES work
Conduct CHA & Direct Install activities & provide suggested scope of HPwES work
Schedule HPD Visit with available contractor (CSG)
Enter data into Home Check
Maintain Home Check (CSG)
Receive weekly summary report
Select HPwES measures
Receive payment
Yes
No
Send payment to contractors & prepare LIPA invoice
HPD Visit Ends
Provide HPwES measures (later date)
Reimburse National Grid
Create contractor invoices
Evaluation
Design customer satisfaction survey
Recieve weekly survey results
Coordinate fielding of satisfaction survey & maintain survey database (CSG)
Administer customer satisfaction survey
Coordinate Program Evaluation Process
Support Program Evaluation Efforts
Conduct Program Evaluation

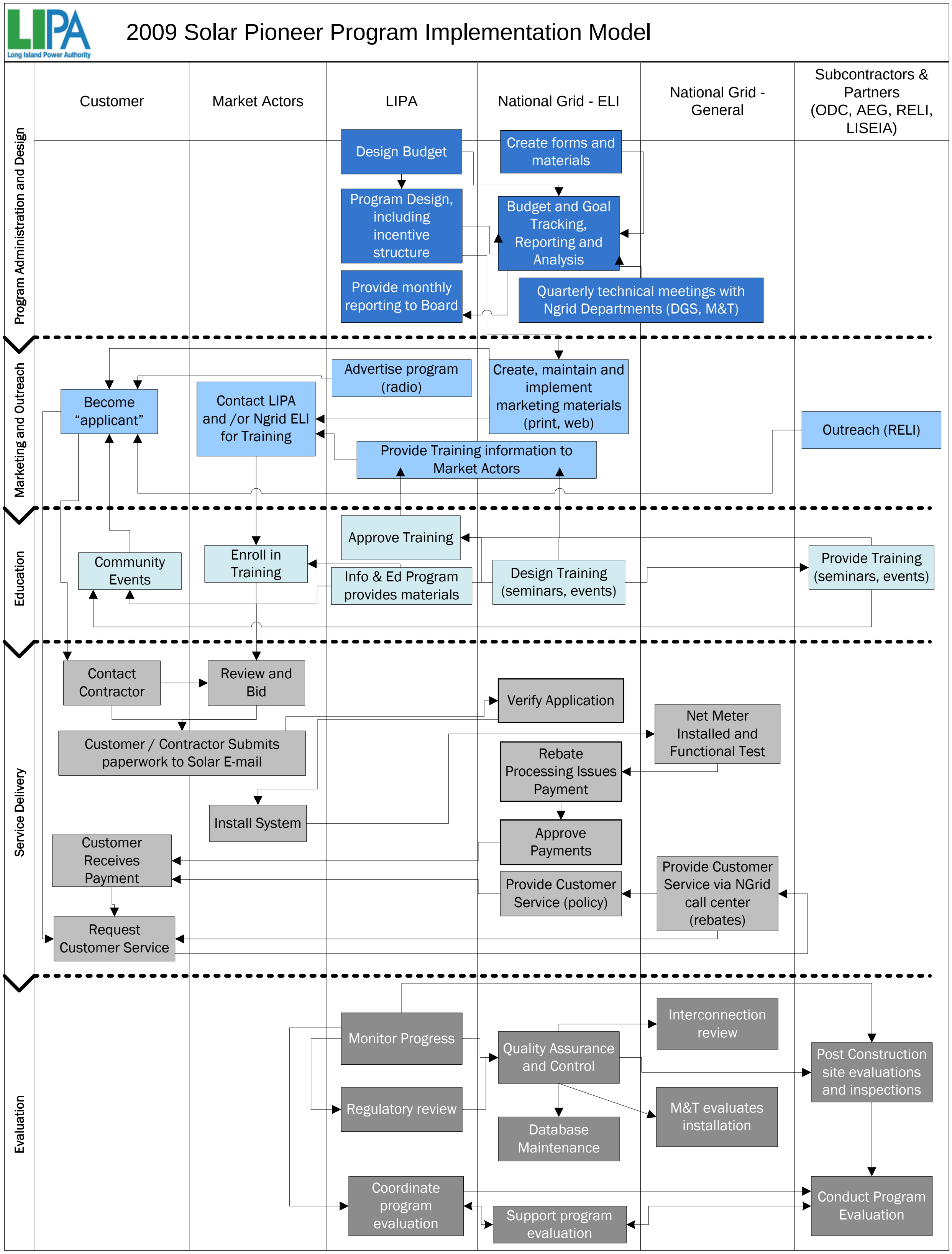

LIPA
Long Island Power Authority
Home Performance Direct Implementation Model – Payment Process Flow
Market Actors
LIPA
National Grid
National Grid ELI
Subcontractor (CSG)
Compile incentive paperwork from HomeCheck system
Prepare customer letter, contractor letter, accounts payable memo and backup information
Review and approve rebate documents
Submit documents to NGrid rebate processing group
Print paperwork, attach batch sheet, transmit to NGrid accounts payable
Receive payment
Return copy of batch sheet showing check register receipt to rebate processing group
Reconciliation with original documents


LIPA
Long Island Power Authority
2009 Home Performance with Energy Star Program Implementation Model
Customers (Target population: Non-low income Electric heat and/or CAC)
Market Actors
LIPA
National Grid ELI
Subcontractors (CSG, AEG, HVCC, ODC)
Program Administration and Design
Manage development of program design, budget and incentive structure.
Assist program design, budget and incentive structures
Manage administrative activities
Support administrative activities (AEG)
Marketing and Outreach
View program marketing materials and/or website
Market HPwES to HPD! customers
Create and manage development of marketing collateral, including website
Assist in development of marketing collateral (CSG)
Provide program brochures to Info Ed
Education
Create curricula & provide BPI training (HVCC)
Receive BPI certification training
Sponsor & incentivize BPI certification training
Market, coordinate, schedule & deliver BPI training (HVCC)
Service Delivery
Request additional program information
Maintain program hotline(CSG)
Schedule HPwES visit
Provide additional info (CSG)
Receive HPwES visit
Conduct HPwES visit
Select HPwES measures
Enter data into HomeCheck & provide recommendations
Maintain HomeCheck database
No
Yes
HPwES visit ends
Create HPwES work scope
Review & Approve HPwES work scope
Sign off and pay for or assign rebate on installed HPwES measures
Provide HPwES measures
Submit payment paperwork
Receive rebates
Rebate Processing
Evaluation
Coordinate Program Evaluation Process
Conduct Program Evaluation
Support Program Evaluation Efforts

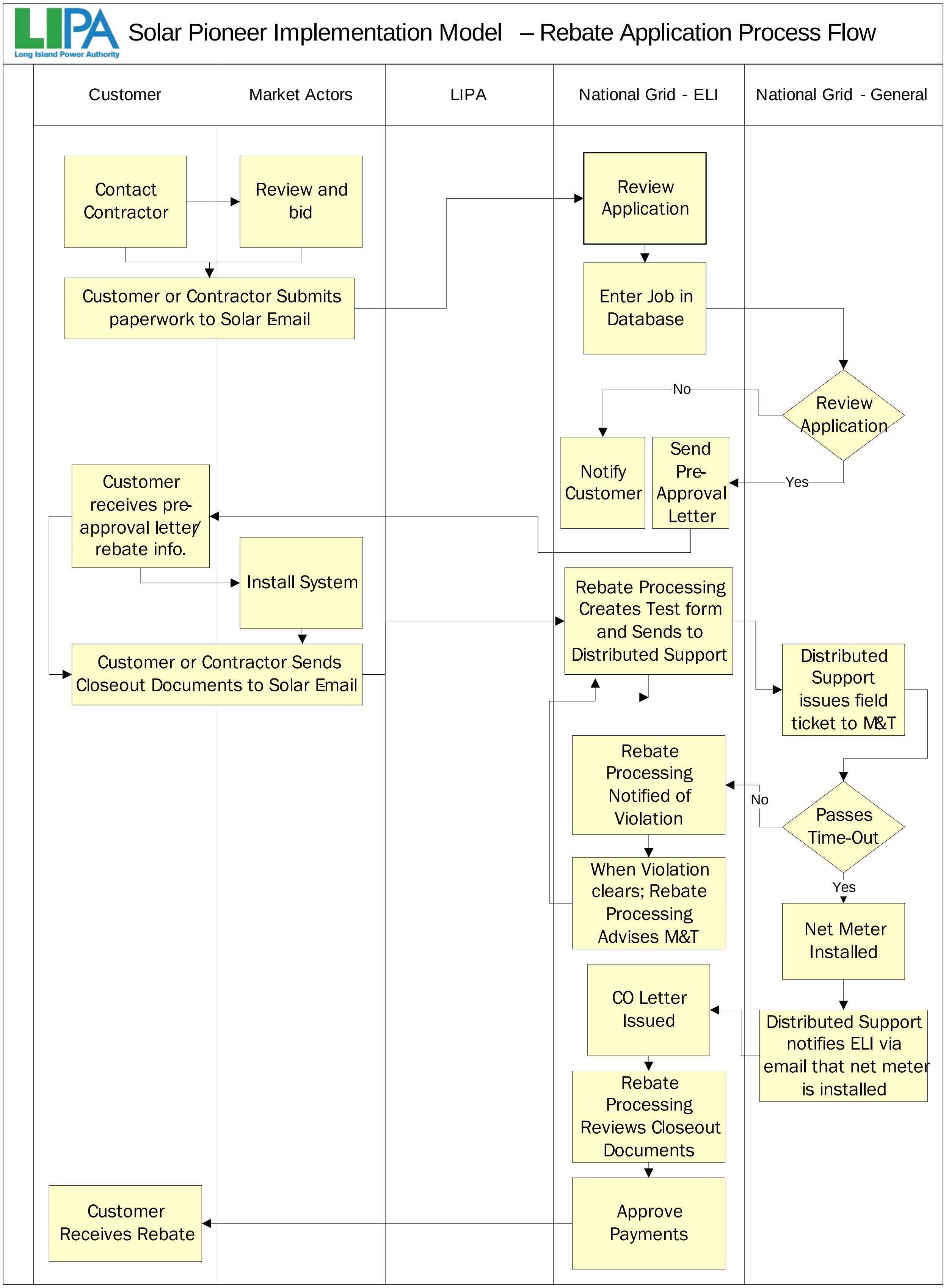

Long Island Power Authority
Home Performance Implementation Model – Rebate Process Flow
Customer
Market Actors
National Grid
National Grid ELI
Subcontractor (CSG, HVCC)
Submit BPI course results (HVCC)
Attend & pay for BPI training class
Compile incentive paperwork (HVCC)
Review and approve rebate documents
Prepare customer letter or contractor letter, accounts payable memo and backup information (CSG)
Submit documents to NGrid rebate processing group
Receive BPI course reimbursement
Print paperwork, attach batch sheet, transmit to NGrid accounts payable
Receive rebates
Return copy of batch sheet showing check register receipt to rebate processing group
Reconciliation with original documents

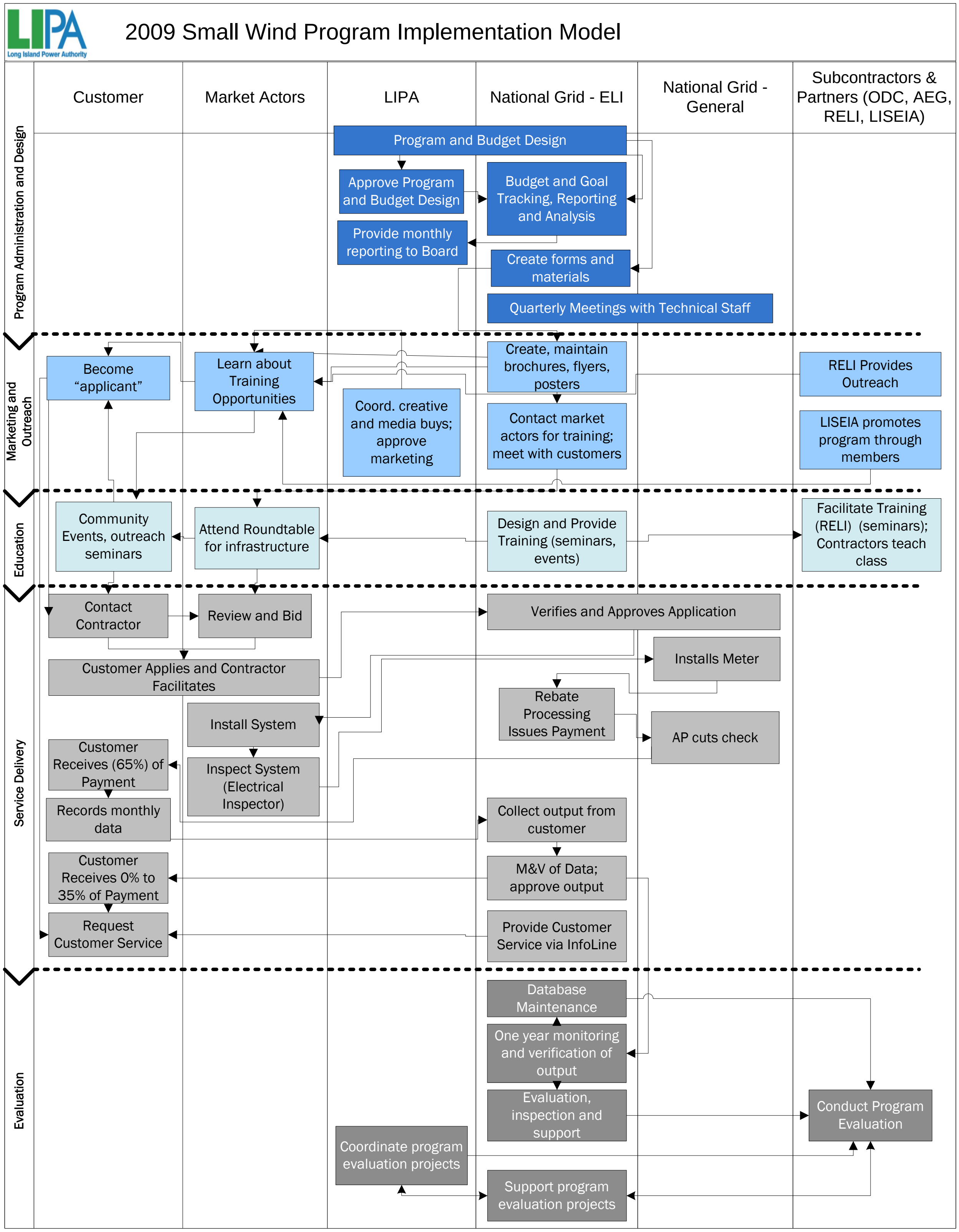

2009 Information Education Program Implementation Model
Customers (including K-12 students)
Market Actors (including K-12 teachers)
LIPA
National Grid ELI
Subcontractors & Partners (ACLARA, NYSERDA, Display Presentations, ODC, AEG)
Program Administration and Design
Approve event attendance plan
Plan & schedule event attendance
Event Logistics (Display Presentations)
Marketing and Outreach
Maintain/ Approve website
Suggest website content
Collect marketing materials from other programs
Service Delivery
Attend community events
Attend trade events
Staff trade show and community events
Provide Home Energy Audit Software (ACLARA)
Complete Home Energy Audit
Create Home Energy Survey report
Receive Home Energy Survey report
Provide eNEWS alerts
Sign-up for e-NEWS alerts
Create/Revise ICWE curriculum and materials
Attend ICWE education events
Facilitate ICWE classes
Complete ICWE home survey
Receive ICWE home surveys
Receive incentives (CFL coupon, gift certificate, pizza party)
Receive CFL coupon, process & mail bulb
Revise ESS "4 E's of Energy" curriculum and materials
Attend ESS "The 4 E's of Energy" workshop
Conduct ESS "The 4 E's of Energy" workshops
Submit lesson plan
Teach lesson plan
Review lesson plans
Evaluation
Review event evaluation
Complete event evaluation
Coordinate Program Evaluation Process
Conduct Program Evaluation
Support Program Evaluation Efforts

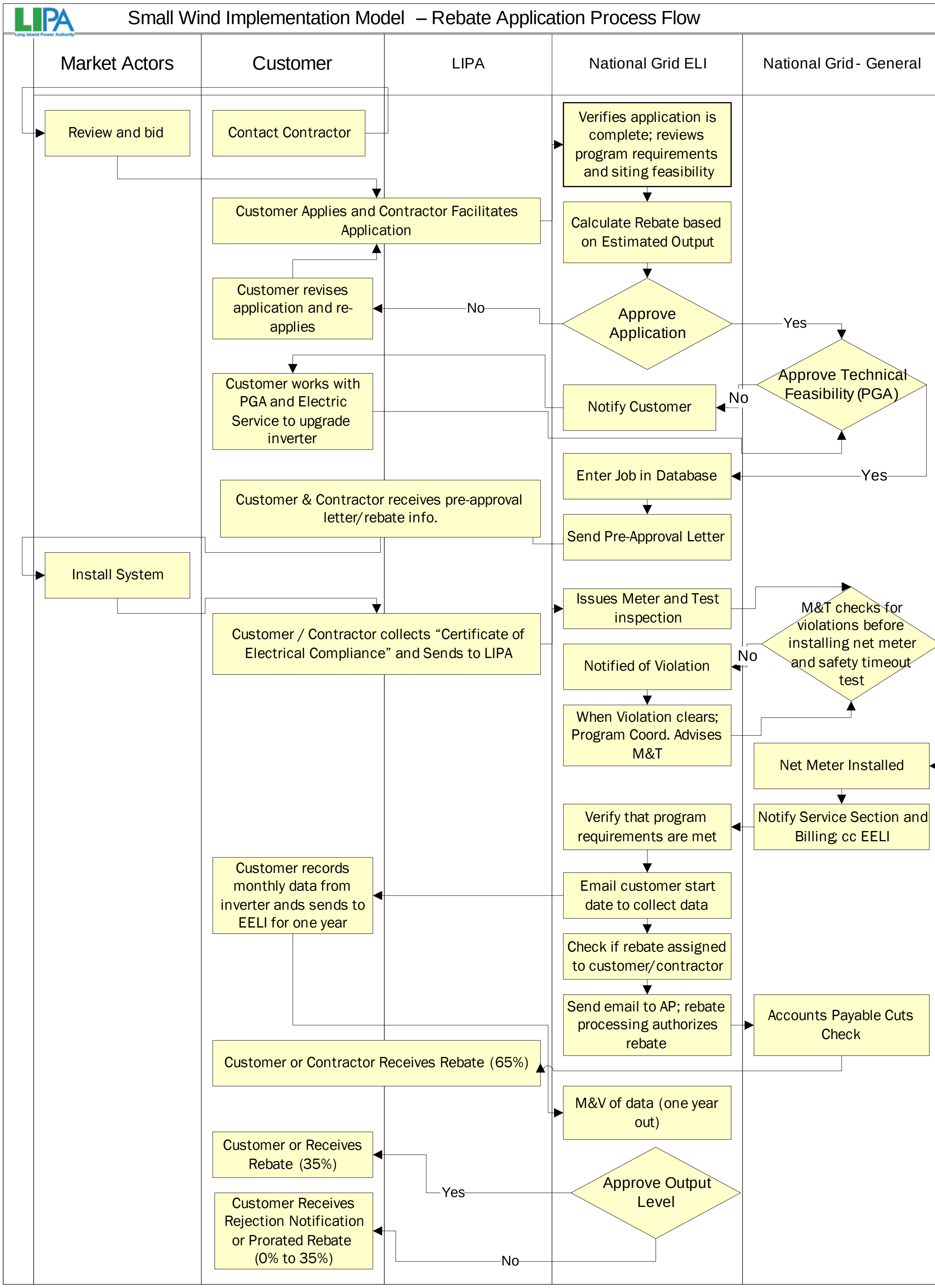

LIPA
Long Island Power Authority
Residential New Homes Implementation Model
Builder
HERS Rater
LIPA
National Grid ELI
Subcontractors (CSG)
NYSBA (incl. LIBI)
Program Administration and Design
Design Budget
Program Design, including incentive structure
Create forms and materials
Budget and Goal Tracking, Reporting and Analysis
Reporting
Marketing and Outreach
Recruit builders and HERS raters
Outreach to towns on building code upgrades
Education
Conducts info session for builders
Conducts training for HERS raters
Service Delivery
Become applicant
Attends trainings
Builds ES home
Builder submits rating and application to NYSBA
Builder receives payment
Contact LIBI for training
Attend training
Become HERS rater
Receives rebate for diagnostic tools
Reviews/rates ES Home
Reimburses 75% of training for HERS raters in program
Provides co-op advertising for builders
Process rebates and approve payments
Technical assistance to builder
Database maintenance
Review application
Rebate Processing Issues Payment
Enters information into database
Evaluation
Coordinate program evaluation process
Conduct program evaluation
Support program evaluation efforts

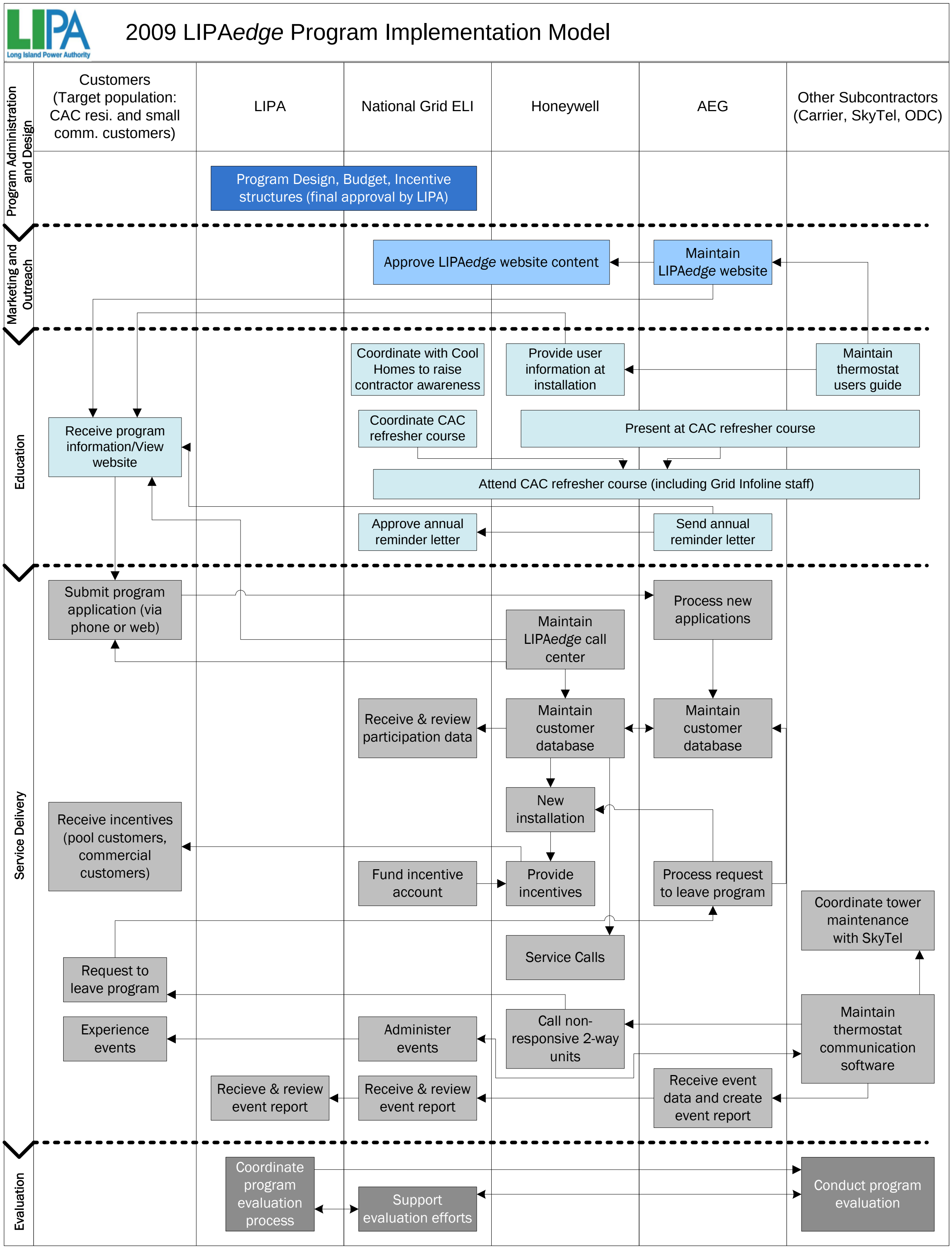


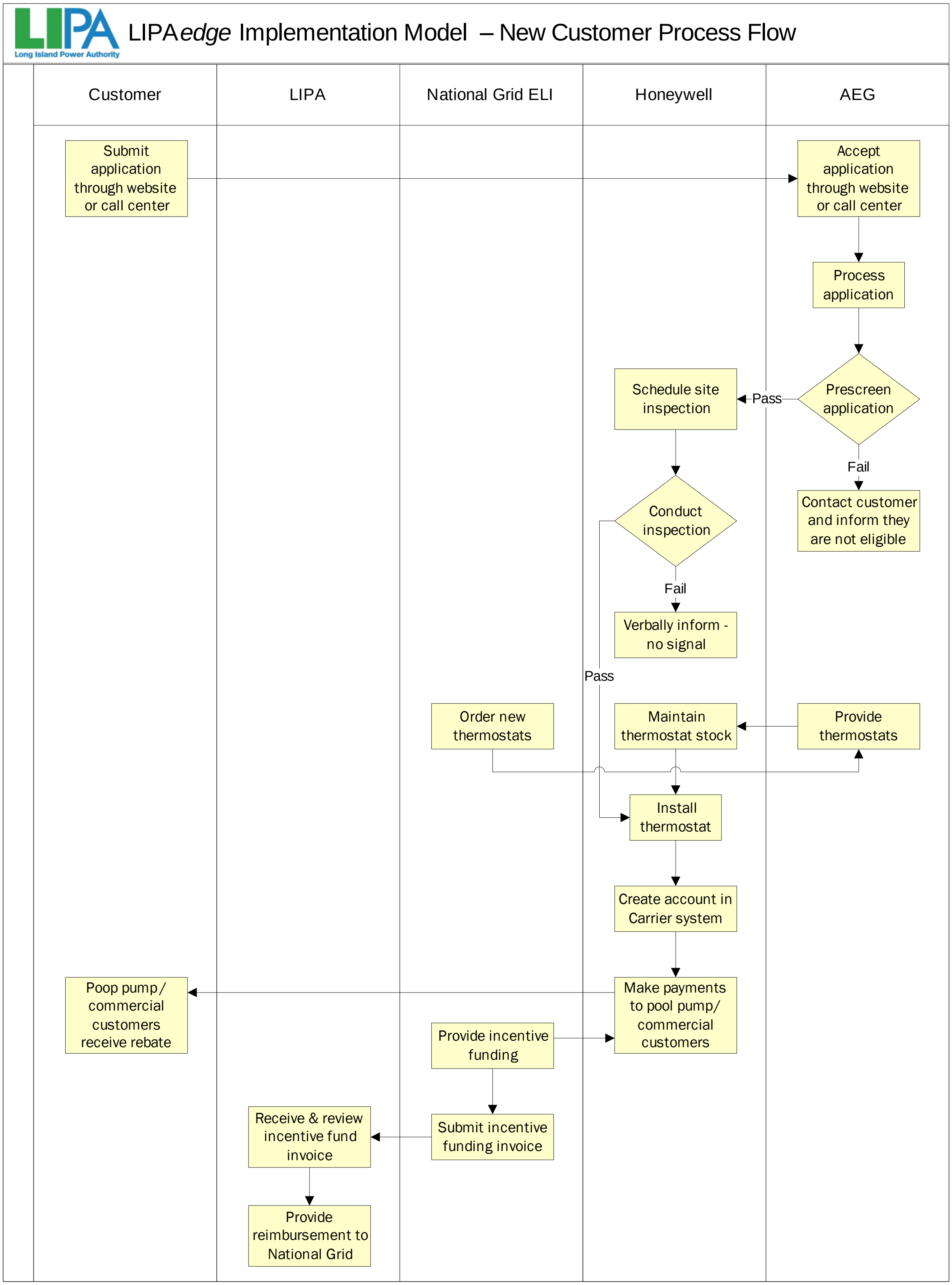
LIPA
Long Island Power Authority
2009 Solar Pioneer Program Implementation Model
Customer
Market Actors
LIPA
National Grid - ELI
National Grid - General
Subcontractors & Partners (ODC, AEG, RELI, LISEIA)
Program Administration and Design
Design Budget
Create forms and materials
Program Design, including incentive structure
Budget and Goal Tracking, Reporting and Analysis
Provide monthly reporting to Board
Quarterly technical meetings with Ngrid Departments (DGS, M&T)
Marketing and Outreach
Advertise program (radio)
Create, maintain and implement marketing materials (print, web)
Become "applicant"
Contact LIPA and /or Ngrid ELI for Training
Outreach (RELI)
Provide Training information to Market Actors
Education
Approve Training
Community Events
Enroll in Training
Info & Ed Program provides materials
Design Training (seminars, events)
Provide Training (seminars, events)
Service Delivery
Contact Contractor
Review and Bid
Verify Application
Net Meter Installed and Functional Test
Customer / Contractor Submits paperwork to Solar E-mail
Rebate Processing Issues Payment
Install System
Approve Payments
Customer Receives Payment
Provide Customer Service (policy)
Provide Customer Service via NGrid call center (rebates)
Request Customer Service
Evaluation
Interconnection review
Monitor Progress
Quality Assurance and Control
Post Construction site evaluations and inspections
Regulatory review
M&T evaluates installation
Database Maintenance
Coordinate program evaluation
Support program evaluation
Conduct Program Evaluation

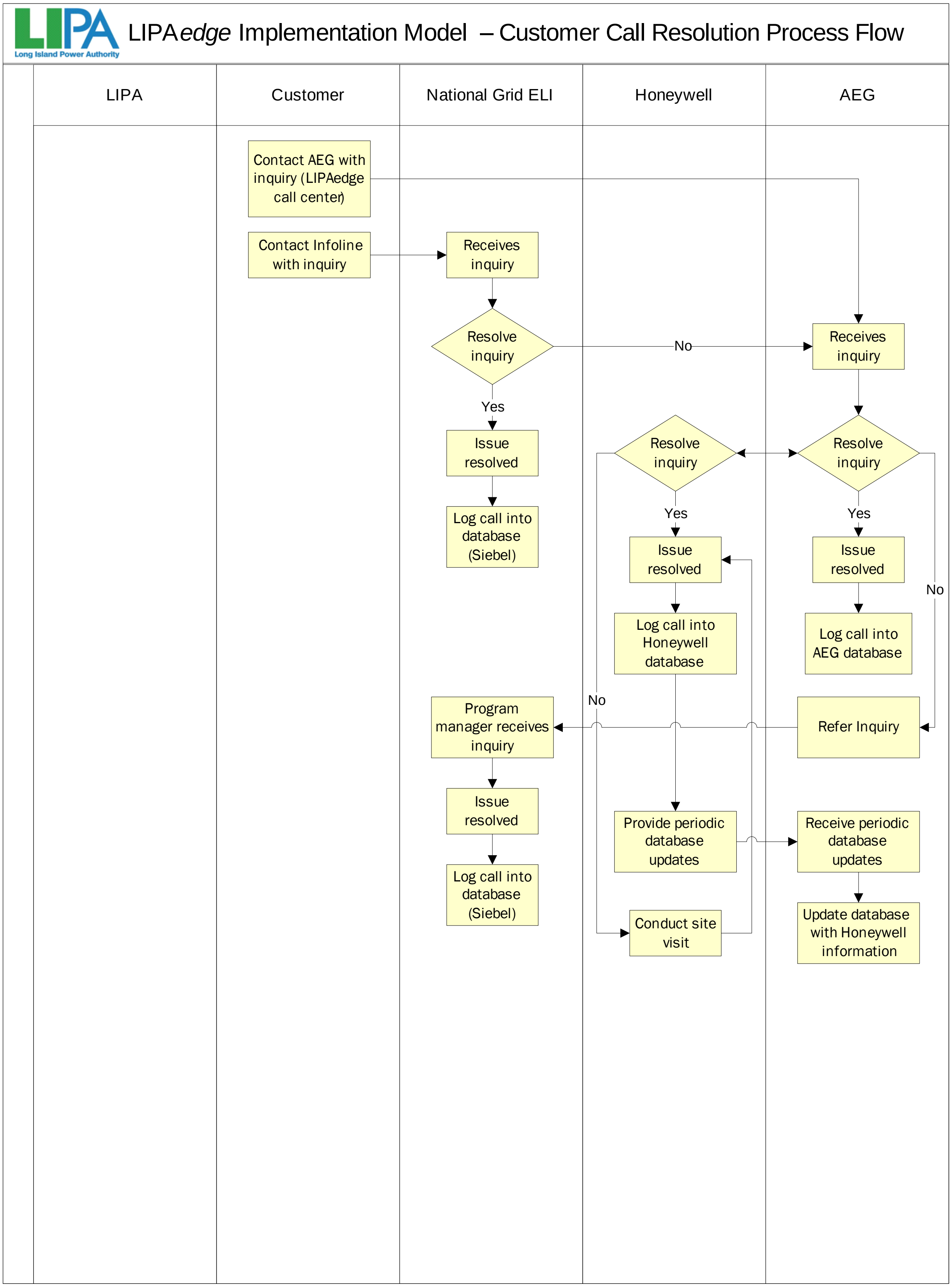

Solar Pioneer Implementation Model – Rebate Application Process Flow
Customer
Market Actors
LIPA
National Grid - ELI
National Grid - General
Contact Contractor
Review and bid
Review Application
Enter Job in Database
Customer or Contractor Submits paperwork to Solar Email
Review Application
No
Yes
Notify Customer
Send Pre-Approval Letter
Customer receives pre-approval letter/ rebate info.
Install System
Rebate Processing Creates Test form and Sends to Distributed Support
Customer or Contractor Sends Closeout Documents to Solar Email
Distributed Support issues field ticket to M&T
Rebate Processing Notified of Violation
No
Passes Time-Out
Yes
When Violation clears; Rebate Processing Advises M&T
Net Meter Installed
CO Letter Issued
Distributed Support notifies ELI via email that net meter is installed
Rebate Processing Reviews Closeout Documents
Customer Receives Rebate
Approve Payments

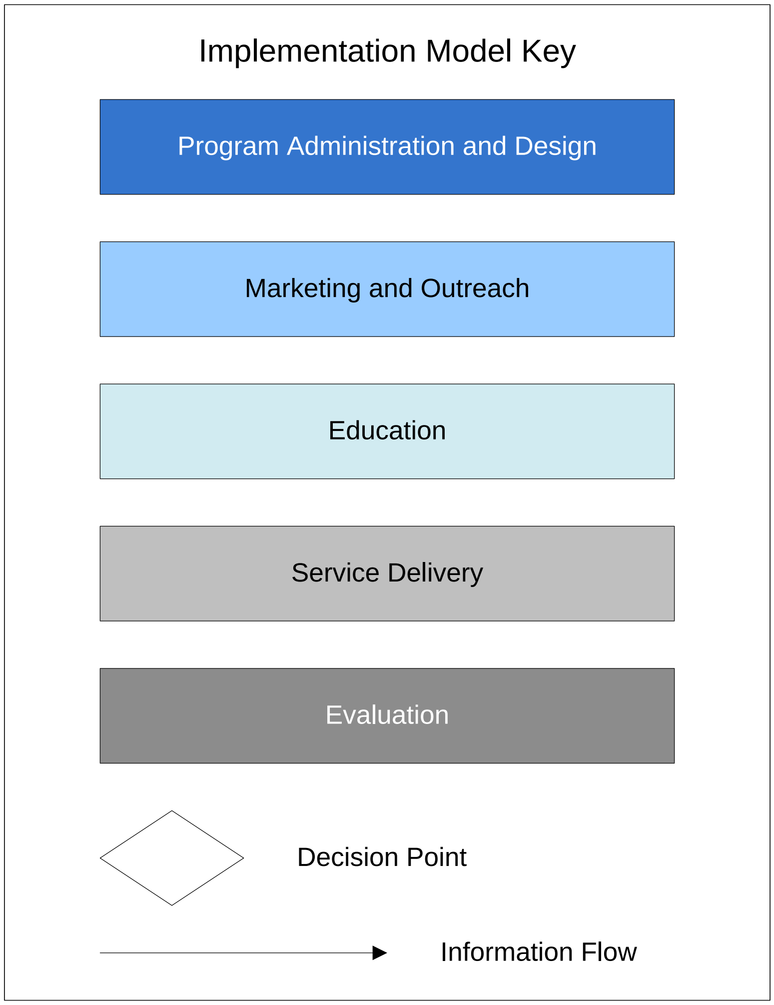

2009 Small Wind Program Implementation Model
Program Administration and Design
Marketing and Outreach
Education
Service Delivery
Evaluation
Customer
Market Actors
LIPA
National Grid - ELI
National Grid - General
Subcontractors & Partners (ODC, AEG, RELI, LISEIA)
Program and Budget Design
Approve Program and Budget Design
Budget and Goal Tracking, Reporting and Analysis
Provide monthly reporting to Board
Create forms and materials
Quarterly Meetings with Technical Staff
Become "applicant"
Learn about Training Opportunities
Coord. creative and media buys; approve marketing
Create, maintain brochures, flyers, posters
Contact market actors for training; meet with customers
RELI Provides Outreach
LISEIA promotes program through members
Community Events, outreach seminars
Attend Roundtable for infrastructure
Design and Provide Training (seminars, events)
Facilitate Training (RELI) (seminars); Contractors teach class
Contact Contractor
Review and Bid
Verifies and Approves Application
Customer Applies and Contractor Facilitates
Installs Meter
Rebate Processing Issues Payment
Install System
AP cuts check
Customer Receives (65%) of Payment
Inspect System (Electrical Inspector)
Records monthly data
Collect output from customer
Customer Receives 0% to 35% of Payment
M&V of Data; approve output
Request Customer Service
Provide Customer Service via InfoLine
Database Maintenance
One year monitoring and verification of output
Evaluation, inspection and support
Conduct Program Evaluation
Coordinate program evaluation projects
Support program evaluation projects


LIPA
Small Wind Implementation Model – Rebate Application Process Flow
Market Actors
Customer
LIPA
National Grid ELI
National Grid - General
Review and bid
Contact Contractor
Verifies application is complete; reviews program requirements and siting feasibility
Customer Applies and Contractor Facilitates Application
Calculate Rebate based on Estimated Output
Customer revises application and re-applies
No
Approve Application
Yes
Approve Technical Feasibility (PGA)
Customer works with PGA and Electric Service to upgrade inverter
Notify Customer
No
Enter Job in Database
Yes
Customer & Contractor receives pre-approval letter/rebate info.
Send Pre-Approval Letter
Install System
Issues Meter and Test inspection
M&T checks for violations before installing net meter and safety timeout test
Customer / Contractor collects "Certificate of Electrical Compliance" and Sends to LIPA
No
Notified of Violation
Yes
When Violation clears; Program Coord. Advises M&T
Net Meter Installed
Verify that program requirements are met
Notify Service Section and Billing; cc EELI
Customer records monthly data from inverter ands sends to EELI for one year
Email customer start date to collect data
Check if rebate assigned to customer/contractor
Send email to AP; rebate processing authorizes rebate
Accounts Payable Cuts Check
Customer or Contractor Receives Rebate (65%)
M&V of data (one year out)
Customer or Receives Rebate (35%)
Yes
Approve Output Level
Customer Receives Rejection Notification or Prorated Rebate (0% to 35%)
No


2009 LIPAedge Program Implementation Model
Long Island Power Authority
Customers (Target population: CAC resi. and small comm. customers)
LIPA
National Grid ELI
Honeywell
AEG
Other Subcontractors (Carrier, SkyTel, ODC)
Program Administration and Design
Marketing and Outreach
Education
Service Delivery
Evaluation
Program Design, Budget, Incentive structures (final approval by LIPA)
Approve LIPAedge website content
Maintain LIPAedge website
Coordinate with Cool Homes to raise contractor awareness
Provide user information at installation
Maintain thermostat users guide
Receive program information/View website
Coordinate CAC refresher course
Present at CAC refresher course
Attend CAC refresher course (including Grid Infoline staff)
Approve annual reminder letter
Send annual reminder letter
Submit program application (via phone or web)
Process new applications
Maintain LIPAedge call center
Receive & review participation data
Maintain customer database
Maintain customer database
New installation
Receive incentives (pool customers, commercial customers)
Fund incentive account
Provide incentives
Process request to leave program
Coordinate tower maintenance with SkyTel
Service Calls
Request to leave program
Experience events
Administer events
Call non-responsive 2-way units
Maintain thermostat communication software
Recieve & review event report
Receive & review event report
Receive event data and create event report
Coordinate program evaluation process
Support evaluation efforts
Conduct program evaluation


Long Island Power Authority
LIPA*edge* Implementation Model – New Customer Process Flow
Customer
LIPA
National Grid ELI
Honeywell
AEG
Submit application through website or call center
Accept application through website or call center
Process application
Prescreen application
Pass
Schedule site inspection
Fail
Contact customer and inform they are not eligible
Conduct inspection
Fail
Verbally inform - no signal
Pass
Order new thermostats
Maintain thermostat stock
Provide thermostats
Install thermostat
Create account in Carrier system
Make payments to pool pump/ commercial customers
Poop pump/ commercial customers receive rebate
Provide incentive funding
Submit incentive funding invoice
Receive & review incentive fund invoice
Provide reimbursement to National Grid


LIPA
Long Island Power Authority
LIPAedge Implementation Model – Customer Call Resolution Process Flow
LIPA
Customer
National Grid ELI
Honeywell
AEG
Contact AEG with inquiry (LIPAedge call center)
Contact Infoline with inquiry
Receives inquiry
Resolve inquiry
No
Receives inquiry
Yes
Issue resolved
Log call into database (Siebel)
Resolve inquiry
Resolve inquiry
Yes
Yes
Issue resolved
Issue resolved
No
Log call into Honeywell database
Log call into AEG database
No
Program manager receives inquiry
Refer Inquiry
Issue resolved
Provide periodic database updates
Receive periodic database updates
Log call into database (Siebel)
Conduct site visit
Update database with Honeywell information


Implementation Model Key
Program Administration and Design
Marketing and Outreach
Education
Service Delivery
Evaluation
Decision Point
Information Flow

L. PROGRAM-BY-PROGRAM NON-ENERGY GOALS

The following table provides a list of program-by-program non-energy goals. These goals are referenced in Volume I.

Table 27. Program-by-Program Non-Energy Goals

Program	Non-Energy Goals
Commercial Efficiency	• Lower electric energy consumption and demand requirements for commercial customers through prescriptive, custom and whole building approaches • Expand services to small as well as large customers • Actively pursue retrofit market • Encourage commissioning and benchmarking of buildings • Educate customers as to economic benefits of efficiency spending
Energy Efficient Products	• Support the stocking, sale and promotion of ENERGY STAR® qualified efficient residential products • Use financial mechanisms to increase the market saturation of these efficient products • Pilot programs for ENERGY STAR set top boxes and other consumer electronics
Cool Homes	• Maximize energy savings through proper sizing and installation of high efficiency residential cooling and heating equipment and furnace distribution fans • Use financial incentives to influence consumer purchases and contractor specification practices • Make high efficiency choices a routine part of the decision making process for LIPA customers when purchasing ENERGY STAR® central air conditioners and heat pumps • Build strong working business partnerships with CAC contractors, manufacturers and program support contractors • Provide tune ups for customers who are unable or unwilling to replace their existing units
REAP	• Achieve maximum level of cost-effective energy savings possible in each participant dwelling • Improve participant bill payment capability and bill payment practices • Achieve persistence of energy savings through effective energy education and the appropriate choice of efficiency measures • Improve participant comfort, health and safety through diagnostic testing procedures • Educate participants about the environment and energy efficiency
Home Performance Direct & Home Performance with ENERGY STAR®	• Provide high value savings from an initial site visit through free CFLs as well as up to 4 hrs of free crew labor for air and duct sealing • Provide sales leads for additional efficiency improvements • Provide support to existing Home Performance with ENERGY STAR® infrastructure • Continue financial assistance with BPI training fees and diagnostic equipment

Program	Non-Energy Goals
Information & Education	• Educate consumers on energy efficiency so they make conscious decisions about energy efficiency in their daily lives • Provide relevant energy-saving information tailored to the customer • Engage students in a discussion of energy efficient practices in the classroom and at home • Provide free instruction and educational tools for in-school programs • Provide interactive, online home energy audit services • Attend community events and trade shows
Residential New Homes	• Increase awareness and demand for LIPA ENERGY STAR® Labeled Homes • Support towns that adopted ENERGY STAR as the code minimum through assuring a sufficient and effective infrastructure of Raters • Address any other potential barriers
Solar Pioneer	• Provide customers with appropriately zoned properties to tap into the island's available wind power resource • Increase awareness about the range of alternative clean energy options available and market demand for wind systems • Encourage the development of a robust, self-sustaining local infrastructure for the delivery and maintenance of quality wind systems • Provide market oriented financial incentives to reduce barriers related to high first costs • Accelerate the cost reduction of wind systems while increasing reliability and performance • Provide training for utility field engineers, electrical inspectors and contractors • Build partnerships with the wind industry, as well as regional and national wind market transformation initiatives • Reduce economic market barriers through tariff rule changes and economic incentives
Small Wind	• Support the advancement of new energy technologies by diversifying investments in cost-effective distributed generation resources • Reach local markets in order to acquire increasing amounts of customer-sited PV electric generation • Support the deployment of proven PV technologies • Assist with efforts to expand the PV workforce and delivery infrastructure on Long Island • Foster the transformation of the PV market by reducing rebate levels as conditions and installation costs warrant • Increase program cost effectiveness by encouraging residential customers to first install energy efficiency measures
LIPA*edge*	• Maintain existing enrollment levels
*Source: Residential, Renewables and Commercial Operations Manuals, and 2009 Program Portfolio Marketing Plan.	

M. Program-by-Program Review of Evaluation Best Practices

Below we present a program-by-program review of evaluation best practices since 1999. These tables augment findings presented in Volume I.

Table 28 provides a program by program review of impact evaluations conducted over the last ten years.

Table 28. Number of Impact Evaluations Conducted (1999-2009)

Program	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Energy Efficient Products									X		
Cool Homes				X							
Residential Energy Affordability Partners			X	X				X			
Home Performance with ENERGY STAR ®											
Residential New Homes											
Solar Pioneer									X	X	
Information & Education									X		
Commercial Efficiency											
LIPA*edge*						X	X	X	X		

Gray indicates that the programs were not yet in existence. X's indicate the dates when data was collected.

Table 29 reviews the programs and timing of prior evaluations that provided these estimates.

Table 29. Number of Evaluations that Estimate Free-ridership and Spillover (1999-2009)

Program	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Energy Efficient Products				X[a]				X[a]			
Cool Homes				X[a]							
Residential Energy Affordability Partners											
Home Performance with ENERGY STAR ®											
Residential New Homes											
Solar Pioneer											
Information & Education											
Commercial Efficiency											
LIPA*edge*						X[b]	X[b]	X[b]	X[b]		

Gray indicates that the programs were not yet in existence. X's indicate the dates when data was collected. [a] indicates market assessment, [b] indicates impact evaluation.

Table 30 provides a review of the number of market assessments conducted as of 2009.

Table 30.Number of Market Assessments Conducted (1999-2009)

Program	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Energy Efficient Products		X		X				X	X*		
Cool Homes				X		X					
Residential Energy Affordability Partners											
Home Performance with ENERGY STAR ®								X			
Residential New Homes					X			X			
Solar Pioneer		X									
Information & Education											
Commercial Efficiency		X		X		X			X		
LIPA*edge*											

The X's indicate baseline and market assessments. Gray indicates that the programs were not yet in existence. *The 2007 EEP X indicates a Residential Appliance Saturation Survey (RASS).