Cape Light Compact

Annual Report on Energy Efficiency Activities in 2010

Submitted to the
Massachusetts Department of Public Utilities
and the Massachusetts Department of Energy Resources

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I. INTRODUCTION

In the first full year of the three-year energy efficiency plans, as reviewed and approved by the Department on January 28, 2010 in D.P.U. 09-116 through 09-127 (the "Gas and Electric Orders"), program year 2010 showed remarkable success with respect to goal attainment and achievement of real benefits for the environment and the economy in the Commonwealth of Massachusetts. Collectively, the Program Administrator (the "Cape Light Compact"), along with all the gas and electric distribution companies and municipal aggregators (together, the "Program Administrators" or "PAs") were able to deliver on their goals during program year 2010, as established in the Gas and Electric Orders, while maintaining the balance between meeting the budget for their programs and complying with the directives of the Green Communities Act ("GCA") in ensuring that they make available all cost-effective energy efficiency opportunities. Overall, the Cape Light Compact and other PAs worked diligently with the Department of Public Utilities ("Department"), the Department of Energy Resources ("DOER"), the Energy Efficiency Advisory Council ("EEAC"), and other interested stakeholders to meet challenging 2010 program year goals. In many cases, achievements in savings and benefits exceeded those goals. Program year 2010 performance showed that strong savings levels were achieved, that both Residential and Commercial and Industrial ("C&I") program implementation showed strong results, and that the PAs worked well to implement the programs in the field while also ramping up programs to unprecedented spending and savings levels so as to meet obligations not just for program year 2010, but for the full life of the Three-Year Plans.

On a statewide basis, the results shown by the PAs are generally at or in excess of initially projected amounts for annual MWh and therm goals. In fact, as noted by the EEAC in its recent 2010 Annual Report to the Massachusetts General Court and the Department, the combined efforts of the PAs resulted in enough savings to power 85,000 households and heat 14,000 homes annually. At the same time, the results show greenhouse gas emission reductions equivalent to the annual output of over 74,000 cars, and significant progress towards greenhouse gas, NOx, and SO2 emission reductions. The ability to achieve or exceed nearly all of the statewide goals and targets, despite a very difficult economic climate in the Commonwealth, results in significant benefits for the environment, the economy, and end-use customers.

In addition, while working to achieve their programmatic goals for 2010, the Cape Light Compact and other PAs have worked diligently to establish statewide marketing of energy efficiency program offerings through the use of the Mass Save label, which won the AESP Outstanding Achievement in Marketing and Communications Award based on work accomplished in 2010. Simultaneously, the PAs have engaged in over 35 studies across a wide span of program sectors to ensure that the Evaluation, Monitoring, and Verification ("EM&V") elements of these program offerings remain a critical and vital tool to evaluate and transform measures in the future to meet demand in an ever-changing marketplace. The Cape Light Compact and other PAs have worked diligently with financial institutions, and, through the partnership with the Massachusetts Bankers Association, worked to develop financing options to expand access to energy efficiency measures for customers in 2010, for the life of the Three-Year Plans, and beyond.

The Cape Light Compact and other PAs have continued to be engaged in the monthly EEAC process, and have worked collaboratively with each other and with the EEAC's consultants to meet stringent reporting and data collection deadlines so as to adequately monitor and review where the Three-Year Plan efforts have succeeded, and where improvement could be anticipated for the future. Given the unprecedented nature of these efforts and the significantly ambitious goals established in the Three-Year Plans, the Cape Light Compact and other PAs contend that the 2010 program year performance has been an unmitigated success and has in many ways exceeded the expectations for the first year of the Three-Year Plan. The Cape Light Compact and other PAs continue to endeavor to achieve deeper savings from participating customers, and have worked to reach a broader range of customers to capture all available efficiency opportunities that can be delivered in a cost-effective manner.

A. Purpose of Annual Report

The Cape Light Compact is pleased to provide its Energy Efficiency Annual Report ("Annual Report") for 2010. The purpose of the Annual Report is to:

- Provide a comparison of the Cape Light Compact's planned, preliminary year-end, and evaluated (where applicable) expenses, savings, and benefits at the portfolio, sector, and program levels for the program year.
- Identify significant variances between the Cape Light Compact's planned and evaluated costs, savings, and benefits for the program year, and discuss reasons for such variances.
- Discuss how program performance during the program year informs the Cape Light Compact's proposed modifications to program implementation, if any, during upcoming years.
- Describe the EM&V activities undertaken by the Cape Light Compact (both individually and jointly with other Program Administrators ("PAs")) that have not been included in previous Annual Reports, and explain how the results of the EM&V studies impact program cost-effectiveness.
- Describe the performance incentives that the Program Administrators propose to collect.[1]

B. Organization of Annual Report

The Cape Light Compact's 2010 Annual Report is organized as follows:

- Section I.C provides summary information on program performance at the portfolio and sector levels.
- Section II provides detailed information on program performance at the sector and program levels for the residential, low-income, and C&I sectors.
- Section III provides detailed information on the EM&V studies included in the Annual Report for each sector.

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1 Since the Cape Light Compact, as a public entity and municipal aggregator, does not collect any performance incentives, this section of the Annual Report is not applicable to the Cape Light Compact.

- Section IV addresses statutory budget requirements.
- Section V addresses the performance incentives the PA proposes to collect.
- Section VI addresses audits conducted during the past 5 program years.
- Section VII provides detailed supporting documentation.

C. Summary of Program Portfolio

The purpose of this section is to provide summary information on program performance at the portfolio and sector levels.

In 2010 the Cape Light Compact invested 28% more funds toward energy efficiency programs and services in our communities than in the 2009 program year. The 2009 program year represented a 93% increase in funding over the 2008 energy efficiency programs. Since the passage of the GCA, and implementation of all available cost-effective efficiency opportunities, the Compact expenditures have increased from approximately $5 million annually to over $13 million – this more than doubling of investments in energy efficiency represents the Towns and Counties continued commitment to serving our customers.

The Cape Light Compact highlights just a few of the many accomplishments in this first year 2010 of its three-year, 2010-2012, energy efficiency plan:

- Completed the Green Affordable Homes projects implemented between 2008 and 2010. In 2006, the Cape Light Compact received a $1.5 million grant from the Massachusetts Technology Collaborative Renewable Energy Trust's Green Affordable Housing Initiative to be used for the development of affordable housing utilizing green design. With this grant money, the Cape Light Compact assisted builders in the development of 55 affordable housing units on Cape Cod and Martha's Vineyard, built to LEED-H® standards and included the installation of renewable energy systems;

- Expanded Commercial & Industrial Program implementation throughout Barnstable County by identifying and managing projects funded by both the U.S. Department of Energy's Energy-Efficiency Conservation Block Grant and the U.S. Department of Agriculture Grant;

- Celebrated the Association of Energy Engineers New England Chapter Award for the best comprehensive energy efficiency project in the commercial category to Cape Air, the largest regional airline in the U.S. This project was also honored with the MassSaver award for its extensive efforts to increase the business' efficiency through participation in the Cape Light Compact C&I Programs; and

- Received, along with other regional PAs, the 2010 ENERGY STAR® Award for Sustained Excellence in recognition for consistent demonstration of the effectiveness of regional collaboration in transforming the market for ENERGY STAR® qualified products.

Tables[2] I.A and I.B provide summary information on program performance at the portfolio and customer sector levels, respectively.

Table I.A: Program Portfolio Summary							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	18,636,789			13,531,218		-27%
Performance Incentive	$	0			0		0%
Savings & Benefits							
Energy							
Lifetime	MWh	303,068	176,227	-42%	165,946	-6%	-45%
Annualized	MWh	26,325	16,254	-38%	15,378	-5%	-42%
Demand							
Lifetime	kW	92,376	37,190	-60%	37,514	1%	-59%
Annualized							
Summer	kW	6,613	2,784	-58%	2,764	-1%	-58%
Winter	kW	4,646	2,911	-37%	2,881	-1%	-38%
NEB (Lifetime)	$	23,463,784	13,924,782	-41%	15,110,138	9%	-36%
Cost-Effectiveness							
TRC Benefits	$	68,610,103			38,156,209		-44%
TRC Costs	$	21,215,238			14,998,735		-29%
Net Benefits	$	47,394,865			23,157,474		-51%
BCR	n/a	3.23			2.54		-21%

Please Note: The Planned Values in Table I.A and all subsequent tables that contain Planned Values in this Annual Report can be found in the 08-50 tables in Appendix B.1.b of this filing. The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 D.P.U. Order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011). Please note that the Cape Light Compact did not file updated 08-50 tables in its 2010 Mid-Year Revisions filing. In order to cite plan values that appear in the Cape Light Compact's 2010 Annual Report, the Cape Light Compact included 08-50 tables for its 2010 Mid-Year Revisions filing as Appendix B.1.b.

As shown in Table 1.A above, significant[3] variances exist at the portfolio level for:

- All metrics between planned and preliminary values, and
- All metrics between planned and evaluated values.

2 The Cape Light Compact is also providing the Department of Public Utilities with working Microsoft® Excel spreadsheets for all of the tables included in this Annual Report. Such tables include all formulas and functions used in each table.

3 Unless otherwise noted, "significant" variances are defined throughout this Annual Report as variances of +/-20% or more between the stated values at the program, sector or portfolio level.

There are no significant variances at the portfolio level between preliminary values and evaluated values. This indicates that the EM&V impact studies did not have a significant impact on portfolio level results.

Each sector contributed to these variances as follows:

- Residential (for Total Program Costs, Lifetime Energy, Lifetime Demand, Summer Demand, NEB (Lifetime), TRC Benefits, TRC Costs, and Net Benefits): Please reference section II.A.1 for a more detailed discussion of the cause of the variances for this sector.
- Low-Income (for Lifetime Energy, Annual Energy, Lifetime Demand, Summer Demand, Winter Demand, TRC Benefits, and Net Benefits): Please reference section II.B.1 for a more detailed discussion of the cause of the variances for this sector.
- C&I (for Total Program Costs, Lifetime Energy, Annual Energy, Lifetime Demand, Summer Demand, Winter Demand, NEB (Lifetime), TRC Benefits, TRC Costs, Net Benefits and BCR): Please reference section II.C.1 for a more detailed discussion of the cause of the variances for this sector.

Table I.B: Customer Sector Summary

Sector	Units	Planned Value	Evaluated Results	
			Value	% Change from Planned
Residential				
TRC Benefits	$	34,831,733	19,382,496	-44%
TRC Costs	$	10,751,784	7,186,647	-33%
Net Benefits	$	24,079,949	12,195,849	-49%
BCR	n/a	3.24	2.70	-17%
Low-Income				
TRC Benefits	$	5,922,383	4,301,936	-27%
TRC Costs	$	2,088,750	1,828,369	-12%
Net Benefits	$	3,833,633	2,473,567	-35%
BCR	n/a	2.84	2.35	-17%
C&I				
TRC Benefits	$	27,855,987	14,471,777	-48%
TRC Costs	$	8,374,704	5,983,719	-29%
Net Benefits	$	19,481,283	8,488,059	-56%
BCR	n/a	3.33	2.42	-27%
TOTAL				
TRC Benefits	$	68,610,103	38,156,209	-44%
TRC Costs	$	21,215,238	14,998,735	-29%
Net Benefits	$	47,394,865	23,157,474	-51%
BCR	n/a	3.23	2.54	-21%

As shown in Table 1.B above, significant variances exist at the sector level between planned and evaluated values for Residential TRC Benefits, TRC Costs, and Net Benefits; Low-Income TRC Benefits and Net Benefits; and C&I TRC Benefits, TRC Costs, Net Benefits and BCR.

- Within the Residential sector, the Multi-Family Retrofit, MassSAVE and ENERGY STAR® Lighting programs are contributing to the variance between planned and evaluated values. Please reference section II.A.2 for a more detailed discussion of the cause of the variances by program within this sector.
- Within the Low-Income sector, the Low-Income 1 to 4 Family Retrofit and Low-Income Multi-Family Retrofit programs are contributing to the variance between planned and evaluated values. Please reference section II.B.2 for a more detailed discussion of the cause of the variances by program within this sector.
- Within the C&I sector, the C&I New Construction and Major Renovation, C&I Large Retrofit and C&I Small Retrofit programs are contributing to the variance between planned and evaluated values. Please reference section II.C.2 for a more detailed discussion of the cause of the variances by program within this sector.

II. PROGRAM PERFORMANCE

The purpose of this section is to provide detailed information on program performance at the sector and program levels for the Residential, Low-Income, and C&I sectors.

A. Residential Sector Programs

1. Summary

During 2010, the Cape Light Compact implemented the following Residential programs and Residential pilots:

Residential Programs (Statewide)

- Residential New Construction & Major Renovation
- Residential Cooling & Heating Equipment
- Multi-Family Retrofit
- MassSAVE
- ENERGY STAR® Lighting
- ENERGY STAR® Appliances

Residential Pilots (Statewide)

- Deep Energy Retrofit
- Residential New Construction & Major Renovation - Major Renovation Statewide Pilot
- Residential New Construction - Multi-Family (4-8 story) Statewide Pilot4
- Residential New Construction - Lighting Design Statewide Pilot
- Residential New Construction - V3 ENERGY STAR® Homes Statewide Pilot

Residential Pilots (Non-Statewide & Cape Light Compact-Specific)

- Heat Pump Water Heating Pilot (Non-Statewide)
- Power Monitor Pilot (Cape Light Compact-Specific)
- Home Automation Pilot (Cape Light Compact-Specific)

Tables II.A.1 through II.A.3 provide summary information on the performance of the residential programs at the sector, end use, and program levels, respectively.

Tables II.A.4 through II.A.16 provide detailed information on the performance of each residential program and pilot program, respectively.

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4 Though the Cape Light Compact supports this statewide pilot, Cape Light Compact does not have enough Multi-Family (4- to 8-story) homes in its service territory to be able to participate in this pilot.

Table II.A.1: Residential Sector Summary							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	9,449,462			6,388,566		-32%
Performance Incentive	$	0			0		0%
Savings & Benefits							
Energy							
Lifetime	MWh	96,058	75,897	-21%	75,217	-1%	-22%
Annualized	MWh	10,179	8,652	-15%	8,372	-3%	-18%
Demand							
Lifetime	kW	39,712	14,813	-63%	15,504	5%	-61%
Annualized							
Summer	kW	2,489	1,181	-53%	1,189	1%	-52%
Winter	kW	2,032	2,011	-1%	1,958	-3%	-4%
NEB (Lifetime)	$	19,030,126	7,837,252	-59%	9,022,607	15%	-53%
Cost-Effectiveness							
TRC Benefits	$	34,831,733			19,382,496		-44%
TRC Costs	$	10,751,784			7,186,647		-33%
Net Benefits	$	24,079,949			12,195,849		-49%
BCR	n/a	3.24			2.70		-17%

During 2010, the Cape Light Compact built upon existing residential programs and significantly expanded initiatives to increase participation in all residential programs. Selected highlights are presented below:

- *Residential New Construction & Major Renovation* - In 2010, the Massachusetts New Homes with ENERGY STAR® program faced a market in which energy codes were changing, single-family development remained slow, and opportunities to capture future energy savings were becoming increasingly difficult. To address these barriers the program engaged in code support activities and introduced several new marketing efforts including a lumberyard outreach series, increased e-mail marketing and social media activity. The program launched four new pilots, multi-family new construction, major renovations, lighting design and ENERGY STAR® Version 3, to aid in identifying the next generation of energy savings opportunities. The program also increased market penetration while providing energy savings for homeowners and reducing peak demand. These efforts resulted in the program receiving its fourth consecutive ENERGY STAR® award for Sustained Excellence in Program Delivery.
- *Multi-Family Retrofit* - Implementation of the Multi-Family Market Integrator ("MMI") began in July 2010 and continued as a primary focus at all PA multi-family working group meetings to address start up tasks such as data tracking and reporting, and coordination with program vendors. A data gathering form was developed and used at intake to identify key customer facility data and eligibility, and forwarded to the appropriate vendor for customer contact. In addition, monthly activity reports were developed and reviewed, to track program progress. Requests thru the MMI increased as customers utilized the new single telephone number. Energy efficient lighting retrofits were high in demand from this market sector.

- *ENERGY STAR® Lighting* - The lighting program in 2010 started off slowly (due to the lead time for new program measures) but then progressed at a good pace. The program focus shifted from the bare spirals of previous years to specialty lighting and a new hard-to-reach lighting market. Qualified Light-Emitting Diode ("LED") products were also introduced in 2010, but due to a long testing period for ENERGY STAR® qualification, there were only a couple of commercially available, residential, qualified products that had completed testing for market availability in 2010. Many qualified LEDs have since been qualified for marketing, so plan year 2011 will have many more LED offerings.
- *ENERGY STAR® Appliances* – The mail-in refrigerator, secondary refrigerator recycling, and the mid-stream television promotions comprised the majority of the adopted measures in this program. The lack of inventory of higher efficiency room air conditioners during the summer of 2010 caused this portion of the program to have to make up for these savings in other areas. Room air cleaner, computer and monitor rebates, new measures in 2010, had slower adoption rates.
- *MassSAVE* –
    - A Request for Proposals ("RFP") was initiated in 2010 for a new lead vendor and in place as of the first quarter of 2011;
    - A new market model was rolled out including full integration of the gas weatherization program with this program via mandatory audits;
    - The program moved back to the single audit model as a result of lessons learned;
    - The new 3rd party QA/QC was introduced into the program; and
    - HEAT Loan was expanded to include micro loans ($500-$2,000), non-owner occupied loans, and expanded loan offerings from a maximum of $15,000 in 2010.

Preliminary Year-End Results % Change from Planned

Within the Residential sector, the following programs are contributing to the variance between planned and evaluated values.

- Multi-Family Retrofit (for TRC Benefits, TRC Costs, Net Benefits and BCR): Please reference section II.A.c for a more detailed discussion of the cause of the variances for this program.
- MassSAVE (for TRC Benefits, TRC Costs, Net Benefits and BCR): Please reference section II.A.d for a more detailed discussion of the cause of the variances for this program.
- ENERGY STAR® Lighting (for TRC Benefits, TRC Costs and Net Benefits): Please reference section II.A.e for a more detailed discussion of the cause of the variances for this program.

Evaluated Results % Change from Preliminary

Impact evaluation studies apply to the following Residential sector programs:

- MassSAVE
- ENERGY STAR® Lighting
- ENERGY STAR® Appliances

However, the combined effect of the impact evaluation studies at the sector level is not significant. As a result, there is no significant variance in the Evaluated Results % Change from Preliminary.

Evaluated Results % Change from Planned

Since there is no significant effect from the implementation of the impact evaluation studies, there is little difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

Table II.A.2: Residential Sector Summary of End Uses				
End Uses	Units (lifetime)	Preliminary Year-End Results	Evaluated Results	% Change from Preliminary to Evaluated
Lighting				
Energy	MWh	48,367	46,524	-4%
Demand	kW	4,206	4,022	-4%
NEB	$	380,454	363,868	-4%
Heating, Ventillation & Air Conditioning (HVAC)				
Energy	MWh	11,284	11,084	-2%
Demand	kW	6,614	6,611	0%
NEB	$	1,578,625	1,304,046	-17%
Motors & Drives				
Energy	MWh	350	350	0%
Demand	kW	49	49	0%
NEB	$	40,323	40,323	0%
Refrigeration				
Energy	MWh	2,019	1,542	-24%
Demand	kW	213	212	-1%
NEB	$	0	0	0%
Hot Water				
Energy	MWh	455	455	0%
Demand	kW	189	189	0%
NEB	$	594,850	460,062	-23%
Process				
Energy	MWh	6,835	6,835	0%
Demand	kW	801	801	0%
NEB	$	0	0	0%
End Use Behavior				
Energy	MWh	136	136	0%
Demand	kW	38	38	0%
NEB	$	0	0	0%
Envelope				
Energy	MWh	6,111	7,951	30%
Demand	kW	2,603	3,483	34%
NEB	$	5,227,922	6,839,232	31%
Solar Hot Water				
Energy	MWh	339	339	0%
Demand	kW	100	100	0%
NEB	$	15,077	15,077	0%
Total				
Energy	MWh	75,897	75,217	-1%
Demand	kW	14,813	15,504	5%
NEB	$	7,837,252	9,022,607	15%

Table II.A.3: Residential Program Summary				
Program/ Performance Category	**Units**	**Planned Value**	**Evaluated Results**	
			Value	% Change from Planned
Residential New Construction & Major Renovation				
TRC Benefits	$	1,079,130	902,816	-16%
TRC Costs	$	491,819	525,503	7%
Net Benefits	$	587,311	377,312	-36%
BCR	n/a	2.19	1.72	-22%
Residential Cooling & Heating Equipment				
TRC Benefits	$	1,131,262	1,400,725	24%
TRC Costs	$	674,832	616,987	-9%
Net Benefits	$	456,431	783,738	72%
BCR	n/a	1.68	2.27	35%
Multi-Family Retrofit				
TRC Benefits	$	1,920,590	64,853	-97%
TRC Costs	$	472,849	37,519	-92%
Net Benefits	$	1,447,741	27,334	-98%
BCR	n/a	4.06	1.73	-57%
MassSAVE				
TRC Benefits	$	25,346,901	12,846,893	-49%
TRC Costs	$	6,334,839	4,279,697	-32%
Net Benefits	$	19,012,063	8,567,196	-55%
BCR	n/a	4.00	3.00	-25%
ENERGY STAR Lighting				
TRC Benefits	$	4,566,401	3,121,448	-32%
TRC Costs	$	1,401,781	820,905	-41%
Net Benefits	$	3,164,620	2,300,543	-27%
BCR	n/a	3.26	3.80	17%
ENERGY STAR Appliances				
TRC Benefits	$	787,448	1,045,762	33%
TRC Costs	$	319,340	433,119	36%
Net Benefits	$	468,109	612,642	31%
BCR	n/a	2.47	2.41	-2%

Table II.A.3: Residential Program Summary (cont'd)				
Program/ Performance Category	**Units**	**Planned Value**	**Evaluated Results**	
			Value	% Change from Planned
Deep Energy Retrofit				
TRC Benefits	$	n/a	n/a	n/a
TRC Costs	$	83,333	26,659	-68%
Net Benefits	$	n/a	n/a	n/a
BCR	n/a	n/a	n/a	n/a
Residential New Construction & Major Renovation - Major Renovation Statewide Pilot				
TRC Benefits	$	n/a	n/a	n/a
TRC Costs	$	257,547	43,992	-83%
Net Benefits	$	n/a	n/a	n/a
BCR	n/a	n/a	n/a	n/a
Residential New Construction - Multi-Family (4-8 story) Statewide Pilot				
TRC Benefits	$	n/a	n/a	n/a
TRC Costs	$	n/a	n/a	n/a
Net Benefits	$	n/a	n/a	n/a
BCR	n/a	n/a	n/a	n/a
Residential New Construction - Lighting Design Statewide Pilot				
TRC Benefits	$	n/a	n/a	n/a
TRC Costs	$	22,222	11,264	-49%
Net Benefits	$	n/a	n/a	n/a
BCR	n/a	n/a	n/a	n/a
Residential New Construction - V3 Energy Star Homes Statewide Pilot				
TRC Benefits	$	n/a	n/a	n/a
TRC Costs	$	0	0	0%
Net Benefits	$	n/a	n/a	n/a
BCR	n/a	n/a	n/a	n/a
Heat Pump Water Heater Pilot				
TRC Benefits	$	n/a	n/a	n/a
TRC Costs	$	11,111	9,022	-19%
Net Benefits	$	n/a	n/a	n/a
BCR	n/a	n/a	n/a	n/a
Power Monitor Pilot				
TRC Benefits	$	n/a	n/a	n/a
TRC Costs	$	233,333	74,496	-68%
Net Benefits	$	n/a	n/a	n/a
BCR	n/a	n/a	n/a	n/a
Home Automation Pilot				
TRC Benefits	$	n/a	n/a	n/a
TRC Costs	$	10,800	0	-100%
Net Benefits	$	n/a	n/a	n/a
BCR	n/a	n/a	n/a	n/a

Table II.A.3: Residential Program Summary (cont'd)				
Program/ Performance Category	**Units**	**Planned Value**	**Evaluated Results**	
			Value	% Change from Planned
Hard-to-Measure Initiatives				
TRC Costs	$	437,978	307,484	-30%
TOTAL				
TRC Benefits	$	34,831,733	19,382,496	-44%
TRC Costs	$	10,751,784	7,186,647	-33%
Net Benefits	$	24,079,949	12,195,849	-49%
BCR	n/a	3.24	2.70	-17%

2. Residential Programs

a. Residential New Construction & Major Renovation

Purpose/Goal: The purpose of the Residential New Construction & Major Renovation program was to capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving toward net-zero energy.

Targeted Customers: The target market for this program included homebuilders, contractors, architects/designers, trade allies, Home Energy Rating System ("HERS") raters, homebuyers, realtors, developers, low income and affordable housing developers, code officials, and consumers in the market for new homes and/or major renovations.

Definition of Program Participant: A count of the number of unique households served by the program.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Hot Water
Refrigeration

Delivery Mechanism: The program was administered by each PA in its service territory and coordinated regionally through the Joint Management Committee ("JMC"). The JMC's contractor was responsible for tracking and reporting program activity. The contractor also conducted quality assurance/quality control of field activities and advised the JMC on necessary program changes and enhancements. The JMC utilized a market-based network of trained contractors who offered energy efficiency and rating services to homebuilders for a fee.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011).

Green Affordable Housing Initiative (Cape Light Compact-specific component of the Residential New Construction & Major Renovation program)

In 2006, the Cape Light Compact received a $1.5 million grant from the Massachusetts Technology Collaborative Renewable Energy Trust's Green Affordable Housing Initiative, to be used for the development of affordable housing utilizing green design. With this grant money, the Cape Light Compact assisted builders in the development of 43 Residential affordable housing units on Cape Cod and Martha's Vineyard to be built to LEED-H® standards and to include the installation of renewable energy systems. The Green Affordable Housing Initiative was implemented from 2008 – 2010.

Table II.A.4. provides information on the performance of Residential New Construction & Major Renovation.

Table II.A.4: Residential New Construction & Major Renovation							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	380,019			525,503		38%
Performance Incentive	$	0			0		0%
Participants	hhlds	59			76		29%
Program Cost / Participant	$	6,441			6,915		7%
Savings & Benefits							
Energy							
Lifetime	MWh	2,479	5,174	109%	5,174	0%	109%
Annualized	MWh	271	333	23%	333	0%	23%
Average Measure Life	yrs	9.1	15.6	70%	15.6	0%	70%
Demand							
Lifetime	kW	941	721	-23%	721	0%	-23%
Annualized							
Summer	kW	51	37	-28%	37	0%	-28%
Winter	kW	98	73	-25%	73	0%	-25%
Average Measure Life	yrs	18.4	19.6		19.6		
NEB (Lifetime)	$	676,612	283,649	-58%	283,649	0%	-58%
Cost-Effectiveness							
TRC Benefits	$	1,079,130			902,816		-16%
TRC Costs	$	491,819			525,503		7%
Net Benefits	$	587,311			377,312		-36%
BCR	n/a	2.19			1.72		-22%

Preliminary Year-End Results % Change from Planned

This program generated higher than expected costs but achieved higher savings due to 1) greater affordable home completions than anticipated, 2) the fact that the homes in the program were built to higher performance standards than anticipated, and 3) the fact that a greater proportion of electrically heated homes were built than anticipated. As higher program costs were coupled with higher program savings, this program is cost-effective.

2010 was a unique year for the Cape Light Compact's Residential New Construction & Major Renovation program. The Cape Light Compact's 2010 plan assumed that the economic downturn would result in lower participation. However, the continuation of federal and state support for affordable new construction enabled more affordable homes to be built than planned in 2010. Since evaluated participants were significantly higher than planned participants, evaluated total program costs were significantly higher than planned.

Additionally, the homes were built to higher efficiency levels than planned because of the Cape Light Compact's administration of the Green Affordable Homes Initiative with the Massachusetts Clean Energy Center grant funding. The plan assumed that most of the affordable homes would be built to either the LEED for Homes Certified or LEED Silver standard. However, most of the homes were built to the LEED Platinum standard, the highest level of LEED-H achievement. This contributed to significantly higher evaluated annual energy savings as compared to planned. Furthermore, there were simply a greater number of electric homes built versus planned. This also contributed to significantly higher evaluated energy savings as compared to planned.

Given the high proportion of affordable new homes in the new construction completions, the significant variances between evaluated and planned lifetime energy savings, annual energy savings, average measure life, lifetime demand savings, summer demand savings, winter demand savings and non-electric benefits can also be explained by the fact that certain building approaches are specific to affordable new construction. Affordable new construction practices place more emphasis on building shell measures as compared to lighting and appliance measures. Affordable units typically feature hard-wired fixtures, which limit the savings opportunities from lighting. Since building shell measures have significantly higher savings and longer lifetimes as compared to lighting and appliances measures, the significant positive variances between evaluated and planned annual energy savings, lifetime energy savings and average measure life can be explained by this shift in measure mix.

The significant negative variance between evaluated and planned lifetime demand savings, summer demand savings and winter demand savings is also attributable to a shift in measure mix. The percent change in the summer demand savings is explained by reduced savings from appliance measures. Also, affordable homes do not typically feature central air conditioning, which limits summer demand savings. The percent change in lifetime demand savings is explained by lower summer demand savings. The percent change in winter demand savings is explained by reduced savings from lighting and appliance measures.

The significant negative variance between evaluated and planned non-electric benefits is attributable to the shift from propane to electrically-heated homes using heat pumps. The plan assumed that nearly half of the homes were to be heated by propane and approximately 20 percent were to be electrically heated. However, nearly half of the homes completed were electrically heated and around 10 percent heated by propane. This resulted in higher electric savings and benefits and lower non-electric savings and benefits.

Evaluated Results % Change from Preliminary

The following is the one impact evaluation study that applies to this program.

1. *Estimated Net-to-Gross (NTG) Factors for the Massachusetts PAs 2010 Residential New Construction Programs, Residential HEHE and Multi-Family Gas Programs, and C&I Gas Programs:* The object of the study was to assist the Massachusetts PAs in identifying reasonable estimated net-to-gross factors for the 2010 Residential New Construction programs; C&I programs; Multi-Family Retrofit and Residential High Efficiency Heating and Water Heating programs. However, the findings in this evaluation simply confirm that the net-to-gross ratio that is already being applied by the Cape Light Compact will continue to be applied. As a result, there is no Evaluated Results % Change from Preliminary. This study is discussed in more detail in Section III.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Massachusetts New Homes with ENERGY STAR® Mystery Shopping:* This study provided insight into the current marketing strategies of real estate agents listing ENERGY STAR® homes, and the effect of program-sponsored trainings on these marketing strategies. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.
2. *The Massachusetts New Homes with ENERGY STAR® Program, 2011Baseline Phase 1:* Completion of Planning: This study describes the planning process for the 2011 Baseline Study and the work done to develop a sample of eligible homes. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.
3. *The Massachusetts New Homes with ENERGY STAR® Program Estimated Maximum Potential Savings from Enhanced Compliance with the IECC 2009 Residential Building Code in Massachusetts:* This study estimated the potential savings for the years 2011, 2012, and 2013 that might be achieved through promoting compliance with the newly-adopted IECC 2009 energy code for four measures—wall insulation, basement insulation, proper insulation of ducts in unconditioned spaces, and fifty percent high efficacy lamp requirement—in order to provide needed guidance to the PAs on the implementation and evaluation costs that might be justified. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.
4. *Cross-Cutting Net-to-Gross Methodology Study for Residential Programs – Suggested Approaches (Final):* The primary objective of this study was to develop approaches for

consideration by the PAs for estimating net program impacts for the Massachusetts PA's residential programs. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

There is one impact evaluation study that applies to this program. However, the findings in this evaluation simply confirm the net-to-gross value that is being applied by the Cape Light Compact will not change. As a result, there is no difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

The significant variance in net benefits and BCR is due to higher costs and lower benefits versus plan. The lower benefits are driven by the fact that higher energy savings did not offset the lower demand savings and lower non-electric benefits than planned.

b. Residential Cooling & Heating Equipment

Purpose/Goal: The purpose of the Residential Cooling & Heating Equipment program was to raise residential consumer awareness and market share of properly installed high-efficiency cooling and heating equipment and systems.

Targeted Customers: The program targeted residential customers in the market to purchase new or replacement HVAC equipment including new systems in existing and new homes (new systems); replacement systems in existing homes (new equipment/old systems), including the early retirement of existing equipment; and improvements in operational systems in existing homes (new equipment/old systems). The program also targeted HVAC contractors and technicians; suppliers, manufacturers, and distributors of HVAC equipment; new-home builders; and remodeling contractors.

Definition of Program Participant: A count of the number of unique households served by the program.

Targeted End-Uses:
Heating, Ventilation, and Air Conditioning
Motors & Drives
Envelope

Delivery Mechanism: Each PA administered the program in its service territory. Delivery was through a common vendor selected through a common RFP. Whenever possible, there was coordination among the related gas PA's initiatives and energy-efficiency service providers. To this end, the COOL SMART and Gas Networks' High Efficiency Heating and Hot Water programs worked to procure a single, joint circuit rider to support both programs in the field.

Program initiatives were also piggybacked onto the residential new construction and MassSAVE programs:

- Participating residential new construction program builders and their HVAC contractors were referred to the COOL SMART Program for training and QIV. Whenever appropriate, these training were jointly provided with GasNetworks
- MassSAVE participants were referred to COOL SMART for HVAC measures using COOL SMART literature, which is part of the standard MassSAVE information package.
- Independent inspectors performed quality control follow-up inspections on up to 10 percent of installations to verify equipment installation and performance.
- The program continued to use equipment distributors to process rebates, sell high-efficiency and QIV-related technology, and to provide indoor training labs for HVAC contractors.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011).

Table II.A.5. provides information on the performance of Residential Cooling & Heating Equipment.

Table II.A.5: Residential Cooling & Heating Equipment							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	640,525			522,990		-18%
Performance Incentive	$	0			0		0%
Participants	hhlds	803			909		13%
Program Cost / Participant	$	798			575		-28%
Savings & Benefits							
Energy							
Lifetime	MWh	6,568	5,382	-18%	5,382	0%	-18%
Annualized	MWh	374	305	-18%	305	0%	-18%
Average Measure Life	yrs	17.6	17.6	0%	17.6	0%	0%
Demand							
Lifetime	kW	4,284	5,984	40%	5,984	0%	40%
Annualized							
Summer	kW	266	348	30%	348	0%	30%
Winter	kW	48	176	270%	176	0%	270%
Average Measure Life	yrs	16.1	17.2		17.2		
NEB (Lifetime)	$	(127,672)	49,842	139%	49,842	0%	139%
Cost-Effectiveness							
TRC Benefits	$	1,131,262			1,400,725		24%
TRC Costs	$	674,832			616,987		-9%
Net Benefits	$	456,431			783,738		72%
BCR	n/a	1.68			2.27		35%

Preliminary Year-End Results % Change from Planned

All of the significant variances in savings and benefits can be attributed to a change in the measure mix relative to the plan. Annual and lifetime energy savings were not significantly lower than planned. However, lifetime demand savings, summer demand savings and winter demand savings were all significantly higher than planned. The primary reason for this change was that participants had a greater interest in air conditioning equipment (as compared heating equipment and to air-conditioning and heating services) than planned. In general, air conditioning equipment has lower energy savings as compared to heating equipment, but higher demand savings. A greater interest in mini split heat pumps than planned is also contributing to the significant increase in summer demand savings and winter demand savings as the demand savings for this measure are relatively high compared to other measures offered by the program.

Also, interest in ECM furnaces was significantly lower, as was planned. However, the installed ECM furnaces generated oil and propane savings that were not assumed in the plan. This accounts for the significant increase in non-electric benefits as compared to the plan.

Evaluated Results % Change from Preliminary

There are no impact evaluation studies that apply to this program. As a result, there is no change in the Evaluated Results % Change from Preliminary.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Massachusetts 2010 Residential Retrofit and Low-Income Evaluation - Brushless Fan Motors:* The objectives of the study were to determine the following: program processes, implementation strengths, and areas for improvements; program tracking data sufficiency; contractor practices, perceptions, and participation barriers; customer behavior, motivations, awareness, and satisfaction; program outreach and recruitment efficacy; and participants' potential changes in fan use, from pre- to post-installation. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.
2. *Cross-Cutting Net-to-Gross Methodology Study for Residential Programs – Suggested Approaches (Final):* The primary objective of this study was to develop approaches for consideration by the PAs for estimating net program impacts for the Massachusetts PA's residential programs. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there are no impact evaluation studies that apply to this program, there is no difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

The significant variance in TRC Benefits, Net Benefits and BCR is due to significantly higher demand savings and higher non-electric benefits versus plan.

c. Multi-Family Retrofit

Purpose/Goal: The purpose of the Residential Multi-Family Retrofit program was to address the energy efficiency retrofit opportunities in facilities with five or more residential dwelling units in the non-low-income sector.

Targeted Customers: This program targeted residential facilities with five or more dwelling units.

Definition of Program Participant: A count of the number of unique housing units served by the program.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Refrigeration
Hot Water

Envelope
End Use Behavior

Delivery Mechanism: The program was administered cooperatively by the gas and electric PAs. The Multi-Family Market Integrator, implemented in July 2010, was responsible for facilitating the delivery of program services as well as acting as the conduit through which participant questions and concerns were directed to ensure that participants were not required to directly contact multiple parties during the project lifecycle.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011).

Table II.A.6. provides information on the performance of the Multi-Family Retrofit program.

Table II.A.6: Multi-Family Retrofit

Performance Category	Units	Planned Value	Preliminary Year-End Results		Evaluated Results		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	443,571			37,519		-92%
Performance Incentive	$	0			0		0%
Participants	units	400			48		-88%
Program Cost / Participant	$	1,109			782		-30%
Savings & Benefits							
Energy							
Lifetime	MWh	4,425	491	-89%	491	0%	-89%
Annualized	MWh	609	70	-89%	70	0%	-89%
Average Measure Life	yrs	7.3	7.1	-3%	7.1	0%	-3%
Demand							
Lifetime	kW	686	31	-95%	31	0%	-95%
Annualized							
Summer	kW	63	4	-93%	4	0%	-93%
Winter	kW	103	17	-83%	17	0%	-83%
Average Measure Life	yrs	11.0	7.1		7.1		
NEB (Lifetime)	$	1,349,576	3,621	-100%	3,621	0%	-100%
Cost-Effectiveness							
TRC Benefits	$	1,920,590			64,853		-97%
TRC Costs	$	472,849			37,519		-92%
Net Benefits	$	1,447,741			27,334		-98%
BCR	n/a	4.06			1.73		-57%

Preliminary Year-End Results % Change from Planned

This program resulted in significant variances for all cost, savings, and benefits metrics. Despite significant variances in costs and benefits, the program remains cost-effective.

In general, the Cape Light Compact does not have many traditionally defined Residential Multi-Family customers in its territory (for example, high rises and apartment complexes). The majority of the Cape Light Compact Residential Multi-Family customers are condominium owners.

While condominiums are defined as Residential Multi-Family for the purpose of program implementation, the owners view their property as single family and desire products and services that are offered to single family customers within the MassSAVE program. Additionally, there are significant barriers for condominium owners to navigate as in many cases they need to involve the condominium association in the decision making process in order to implement a majority of the weatherization measures. In an effort to serve interested customers, the Cape Light Compact provided services through its MassSAVE Program. These participants, along with any costs and savings associated with their projects, are reported within the MassSAVE program. This explains much of the variance in costs and benefits from plan.

Also, delays in vendor selection and finalization of the program design prevented all PAs from rolling out this program until mid-year (June 2010). Furthermore, the Cape Light Compact anticipated more units in the effort to serve all fuels, but the program design finalized in 2010 determined that gas heated customers would be served by the gas PA. All of these factors drove lower than anticipated participation, and as a result the Cape Light Compact could not spend its Residential Multi-Family program budget. As the Cape Light Compact could not spend its budget, it did not generate the savings and benefits that were planned for this program.

Evaluated Results % Change from Preliminary

There are no impact evaluation studies that apply to this program. As a result, there is no variance in the Evaluated Results % Change from Preliminary.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Cross-Cutting Net-to-Gross Methodology Study for Residential Programs – Suggested Approaches (Final):* The primary objective of this study was to develop approaches for consideration by the PAs for estimating net program impacts for the Massachusetts PA's residential programs. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there are no impact evaluation studies that apply to this program, there is no difference between the Evaluated Results % Change from Planned and the Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

The significant variance in TRC Benefits, TRC Costs, Net Benefits and BCR is due to significantly lower participation than planned.

d. MassSAVE

Purpose/Goal: The purpose of the MassSAVE program was to provide residential customers with energy efficiency recommendations that enable them to identify and initiate the process of installing cost-effective energy efficiency upgrades.

Targeted Customers: The customers targeted by the program were all non-low-income residential customers living in single-family houses or one- to four-unit multi-family buildings, regardless of heating fuel, who were committed to making their homes more energy efficient.

Definition of Program Participant: A count of the unique households served by the program.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Refrigeration
Hot Water
End Use Behavior
Envelope
Solar Hot Water

Delivery Mechanism: The program was administered by each PA in its service territory and coordinated statewide through the Residential Management Committee ("RMC"). The RMC actively managed and steered the statewide MassSAVE program. Program vendors, selected through a competitive bidding process, delivered this program.

In order to increase the number of energy efficiency contractors, the program offered an incentive/rebate to contractors who installed retrofit weatherization measures such as insulation and air sealing.

Customers were required to have a site visit, conducted by the PA's vendor, to identify and prioritize all cost effective energy efficiency upgrades in order to receive incentives or a program rebate. All insulation work, whether performed by an authorized independent contractor or a vendor's subcontractor, was inspected for quality control by the PA's vendor when the work was

completed. This ensured that, either through an authorized installer or the PA's vendor, installations met Building Performance Institute standards or similar standards set by the PAs.

In addition, and consistent with the Green Communities Act, the HEAT Loan program provided qualified customers with zero percent interest loans up to $15,000 with terms up to seven years.

The RMC members worked together towards a "best practices" approach to provide a more coordinated statewide training as a means to ensure correct installation techniques for the Residential Conservation Services ("RCS")/MassSAVE Program.

Contractors must maintain a high level of customer satisfaction to continue in the program.

RMC applied a "best practices" approach to make quality control an integral part of the RCS/MassSAVE Program. The PAs issued an RFP and selected a third-party Quality Control ("QC") vendor responsible for performing QC inspections of program implementation vendors, subcontractors, and contractors.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011).

Table II.A.7. provides information on the performance of the MassSAVE program.

Table II.A.7: MassSAVE							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	5,516,024			3,626,015		-34%
Performance Incentive	$	0			0		0%
Participants	hhlds	3,900			3,803		-2%
Program Cost / Participant	$	1,414			953		-33%
Savings & Benefits							
Energy							
Lifetime	MWh	43,462	31,542	-27%	32,936	4%	-24%
Annualized	MWh	4,063	3,909	-4%	3,917	0%	-4%
Average Measure Life	yrs	10.7	8.1	-25%	8.4	4%	-21%
Demand							
Lifetime	kW	28,997	4,391	-85%	5,251	20%	-82%
Annualized							
Summer	kW	1,522	359	-76%	391	9%	-74%
Winter	kW	740	959	30%	955	0%	29%
Average Measure Life	yrs	19.0	12.2		13.4		
NEB (Lifetime)	$	16,857,554	7,299,161	-57%	8,499,399	16%	-50%
Cost-Effectiveness							
TRC Benefits	$	25,346,901			12,846,893		-49%
TRC Costs	$	6,334,839			4,279,697		-32%
Net Benefits	$	19,012,063			8,567,196		-55%
BCR	n/a	4.00			3.00		-25%

In the first half of 2010, the Cape Light Compact experienced lower than anticipated costs, savings and benefits due to lower customer participation stemming from unfavorable economic conditions. As a result, in October 2010, the Cape Light Compact filed its 2010 Mid-Year Revisions (D.P.U. 10-106) notifying the Department that it was likely that the MassSAVE program would be 20% or more under budget and savings for the year. The Cape Light Compact committed to conduct aggressive customer outreach through the remainder of the year in order to spur customers to participate in this program.

In the latter half of 2010, during the preparation of the Cape Light Compact's 2010 Mid-Year Revision filing and through the end of the year, a significant statewide decision to change the program design re-focused the Cape Light Compact's attention to creating and implementing a market model. By this time, customer interest in this program had ramped up significantly due to seasonal increases that are seen on a yearly basis. However, due to the uncertainty regarding the direction and outcome of program design changes, the Cape Light Compact was compelled to manage the risk involved in the program changes. As a result, the Cape Light Compact directed its vendor not to hire more staff until the program design issues were settled and therefore, was not able to serve all of the customer interest in this program.

In the Department's Order approving the Cape Light Compact's 2010 Mid-Year Revisions, the Department asked the Cape Light Compact to document its outreach efforts and discuss the

impact of these efforts on customer participation in its 2010 Annual Report.[5] Due to the program design changes that required consideration after the Cape Light Compact filed its 2010 Mid-Year Revisions, the Cape Light Compact did not conduct any additional outreach efforts as planned. As a result, customer participation was not impacted by any additional outreach efforts in 2010.

Additionally, as a part of the 2010 Mid-Year Revision filing, the Cape Light Compact committed to carry over any unspent MassSAVE program funds from 2010 to its 2011 residential sector budget and report such carry-over in this 2010 Annual Report.[6] While roughly $1,890,000 of the approved MassSAVE budget was not spent in 2010[7], revenues were also lower-than-planned. Due to the under-collection in the Residential sector[8], the Cape Light Compact will not be carrying over any of the unexpended 2010 budget in MassSAVE to 2011.

Preliminary Year-End Results % Change from Planned

This program resulted in significant variances for cost, savings and benefits metrics. However, participation was not the key driver of significant variances as thought at the time of the 2010 Mid-Year Revisions filing. Lower than anticipated program costs per participant drove lower than anticipated program costs. As mentioned above, customer interest ramped up in the latter half of 2010. However, the projects did not achieve the same depth as anticipated, likely due to economic conditions. In the absence of significant upcoming changes to program design, the Cape Light Compact could have directed its implementation to hire more staff to serve the additional customer interest, completely spend the budget and achieve the savings. However, as explained above, the likelihood of significant program design changes required that the Cape Light Compact act prudently and manage the program demand using existing vendor resources. Since the costs and savings experienced similar variances from the plan, the program remains cost-effective.

As a result of less comprehensive projects, the Cape Light Compact did not spend its program budget, and therefore it did not generate the savings and benefits that were planned for this program. The significant variance in lifetime energy savings and average measure life is due to the shift to lighting, domestic hot water instant savings measures (such as low flow showerheads, faucet aerators and pipe and tank wraps) and programmable thermostat measures from refrigerators, weatherization measures and heating system replacements. In this way, the Cape Light Compact was able to meet its annualized energy savings goal while not exhausting the total budget. Summer and lifetime demand savings were particularly impacted by the shift away

5 Order in the Cape Light Compact's Petition to the Department of Public Utilities, for approval of a Modification to its Three-Year Electric Energy Efficiency Plan Budget for Program Year 2010. D.P.U. 10-106. January 10, 2011 at page 13.

6 Order in the Cape Light Compact's Petition to the Department of Public Utilities, for approval of a Modification to its Three-Year Electric Energy Efficiency Plan Budget for Program Year 2010. D.P.U. 10-106. January 10, 2011 at page 4.

7 Please note that this is greater than the $1,103,271 difference between the modified and planned 2010 budgets assumed in Table 1: Program Budgets on Page 10 of the January 28, 2011 DPU order in Docket 10-106.

8 NSTAR 2011 EERF Filing, Docket 11-40, filed April 28, 2011, Exhibit CLC-CLV-1 (Cape Light Compact 2011 Residential Monthly EERF Deferral), Page 3 of 3, Column A, Line 13.

from measures with higher summer coincidence factors such as refrigerators and toward measures with lower summer coincidence factors such as lighting. Non-electric benefits were particularly impacted by the shift away from measures with non-electric benefits, such as weatherization measures and heating system replacements and toward measures with electric benefits such as lighting. Winter demand savings actually increased significantly as a result of the shift in measure mix to measures with higher winter coincidence (such as programmable thermostats and domestic hot water instant savings measures) from measures with lower winter coincidence.

Evaluated Results % Change from Preliminary

The following impact evaluation studies apply to this program.

1. *2010 Net-to-Gross Findings: Home Energy Assessment:* This study evaluated the free-ridership and spillover rates for all customers participating in the MassSAVE program. The study supplied updated impact factors for many measures, including:
    - Free ridership rates for CFLs, refrigerators, air sealing, insulation, programmable thermostats, heating system replacements and water heater replacements;
    - Participant spillover rates for CFLs and insulation; and
    - A non-participant spillover rate for insulation.

    The implementation of these study results drove a significant increase in lifetime demand savings. This is due primarily to the increase in non-participant spillover for the insulation measure. This study is discussed in more detail in Section III.
2. *Non-Electric Impact (NEI) Findings:* This memo reviews the non-electric impacts claimed for the MassSAVE program. Non-electric impacts include the gas, oil, and propane savings claimed through the measures installed through the electric program. The memo recommends that PAs use vendor estimated data to calculate non-electric impacts. As the Cape Light Compact already uses vendor data to calculate its non-electric impacts, no change is necessary. This study is discussed in more detail in Section III.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Massachusetts 2010 Residential Retrofit and Low Income Evaluation: Mass Save:* This study assessed program processes with a particular focus on identifying similarities and differences in the perspectives and assumptions of program staff, implementation staff, and customers regarding program goals, design and implementation across the PAs. The process evaluation has no impact on the evaluated results. This study is discussed in more detail in Section III.
2. *Cross-Cutting Net-to-Gross Methodology Study for Residential Programs – Suggested Approaches (Final):* The primary objective of this study was to develop approaches for consideration by the PAs for estimating net program impacts for the Massachusetts PAs'

residential programs. This study has no impact on the evaluated results. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there is an impact evaluation study that applies to this program, there is a significant difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. This difference is due to the impact of the 2010 Net-to-Gross Findings: Home Energy Assessment on the Evaluated Results Value.

The significant variance in TRC Benefits, TRC Costs, Net Benefits and BCR is due to the fact that projects were less comprehensive than estimated in the plan.

e. ENERGY STAR® Lighting

Purpose/Goal: The purpose of the ENERGY STAR® Lighting program was to increase consumer awareness of the importance and benefits of purchasing ENERGY STAR® qualified lighting products, and expand the availability, consumer acceptance, and use of high-quality energy-efficient lighting technologies and controls.

Targeted Customers: This program targeted all residential customers.

Definition of Program Participant: Estimated number of unique households served by the program.[9]

Targeted End-Uses: Lighting

Delivery Mechanism: A manufacturer/retailer outreach contractor recruited and trained retailers to participate in the program; placed point-of-purchase materials and rebate coupons in participating retail stores; oversaw the Negotiated Cooperative Promotions ("NCP") process; and acted as a liaison for PAs, manufacturers, and retailers.

A rebate fulfillment contractor collected data and payment requests from manufacturers, retailers, and consumers; processed rebate coupons and NCPs, and provided documentation to the PAs for program tracking and evaluation purposes.

An Internet/mail-order sales channel contractor developed and distributed the catalog; purchased and stocked products offered through the catalog and the www.estarlights.com website; staffed a toll-free line for customers; and processed catalog and website purchases.

Significant Differences in Actual Program Design from Approved Program Design: None.

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9 Per the methodology used to estimate participants for this program for the Three-Year Plan, production is divided by assumptions on the average number of bulbs installed per participant per measure to get to participants. The participants per measure are then summed to get to the total participants for the program.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011).

Table II.A.8. provides information on the performance of the ENERGY STAR® Lighting program.

Table II.A.8: ENERGY STAR Lighting							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	1,159,453			817,217		-30%
Performance Incentive	$	0			0		0%
Participants	est. hhlds	30,429			19,033		-37%
Program Cost / Participant	$	38			43		13%
Savings & Benefits							
Energy							
Lifetime	MWh	33,672	24,669	-27%	23,051	-7%	-32%
Annualized	MWh	4,199	3,075	-27%	2,844	-8%	-32%
Average Measure Life	yrs	8.0	8.0	0%	8.1	1%	1%
Demand							
Lifetime	kW	3,596	2,658	-26%	2,488	-6%	-31%
Annualized							
Summer	kW	444	326	-26%	302	-7%	-32%
Winter	kW	904	664	-26%	615	-7%	-32%
Average Measure Life	yrs	8.1	8.1		8.2		
NEB (Lifetime)	$	274,056	200,979	-27%	186,096	-7%	-32%
Cost-Effectiveness							
TRC Benefits	$	4,566,401			3,121,448		-32%
TRC Costs	$	1,401,781			820,905		-41%
Net Benefits	$	3,164,620			2,300,543		-27%
BCR	n/a	3.26			3.80		17%

Preliminary Year-End Results % Change from Planned

This program resulted in significant variances for cost, savings and benefits metrics. Since the costs and savings experienced similar variances from the plan, the program remains cost-effective.

The lack of available shelf space for specialty bulbs was a major impediment to achieving planned cost, savings and benefits goals in 2010. Per its plan, the Cape Light Compact attempted to expand the variety of specialty bulbs for retailers to offer. However, retailers did not have the available shelf space for these specialty bulbs. As a result, the quantities for specialty bulbs are significantly lower than planned. In summary, as a result of lower than anticipated participation, the Cape Light Compact could not spend its program budget, and therefore it did not generate the savings and benefits that were planned for this program.

The Cape Light Compact notes that some of the variance in savings and benefits metrics was offset by a correction to planning assumptions that was made in the preliminary and evaluated results. The Cape Light Compact changed in-service rates from 80% and 50% respectively for specialty and hard-to-reach bulbs after confirming that other PAs did not have in-service rates for specialty bulbs and hard-to-reach bulbs.

Evaluated Results % Change from Preliminary

The following impact evaluation study applies to this program.

1. *The Massachusetts ENERGY STAR® Lighting Program: 2010 Annual Report:* The study supplied updated net-to-gross ratios for standard CFLs and specialty CFLs. Due to the fact that the evaluation results for the hard to reach lighting component were inconclusive, a net-to-gross ratio for hard-to-reach CFLs was negotiated and agreed to by the EEAC Consultants and the PAs. The implementation of these study results did not result in any significant change in the Evaluated Results % Change from Preliminary because increased savings and benefits for standard CFL measures partially offset decreased savings and benefits for specialty and hard-to-reach CFL measures. This study is discussed in more detail in Section III.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Cross-Cutting Net-to-Gross Methodology Study for Residential Programs – Suggested Approaches (Final):* The primary objective of this study was to develop approaches for consideration by the PAs for estimating net program impacts for the Massachusetts PA's residential programs. This study has no impact on the evaluated results. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there is an impact evaluation study that applies to this program, there is a difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. This difference is due to the impact of the The Massachusetts ENERGY STAR® Program: 2010 Annual Report on the Evaluated Results Value.

The significant variance in TRC Benefits, TRC Costs and Net Benefits is due to lower specialty bulb purchases than assumed in the plan.

f. ENERGY STAR® Appliances

Purpose/Goal: The purpose of the program was to raise consumer awareness of the benefits of energy-efficient ENERGY STAR® qualified consumer products, encourage consumers to purchase qualified appliances and consumer electronics, promote higher efficiency standards for

products, and to help customers reduce energy bills by replacing or recycling inefficient products.

Targeted Customers: This program targeted all residential customers.

Definition of Program Participant: A count of the number of unique households served by the program.

Targeted End-Uses:
Heating, Ventilation and Air Conditioning
Motors & Drives
Refrigeration
End Use Behavior
Process

Delivery Mechanism: A manufacturer/retailer outreach contractor recruited and trained retailers to participate in the program; placed point-of-purchase materials and rebate forms in participating retail stores; oversaw the Negotiated Cooperative Program ("NCP") process for televisions; and acted as a liaison for PAs, manufacturers, and retailers.

A rebate fulfillment contractor collected rebate forms from consumers, data and payment requests from manufacturers and retailers; processed rebates and NCPs, and provided documentation to the PAs for program tracking and evaluation purposes.

For advanced power strips, an Internet/mail-order sales channel contractor developed and distributed the catalog; purchased and stocked products offered through the catalog and the www.estarlights.com website; staffed a toll-free line for customers; and processed catalog and website purchases

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.A.9. provides information on the performance of the ENERGY STAR® Appliances program.

Table II.A.9: ENERGY STAR Appliances							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	253,545			386,404		52%
Performance Incentive	$	0			0		0%
Participants	hhlds	6,243			4,247		-32%
Program Cost / Participant	$	41			91		124%
Savings & Benefits							
Energy							
Lifetime	MWh	5,452	8,638	58%	8,181	-5%	50%
Annualized	MWh	663	960	45%	903	-6%	36%
Average Measure Life	yrs	8.2	9.0	9%	9.1	1%	10%
Demand							
Lifetime	kW	1,209	1,029	-15%	1,029	0%	-15%
Annualized							
Summer	kW	143	107	-25%	107	0%	-25%
Winter	kW	140	122	-13%	122	0%	-13%
Average Measure Life	yrs	8.5	9.6		9.6		
NEB (Lifetime)	$	0	0	0%	0	0%	0%
Cost-Effectiveness							
TRC Benefits	$	787,448			1,045,762		33%
TRC Costs	$	319,340			433,119		36%
Net Benefits	$	468,109			612,642		31%
BCR	n/a	2.47			2.41		-2%

Preliminary Year-End Results % Change from Planned

This program experienced a significant positive variance from planned total program costs due to higher than anticipated interest in refrigerator and TV rebates. Refrigerators represented approximately one-fifth of the measures in the plan, but two-thirds of the measures actually installed. TVs represented approximately 5 percent of the measures in the plan, but approximately 15 percent of the measures actually installed. The level of interest in TVs is substantial, considering there was only one retailer in Cape Light Compact territory participating in the program and the measure launched in October 2010.

The program cost per participant was higher due to a shift in measure mix from room air conditioners and smart strips to refrigerators. Refrigerators have a higher incentive ($50) as compared to room air conditioners ($35) and smart strips ($10). Also, program planning and administration ("PP&A") and Marketing costs were higher than planned as additional resources were needed to aggressively expand the number of products offered. Despite the fact that the total program costs exceeded planned costs, the program did not serve as many participants as planned due to the fact that the total program costs were significantly higher per participant.

Annual and lifetime energy savings were significantly higher than planned due to higher than anticipated interest in refrigerators and TVs. Summer demand savings were significantly lower than planned due to the shift from room air conditioners to refrigerators.

Evaluated Results % Change from Preliminary

The following impact evaluation study applies to this program.

1. *The Massachusetts Appliance Turn-in Program Impact Evaluation*: The study supplied updated gross savings for refrigerator recycling and freezer recycling. The implementation of these study results did not result in any significant change in Evaluated Results % Change from Preliminary. While the decrease in savings and benefits for refrigerator recycling and freezer recycling were significant at the measure level, these measures represented a relatively small proportion of the total measures installed by this program in 2010. Consequently, the impact of the reduction in the savings for refrigerator and freezer recycling measures is diluted by the fact that there was no change in savings for the rest of the measures implemented by this program. This study is discussed in more detail in Section III.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Cross-Cutting Net-to-Gross Methodology Study for Residential Programs – Suggested Approaches (Final):* The primary objective of this study was to develop approaches for consideration by the PAs for estimating net program impacts for the Massachusetts PA's residential programs. This study has no impact on the evaluated results. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there is an impact evaluation study that applies to this program, there is a difference between the Evaluated Results % Change from Planned and the Preliminary Year-End Results % Change from Planned. This difference is due to the impact of the Massachusetts Appliance Turn-in Program Impact Evaluation on the Evaluated Results Value.

The significant variance in TRC Benefits, TRC Costs and Net Benefits is due to greater-than-anticipated interest in measures that generally have greater cost and greater savings.

3. Residential Pilot Programs

The purpose of the Annual Report is to provide actual measured and verified cost, participation, savings and benefits data on the performance of programs. To the extent such final actual data for pilots programs is available, it is provided in this report.

a. Deep Energy Retrofit

Description of Pilot/Specific Activities Intended to Study: The Deep Energy Retrofit pilot was implemented to investigate the potential for energy savings of at least 50 percent of total on-site energy use through deep retrofits of existing residential buildings and to identify incremental savings and how to reduce the costs and challenges associated with deep retrofits.

Why Implemented on Pilot Basis rather than as a Full Program: This initiative was offered as a pilot to determine if the initiative is cost-effective.

Targeted Customers: The pilot targeted home-owners, property owners, and property managers considering renovations and willing to invest in extensive carbon reductions. In addition, the pilot targeted advanced building remodelers, architects, designers, trade allies, and others involved in renovation or restoration of residential buildings.

Definition of Pilot Program Participant: A count of the number of unique households with a completed project. In order to be reported as a participant, the project must be completed during the program year.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Hot Water
Envelope
End Use Behavior

Delivery Mechanism: Project design details and assistance to the Deep Energy Retrofit contractors performing the work was handled through technical specialist contractor, program manager and organizations under contract and/or utilizing DOE Building America funds.

Significant Differences in Actual Program Design from Approved Program Design: None.

How Achievement of the Pilot's Stated Goal was Measured: An evaluation of the pilot is included in this Annual Report.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.A.10. provides information on the performance of the Deep Energy Retrofit Pilot.

Table II.A.10: Deep Energy Retrofit							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	83,333			26,659		-68%
Participants	hhlds	n/a			1		n/a
Program Cost / Participant	$	n/a			26,659		n/a
Savings & Benefits							
Energy							
Lifetime	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
Demand							
Lifetime	kW	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	kW						
Summer	kW	n/a	n/a	n/a	n/a	n/a	n/a
Winter	kW	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
NEB (Lifetime)	$	n/a	n/a	n/a	n/a	n/a	n/a
Cost-Effectiveness							
TRC Benefits	$	n/a			n/a		n/a
TRC Costs	$	83,333			26,659		-68%
Net Benefits	$	n/a			n/a		n/a
BCR	n/a	n/a			n/a		n/a

Preliminary Year-End Results % Change from Planned, Evaluated Results % Change from Preliminary, and Evaluated Results % Change from Planned

The Cape Light Compact's evaluated total program costs are significantly lower than planned due to lower participation than anticipated. The Cape Light Compact planned for six participants in 2010.[10] Although, the Cape Light compact did have a lot of interest in this pilot in 2010, homeowners did not seem to fully understand that this was a major undertaking with significant planning, financing, and construction components. As a result, longer lead times for planning, high upfront participant costs, and general customer unwillingness to commit to a comprehensive Deep Energy Retrofit project contributed to the fact that only one project was completed in 2010.

There are no impact evaluation studies that apply to this pilot program. As there was no impact evaluation conducted on this pilot, there are no evaluated savings or benefits to report.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

10 Cape Light Compact D.P.U. 09-119. Response to AG Third Set of Information Requests. November 30, 2009. AG 3-1.

1. *Massachusetts 2010 Residential Retrofit and Low Income Evaluation – Deep Energy Retrofit:* The overarching goal of the 2010 Deep Energy Retrofit pilot evaluation was to provide the PAs/implementers with actionable findings and recommendations aimed at increasing customer and contractor participation, as well as refining pilot program's delivery. As the investigations progressed, effort focused on identifying information to aid in formulating a consensus about the pilot's mission and goals, rather than fine-tuning delivery mechanisms. The Cape Light Compact anticipates using the lessons learned to move toward evaluating cost-effective prescriptive paths for deeper measures within homes. This study is discussed in more detail in Section III.

b. Residential New Construction & Major Renovation – Major Renovation Statewide Pilot

Description of Pilot/Specific Activities Intended to Study: The pilot was implemented to capture lost opportunities and encourage energy efficient additions and renovations to existing homes.

Why Implemented on Pilot Basis rather than as a Full Program: This initiative was offered as a pilot to determine if the initiative is cost-effective. Initial results are included in the process evaluation included in this Annual Report.

Targeted Customers: This program targeted customers who want to build an addition on their existing home.

Definition of Pilot Program Participant: A count of the number of unique households with a completed project. In order to be reported as a participant, the project must be completed during the program year.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Hot Water
Envelope

Delivery Mechanism: The PAs, along with the JMC, included this pilot as an offering under the Massachusetts New Homes with ENERGY STAR® Program. This pilot combines elements of the Residential New Construction Program (for the addition) and RCS program (for the existing portion) to provide a comprehensive whole-house approach. Each home in the program had a HERS analysis performed in order to better understand the existing structure. Recommendations were provided to the homeowner for the existing portion and the new addition by the market-based rater in the program.

Significant Differences in Actual Program Design from Approved Program Design: None.

How Achievement of the Pilot's Stated Goal was Measured: An evaluation of the pilot is currently in process.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.A.11. provides information on the performance of the Residential New Construction & Major Renovation – Major Renovation Statewide Pilot.

Table II.A.11: Residential New Construction & Major Renovation - Major Renovation Statewide Pilot							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	257,547			43,992		-83%
Participants	hhlds	n/a			2		n/a
Program Cost / Participant	$	n/a			21,996		n/a
Savings & Benefits							
Energy							
Lifetime	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
Demand							
Lifetime	kW	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	kW						
Summer	kW	n/a	n/a	n/a	n/a	n/a	n/a
Winter	kW	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
NEB (Lifetime)	$	n/a	n/a	n/a	n/a	n/a	n/a
Cost-Effectiveness							
TRC Benefits	$	n/a			n/a		n/a
TRC Costs	$	257,547			43,992		-83%
Net Benefits	$	n/a			n/a		n/a
BCR	n/a	n/a			n/a		n/a

Preliminary Year-End Results % Change from Planned, Evaluated Results % Change from Preliminary, and Evaluated Results % Change from Planned

The Cape Light Compact's evaluated total program costs are significantly lower than planned due to lower participation than anticipated. The Cape Light Compact planned for 110 participants[11] and had 2 project completions.

11 Cape Light Compact D.P.U. 09-119. Response to AG Third Set of Information Requests. November 30, 2009. AG 3-2.

The Cape Light Compact clearly did not have enough interest and participation in 2010 to draw conclusions as to why participation was significantly lower than planned. However, it seems that the renovation and new construction markets for new, efficient additions are both currently significantly smaller than expected which is greatly impacting participation. There are several reasons for the recent reduction in renovation market opportunity. EPA's Lead Renovation, Repair and Painting Rule[12] (which went into effect on April 22, 2010) likely slowed the renovation rate as the rule led to an increase in renovation costs. Also, the economy slowed the renovation rate as many homeowners do not currently have the funds to add an addition and are postponing projects. Also, it seems that the requirement that projects include an addition of 500 sq. ft. or more is a barrier to participation. There are few renovation projects on Cape Cod that can currently meet this requirement, likely due to the contraction in the new construction market that occurred in conjunction with the recession. Lastly, the fact that many homes in the Cape Light Compact's service territory are seasonal use and vacation rental properties is a major impediment to implementation of this pilot. Several projects that the Cape Light Compact analyzed involved conversion of unconditioned space into conditioned space for occasional use as a guest room, which was not a cost-effective use of funds.

There is no completed impact evaluation study that applies to this pilot program. There are no evaluated savings or benefits to report as the evaluation of this pilot has been extended in order to include enough projects at the statewide level to generate a statistically significant sample.

There is also no non-impact evaluation study that applies to this pilot program.

c. Residential New Construction - Multi-Family (4-8 story) Statewide Pilot

Description of Pilot/Specific Activities Intended to Study: The pilot was implemented to broaden participation, through an incentive design that encourages such action, and achieve deeper savings in the multi-family new construction 4-8 story category.

Why Implemented on Pilot Basis rather than as a Full Program: This initiative was offered as a pilot to determine if the initiative is cost-effective.

Targeted Customers: This pilot targeted 4-8 story multi-family new construction projects.

Definition of Pilot Program Participant: Though the Cape Light Compact supports this statewide pilot, Cape Light Compact does not have enough Multi-Family (4- to 8-story) homes in its service territory to be able to participate in this pilot. Therefore, the Cape Light Compact has not developed a participant definition for this pilot program.

Targeted End-Uses:
Lighting
Hot Water

12 Details on this rule can be found at: http://www.epa.gov/lead/pubs/renovation.htm.

Heating, Ventilation, and Air Conditioning
Motors & Drives
Envelope

Delivery Mechanism: The PAs and the statewide new construction program lead vender delivered this pilot.

Significant Differences in Actual Program Design from Approved Program Design: None.

How Achievement of the Pilot's Stated Goal was Measured: A final evaluation has not been completed.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.A.12. provides information on the performance of the Residential New Construction – Multi-Family (4-8 story) Statewide Pilot.

Table II.A.12: Residential New Construction - Multi-Family (4-8 story) Statewide Pilot

Performance Category	Units	Planned Value	Preliminary Year-End Results		Evaluated Results		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	n/a			n/a		n/a
Participants	hhlds	n/a			n/a		n/a
Program Cost / Participant	$	n/a			n/a		n/a
Savings & Benefits							
Energy							
Lifetime	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
Demand							
Lifetime	kW	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	kW						
Summer	kW	n/a	n/a	n/a	n/a	n/a	n/a
Winter	kW	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
NEB (Lifetime)	$	n/a	n/a	n/a	n/a	n/a	n/a
Cost-Effectiveness							
TRC Benefits	$	n/a			n/a		n/a
TRC Costs	$	n/a			n/a		n/a
Net Benefits	$	n/a			n/a		n/a
BCR	n/a	n/a			n/a		n/a

Preliminary Year-End Results % Change from Planned, Evaluated Results % Change from Preliminary, and Evaluated Results % Change from Planned

Though the Cape Light Compact supports this statewide pilot, Cape Light Compact does not have enough Multi-Family (4- to 8-story) homes in its service territory to be able to participate in this pilot. Therefore, no budget was allocated to this pilot in the plan, and there are no results from 2010 to report.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Massachusetts New Homes with ENERGY STAR® Process Evaluation of the Four to Eight Story Multi-Family New Construction Pilot Interim Findings:* This report presents preliminary findings from interviews with the two Sponsors of the Pilot, and two individuals representing the three projects that completed in 2010. The objective of the interviews was to address several process evaluation issues such as the Pilot's goals and objectives, the process of signing up and completing verification, outreach and the types of projects served, the measures covered, the measures installed, barriers to energy efficient multi-family new construction, and satisfaction. This study is discussed in more detail in Section III.

d. Residential New Construction - Lighting Design Statewide Pilot

Description of Pilot/Specific Activities Intended to Study: The PAs worked with lighting designers and build/design teams to identify creative ways to approach energy savings through proper lighting design on a portfolio level.

Why Implemented on Pilot Basis rather than as a Full Program: This initiative was offered as a pilot to determine if the initiative is cost-effective.

Targeted Customers: The target audience for this pilot included homebuilders, contractors, architects/designers, trade allies, HERS raters, homebuyers, realtors, developers, low-income and affordable housing developers, and consumers in the market for new homes and or major renovations.

Definition of Pilot Program Participant: A count of the number of unique households with a completed project. In order to be reported as a participant, the project must be completed during the program year.

Targeted End-Uses: Lighting

Delivery Mechanism: The PAs, along with the JMC, included this pilot as an offering under the Massachusetts New Homes with ENERGY STAR® Program.

Significant Differences in Actual Program Design from Approved Program Design: None.

How Achievement of the Pilot's Stated Goal was Measured: A final evaluation of this pilot has not been completed.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.A.13. provides information on the performance of the Residential New Construction - Lighting Design Statewide Pilot.

Table II.A.13: Residential New Construction - Lighting Design Statewide Pilot							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	22,222			11,264		-49%
Participants	hhlds	n/a			0		n/a
Program Cost / Participant	$	n/a			n/a		n/a
Savings & Benefits							
Energy							
Lifetime	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
Demand							
Lifetime	kW	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	kW						
Summer	kW	n/a	n/a	n/a	n/a	n/a	n/a
Winter	kW	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
NEB (Lifetime)	$	n/a	n/a	n/a	n/a	n/a	n/a
Cost-Effectiveness							
TRC Benefits	$	n/a			n/a		n/a
TRC Costs	$	22,222			11,264		-49%
Net Benefits	$	n/a			n/a		n/a
BCR	n/a	n/a			n/a		n/a

Preliminary Year-End Results % Change from Planned, Evaluated Results % Change from Preliminary, and Evaluated Results % Change from Planned

The Cape Light Compact's evaluated total program costs are significantly lower than planned due to lower participation than anticipated. The Cape Light Compact planned for 10 participants[13] and had no project completions in 2010.[14]

13 Cape Light Compact D.P.U. 09-119. Response to AG Third Set of Information Requests. November 30, 2009. AG 3-5.

The Cape Light Compact clearly did not have enough interest and participation in 2010 to draw conclusions as to why participation was significantly lower than planned. However, it seems that lighting design is already being addressed as a part of the more comprehensive Residential New Construction & Major Renovation program. As a result, the opportunity is smaller than expected.

There is no completed impact evaluation study that applies to this pilot program. As this pilot is currently undergoing evaluation, there are no evaluated savings or benefits to report.

There are no process, market characterization and baseline studies that apply to this program.

e. Residential New Construction - V3 ENERGY STAR® Homes Statewide Pilot

Description of Pilot/Specific Activities Intended to Study: The PAs implemented the pilot to study many of the new specifications of Version 3 of the federal ENERGY STAR® Homes program anticipated to go into effect in 2011.

Why Implemented on Pilot Basis rather than as a Full Program: This initiative was offered as a pilot to determine if the initiative is cost-effective.

Targeted Customers: The target audience for this pilot included homebuilders, contractors, architects/designers, trade allies, HERS raters, homebuyers, realtors, developers, low-income and affordable housing developers, code officials, and consumers in the market for new homes and or major renovations.

Definition of Pilot Program Participant: A count of the number of unique households with a completed project. In order to be reported as a participant, the project must be completed during the program year.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Envelope
Hot Water

Delivery Mechanism: The PAs, along with the JMC, included this pilot as an offering under the Massachusetts New Homes with ENERGY STAR® Program.

Significant Differences in Actual Program Design from Approved Program Design: None.

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14 The Cape Light Compact reports costs as they are incurred. However, the Cape Light Compact only reports participants, savings and benefits once projects are complete. Since two projects began in 2010 but were not completed during the program year, the total program costs are shown but the participants are not shown.

How Achievement of the Pilot's Stated Goal was Measured: A final evaluation of the pilot is currently in process.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.A.14. provides information on the performance of the Residential New Construction V3 - ENERGY STAR® Homes Statewide Pilot.

Table II.A.14: Residential New Construction - V3 Energy Star Homes Statewide Pilot							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	0			0		0%
Participants	hhlds	n/a			0		n/a
Expense/Customer	$	n/a			n/a		n/a
Savings & Benefits							
Energy							
Lifetime	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
Demand							
Lifetime	kW	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	kW						
Summer	kW	n/a	n/a	n/a	n/a	n/a	n/a
Winter	kW	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
NEB (Lifetime)	$	n/a	n/a	n/a	n/a	n/a	n/a
Cost-Effectiveness							
TRC Benefits	$	n/a			n/a		n/a
TRC Costs	$	0			0		0%
Net Benefits	$	n/a			n/a		n/a
BCR	n/a	n/a			n/a		n/a

Preliminary Year-End Results % Change from Planned, Evaluated Results % Change from Preliminary, and Evaluated Results % Change from Planned

Though the Cape Light Compact supported this statewide pilot, it did not actually need to allocate any budget to this pilot in 2010. The Cape Light Compact expected the incentive cost increase between version 2 and version 3 to be high due to significant differences between the two versions. However, once version 3 was finalized the differences between the two versions were not significant, and the incentive costs were not significantly different. Since it was unlikely that participant response to this version would be significantly different than to version

2, the Cape Light Compact determined that version 3 should be an extension of its Residential New Construction & Major Renovation program rather than a separate pilot. Also, the costs, savings and benefits associated with all version 3 projects are small, as one home was completed in 2010. As a result, the Cape Light Compact included the costs, savings and benefits from the one home as a part of its Residential New Construction & Major Renovation program.

The Cape Light Compact did not allocate budget to this pilot in 2011 as shown in its 2011 Mid-Term Modifications filed in October 2010. Furthermore, the Cape Light Compact does not anticipate allocating budget to this pilot in 2012 as shown in its original Three-Year Plan filing.

There is no impact evaluation study that applies to this pilot program.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *The Massachusetts New Homes with ENERGY STAR® Program Version 3 Pilot Evaluation:* The focus of this report is on lessons learned from the Massachusetts New Homes with ENERGY STAR® Program Version 3 Pilot ("Pilot") and issues the program will face going forward to keep existing builders in the program, as well as recruit new builders, as ENERGY STAR® Version 3 requirements take effect. Version 3 Guidelines for ENERGY STAR® Homes become effective for all new homes, regardless of permit dates, starting January 1, 2012. This study is discussed in more detail in Section III.

f. Heat Pump Water Heater Pilot (Non-Statewide)

Description of Pilot/Specific Activities Intended to Study: This pilot was designed to study the reliability and energy savings of heat pump water heaters.

Why Implemented on Pilot Basis rather than as a Full Program: This initiative was offered as a pilot to determine if the initiative is cost-effective.

Targeted Customers: This pilot targeted residential customers with stand-alone electric water heaters.

Definition of Pilot Program Participant: A count of the number of unique households served by the pilot program.

Targeted End-Uses: Hot Water

Delivery Mechanism: The PAs worked with a third party evaluation team that installed the measure and is monitoring usage.

Significant Differences in Actual Program Design from Approved Program Design: None.

How Achievement of the Pilot's Stated Goal was Measured: An evaluation is on-going.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.A.15. provides information on the performance of the Heat Pump Water Heater Pilot.

Table II.A.15: Heat Pump Water Heater Pilot							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	11,111			9,022		-19%
Participants	hhlds	n/a			2		n/a
Program Cost / Participant	$	n/a			4,511		n/a
Savings & Benefits							
Energy							
Lifetime	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
Demand							
Lifetime	kW	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	kW						
Summer	kW	n/a	n/a	n/a	n/a	n/a	n/a
Winter	kW	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
NEB (Lifetime)	$	n/a	n/a	n/a	n/a	n/a	n/a
Cost-Effectiveness							
TRC Benefits	$	n/a			n/a		n/a
TRC Costs	$	11,111			9,022		-19%
Net Benefits	$	n/a			n/a		n/a
BCR	n/a	n/a			n/a		n/a

Preliminary Year-End Results % Change from Planned, Evaluated Results % Change from Preliminary, and Evaluated Results % Change from Planned

The Cape Light Compact's plan tracked with actuals as two participants were planned[15] and two units were installed in 2010 in customers' homes. Due to the fact that the evaluated cost per participant was similar to planned costs, total program costs are not significantly different than planned.

There is no completed impact evaluation study that applies to this pilot program. Savings and benefits are not available as this pilot is currently being evaluated.

[15] Cape Light Compact D.P.U. 09-119. Response to AG Third Set of Information Requests. November 30, 2009. AG 3-6.

There are no process, market characterization and baseline studies that apply to this program.

g. Power Monitor Pilot (Cape Light Compact-specific)

Description of Pilot/Specific Activities Intended to Study: In 2009, the Cape Light Compact conducted Phase I of this pilot, in an effort to gain insight to behavioral aspects of energy use. The Compact identified 91 participants on Cape Cod and Martha's Vineyard and installed an in-home energy monitoring system in each participant's home. The monitoring system enables the participant to view their electricity consumption in real time, displaying energy usage down to the minute. Participants had access to an online dashboard, which offered participants feedback on their energy consumption and demand, savings metrics in kWh, dollars, and CO2 emissions and opportunities to learn about and sign up for energy saving activities (e.g., unplugging chargers when not in use). Participants were also part of a social networking system with other pilot members.

In March of 2010, an independent third party evaluation was completed of Phase I that was included in the Cape Light Compact's 2009 Annual Report. The results of the evaluation indicated a strong customer interest in the pilot, high levels of customer satisfaction with the pilot and significant energy savings. On average, customers saved 9.3 percent, controlling for temperature differences and for other Cape Light Compact program activity. This is equivalent to 2.9 kWh of saved electricity per day.

In the fall of 2010, Cape Light Compact supplemented its review of the Pilot program with qualitative in-depth interviews of ten participants. The interviews were conducted by an independent third party and discussed primarily participant's thoughts and patterns of interaction with the monitoring system and their feedback regarding suggestions on changes or features they would like to see in the energy monitoring system. Findings from these interviews provided insight into how and why participants are motivated to stay engaged with the system over longer periods of time and provide further evidence to the evaluation's conclusions.

As a result of the findings in the report and follow up interviews, the Compact extended the pilot by offering Phase II in 2011. Phase II of the pilot includes both residential and commercial participants. The purpose of Phase II and its associated evaluation is to provide the basis for determining whether to transition the Pilot into a Program. The evaluation of Phase II will further evaluate the savings associated with the pilot, as well as the persistence of the energy savings identified in Phase I.

Why Implemented on Pilot Basis rather than as a Full Program: This initiative was offered as a pilot to determine if the initiative is cost-effective. Once the evaluation of the pilot is completed, the pilot may be offered as a program in the future.

Targeted Customers: Phase I of this Pilot targeted year-round residential customers. Phase II of this Pilot targets year-round residential customers, as well as a few small commercial customers.

Definition of Pilot Program Participant: A count of the number of unique households in which pilot hardware was installed.

Targeted End-Uses: The Pilot targets all residential and commercial end-uses through either motivating customers to change their behavior to save energy or to take energy saving actions.

Delivery Mechanism: The Cape Light Compact and its implementation vendor, Tendril, Inc. delivered this Pilot.

Significant Differences in Actual Program Design from Approved Program Design: None.

How Achievement of the Pilot's Stated Goal was Measured: An evaluation of the Pilot's first phase has been completed. The evaluation of the Pilot's second phase is in process.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011).

Table II.A.16. provides information on the performance of the Power Monitor Pilot.

Table II.A.16: Power Monitor Pilot							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	233,333			74,496		-68%
Participants	hhlds	n/a			91		n/a
Expense/Customer	$	n/a			819		n/a
Savings & Benefits							
Energy							
Lifetime	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
Demand							
Lifetime	kW	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	kW						
Summer	kW	n/a	n/a	n/a	n/a	n/a	n/a
Winter	kW	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
NEB (Lifetime)	$	n/a	n/a	n/a	n/a	n/a	n/a
Cost-Effectiveness							
TRC Benefits	$	n/a			n/a		n/a
TRC Costs	$	233,333			74,496		-68%
Net Benefits	$	n/a			n/a		n/a
BCR	n/a	n/a			n/a		n/a

Preliminary Year-End Results % Change from Planned, Evaluated Results % Change from Preliminary, and Evaluated Results % Change from Planned

The Cape Light Compact's evaluated total program costs are significantly lower than planned due to lower Phase II incentive costs in 2010 than anticipated. Phase II did not launch until 2010 was nearly over as the Cape Light Compact decided to leverage the study results from Phase I to inform Phase II. As a result, most of the costs for Phase II will occur in 2011 rather than 2010, as originally planned.

Savings and benefits data for Phase II is not provided as the level and persistence of savings is currently being evaluated. The Cape Light Compact began its implementation of Phase II starting in the spring of 2011 and will review preliminary results in the summer of 2012. Based on the findings from the evaluation, the Cape Light Compact will decide whether or not to include Power Monitor as a part of its program offerings in its 2013 – 2015 Three-Year Energy Efficiency Plan.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Findings from In-Depth Interviews with Smart Energy Monitoring Pilot Participants:* The purpose of the study was to supplement findings from the first evaluation of the Pilot

that was completed in Spring 2010, and inform the Pilot's future expansion. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.

h. Home Automation Pilot (Cape Light Compact-specific)

Description of Pilot/Specific Activities Intended to Study: The Cape Light Compact's Residential Home Automation Pilot is designed to promote energy savings through the use of automation tools that will give homeowners the ability to remotely control their homes' energy usage while they are gone for an extended period of time.

Why Implemented on Pilot Basis rather than as a Full Program: This initiative was offered as a pilot to determine if the initiative is cost-effective. This pilot was not launched during the program year due to unforeseen circumstances and changes in home automation during 2010. During the planning stage, the Cape Light Compact identified a potential partner with a low-cost home automation installation product that could help to test the energy savings potential of home automation. However, the Cape Light Compact discovered that while the technologies did exist, they did not meet the basic requirements for the pilot, as they did not have features that the Cape Light Compact was interested in trying out with customers.

Targeted Customers: This pilot program was developed in response to the needs of seasonal and second home-owners in the Compact's market.

Definition of Pilot Program Participant: N/A

Targeted End-Uses: N/A

Delivery Mechanism: N/A

Significant Differences in Actual Program Design from Approved Program Design: N/A

How Achievement of the Pilot's Stated Goal was Measured: N/A

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011).

Table II.A.17. provides information on the performance of the Home Automation Pilot.

Table II.A.17: Home Automation Pilot							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	10,800			0		-100%
Participants	hhlds	n/a			0		n/a
Expense/Customer	$	n/a			n/a		n/a
Savings & Benefits							
Energy							
Lifetime	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	MWh	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
Demand							
Lifetime	kW	n/a	n/a	n/a	n/a	n/a	n/a
Annualized	kW						
Summer	kW	n/a	n/a	n/a	n/a	n/a	n/a
Winter	kW	n/a	n/a	n/a	n/a	n/a	n/a
Average Measure Life	yrs	n/a	n/a	n/a	n/a	n/a	n/a
NEB (Lifetime)	$	n/a	n/a	n/a	n/a	n/a	n/a
Cost-Effectiveness							
TRC Benefits	$	n/a			n/a		n/a
TRC Costs	$	10,800			0		-100%
Net Benefits	$	n/a			n/a		n/a
BCR	n/a	n/a			n/a		n/a

Preliminary Year-End Results % Change from Planned, Evaluated Results % Change from Preliminary, and Evaluated Results % Change from Planned

While the Cape Light Compact originally budgeted $10,800 for this pilot, this pilot was not launched during the program year due to unforeseen circumstances that occurred over the course of the year. During the planning stage, the Cape Light Compact identified a potential partner with a low-cost home automation installation product that could help to test the energy savings potential of home automation. However, the Cape Light Compact discovered that while the technology did exist, the product did not meet the basic requirements for the pilot, as it did not have the features that the Cape Light Compact was interested in trying out with customers. As a result, the Cape Light Compact did not sign a contract with that partner and continued to search for a partner that would meet the pilot requirements.

There is no impact evaluation study that applies to this pilot program.

There are no process, market characterization and baseline studies that apply to this program.

i. 2010 Energy Education Activities

The Cape Light Compact is committed to energy education and outreach to its community and continues to be a nationally recognized leader in the design and implementation of its energy

education programs. As a unique energy efficiency administrator and municipal aggregator, the Compact strives to support the community in efforts to encourage the development of deeper and broader knowledge of energy efficiency technology and practices, moving towards an energy-literate society.

Toward this goal, this past year saw the Cape Light Compact's Energy Education Program substantially increase its outreach within the school population through its innovative programs (please see the table in Appendix E.5 for more detail). Highlights of these programs included:

- Over 100 education based presentations, field trips and all-school Energy Carnivals: students learn the basic lessons of energy efficiency, energy forms and energy sources in a first-hand, fun and engaging way. Over 5,000 students and teachers were reached.
- A Standards-based graduate level course for teachers to introduce and reinforce energy education concepts for the classroom.
- Informal science educator workshops for science and nature center staff.
- We were proud to have four of our schools recognized by the National Energy Education Development Project ("NEED") for their outstanding work in energy education outreach to their communities:
    - Sandwich High School – National Senior Level School of the Year
    - Eastham Elementary School – National Elementary School of the Year Finalist
    - Cape Cod Lighthouse Charter School – State Middle School of the Year
    - Nauset Regional High School – State Senior Level Rookie of the Year

Our greatest successes were seen with the "kids as teachers" model where high school and middle school students were trained and studied to present information on energy efficiency, renewable energy, and related topics to younger students and community members. As evidenced in repeat school programs from year to year, schools have moved towards adopting energy education into their yearly scope and sequence of classroom activities and thus continue to reach more individuals.

The Cape Light Compact continues its collaboration with the NEED of Manassas, VA, a 501 (C)3 non-profit educational organization affiliated with the Department of Energy in Washington DC. Using a model for science-based facts, the Cape Light Compact and NEED created curriculum materials to align with the MA state standards for science and technology, allowing teachers to introduce lesson plans discussing energy efficiency and conservation.

B. Low-Income Sector Programs

1. Summary

During 2010 the Cape Light Compact implemented the following low-income programs[16]:

16 The Cape Light Compact did not offer any pilot programs in the low-income sector during 2010.

- Low-Income Residential New Construction
- Low-Income 1-4 Family Retrofit
- Low-Income Multi-Family Retrofit

Tables II.B.1 through II.B.3 provide summary information on the performance of the low-income programs at the sector, end use, and program levels, respectively.

Tables II.B.4 through II.B.6 provide detailed information on the performance of each low-income program.

Table II.B.1: Low-Income Sector Summary

Performance Category	Units	Planned Value	Preliminary Year-End Results		Evaluated Results		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	2,088,750			1,826,691		-13%
Performance Incentive	$	0			0		0%
Savings & Benefits							
Energy							
Lifetime	MWh	16,195	8,164	-50%	8,164	0%	-50%
Annualized	MWh	1,416	628	-56%	628	0%	-56%
Demand							
Lifetime	kW	1,856	852	-54%	852	0%	-54%
Annualized							
Summer	kW	164	63	-62%	63	0%	-62%
Winter	kW	308	125	-60%	125	0%	-60%
NEB (Lifetime)	$	3,967,799	3,350,053	-16%	3,350,053	0%	-16%
Cost-Effectiveness							
TRC Benefits	$	5,922,383			4,301,936		-27%
TRC Costs	$	2,088,750			1,828,369		-12%
Net Benefits	$	3,833,633			2,473,567		-35%
BCR	n/a	2.84			2.35		-17%

Preliminary Year-End Results % Change from Planned

Within the Low-Income sector, the following programs are contributing to the variance between planned and evaluated values:

- Low-Income 1 to 4 Family Retrofit (for TRC Benefits and Net Benefits): Please reference section II.B.b for a more detailed discussion of the cause of the variances for this program.
- Low-Income Multi-Family Retrofit (for TRC Benefits, TRC Costs, Net Benefits and BCR): Please reference section II.B.c for a more detailed discussion of the cause of the variances for this program.

Evaluated Results % Change from Preliminary

There are no impact evaluation studies that apply to the Low-Income sector programs. As a result, there is no change in the Evaluated Results % Change from Preliminary.

Evaluated Results % Change from Planned

Since there are no impact evaluation studies that apply to the Low-Income sector programs, there is no difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

Table II.B.2: Low-Income Sector Summary of End Uses				
End Uses	Units (lifetime)	**Preliminary Year-End Results**	**Evaluated Results**	**% Change from Preliminary to Evaluated**
Lighting				
Energy	MWh	2,296	2,296	0%
Demand	kW	212	212	0%
NEB	$	76,517	76,517	0%
Heating, Ventillation & Air Conditioning (HVAC)				
Energy	MWh	1,033	1,033	0%
Demand	kW	76	76	0%
NEB	$	742,982	742,982	0%
Refrigeration				
Energy	MWh	4,032	4,032	0%
Demand	kW	530	530	0%
NEB	$	133,311	133,311	0%
Hot Water				
Energy	MWh	6	6	0%
Demand	kW	0	0	0%
NEB	$	56,873	56,873	0%
End Use Behavior				
Energy	MWh	333	333	0%
Demand	kW	32	32	0%
NEB	$	42,723	42,723	0%
Envelope				
Energy	MWh	465	465	0%
Demand	kW	2	2	0%
NEB	$	2,297,647	2,297,647	0%
Total				
Energy	MWh	8,164	8,164	0%
Demand	kW	852	852	0%
NEB	$	3,350,053	3,350,053	0%

Table II.B.3: Low-Income Program Summary				
Program/ Performance Category	**Units**	**Planned Value**	**Evaluated Results**	
			Value	% Change from Planned
Low-Income Residential New Construction				
TRC Benefits	$	28,702	134,686	369%
TRC Costs	$	28,666	100,180	249%
Net Benefits	$	35	34,506	97450%
BCR	n/a	1.00	1.34	34%
Low-Income 1 to 4 Family Retrofit				
TRC Benefits	$	4,842,758	3,806,534	-21%
TRC Costs	$	1,626,844	1,503,465	-8%
Net Benefits	$	3,215,914	2,303,069	-28%
BCR	n/a	2.98	2.53	-15%
Low-Income MultiFamily Retrofit				
TRC Benefits	$	1,050,923	360,717	-66%
TRC Costs	$	406,465	202,626	-50%
Net Benefits	$	644,458	158,091	-75%
BCR	n/a	2.59	1.78	-31%
Hard-to-Measure Initiatives				
TRC Costs	$	26,774	22,099	-17%
TOTAL				
TRC Benefits	$	5,922,383	4,301,936	-27%
TRC Costs	$	2,088,750	1,828,369	-12%
Net Benefits	$	3,833,633	2,473,567	-35%
BCR	n/a	2.84	2.35	-17%

2. Low-Income Programs

a. Low-Income Residential New Construction

Purpose/Goal: The purpose of the Low-Income New Construction program was to encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Targeted Customers: The target market for this program included homebuilders, contractors, architects/designers, trade allies, HERS raters, homebuyers, realtors, developers, low income and affordable housing developers, code officials, and consumers in the market for new homes and or major renovations.

Definition of Program Participant: A count of the number of unique households served by the program.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Refrigeration
Hot water

Delivery Mechanism: The program is administered each PA in its service territory and coordinated regionally through the JMC.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Green Affordable Housing Initiative (Cape Light Compact-specific component of the Low-Income Residential New Construction program)

In 2006, the Compact received a $1.5 million grant from the Massachusetts Technology Collaborative Renewable Energy Trust's Green Affordable Housing Initiative, to be used for the development of affordable housing utilizing green design. With this grant money, the Compact assisted builders in the development of 12 Low-Income affordable housing units on Cape Cod and Martha's Vineyard to be built to LEED-H® standards and to include the installation of renewable energy systems. The Green Affordable Housing Initiative was implemented from 2008 – 2010.

Table II.B.4. provides information on the performance of Low-Income Residential New Construction.

Table II.B.4: Low-Income Residential New Construction							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	28,666			100,180		249%
Performance Incentive	$	0			0		0%
Participants	hhlds	8			24		200%
Program Cost / Participant	$	3,583			4,174		16%
Savings & Benefits							
Energy							
Lifetime	MWh	100	787	686%	787	0%	686%
Annualized	MWh	11	41	284%	41	0%	284%
Average Measure Life	yrs	9.3	19.0	105%	19.0	0%	105%
Demand							
Lifetime	kW	25	85	241%	85	0%	241%
Annualized							
Summer	kW	1	4	181%	4	0%	181%
Winter	kW	3	10	202%	10	0%	202%
Average Measure Life	yrs	17.3	21.0		21.0		
NEB (Lifetime)	$	14,250	46,290	225%	46,290	0%	225%
Cost-Effectiveness							
TRC Benefits	$	28,702			134,686		369%
TRC Costs	$	28,666			100,180		249%
Net Benefits	$	35			34,506		97450%
BCR	n/a	1.00			1.34		34%

Preliminary Year-End Results % Change from Planned

This program generated higher than expected costs but also achieved commensurately higher energy and demand savings due to 1) greater affordable home completions than anticipated and 2) the fact that the homes in the program were built to higher performance standards than anticipated. As higher program costs were coupled with higher program savings, this program is cost-effective.

2010 was a unique year for the Cape Light Compact's Low-Income Residential New Construction & Major Renovation program. The Cape Light Compact's 2010 plan assumed that the economic downturn would result in lower participation. However, the continuation of federal and state support for affordable new construction enabled more affordable homes to be built than planned in 2010. Since evaluated participants were significantly higher than planned participants, evaluated total program costs were significantly higher than planned.

Additionally, the homes were built to higher efficiency level than planned because of the Compact's administration of the Green Affordable Homes Initiative for with the Massachusetts Clean Energy Center grant funds. The plan assumed that most of the affordable homes would be built to either the LEED for Homes Certified or LEED Silver standard. However, most of the affordable homes were built to the LEED Platinum standard, the highest level of LEED-H achievement. This contributed to significantly higher evaluated lifetime energy savings, annual

energy savings, lifetime demand savings, summer demand savings and winter demand savings and non-electric benefits, as compared to planned. The significantly higher evaluated average measure life as compared to plan is due to the achievement of the higher performance standards. These performance standards required greater focus on the building shell, which drove significantly higher savings with significantly longer lifetimes.

Evaluated Results % Change from Preliminary

There are no impact evaluation studies that apply to this program. As a result, there is no change in the Evaluated Results % Change from Preliminary.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Massachusetts New Homes with ENERGY STAR® Mystery Shopping:* This study provided insight into the current marketing strategies of real estate agents listing ENERGY STAR® homes, and the effect of program-sponsored trainings on these marketing strategies. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.
2. *The Massachusetts New Homes with ENERGY STAR® Program, 2011Baseline Phase 1:* Completion of Planning: This study describes the planning process for the 2011 Baseline Study and the work done to develop a sample of eligible homes. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.
3. *The Massachusetts New Homes with ENERGY STAR® Program Estimated Maximum Potential Savings from Enhanced Compliance with the IECC 2009 Residential Building Code in Massachusetts:* This study estimated the maximum potential savings for the years 2011, 2012, and 2013 that might be achieved through promoting compliance with the newly-adopted IECC 2009 energy code for four measures—wall insulation, basement insulation, proper insulation of ducts in unconditioned spaces, and fifty percent high efficacy lamp requirement—in order to provide needed guidance to the PAs on the implementation and evaluation costs that might be justified. The results of this study did not impact the 2010 evaluated results. This study is discussed in more detail in Section III.
4. *Massachusetts New Homes with ENERGY STAR® Process Evaluation of the Four to Eight Story Multi-Family New Construction Pilot Interim Findings:* This report presents preliminary findings from interviews with the two Sponsors of the Pilot, and two individuals representing the three projects that completed in 2010. The objective of the interviews was to address several process evaluation issues such as the Pilot's goals and objectives, the process of signing up and completing verification, outreach and the types of projects served, the measures covered, the measures installed, barriers to energy efficient multi-family new construction, and satisfaction. This study is discussed in more detail in Section III.
5. *The Massachusetts New Homes with ENERGY STAR® Program Major Renovations Pilot Evaluation:* Preliminary Report on Non-Participant Interviews: This report presents

preliminary findings from interviews with seven homeowners and one builder who had projects eligible to participate in the pilot and considered enrolling in the pilot, but decided not to enroll. The objective of the interviews was to identify how these potential participants learned about the pilot, why they decided not to enroll in the pilot and to get their suggestions on how to make participation in the pilot a more user-friendly experience for homeowners. This study is discussed in more detail in Section III.

6. *The Massachusetts New Homes with ENERGY STAR® Program Version 3 Pilot Evaluation:* The focus of this report is on lessons learned from the Massachusetts New Homes with ENERGY STAR® Program Version 3 Pilot ("Pilot") and issues the program will face going forward to keep existing builders in the program, as well as recruit new builders, as ENERGY STAR® Version 3 requirements take effect. Version 3 Guidelines for ENERGY STAR® Homes become effective for all new homes, regardless of permit dates, starting January 1, 2012. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there are no impact evaluation studies that apply to this program, there is no difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

The significant variance in TRC Benefits, TRC Costs, Net Benefits and BCR is due to higher participation and the achievement of higher performance standards versus what was assumed in the plan.

b. Low-Income 1 to 4 Family Retrofit

Purpose/Goal: The purpose of the Low-Income 1-4 Family Retrofit program was to increase energy efficiency and reduce the energy cost burden for income-eligible customers through education and the installation of electric and gas energy efficiency measures to achieve deeper and broader energy savings.

Targeted Customers: This program targeted residential electric customers using oil, propane, electric and other non-gas fuels living in one- to four-unit dwellings who are at or below sixty percent (60%) of the state median income level.

Definition of Program Participant: A count of the number of unique households served by the program.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Refrigeration
Hot water
End Use Behavior

Envelope
Solar Hot Water

Delivery Mechanism: PAs, when warranted, used a lead vendor to administer the program. The PAs worked closely with their lead vendor and/or respective Network agencies on all aspects of the program design and implementation.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.B.5. provides information on the performance of Low-Income 1 to 4 Family Retrofit.

Table II.B.5: Low-Income 1 to 4 Family Retrofit

Performance Category	Units	Planned Value	Preliminary Year-End Results		Evaluated Results		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	1,626,844			1,503,465		-8%
Performance Incentive	$	0			0		0%
Participants	hhlds	1,115			805		-28%
Program Cost / Participant	$	1,459			1,868		28%
Savings & Benefits							
Energy							
Lifetime	MWh	13,069	6,990	-47%	6,990	0%	-47%
Annualized	MWh	1,144	542	-53%	542	0%	-53%
Average Measure Life	yrs	11.4	12.9	13%	12.9	0%	13%
Demand							
Lifetime	kW	1,635	753	-54%	753	0%	-54%
Annualized							
Summer	kW	144	57	-61%	57	0%	-61%
Winter	kW	256	108	-58%	108	0%	-58%
Average Measure Life	yrs	11.3	13.3		13.3		
NEB (Lifetime)	$	3,248,428	2,988,029	-8%	2,988,029	0%	-8%
Cost-Effectiveness							
TRC Benefits	$	4,842,758			3,806,534		-21%
TRC Costs	$	1,626,844			1,503,465		-8%
Net Benefits	$	3,215,914			2,303,069		-28%
BCR	n/a	2.98			2.53		-15%

Preliminary Year-End Results % Change from Planned

This program provided significantly higher incentives per home than planned due to a shift to more comprehensive visits geared towards serving customers in one year instead of over the

course of multiple years. As a result, fewer participants were served with the program budget[17] as compared to plan.

The significant decline in lifetime energy savings, annual energy savings, lifetime demand savings, summer demand savings and winter demand savings relative to plan is due to the use of a deemed savings value for weatherization measures from the plan in order to calculate the evaluated savings for this program. The Cape Light Compact's implementation vendor for this program is not currently capable of calculating gross savings. Therefore, the Cape Light Compact relies on the deemed savings values to plan and report savings for all measures in this program. The deemed savings for all measures except weatherization are reasonable. However, the weatherization deemed savings value is understated, given that the program has changed over time to allow higher incentives in order to treat each unit more comprehensively and generate greater savings per unit. Since most of the Cape Light Compact's evaluated savings for this program come from weatherization measures, the savings values for this program are understated. Furthermore, the current deemed savings value for weatherization leads the implementation vendor to focus on lighting and appliances rather than weatherization measures in order to achieve savings goals for this program. This is contrary to best practices for any comprehensive energy efficiency program and needs to be rectified. The Cape Light Compact plans to address this issue in its 2012 Mid-Term Modifications by requesting a change in the deemed savings value for weatherization measures in the 2012 TRM – Plan Version.

Despite the fact that similar program costs generated significantly lower program savings, this program remained cost-effective.

Evaluated Results % Change from Preliminary

There are no impact evaluation studies that apply to this program. As a result, there is no change in the Evaluated Results % Change from Preliminary.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Final Report for Low Income Program – Massachusetts 2010 Residential Retrofit and Low Income Evaluation:* This study focused on assessing program processes and identifying similarities and differences between the perspectives and assumptions of program staff, implementation staff, and customers regarding program goals, design, and implementation. The study also reviewed the process by which program data are collected, managed, and reported, including an assessment of the quality and consistency of the program data across PAs. This study is discussed in more detail in Section III.

17 Though the difference between the evaluated and planned total program costs is not significant, the Cape Light Compact notes that any difference between the evaluated and planned total program costs is due to lower evaluation, measurement and verification costs than planned and lower sales, technical assistance and training costs than originally estimated by the vendor.

Evaluated Results % Change from Planned

Since there are no impact evaluation studies that apply to this program, there is no difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

The significant variance in TRC Benefits and Net Benefits is due to understated weatherization savings in the report, relative to the plan.

c. Low-Income Multi-Family Retrofit

Purpose/Goal: The purpose of the Low-Income Multi-Family Retrofit program was to deliver energy efficient products and services directly to the dwellings of: 1) residential customers living in facilities (with five or more dwelling units) at or below 60 percent of state median income or 2) eligible income-eligible residents living in multi-family non-institutional facilities (with five or more units) owned or operated by a non-profit entity or a public housing authority.

Targeted Customers: Residential customers on the low-income rate or individuals living in non-institutional dwellings owned or operated by non-profit entities or public housing authorities with five or more dwelling units who are at or below 60 percent of median income level as well as landlords and property managers of these buildings were targeted by this program.

Definition of Program Participant: A count of the number of unique housing units served by the program.

Targeted End-Uses:
Lighting
Heating, Ventilation, and Air Conditioning
Refrigeration
Hot water
End Use Behavior
Envelope

Delivery Mechanism: The program was administered cooperatively by the gas and electric PAs in conjunction with interested stakeholders.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.B.6. provides information on the performance of Low-Income Multi-Family Retrofit.

Table II.B.6: Low-Income MultiFamily Retrofit							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	406,465			200,948		-51%
Performance Incentive	$	0			0		0%
Participants	units	194			125		-36%
Program Cost / Participant	$	2,095			1,608		-23%
Savings & Benefits							
Energy							
Lifetime	MWh	3,026	388	-87%	388	0%	-87%
Annualized	MWh	261	45	-83%	45	0%	-83%
Average Measure Life	yrs	11.6	8.7	-25%	8.7	0%	-25%
Demand							
Lifetime	kW	196	14	-93%	14	0%	-93%
Annualized							
Summer	kW	18	2	-88%	2	0%	-88%
Winter	kW	48	7	-86%	7	0%	-86%
Average Measure Life	yrs	10.6	6.2		6.2		
NEB (Lifetime)	$	705,121	315,733	-55%	315,733	0%	-55%
Cost-Effectiveness							
TRC Benefits	$	1,050,923			360,717		-66%
TRC Costs	$	406,465			202,626		-50%
Net Benefits	$	644,458			158,091		-75%
BCR	n/a	2.59			1.78		-31%

Preliminary Year-End Results % Change from Planned

This program experienced significant negative variances for all cost, savings and benefits metrics relative to plan. Although there were higher variances for savings than costs, the program remains cost-effective.

In the three-year plan, the implementation vendor had several challenges, including an influx of ARRA funding, a new focus on Multi-Family programs (where Single-Family has been the primary focus), and increased program funding. In order to better affect the Low Income Multi-Family program, the implementation vendor hired a Multi-Family assessor who has recently come up to speed. Additionally, the Cape Light Compact anticipated more units in the effort to serve all fuels, but it could not serve gas customers in the Multi-Family Sector due to changes in program design in 2010.

Evaluated Results % Change from Preliminary

There are no impact evaluation studies that apply to this program. As a result, there is no Evaluated Results % Change from Preliminary.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Final Report for Low Income Program – Massachusetts 2010 Residential Retrofit and Low Income Evaluation:* This study focused on assessing program processes and identifying similarities and differences between the perspectives and assumptions of program staff, implementation staff, and customers regarding program goals, design, and implementation. The study also reviewed the process by which program data are collected, managed, and reported, including an assessment of the quality and consistency of the program data across PAs. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there are no impact evaluation studies that apply to this program, there is no difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

The significant variance in TRC Benefits, TRC Costs, Net Benefits and BCR is due to a lag in the ramp up of the Low-Income implementation vendor, who could not meet cost, savings or benefit goals for this program in 2010.

C. Commercial & Industrial Sector Programs

1. Summary

During 2010 the Cape Light Compact implemented the following C&I programs[18]:

- C&I New Construction and Major Renovation
- C&I Large Retrofit
- C&I Small Retrofit

Tables II.C.1 through II.C.3 provide summary information on the performance of the commercial & industrial programs at the sector, end use, and program levels, respectively.

Tables II.C.4 through II.C.6 provide detailed information on the performance of each commercial & industrial program.

18 The Cape Light Compact did not offer any pilot programs in the commercial and industrial sector during 2010.

Table II.C.1: C&I Sector Summary							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	7,098,577			5,315,961		-25%
Performance Incentive	$	0			0		0%
Savings & Benefits							
Energy							
Lifetime	MWh	190,815	92,166	-52%	82,565	-10%	-57%
Annualized	MWh	14,730	6,973	-53%	6,378	-9%	-57%
Demand							
Lifetime	kW	50,809	21,525	-58%	21,159	-2%	-58%
Annualized							
Summer	kW	3,960	1,540	-61%	1,512	-2%	-62%
Winter	kW	2,307	775	-66%	799	3%	-65%
NEB (Lifetime)	$	465,860	2,737,478	488%	2,737,478	0%	488%
Cost-Effectiveness							
TRC Benefits	$	27,855,987			14,471,777		-48%
TRC Costs	$	8,374,704			5,983,719		-29%
Net Benefits	$	19,481,283			8,488,059		-56%
BCR	n/a	3.33			2.42		-27%

The Cape Light Compact has a history of significant variances between plan and actual costs, savings and benefits for its C&I programs. As a smaller Massachusetts PA, small absolute changes in total program costs, savings and benefits result in significant variances. As a result, relatively small changes in the timing or scale and scope of a few projects can add up to a significant variance in total program costs, savings and benefits. Also, the small number of Large C&I customers on Cape Cod and Martha's Vineyard make forecasts of expenditures, savings and benefits for this program particularly challenging.

Preliminary Year-End Results % Change from Planned

Within the C&I sector, the following programs are contributing to the variance between planned and evaluated values:

- C&I New Construction and Major Renovation (for TRC Benefits, TRC Costs, Net Benefits and BCR): Please reference section II.C.a for a more detailed discussion of the cause of the variances for this program.
- C&I Large Retrofit (for TRC Benefits, TRC Costs, Net Benefits and BCR): Please reference section II.C.b for a more detailed discussion of the cause of the variances for this program.
- C&I Small Retrofit (for TRC Costs, TRC Benefits and Net Benefits): Please reference section II.C.c for a more detailed discussion of the cause of the variances for this program.

Evaluated Results % Change from Preliminary

Impact evaluation studies apply to the following C&I sector programs:

- C&I New Construction and Major Renovation
- C&I Large Retrofit
- C&I Small Retrofit

However, the combined effect of the impact evaluation studies at the sector level is not significant, as evidenced by the fact that the Evaluated Results % Change from Preliminary is not significant.

Evaluated Results % Change from Planned

Since there is no significant effect from the implementation of the impact evaluation studies, there is little difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. As a result, all of the discussion regarding significant variances from the Preliminary Year-End Results % Change from Planned section above applies.

Table II.C.2: C&I Sector Summary of End Uses				
End Uses	Units (lifetime)	**Preliminary Year-End Results**	**Evaluated Results**	**% Change from Preliminary to Evaluated**
Lighting				
Energy	MWh	52,855	54,536	3%
Demand	kW	12,697	12,380	-2%
NEB	$	1,474,834	1,474,834	0%
Heating, Ventillation & Air Conditioning (HVAC)				
Energy	MWh	19,878	13,556	-32%
Demand	kW	5,433	5,264	-3%
NEB	$	997,827	997,827	0%
Motors & Drives				
Energy	MWh	14,280	9,763	-32%
Demand	kW	2,919	3,038	4%
NEB	$	0	0	0%
Refrigeration				
Energy	MWh	4,576	4,467	-2%
Demand	kW	179	179	0%
NEB	$	0	0	0%
Hot Water				
Energy	MWh	7	3	-61%
Demand	kW	0	0	0%
NEB	$	74,523	74,523	0%
Envelope				
Energy	MWh	569	240	-58%
Demand	kW	298	298	0%
NEB	$	190,294	190,294	0%
Total				
Energy	MWh	92,166	82,565	-10%
Demand	kW	21,525	21,159	-2%
NEB	$	2,737,478	2,737,478	0%

Table II.C.3: C&I Program Summary				
Program/ Performance Category	**Units**	**Planned Value**	**Evaluated Results**	
			Value	% Change from Planned
C&I New Construction and Major Renovation				
TRC Benefits	$	6,608,366	2,033,334	-69%
TRC Costs	$	1,201,698	754,061	-37%
Net Benefits	$	5,406,669	1,279,273	-76%
BCR	n/a	5.50	2.70	-51%
C&I Large Retrofit				
TRC Benefits	$	9,035,693	3,584,193	-60%
TRC Costs	$	2,290,512	1,710,016	-25%
Net Benefits	$	6,745,181	1,874,177	-72%
BCR	n/a	3.94	2.10	-47%
C&I Small Retrofit				
TRC Benefits	$	12,211,928	8,854,250	-27%
TRC Costs	$	4,786,787	3,480,661	-27%
Net Benefits	$	7,425,141	5,373,589	-28%
BCR	n/a	2.55	2.54	0%
Hard-to-Measure Initiatives				
TRC Costs	$	95,708	38,981	-59%
TOTAL				
TRC Benefits	$	27,855,987	14,471,777	-48%
TRC Costs	$	8,374,704	5,983,719	-29%
Net Benefits	$	19,481,283	8,488,059	-56%
BCR	n/a	3.33	2.42	-27%

2. C&I Programs

a. C&I New Construction and Major Renovation

Purpose/Goal: The C&I New Construction & Major Renovation program was designed to optimize the efficiency of equipment, building design and systems in new construction and renovation of commercial, industrial, institutional and government facilities. Focusing on offering a comprehensive set of electric and gas efficiency options specific to the needs unique to each customer, the program also targeted the brief window of opportunity to install premium grade replacements when equipment fails or is near the end of its useful life. In doing so, the PAs worked to ensure that the best practices propagated by the program are ultimately built into the evolution of better building requirements.

Targeted Customers: The target market for this program was all time-dependent gas and electric energy efficiency opportunities in the C&I sector – commercial, industrial, institutional, and government customers.

Definition of Program Participant: A count of the number of unique sites where a project was completed during the program year.

Targeted End-Uses:
Lighting
Heating, Ventilation and Air Conditioning
Motors & Drives
Refrigeration
Hot Water
Compressed Air
Process
Envelope
Combined Heat & Power

Delivery Mechanism: The PAs worked together to market and implement the program as a unitary statewide effort to maximize the acquisition of potential energy savings (gas and electric) in the ongoing market for new facilities and replacement equipment in the Commonwealth.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where the Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.C.4. provides information on the performance of C&I New Construction and Major Renovation.

Table II.C.4: C&I New Construction and Major Renovation							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	905,004			729,220		-19%
Performance Incentive	$	0			0		0%
Participants	sites	58			75		29%
Program Cost / Participant	$	15,604			9,723		-38%
Savings & Benefits							
Energy							
Lifetime	MWh	43,218	17,936	-58%	6,363	-65%	-85%
Annualized	MWh	2,917	1,155	-60%	407	-65%	-86%
Average Measure Life	yrs	14.8	15.5	5%	15.6	1%	5%
Demand							
Lifetime	kW	11,251	8,187	-27%	8,018	-2%	-29%
Annualized							
Summer	kW	763	516	-32%	505	-2%	-34%
Winter	kW	527	175	-67%	175	0%	-67%
Average Measure Life	yrs	14.7	15.9		15.9		
NEB (Lifetime)	$	519,847	345,314	-34%	345,314	0%	-34%
Cost-Effectiveness							
TRC Benefits	$	6,608,366			2,033,334		-69%
TRC Costs	$	1,201,698			754,061		-37%
Net Benefits	$	5,406,669			1,279,273		-76%
BCR	n/a	5.50			2.70		-51%

Preliminary Year-End Results % Change from Planned

Despite the fact that there were more participants than anticipated, the cost per participant was significantly lower than anticipated. There are two explanations for this change.

- First, the current economic climate makes it especially difficult to plan for C&I New Construction and Major Renovation projects. While the Cape Cod and Martha's Vineyard new construction industry is holding steady with many new starts in progress, some project scopes were scaled back between planning and implementation phases.
- Second, the Cool Choice program, which is a component of the C&I New Construction and Major Renovation program, was well subscribed by customers. Cool Choice incentives per customer are substantially lower as compared to other new construction projects.

Also, lifetime and annual energy savings were significantly lower than planned. There are several reasons for this change.

- First, savings did not meet the target because the full budget was not spent.
- Second, there was a shift in measure mix from lighting measures to heating, ventilation and air conditioning and motors and drives measures. Lighting typically

has a lower cost per kWh saved whereas heating, ventilation and air conditioning and motors and drives typically have a higher cost per kWh saved.

- Third, there was an increase in cost per kWh of energy saved across many measures. For example, with some projects, the heating, ventilation and air conditioning end use experienced a significant increase in cost per kWh of energy saved relative to the plan yet were still cost-effective and achieved deeper savings for customers.

Lifetime demand savings, summer demand savings and winter demand savings were significantly lower than planned due to the shift in measure mix. Lifetime demand savings and summer demand savings were impacted to a lesser extent than winter demand savings due to the shift in measure mix from lighting measures to heating, ventilation and air conditioning measures, which have higher summer coincidence factors.

Non-electric benefits were also significantly lower than plan. This is due to the shift in measure mix from lighting measures, which contribute the majority of non-electric benefits in the form of non-resource benefits for this program.

Evaluated Results % Change from Preliminary

There are five impact evaluation studies that apply to this program including the following:

1. *HBL Market Effects Study Project 1A New Construction Market Characterization - Massachusetts Energy Efficiency Programs' Large Commercial & Industrial Evaluation:* This study estimated the energy savings associated with the changes to a high bay lighting market in Massachusetts and assessed the attribution of these changes (i.e. market effects) to the PAs' energy efficiency programs. Specifically, the study supplied high bay lighting participant spillover rates that were weighted with non-high bay lighting participant spillover rates to calculate participant spillover rates that were applied to custom and prescriptive lighting measures. The net effect of this study is to decrease both energy and demand savings for this program. This study is discussed in more detail in Section III.
2. *Impact Evaluation of 2009 Custom HVAC Installations:* The study supplied energy, summer on-peak, and winter on-peak realization rates that were applied to custom HVAC measures. The net effect of this study is to increase energy savings and decrease both summer and winter demand savings for this program. This study is discussed in more detail in Section III.
3. *National Grid, NSTAR, Western Massachusetts Electric Company, Unitil, and Cape Light Compact 2010 Commercial and Industrial Electric Programs Free-ridership and Spillover Study:* The study supplied free-ridership and non-participant spillover rates that were applied to custom and prescriptive measures within all end uses, as well as participant spillover rates that were applied to custom and prescriptive measures within all end uses except lighting. The results of this study vary for each end-use category within the program. The net effect of these results is to decrease program savings. This study is discussed in more detail in Section III.

4. *C&I Unitary HVAC Load Shape Project:* The study supplied energy realization rates and summer coincidence factors by region that the Cape Light Compact used to calculate Cape Light Compact-specific energy realization rates and summer coincidence factors that were applied to unitary HVAC measures. The net effect of this study is to increase energy savings and decrease summer demand savings for this program. This study is discussed in more detail in Section III.
5. *Impact Evaluation of 2008 and 2009 Custom CDA Installations:* The study supplied realization rates for annual kWh, summer on-peak kW and winter on-peak kW reductions for Custom projects in the Comprehensive end-use category. As the Cape Light Compact did not have any Custom CDA installations in 2010, this study had no impact on results. This study is discussed in more detail in Section III.

The results from the 2010 Commercial and Industrial Electric Programs Free-Ridership and Spillover Study drove the high negative Evaluated Results % Change from Preliminary for lifetime and annual energy savings. The primary reason for this is that free ridership rates for all end uses increased significantly as a result of this study, whereas the changes from other studies were not as significant. While participant spillover decreased for all lighting measures due to the implementation of the HBL Market Effects Study, this negative impact on energy savings was small relative to the negative impact of the 2010 Commercial and Industrial Electric Programs Free-ridership and Spillover Study on energy savings.

The following is a list of some positive impacts on energy savings from the studies that affected this program. Demand savings and NEBS were not significantly impacted by the studies. However, these impacts were not significant enough to offset the significant negative impacts of the free ridership rates in the 2010 Commercial and Industrial Electric Programs Free-Ridership and Spillover Study on energy savings.

- Participant spillover rates increased across most end uses and non-participant spillover rates increased for a few end uses as a result of the 2010 Commercial and Industrial Electric Programs Free-ridership and Spillover Study.
- Energy realization rates increased for custom HVAC measures as a result of the Impact Evaluation of 2009 Custom HVAC Installations Study.
- Energy realization rates increased for unitary HVAC measures as a result of the C&I Unitary HVAC Load Shape Project Study.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *FINAL Commercial New Construction Customer Quantitative Profile Project 1A New Construction Market Characterization:* The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal objectives of the Commercial New Construction Customer Quantitative Profile are to: develop a comprehensive characterization of the large C&I new construction market in Massachusetts, in terms of

building type, size, ownership, geographic location, chain or franchise status, and energy use; assess how the trends for large C&I projects have changed over the past 15 years; and characterize the presence of the PAs new construction projects in the market in terms of the number of projects that participated in them and the portion of floor space and energy use they represent in key commercial market segments. This study is discussed in more detail in Section III.

2. *Supply Chain Profile Project 1A New Construction Market Characterization:* The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the New Construction Supply Chain Profile are to: characterize the design, engineering, and construction management firms involved with recent large commercial construction projects in Massachusetts; characterize the design and specification practices with regard to energy efficiency; assess changes in design and specification practices as a result of contact with the program; and assess awareness and participation in new construction programs offered by the PA's. This study is discussed in more detail in Section III.
3. *Final Report Project 1B Chain & Franchise Market Characterization:* The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the Chain & Franchise ("C&F") Market Characterization are: characterize the C&F market in Massachusetts, including estimates of size and key segments (big box, retail, restaurant, etc); identify the key decision-maker at C&F customers and the major barriers to the adoption of energy efficiency measures; understand the decision-making process, in particular free-ridership, regarding energy efficiency at C&F businesses in Massachusetts and in comparable non-program states; assess the current level of program participation and methods to increase participation; and identify the opportunities for increased energy efficiency through on-site inventories of building shell characteristics, end use technologies, and missed opportunities. This study is discussed in more detail in Section III.
4. *Final Report Project 1C Combined Heat & Power Market Characterization:* The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the Combined Heat & Power ("CHP") Market Characterization are: characterize the CHP market including key players and market segments; understand the decision making processes used by potential CHP customers including reasons customers elect to install CHP, selection of specific types or configurations of CHP, and the factors most influencing decisions to purchase CHP systems; identify the current mix of CHP technologies including the CHP systems types deployed, installed and operating costs of the technologies, and identify anticipated changes in the CHP market or improvements in the technologies; identify barriers impacting entry for customers including the key factors that dissuade potential customers from evaluating CHP technologies or have led customers who evaluated CHP

technologies to decide not to install it; estimate CHP opportunities by key market segments and provide PAs with a list of customers likely suitable for CHP. This study is discussed in more detail in Section III.

5. *Project 7 General Process Evaluation Final Report:* The objective of this process evaluation was to look at ways to improve the design and delivery of Massachusetts C&I energy efficiency programs that would be applicable to multiple programs. Issues that the PAs and the EEAC were particularly interested in included how to increase program participation levels, how to obtain deeper energy savings from energy efficiency projects, how to improve the integration of electric and gas energy efficiency programs, and how to increase the general uniformity of program delivery across the state. This study is discussed in more detail in Section III.
6. *Cross Cutting C&I Free-Ridership and Spillover Methodology Study Final Report:* The focus of this study was on the general methods for estimating what would have happened absent C&I programs in Massachusetts. The net program effect is the observed effect, less the estimate of what would have happened absent the program. The objectives of this study were to develop a standardized methodology for situations where C&I end-users are able to report on program impacts via self-report methods, and to provide a decision framework and guidelines for when the standardized self-report methodology is appropriate and when other methods need to be used (e.g., upstream programs). This study is discussed in more detail in Section III.
7. *Project 6B Comprehensive Design Approach Process Evaluation:* This process evaluation had two research objectives. The first was to examine whether the Comprehensive Design Approach ("CDA") tracks that are being delivered by National Grid, Western Massachusetts Electric Company ("WMECo") and NSTAR are meeting their primary goals. These primary goals are to: 1) maximize energy and demand reduction in new construction projects; and 2) influence energy efficiency best practices in the commercial design sector. The second research objective was to conduct a comparative study of the Advanced Buildings ("AB") track. This study compares the AB tracks delivered by the Massachusetts PAs to those delivered in Maine and Vermont. The AB track is similar to CDA but it targets smaller buildings within the commercial new construction market and aims to simplify and expedite the participation process by using standardized incentive and savings assumptions. In order for customers to receive monetary incentives through the AB track, they must incorporate a series of thirteen Core Performance requirements into their building designs. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there are impact evaluation studies that apply to this program, there is a difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned.

Energy savings were equally impacted by the increase in cost per energy saved as by impact evaluation study results. This is demonstrated by the fact that the Preliminary Year-End Results % Change from Planned is similar to the Evaluated Results % Change from Preliminary.

Demand savings and NEBS were mostly impacted by shifts in measure mix. This is demonstrated by the fact that most of the Evaluated Results % Change from Planned is from the Preliminary Year-End Results % Change from Planned.

Overall, TRC Benefits, Net Benefits were significantly impacted by increases in cost per energy savings, changes in measure mix, and the effect of impact evaluation studies. Variances in TRC Costs relative to plan were not as high, but still significant due to scaled back project scopes. Variances in benefits were substantially higher than variances in costs, but the program remained cost-effective due to the fact that the planned BCR for this program was relatively high.

b. C&I Large Retrofit

Purpose/Goal: The C&I Large Retrofit program focused on comprehensive gas and electric energy efficiency opportunities associated with mechanical, electrical, and thermal systems in existing commercial, industrial, governmental and institutional buildings. Through this program, technical assistance and incentives were provided to encourage retrofitting of equipment that continued to function, but was outdated and inefficient, and could be replaced with a premium efficient product. In addition, this program helped participants identify specific peak load management opportunities and assisted occupants in improving their ongoing operation and maintenance practices.

Targeted Customers: The target market for this program was all non-residential customers - commercial, industrial, governmental, and institutional.

Definition of Program Participant: A count of the number of unique sites where a project was completed during the program year.

Targeted End-Uses:
Lighting
Heating, Ventilation and Air Conditioning
Motors & Drives
Refrigeration
Hot Water
Compressed Air
Process
Envelope
Combined Heat & Power

Delivery Mechanism: PA staff, trade allies and project administrators performed most sales, marketing, program administration, and implementation functions while outside contractors were retained for technical review of applications, on-site energy analysis, technical and design assistance for comprehensive projects, project commissioning services, and the actual measure installations, including turn-key services.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots (referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

Table II.C.5. provides information on the performance of C&I Large Retrofit.

Table II.C.5: C&I Large Retrofit

Performance Category	Units	Planned Value	Preliminary Year-End Results		Evaluated Results		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	1,807,995			1,575,123		-13%
Performance Incentive	$	0			0		0%
Participants	sites	56			28		-50%
Program Cost / Participant	$	32,286			56,254		74%
Savings & Benefits							
Energy							
Lifetime	MWh	61,108	25,765	-58%	21,865	-15%	-64%
Annualized	MWh	4,769	1,902	-60%	1,623	-15%	-66%
Average Measure Life	yrs	12.8	13.5	6%	13.5	-1%	5%
Demand							
Lifetime	kW	18,277	3,333	-82%	3,385	2%	-81%
Annualized							
Summer	kW	1,476	241	-84%	244	1%	-83%
Winter	kW	906	200	-78%	209	4%	-77%
Average Measure Life	kW	12.4	13.8		13.9		
NEB (Lifetime)	yrs	(33,390)	764,450	2389%	764,450	0%	2389%
Cost-Effectiveness							
TRC Benefits	$	9,035,693			3,584,193		-60%
TRC Costs	$	2,290,512			1,710,016		-25%
Net Benefits	$	6,745,181			1,874,177		-72%
BCR	n/a	3.94			2.10		-47%

Preliminary Year-End Results % Change from Planned

This program provided significantly higher incentives per participant than planned due to the fact that customers served in 2010 participated in previous years. Participants were more comfortable with the process due to their previous experience with the program. Therefore, the projects had a larger scope than the projects from previous years and more incentive dollars were spent per project than planned. Also, as is typical for multi-year projects that are common in this program, many of the low cost measures are implemented in the first year of the project as these generate quick customer payback. As a result, subsequent years of the project have higher costs because the types of measures installed in subsequent years often cost more to implement. Lastly, the program had a greater proportion of government projects than planned. Since government projects are eligible for higher incentives, costs per participant increased relative to

plan. As a result, fewer participants were served using a budget that was not significantly different from planned.

Program savings were also significantly lower than plan. There are a few reasons for this change.

- First, there was an increase in cost per kWh of energy saved across most government end uses, specifically in the heating, ventilation and air conditioning end use which contributed nearly half of the government savings. Among the customers served this year, the measures within each end use with a low cost per kWh of energy saved have already been addressed. Additional projects for these same customers addressed measures with a higher cost per kWh of saved energy.
- Second, there was a shift in measure mix from lighting to heating, ventilation and air conditioning, and motors and drives. Among the customers served this year, the measures with a low cost per kWh of energy saved such as lighting, have already been addressed. Additional projects for these same customers addressed measures with a higher cost per kWh of saved energy, such as heating, ventilation and air conditioning and motors and drives. As a result, the program generated significantly lower evaluated savings as compared to plan using a budget that was not significantly different from planned.

In contrast, non-electric benefits were significantly higher than plan. This is due to the fact that there were significant therm savings that were not anticipated in the plan.

Evaluated Results % Change from Preliminary

There are five impact evaluation studies that apply to this program, including the following:

1. *HBL Market Effects Study Project 1A New Construction Market Characterization - Massachusetts Energy Efficiency Programs' Large Commercial & Industrial Evaluation:* This study estimated the energy savings associated with the changes to a high bay lighting market in Massachusetts and assessed the attribution of these changes (i.e. market effects) to the PAs' energy efficiency programs. Specifically, the study supplied high bay lighting participant spillover rates that were weighted with non-high bay lighting participant spillover rates to calculate participant spillover rates that were applied to custom and prescriptive lighting measures. The net effect of this study is to increase both energy and demand savings for this program. This study is discussed in more detail in Section III.
2. *Impact Evaluation of 2009 Custom HVAC Installations:* The study supplied energy, summer on-peak, and winter on-peak realization rates that were applied to custom HVAC measures. The net effect of this study is to increase energy savings and decrease both summer and winter demand savings for this program. This study is discussed in more detail in Section III.
3. *National Grid, NSTAR, Western Massachusetts Electric Company, Unitil, and Cape Light Compact 2010 Commercial and Industrial Electric Programs Free-Ridership and Spillover Study:* The study supplied free-ridership and non-participant spillover rates that

were applied to custom and prescriptive measures within all end uses, as well as participant spillover rates that were applied to custom and prescriptive measures within all end uses except lighting. The results of this study vary for each end-use category within the program. The net effect of these results is to decrease program savings. This study is discussed in more detail in Section III.

4. *C&I Lighting Load Shape Project:* This was a regional study facilitated by the NEEP EM&V Forum building upon a 2007 study done for the New England State Program Working Group to develop Commercial and Industrial lighting load shapes and coincidence. The study supplied summer and winter coincidence factors for custom and prescriptive, non-control lighting measures. The net effect of this study was to slightly decrease summer demand savings and slightly increase winter demand savings. This study is discussed in more detail in Section III.
5. *Impact Evaluation of 2008 and 2009 Custom CDA Installations:* The study supplied realization rates for annual kWh, summer on-peak kW and winter on-peak kW reductions for Custom projects in the Comprehensive end-use category. As the Cape Light Compact did not have any Custom CDA installations in 2010, this study had no impact on results. This study is discussed in more detail in Section III.

The combined impact of the studies listed above did not have a significant impact on energy savings, demand savings or non-electric savings for this program. This is primarily due to the fact that the free ridership impacts from the 2010 Commercial and Industrial Electric Programs Free-Ridership and Spillover Study were not as pronounced as for the C&I New Construction and Major Renovation program.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *FINAL Commercial New Construction Customer Quantitative Profile Project 1A New Construction Market Characterization:* The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal objectives of the Commercial New Construction Customer Quantitative Profile are to: develop a comprehensive characterization of the large C&I new construction market in Massachusetts, in terms of building type, size, ownership, geographic location, chain or franchise status, and energy use; assess how the trends for large C&I projects have changed over the past 15 years; and characterize the presence of the PAs new construction projects in the market in terms of the number of projects that participated in them and the portion of floor space and energy use they represent in key commercial market segments. This study is discussed in more detail in Section III.
2. *Supply Chain Profile Project 1A New Construction Market Characterization:* The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the New Construction Supply Chain Profile are to:

characterize the design, engineering, and construction management firms involved with recent large commercial construction projects in Massachusetts; characterize the design and specification practices with regard to energy efficiency; assess changes in design and specification practices as a result of contact with the program; and assess awareness and participation in new construction programs offered by the PA's. This study is discussed in more detail in Section III.

3. *Final Report Project 1B Chain & Franchise Market Characterization:* The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the Chain & Franchise ("C&F") Market Characterization are: characterize the C&F market in Massachusetts, including estimates of size and key segments (big box, retail, restaurant, etc); identify the key decision-maker at C&F customers and the major barriers to the adoption of energy efficiency measures; understand the decision-making process, in particular free-ridership, regarding energy efficiency at C&F businesses in Massachusetts and in comparable non-program states; assess the current level of program participation and methods to increase participation; and identify the opportunities for increased energy efficiency through on-site inventories of building shell characteristics, end use technologies, and missed opportunities. This study is discussed in more detail in Section III.
4. *Final Report Project 1C Combined Heat & Power Market Characterization:* The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the Combined Heat & Power ("CHP") Market Characterization are: characterize the CHP market including key players and market segments; understand the decision making processes used by potential CHP customers including reasons customers elect to install CHP, selection of specific types or configurations of CHP, and the factors most influencing decisions to purchase CHP systems; identify the current mix of CHP technologies including the CHP systems types deployed, installed and operating costs of the technologies, and identify anticipated changes in the CHP market or improvements in the technologies; identify barriers impacting entry for customers including the key factors that dissuade potential customers from evaluating CHP technologies or have led customers who evaluated CHP technologies to decide not to install it; estimate CHP opportunities by key market segments and provide PAs with a list of customers likely suitable for CHP. This study is discussed in more detail in Section III.
5. *Project 7 General Process Evaluation Final Report:* The objective of this process evaluation was to look at ways to improve the design and delivery of Massachusetts C&I energy efficiency programs that would be applicable to multiple programs. Issues that the PAs and the EEAC were particularly interested in included how to increase program participation levels, how to obtain deeper energy savings from energy efficiency projects, how to improve the integration of electric and gas energy efficiency programs, and how to increase the general uniformity of program delivery across the state. This study is discussed in more detail in Section III.

6. *Cross Cutting C&I Free-Ridership and Spillover Methodology Study Final Report:* The focus of this study was on the general methods for estimating what would have happened absent C&I programs in Massachusetts. The net program effect is the observed effect, less the estimate of what would have happened absent the program. The objectives of this study were to develop a standardized methodology for situations where C&I end-users are able to report on program impacts via self-report methods, and to provide a decision framework and guidelines for when the standardized self-report methodology is appropriate and when other methods need to be used (e.g., upstream programs). This study is discussed in more detail in Section III.
7. *Project 6B Comprehensive Design Approach Process Evaluation:* This process evaluation had two research objectives. The first was to examine whether the Comprehensive Design Approach ("CDA") tracks that are being delivered by National Grid, Western Massachusetts Electric Company ("WMECo") and NSTAR are meeting their primary goals. These primary goals are to: 1) maximize energy and demand reduction in new construction projects; and 2) influence energy efficiency best practices in the commercial design sector. The second research objective was to conduct a comparative study of the Advanced Buildings ("AB") track. This study compares the AB tracks delivered by the Massachusetts PAs to those delivered in Maine and Vermont. The AB track is similar to CDA but it targets smaller buildings within the commercial new construction market and aims to simplify and expedite the participation process by using standardized incentive and savings assumptions. In order for customers to receive monetary incentives through the AB track, they must incorporate a series of thirteen Core Performance requirements into their building designs. This study is discussed in more detail in Section III.
8. *Project 7 General Process Evaluation Final Report:* The objective of this process evaluation was to look at ways to improve the design and delivery of Massachusetts C&I energy efficiency programs that would be applicable to multiple programs. Issues that the PAs and the EEAC were particularly interested in included how to increase program participation levels, how to obtain deeper energy savings from energy efficiency projects, how to improve the integration of electric and gas energy efficiency programs, and how to increase the general uniformity of program delivery across the state. This study is discussed in more detail in Section III.
9. *Industry Practices and Policies on Energy Efficiency Program Rebate/Incentives:* This is a high-level scoping study of statewide energy efficiency program incentive and rebate levels, the purpose of which was to help inform the policy debate for statewide programs in Massachusetts and to support fourth quarter 2010 programmatic planning. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there are impact evaluation studies that apply to this program, there is a difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. However, the effect of impact evaluation studies is not significant.

Energy savings, demand savings, and non-electric benefits were impacted to a far greater extent by a higher cost of saved energy than planned and different measure mix than by impact evaluation study results. This is demonstrated by the fact that the Preliminary Year-End Results % Change from Planned is much higher than the Evaluated Results % Change from Preliminary.

Overall, TRC Benefits and Net Benefits were significantly impacted by increases in cost per energy savings and changes in measure mix. Variances in TRC Costs relative to plan were not as high, but still significant. Even though significantly lower savings were generated from a budget that was not significantly different from the plan, the program remained cost-effective.

c. C&I Small Retrofit

Purpose/Goal: The primary objective of the C&I Small Retrofit Program was to provide cost-effective, comprehensive electric and gas retrofit services to business customers on a turnkey basis using the same delivery model throughout the Commonwealth.

Targeted Customers: While 2010 stood as a transition year, all PAs moved toward targeting direct install retrofit business customers below 300kW.

Definition of Program Participant: A count of the number of unique sites where a project was completed during the program year.

Targeted End-Uses:
Lighting
Heating, Ventilation and Air Conditioning
Motors & Drives
Refrigeration
Hot Water
Compressed Air
Process
Envelope
Combined Heat & Power

Delivery Mechanism: Vendors were selected through a competitive bidding process to implement the program. These vendors marketed the program, performed facility audits, and offered recommendations to customers while completing audit forms and questionnaires. In addition the same vendors purchased materials, installed measures, inputted data into a database, and prepared progress reports for the PAs on a regular basis.

Significant Differences in Actual Program Design from Approved Program Design: None.

Docket/Exhibit where Program is Discussed and Approved: The Cape Light Compact's 2010 plan was originally approved in the January 28, 2010 DPU order in Docket 09-119. On August 13, 2010, the Cape Light Compact filed updates to certain of its 2010 programs and pilots

(referred to as its 2010 Mid-Year Revisions filing approved in D.P.U. 10-106 on January 10, 2011.

All Fuels Comprehensive Retrofit Program (Cape Light Compact-specific component of the C&I Small Retrofit program)

In 2010, the Compact expanded its small commercial and industrial retrofit program to include cost-effective thermal measures designed to save oil, propane and other unregulated fuels. These cost-effective measures mirrored those technologies identified as gas measures including, but not limited to: programmable thermostats, pre-rinse spray valves, pipe insulation, insulation, air sealing, EMS, hood controls and other custom measures, as deemed appropriate.

Table II.C.6. provides information on the performance of C&I Small Retrofit.

Table II.C.6: C&I Small Retrofit							
Performance Category	**Units**	**Planned Value**	**Preliminary Year-End Results**		**Evaluated Results**		
			Value	% Change from Planned	Value	% Change from Preliminary	% Change from Planned
Expenses							
Total Program Costs	$	4,289,871			2,972,638		-31%
Performance Incentive	$	0			0		0%
Participants	sites	527			429		-19%
Program Cost / Participant	$	8,140			6,929		-15%
Savings & Benefits							
Energy							
Lifetime	MWh	86,489	48,465	-44%	54,336	12%	-37%
Annualized	MWh	7,044	3,916	-44%	4,347	11%	-38%
Average Measure Life	yrs	12.3	12.4	1%	12.5	1%	2%
Demand							
Lifetime	kW	21,281	10,005	-53%	9,755	-2%	-54%
Annualized							
Summer	kW	1,720	783	-54%	764	-2%	-56%
Winter	kW	873	401	-54%	415	4%	-52%
Average Measure Life	yrs	12.4	12.8		12.8		
NEB (Lifetime)	$	(20,597)	1,627,714	8002%	1,627,714	0%	8002%
Cost-Effectiveness							
TRC Benefits	$	12,211,928			8,854,250		-27%
TRC Costs	$	4,786,787			3,480,661		-27%
Net Benefits	$	7,425,141			5,373,589		-28%
BCR	n/a	2.55			2.54		0%

Preliminary Year-End Results % Change from Planned

This program did not spend its budget because there were fewer participants than anticipated and the cost per participant was lower than anticipated. It took more time than anticipated to launch the statewide marketing efforts, which resulted in a gap between actual participation and planned participation.

Energy savings were significantly lower than planned. As energy savings were significantly lower than planned, summer and winter demand savings were also significantly lower than planned. There were several reasons for this change.

- First, savings did not meet the target because the full budget was not spent.
- Second, there was a shift in measure mix from lighting and refrigeration measures to heating, ventilation and air conditioning and motors and drives measures. Lighting and refrigeration typically have a lower cost per kWh saved whereas heating, ventilation and air conditioning and motors and drives typically have a higher cost per kWh saved.
- Third, similar to C&I Large Retrofit, there was an increase in cost per kWh of energy saved across many measures. For example, for government projects, all end uses experienced a significant increase in cost per kWh of energy saved relative to the plan. Also, government and non-government heating, ventilation and air conditioning projects experienced a significant increase in cost per kWh of energy saved relative to plan.
- Lastly, some motors and drives measures were installed which were not planned. These measures have a higher cost per kWh of energy saved relative to other measures.

In contrast, non-electric benefits were significantly higher than plan. This is due to the success of the All Fuels Comprehensive Retrofit Program, which was well-subscribed.

Evaluated Results % Change from Preliminary

There are four impact evaluation studies that apply to this program including the following:

1. *HBL Market Effects Study Project 1A New Construction Market Characterization - Massachusetts Energy Efficiency Programs' Large Commercial & Industrial Evaluation:* This study estimated the energy savings associated with the changes to a high bay lighting market in Massachusetts and assessed the attribution of these changes (i.e. market effects) to the PAs' energy efficiency programs. Specifically, the study supplied high bay lighting participant spillover rates that were weighted with all lighting participant spillover rates to calculate participant spillover rates that were applied to custom and prescriptive lighting measures. The net effect of this study is to increase both energy and demand savings for this program. This study is discussed in more detail in Section III.
2. *National Grid, NSTAR, Western Massachusetts Electric Company, Unitil, and Cape Light Compact 2010 Commercial and Industrial Electric Programs Free-ridership and Spillover Study:* The study supplied free-ridership and non-participant spillover rates that were applied to custom and prescriptive measures within all end uses, as well as participant spillover rates that were applied to custom and prescriptive measures within all end uses except lighting. The results of this study vary for each end-use category within the program. The net effect of these results is to decrease program savings. This study is discussed in more detail in Section III.

3. *Non-Controls Lighting Evaluation for the Massachusetts Small Commercial Direct Install Program:* The study supplied energy realization rates and winter coincidence factors for all non-control prescriptive lighting measures. The net effect of this study is to increase energy savings and winter demand savings. This study is discussed in more detail in Section III.
4. *C&I Lighting Load Shape Project:* This was a regional study facilitated by the NEEP EM&V Forum building upon a 2007 study done for the New England State Program Working Group to develop Commercial and Industrial lighting load shapes and coincidence. The study supplied summer coincidence factors for custom and prescriptive, non-control lighting measures. The net effect of this study was to slightly decrease summer demand savings. This study is discussed in more detail in Section III.

The combined impact of the studies listed above did not have a significant impact on energy savings, demand savings or non-electric benefits for this program. This is primarily due to the fact that the free ridership impacts from the 2010 Commercial and Industrial Electric Programs Free-ridership and Spillover Study were not as pronounced as for the C&I New Construction and Major Renovation program. Also, energy realization rates increased for all prescriptive non-control lighting measures due to the Non-Controls Lighting Evaluation for the Massachusetts Small Commercial Direct Install Program Study. The participant spillover rate also increased for all custom and prescriptive lighting measures due to the HBL Market Effects Study. Both of these studies had a positive impact on program level savings.

The following are the process, market characterization and baseline studies that apply to this program, but do not impact 2010 evaluated results.

1. *Massachusetts Non-Residential Small Business Direct Install Program:* Multi-Tier Structure Assessment 2010 Process Evaluation: The main objective of the Multi-Tier Program Structure Assessment is to document progress towards statewide integration of the C&I Direct Install programs during 2010, and to gauge customer interest in different program design options such as varying incentive levels, zero interest financing, and on-bill financing options. The assessment is also designed to gather information related to program satisfaction and awareness. This study is discussed in more detail in Section III.
2. *Cross Cutting C&I Free-Ridership and Spillover Methodology Study Final Report:* The focus of this study was on the general methods for estimating what would have happened absent C&I programs in Massachusetts. The net program effect is the observed effect, less the estimate of what would have happened absent the program. The objectives of this study were to develop a standardized methodology for situations where C&I end-users are able to report on program impacts via self-report methods, and to provide a decision framework and guidelines for when the standardized self-report methodology is appropriate and when other methods need to be used (e.g., upstream programs). This study is discussed in more detail in Section III.
3. *Industry Practices and Policies on Energy Efficiency Program Rebate/Incentives:* This is a high-level scoping study of statewide energy efficiency program incentive and rebate levels, the purpose of which was to help inform the policy debate for statewide programs

in Massachusetts and to support fourth quarter 2010 programmatic planning. This study is discussed in more detail in Section III.

Evaluated Results % Change from Planned

Since there are impact evaluation studies that apply to this program, there is a difference between the Evaluated Results % Change from Planned and Preliminary Year-End Results % Change from Planned. However, the effect of impact evaluation studies is not significant.

Energy and demand savings and NEBS were impacted to a far greater extent by changes in measure mix and a higher cost of saved energy than planned than by impact evaluation study results. This is demonstrated by the fact that the Preliminary Year-End Results % Change from Planned is much higher than the Evaluated Results % Change from Preliminary.

Overall, TRC Benefits and Net Benefits were significantly impacted by increases in cost per energy savings and changes in measure mix. Variances in TRC Costs relative to plan were also significant due to lower than anticipated participation and cost per participant. As both benefits and cost declined commensurately relative to the plan, the program remained cost-effective with a BCR that did not change.

III. EVALUATION MEASUREMENT AND VERIFICATION ACTIVITIES

The purpose of this section is to provide detailed information on the EM&V studies included in the Annual Report for each sector.

A. Summary

Table III.A summarizes the EM&V studies that have not been included in previous Annual Reports.

Table III.A: Evaluation Studies in Annual Report			
Studies	Location of Complete Study in Annual Report	Docket & Exhibit Approving Planned Evaluation Studies	Implemented as Approved? (yes/no)
Residential Program Studies			
Massachusetts New Homes with ENERGY STAR Estimated Maximum Potential Savings from Enhanced Code Compliance with the IECC 2009 Residential Building Code in Massachusetts	App. C, Study 1	All Studies are pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010); some studies were initiated prior to the MTM filing	All Studies are implemented as described in the as yet unapproved 2011 MTM (filed Oct. 2010)
Massachusetts New Homes with ENERGY STAR Mystery Shopping	App. C, Study 2		
The Massachusetts New Homes with ENERGY STAR Program 2011 Baseline Phase 1: Completion of Planning	App. C, Study 3		
Massachusetts 2010 Residential Retrofit and Low-Income Evaluation - Brushless Fan Motors	App. C, Study 4		
Massachusetts 2010 Residential Retrofit and Low Income Evaluation: Mass Save	App. C, Study 5		
2010 Net to Gross Findings: Home Energy Assessment	App. C, Study 6		
Non-Electric Impact (NEI) Findings for the 2010 Mass Save Home Energy Services (Mass Save) program	App. C, Study 7		
Massachusetts ENERGY STAR Lighting Program: 2010 Annual Report	App. C, Study 8		
Massachusetts Appliance Turn-in Program Evaluation Integrated Report Findings	App. C, Study 9		
Cross-Cutting Net-to-Gross Methodology Study for Residential Programs – Suggested Approaches (Final)	App. C, Study 10		
Estimated Net-To-Gross (NTG) Factors for the Massachusetts Program Administrators (PAs) 2010 Residential New Construction Programs, Residential HEHE and Multi-Family Gas Programs, and Commercial and Industrial Gas Programs	App. C, Study 11		
HEHE Process and Impact Evaluation	App. C, Study 12		

Table III.A: Evaluation Studies in Annual Report (cont'd)			
Studies	Location of Complete Study in Annual Report	Docket & Exhibit Approving Planned Evaluation Studies	Implemented as Approved? (yes/no)
Residential Pilot Studies			
Massachusetts 2010 Residential Retrofit and Low Income Evaluation – Deep Energy Retrofit	App. C, Study 13	All Studies are pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010); some studies were initiated prior to the MTM filing	All Studies are implemented as described in the as yet unapproved 2011 MTM (filed Oct. 2010)
Massachusetts New Homes with ENERGY STAR Process Evaluation of the Four to Eight Story Multi-Family New Construction Pilot Interim Findings	App. C, Study 14		
The Massachusetts New Homes with ENERGY STAR Program Major Renovations Pilot Evaluation: Preliminary Report on Non-Participant Interviews	App. C, Study 15		
The Massachusetts New Homes with ENERGY STAR Program Version 3 Pilot Evaluation	App. C, Study 16		
Massachusetts Cross-Cutting Behavioral Process Evaluation	App. C, Study 17		
Low-Income Program Studies			
Massachusetts 2010 Residential Retrofit and Low Income Evaluation: Low Income	App. C, Study 18	All Studies are pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010); some studies were initiated prior to the MTM filing	All Studies are implemented as described in the as yet unapproved 2011 MTM (filed Oct. 2010)

Table III.A: Evaluation Studies in Annual Report (cont'd)			
Studies	Location of Complete Study in Annual Report	Docket & Exhibit Approving Planned Evaluation Studies	Implemented as Approved? (yes/no)
Commercial & Industrial Program Studies			
Non-Controls Lighting Evaluation for the Massachusetts Small Commercial Direct Install Program	App. C, Study 19	All Studies are pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010); some studies were initiated prior to the MTM filing	All Studies are implemented as described in the as yet unapproved 2011 MTM (filed Oct. 2010)
Massachusetts Non-Residential Small Business Direct Install Program: Multi-Tier Structure Assessment 2010 Process Evaluation	App. C, Study 20		
Final Report HBL Market Effects Study Project 1A New Construction Market Characterization	App. C, Study 21		
FINAL Commercial New Construction Customer Quantitative Profile Project 1A New Construction Market Characterization	App. C, Study 22		
Supply Chain Profile Project 1A New Construction Market Characterization	App. C, Study 23		
Final Report Project 1B Chain & Franchise Market Characterization	App. C, Study 24		
Impact Evaluation of 2009 Custom HVAC Installations	App. C, Study 25		
Final Report Project 1C Combined Heat &Power Market Characterization	App. C, Study 26		
Project 6B Comprehensive Design Approach Process Evaluation	App. C, Study 27		
Impact Evaluation of 2008 and 2009 Custom CDA Installations	App. C, Study 28		
Project 7 General Process Evaluation Final Report	App. C, Study 29		
2010 Commercial and Industrial Electric Programs Free-ridership and Spillover Final Report	App. C, Study 30		
C&I Lighting Measure Life and Persistence Project	App. C, Study 31		
C&I Lighting Loadshape	App. C, Study 32		
C&I Unitary HVAC Loadshape Project Final Report	App. C, Study 33		
Cross Cutting C&I Free Ridership and Spillover Methodology Study Final Report	App. C, Study 34		
Prescriptive Condensing Boiler Impact Evaluation Project 5 Prescriptive Gas	App. C, Study 35		

Table III.A: Evaluation Studies in Annual Report (cont'd)			
Studies	Location of Complete Study in Annual Report	Docket & Exhibit Approving Planned Evaluation Studies	Implemented as Approved? (yes/no)
Special & Cross-Sector Studies			
Industry Practices and Policies on Energy Efficient Program Rebate/Incentives	App. C, Study 36	All Studies are pending approval of the 2011 MTM, D.P.U. 10-147,	All Studies are implemented as described in the as yet unapproved
Community Based Partnership Interim Process Evaluation	App. C, Study 37		
Cape Light Compact-Specific Studies			
Findings from In-Depth Interviews with Smart Energy Monitoring Pilot Participants	App. C, Study 38	All Studies are pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010); some studies were initiated prior to the MTM filing	All Studies are implemented as described in the as yet unapproved 2011 MTM (filed Oct. 2010)

B. Residential Program Studies

1. Massachusetts New Homes with ENERGY STAR® Estimated Potential Savings from Enhanced Code Compliance with the IECC 2009 Residential Building Code in Massachusetts (Study 1)

Type of Study: Other

Objective of the Study: The objective of this study was to estimate the potential savings for the years 2011, 2012, and 2013 that may be achieved through promoting compliance with the newly-adopted International Energy Conservation Code ("IECC") 2009 energy code for four measures (wall insulation, basement insulation, proper insulation of ducts in unconditioned spaces, and fifty percent high efficacy lamp requirement) in order to provide needed guidance to the PAs on the implementation and evaluation costs that may be justified. Compliance enhancement efforts would focus on PAs' trainings of builders, subcontractors, and code officials as the potential savings presented in the report focus on homes that do not participate in the Massachusetts New Homes with ENERGY STAR® Program.

Programs to which the Results of the Study Apply:

- Residential New Construction & Major Renovation (Electric & Gas)
- Low-Income Residential New Construction (Electric & Gas)

Recommendations Derived from the Study: There are no recommendations from this study as the main purpose was to derive potential savings from code enhancement efforts for the measures mentioned above.

How the Study Came to the Recommended Conclusions: Not Applicable.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: Not Applicable.

A copy of the complete study can be found in Appendix C, Study 1.

2. Massachusetts New Homes with ENERGY STAR® Mystery Shopping (Study 2)

Type of Study: Other

Objective of the Study: This report presents the findings of ten mystery shopping visits to ENERGY STAR® homes conducted in the summer of 2010. The results presented provide insight into the current marketing strategies of agents listing ENERGY STAR® homes, and the effect of program-sponsored trainings on these marketing strategies.

Programs to which the Results of the Study Apply:

- Residential New Construction & Major Renovation (Electric & Gas)
- Low-Income Residential New Construction (Electric & Gas)

Recommendations Derived from the Study:

1	Continue *Be a Star with ENERGY STAR* trainings. There was a noticeable difference in the knowledge of agents who had attended the training compared to those who had not. The agents who had attended training seemed to understand and market more aspects of their ENERGY STAR listings, and generally spent more time discussing the energy efficiency features of the home.
2	Expand trainings to include builders. Builders are well versed in their homes' specific energy efficiency measures and the benefits of those measures, but that knowledge often was not passed on to the developments' sales representatives. Builders might benefit from training that provides guidance on how to train their own sales representatives to fully market the benefits of ENERGY STAR homes.
3	Focus a portion of trainings on the HERS index and HERS ratings. All ENERGY STAR homes are not created equal, and agents should take advantage of the increased marketability of homes with low HERS ratings.

4	Encourage agents to attend all of the inspection stages of an ENERGY STAR home. This will ensure that agents have a better understanding of both the components (e.g., insulation and duct work) of an ENERGY STAR home, and the thoroughness of the certification process. In addition, by attending the various inspection stages, agents are likely to gain a better understanding of the technical terms (e.g., blower door and duct blaster) that are associated with ENERGY STAR homes.
5	Encourage agents to walk through an ENERGY STAR brochure or fact sheet with potential homebuyers. This simple step will guide potential buyers through the benefits of ENERGY STAR qualified homes, providing technical reference where needed, and it will ensure that the major bullet points of ENERGY STAR homes are covered during every showing.
6	Encourage agents to build on consumers' preexisting knowledge of ENERGY STAR for appliances and electronics, emphasizing the value of the ENERGY STAR brand name. Agents might have better success marketing these homes by emphasizing to buyers that the ENERGY STAR label for homes is just an extension of the ENERGY STAR label they already know and trust, found on appliances, heating and cooling equipment, lighting and electronic products in their homes.

How the Study Came to the Recommended Conclusions: Recommendations are based on findings from ten mystery shopping visits to ENERGY STAR® homes, conducted in the summer of 2010. Four of the real estate and sales agents visited had recently attended a program- sponsored Be a Star with ENERGY STAR® training session (these were the only attendees that had suitable homes for sale at the time of the visits). All ten agents visited were ranked on a scale of zero to ten, where zero was "not at all willing or knowledgeable" and ten was "extremely willing or knowledgeable" in the following four areas: knowledge of energy efficiency, knowledge of ENERGY STAR® certification, willingness to use energy efficiency as a selling point, and willingness to use ENERGY STAR® certification as a selling point.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: All recommendations above have been adopted and are being incorporated into the program through continuation and enhancement of various training efforts.

A copy of the complete study can be found in Appendix C, Study 2.

3. The Massachusetts New Homes with ENERGY STAR® Program 2011 Baseline Phase 1: Completion of Planning (Study 3)

Type of Study: Baseline

Objective of the Study: This report describes the planning process for the 2011 Baseline Study and the work done to develop a sample of eligible homes to recruit from; on-site inspections will be conducted in the summer of 2011. This study will include on-site inspections of 100 non-ENERGY STAR® homes built to meet the new IECC 2009 code, which became mandatory in

Massachusetts on July 1, 2010. The results of this study will be used to update the baseline or User Defined Reference Home used in calculating Program savings and to assess building code compliance at the beginning of a code cycle.

Programs to which the Results of the Study Apply:

- Residential New Construction & Major Renovation (Electric & Gas)
- Low-Income Residential New Construction (Electric & Gas)

Recommendations Derived from the Study: There are no recommendations from this study as the main purpose was to document the planning process of the Baseline study.

How the Study Came to the Recommended Conclusions: Not Applicable.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: Not Applicable.

A copy of the complete study can be found in Appendix C, Study 3.

4. Massachusetts 2010 Residential Retrofit and Low-Income Evaluation - Brushless Fan Motors (Study 4)

Type of Study: Process

Objective of the Study: The report presents the results of the process evaluation of the Brushless Fan Motor ("BFM") component of the 2010 COOL SMART program. The objectives of the study were to determine the following: program processes, implementation strengths, and areas for improvements; program tracking data sufficiency; contractor practices, perceptions, and participation barriers; customer behavior, motivations, awareness, and satisfaction; program outreach and recruitment efficacy; and participants' potential changes in fan use, from pre- to post-installation.

Programs to which the Results of the Study Apply:

- Residential Cooling and Heating Equipment (Electric)

Recommendations Derived from the Study:

1	Consider including a unique participation identifier (such as an ID number), BFM manufacturer and model numbers (which would prove helpful for verification purposes); and add a parameter to capture numbers of motors incented per home (which would help indicate if contractors are paid for more than two motors per home).
2	Explore options for making program participation more cost-effective for contractors.

	For example, consider allowing contractors to bill customers for parts or labor that exceed a "typical" installation.

How the Study Came to the Recommended Conclusions: The process evaluation of the BFM included: in-depth telephone interviews with PA and implementer staff; qualitative in-depth interviews with participating and nonparticipating (in the COOL SMART BFM program component) HVAC contractors; and surveys with participating customers. In addition to the primary data collection the study reviewed BFM program materials addressing marketing, implementation, and the participant database. Based on the information obtained, the Cadmus team used its professional judgment and evaluation experience to offer recommendations aimed at improving program processes where appropriate.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why:

1	To assist with future evaluation needs, the PAs will work with the implementation vendors and internal support groups to ensure that all appropriate data is collected. If the data is captured early on this could potentially minimize data requests and on-site visits to customer homes.
2	The PAs, together with the implementation vendor and other trade allies, including HVAC distributors, will explore market opportunities and implementation strategies to enhance contractor participation.

A copy of the complete study can be found in Appendix C, Study 4.

5. Massachusetts 2010 Residential Retrofit and Low Income Evaluation: Mass Save (Study 5)

Type of Study: Process

Objective of the Study: For the 2010 process evaluation, the Cadmus team focused on assessing program processes and identifying similarities and differences between the perspectives and assumptions of program staff, implementation staff, and customers regarding program goals, design, and implementation. The Cadmus team also reviewed the process by which program data are collected, managed, and reported, including an assessment of the quality and consistency of the program data across PAs.

Programs to which the Results of the Study Apply:

- MassSAVE (Electric & Gas)

Recommendations Derived from the Study:

1	Due to concerns among all stakeholders, the potential integration of Home Performance Contractors ("HPCs") should occur slowly and in collaboration with PAs, vendors, and program contractors. Clear protocols for and expectations regarding program delivery by HPCs should be developed and disseminated.
2	Consider developing a standard set of tasks and responsibilities assigned to contractors installing measures in a customer's home, uniform across all PA territories. These would include how jobs are presented to contractors, contractors' responsibilities, and reports and invoices contractors are expected to submit to vendors upon completion of jobs.
3	Explore opportunities to assist customers in addressing health and safety issues, as well as knob and tube wiring removal, to further eliminate barriers and improve participation rates. The Cadmus team suggests expanding the existing financing options to cover these critical pre-participation issues.
4	• Develop a standardized identification system for participants, premises, projects, and measures. The consistent use of customer and premise identification associated with the tracking record will allow tracking of historic program activity and activity in other programs. • Ensure a minimum set of fields is collected and maintained for future evaluation work (see Appendix H). • Maintain a data dictionary for all critical program datasets that includes all field definitions, value definitions, and the sources of the data. The data dictionaries should be provided as part of all data requests, allowing evaluators (or any other third-party) to decode field names and data values efficiently. The data dictionaries would also ensure internal knowledge of the database is not lost in the event of critical personnel turnover. • Develop and employ a standardized measure naming convention. The Technical Reference Manual ("TRM") could be used as the basis for standard names. This convention would allow for improved evaluability and add transparency to the measure-tracking process. The Cadmus team specifically recommends a four-part measure naming convention, which includes varying levels of detail for each program stakeholder, denoting the measure's end-use, group, type, and detail. Such a measure naming convention would clearly relate each measure in the program tracking data to its TRM counterpart.
5	Revisit customer service and follow-up strategies. Although all vendors reported use of a rigorous follow-up procedure, and vendors ensure customer support is readily available

	when customers call, additional customer service in the form of outreach, regular check-ins, and follow-up phone calls could improve participation and satisfaction.
6	Consider offering incentives to auditors based on implementation percentages or another participation goal designed to increase follow-through participation.

How the Study Came to the Recommended Conclusions: The RCS program evaluation included PA program manager interviews, program vendor staff interviews, program contractor interviews, PA data manager interviews, a data review, and participant interviews. Based on information obtained from these stakeholders, the Cadmus team used its professional judgment and experience evaluating energy efficiency programs to offer recommendations aimed at improving program processes where appropriate.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why:

1	The integration of HPCs began with a small pilot in 2010. In 2011, the introduction of additional HPCs is being rolled out using information gained from the 2010 pilot. Clear energy assessment, software use and reporting guidelines are in place.
2	The PAs have developed consistent statewide material and installation standards, as well as, Energy Assessment standards.
3	The PAs are also exploring the opportunity to expand financing to include the mitigation of health and safety barriers. This will require regulatory approval and will be addressed using proper regulatory avenues.
4	The PAs are working with the evaluation team to ensure they are better able to aggregate and/or compare measure savings in the future, where possible.
5	The PAs are developing concrete follow up strategies to ensure constant follow up communication with customers. Many PA lead vendors have already established follow up protocols.

A copy of the complete study can be found in Appendix C, Study 5.

6. 2010 Net to Gross Findings: Home Energy Assessment (Study 6)

Type of Study: Impact

Objective of the Study: The objective of the study was to develop Net-to-Gross ("NTG") estimates for the Home Energy Services program at the measure level. The Home Energy Services program incorporates both Mass Save and the gas Weatherization programs. The research was designed to include freeridership, participant spillover and non-participant spillover in the analysis.

Programs to which the Results of the Study Apply:

- MassSAVE (Electric & Gas)
- Weatherization (Gas)

Results of the Study and How the Study Determined those Results:

2010 Home Energy Services NTG Findings					
Measure Category	**Measure**	**Participant Free-ridership**	**Participant Spillover**	**Non-participant Spillover**	**NTG**
CFL Direct Installs	CFL	22%	19%	0%	97%
Direct Installs	Air Leak Sealing	7%	0%	0%	93%
	Programmable Thermostat	11%	0%	0%	89%
Incented Measures	Heating System	28%	0%	0%	72%
	Insulation	20%	8%	50%	138%
	Refrigerator	5%	0%	0%	95%
	Water Heater	25%	0%	0%	75%
Overall		**18%**	**7%**	**23%**	**112%**

The 2010 Home Energy Services program NTG estimates are based on three combined approaches:

1. *Customer Self-Reports.* Customer self-reported Free Rider ("FR") and Participant Spillover ("SP") through surveys of 2010 RCS (electric) and gas Weatherization participants. As shown in Table 1, this analysis considered all program measures. A survey of 1,200 electric and 400 gas participants informed the analysis.
2. *Statistical Market Share Modeling.* Discrete choice modeling of FR and Non Participant Spillover ("NPS") used 400 gas Weatherization participant and 400 nonparticipant surveys. This analysis did not include the 1,200 electric participants surveyed in fall 2010, as the questionnaire used was not designed for these models. The 2010 NTG analysis also focused on insulation and duct sealing/duct insulation (collectively referred to as insulation), the most important measures in terms of savings.
3. *Trade Ally Research.* Interviews with more than 30 insulation contractors focused on participant and nonparticipant insulation installations, and attribution of self-reported nonparticipant jobs as spillover.

Final participant FR, PS, NPS, and NTG values are composite estimates (rather than a simple average) of the various research methods employed. The estimates were developed using a triangulation process, incorporating the Cadmus teams' experience, professional judgment, and understanding of the programs.

How the Results of the Study Impact each Identified Program's Savings: The results of this study will be used to derive net energy savings by multiplying the gross reported savings by the NTG factors

Formulas Necessary to Understand the Impact of the Study on the PA's Programs:

NTG = 1 – [participant freeridership] + [participant spillover] + [nonparticipant spillover]

If the Results of the Study are Not Adopted, Fully Explain Why: The results of the study are adopted.

A copy of the complete study can be found in Appendix C, Study 6.

7. Non-Electric Impact (NEI) Findings for the 2010 Mass Save Home Energy Services (Mass Save) program (Study 7)

Type of Study: Impact

Objective of the Study: The study summarized Cadmus' review of the non-electric impacts ("NEIs") claimed for the 2011 Mass Save Home Energy Services ("Mass Save") program by the PAs. For the purpose of this study, NEIs were defined as program-driven effects on the consumption of energy other than electricity, such as natural gas (not claimed by a gas PA), water, fuel oil and propane.

Cadmus' review consisted of determining the source of the current NEI values and independently estimating measure-specific NEIs, using the best available PA program data and secondary sources to assess the reasonableness of the current values.

Programs to which the Results of the Study Apply:

- MassSAVE (Electric Only)

Results of the Study and How the Study Determined those Results: The review consisted of determining the source of the current NEI values and independently estimating measure-specific NEIs, using the best available PA program data and secondary sources to assess the reasonableness of the current values.

It was determined that the current PA NEI values were generated based on summaries of audit tool outputs for each program home. These values were driven by inputs from MassSave vendors regarding home characteristics for participants realizing NEIs. These are primarily from program homes for which the primary space heating fuel is neither electricity nor natural gas. An independent assessment of NEI estimates was conducted and found the current vendor-provided values were reasonable.

How the Results of the Study Impact each Identified Program's Savings: Please see Table II.A.7.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: Not Applicable.

If The Results Of The Study Are Not Adopted, Fully Explain Why: The results of the study are adopted.

A copy of the complete study can be found in Appendix C, Study 7.

8. Massachusetts ENERGY STAR® Lighting Program: 2010 Annual Report (Study 8)

Type of Study: Impact

Objective of the Study: The primary objectives of this impact evaluation was to estimate net-to-gross ratios ("NTGR") for all markdown compact fluorescent lamps ("CFLs"), including separate estimates for spiral and specialty bulbs and bulbs targeted at hard-to-reach ("HTR") customers. The evaluators were also charged with assessing the PAs' current working definition of HTR customers and understanding market segmentation related to HTR customers. The evaluators also described the current state of the market for CFLs and other efficient lighting technologies, comparing to results from prior years when possible.

Programs to which the Results of the Study Apply:

- Residential ENERGY STAR® Lighting Program (Electric)

Results of the Study and How the Study Determined those Results: The evaluators recommend using a 0.43 NTGR for spiral CFLs and 0.60 for specialty CFLs, or 0.47 overall for the 2009 and 2010 program years. The evaluators came to this recommendation through the results of five different NTGR estimation methods completed for the 2009 and 2010 Massachusetts ENERGY STAR® lighting program: 1) conjoint study, 2) multistate modeling, 3) revealed preference, 4) supplier interviews, and 5) willingness to pay. The evaluators then convened a Delphi panel and provided each panelist with the results of these studies as well as background information on the history of the Massachusetts ENERGY STAR® lighting program and trends in NTG ratios for Massachusetts and other states. The Delphi panel responded to an initial request to estimate NTG ratios for spiral, specialty, and overall CFLs, and then had the opportunity to revise their estimates after reviewing the responses of their fellow panelist. The final NTGR estimates from the Delphi panel serve as the evaluation-recommended NTGR. The methods did not provide conclusive evidence to support a recommendation of a NTGR for HTR customers. The PAs and EEAC consultants have agreed to use the 0.60 specialty NTGR for HTR customers.

How the Results of the Study Impact each Identified Program's Savings: Please see Table II.A.8.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs:

Net savings = gross savings * in service rate * NTGR.

The planning NTGR value will be updated with the evaluated NTGR results. Markdown spirals will go from .30 to .43, specialty markdown bulbs change from 0.8 to 0.6, and HTR markdown bulbs change from 0.7 to 0.6.

If the Results of the Study are Not Adopted, Fully Explain Why: The results of the study are adopted.

A copy of the complete study can be found in Appendix C, Study 8.

9. Massachusetts Appliance Turn-in Program Impact Evaluation Final (Study 9)

Type of Study: Impact and Process

Objective of the Study: The Massachusetts Appliance Turn-in program collects and recycles working refrigerators and stand-alone freezers that are being used as second units from residential customers.

The primary evaluation activities consisted of a participant survey, a process evaluation, and estimation of net program savings impacts derived by applying participant-reported decision behavior about program influence and usage patterns to gross savings estimates from studies conducted in other areas. These gross and net savings estimates were compared to ex ante savings estimates currently used by the PAs. A secondary focus of the evaluation effort included an exploration of the secondary market and disposal market that exists for appliances to provide insight about how the program functions in the overall appliance market.

Programs to which the Results of the Study Apply:

- Residential ENERGY STAR® Appliances (Electric)

Results of the Study and How the Study Determined those Results: The updated gross and impact estimates derived in this study are based on two methodologies. The first methodology used unit energy consumption ("UEC") estimates from the Association of Home Appliance Manufacturers. The second methodology applied Massachusetts' refrigerator characteristics to the DOE-based model utilized by Cadmus in their 2010 evaluation of the California Appliance Recycling Program. Under each of the NMR methodologies, UECs were adjusted to account for partial use, equipment replacement, and free ridership, values that were derived from the

participant survey. While the program targeted secondary units for recycling, three distinct types of units were identified in the study—secondary units that were replaced with another unit, secondary units that were not replaced, and primary units. The study revealed that each type of recycled unit had a different energy savings profile.

Process related conclusions are based on the participant survey, depth interviews with Sponsors and the implementation contractor, and exploration of the secondary market and disposal market for appliances outside of the program.

Recommendations Derived from the Study:

1	*Use updated gross and net impact estimates for the program*—Overall, the net savings estimate for refrigerators is 522 kWh/year and for freezers is 391 kWh/year. The *ex ante* estimates used by the Sponsors are 724 kWh.
2	*Weigh the value of removing primary refrigerators*—The Sponsors should consider either reducing the number of primary fridges removed by the program by reinforcing the requirement (e.g., in marketing materials and verification of eligibility) or alternatively, opening up the program to include primary fridges.
3	*Consider partnering with major retailers to market and implement the program*. Major retailers could promote the program in their stores to customers who may be making a decision to keep or discard an existing unit. Using retailers would necessitate a shift in targeted appliances for the program—the program would be more likely to pick up primary refrigerators and nearly dead units.
4	*Target missed appointments*—Attempt to reschedule appointments with customers who have missed appointments for recycling pickup using post cards, phone calls, and emails. The program already offers Saturday pick-ups and choices for pick-up times based on schedule and geography, but additional effort should be made to give these customers priority for pick-up times that might include Saturdays, early mornings, evenings, next day pick-up, or small, one- to two-hour windows for pick-up times. Messaging with these customers should reinforce their good decision making for initiating the removal and recycling of an appliance through the program.
5	*Adjust goals to reflect demographics of the residential customer base for each Sponsor—S*ervice areas in NSTAR and Western Massachusetts Electric have a large number of apartments and multi-family homes and residents typically do not have areas where they can keep second refrigerators, such as basements or garages. Adjusting the goals of the program to reflect the pool of single family homes may result in more realistic targets for these Sponsors.
6	*Educate participants about the program goals*—The program should emphasize that the primary goal of the program is to save energy and reduce demand on the electric grid by removing older, less efficient secondary refrigerators and stand-alone freezers. The program helps customers get rid of the appliances before they might do so on their own. Reductions in energy bills and the participation incentive are additional bonuses for

	customers.
7	*Continue messaging about the ease of removal through the program*—Physical and financial barriers may encourage some consumers to keep their secondary appliances, and marketing the program to residents faced with these barriers might allow the Sponsors to collect additional units that would not otherwise be removed from the grid.
8	*Continue promoting the program through existing channels*—The Sponsors' communications network to customers through bill inserts, notations on bills, newsletters, and emails should continue to be used to promote the program on a continuous basis, or when a quick boost in participation is desired. Promotions through schools and community groups and options for rebate donations to these groups help to promote the program and provide a community service.
9	*Reinforce the idea of saving energy by not using appliances that are not essential and buying products with the ENERGY STAR® label*—Tell participants how much energy and money they saved by getting rid of their inefficient model and will continue to save if they do not replace the appliance. If they must replace the appliance, encourage them to consider the more efficient ENERGY STAR® labeled units.
10	*Sponsors should consider reaching out to Craigslist sellers*. Units offered on Craigslist are likely to be working units. The average listing price on Craigslist was $230 more than the program's incentive. However, 10% of units were $50 or less, and 23% percent were $100 or less, and six postings offered their refrigerator for free. Although those with high-value refrigerators may not be dissuaded from selling them on Craigslist, sellers with low-priced units may prefer the ease and environmental benefits of the program.
11	*Let participants know about the environmental benefits they generated*—It should also be emphasized that appliances will be recycled in a way that is less harmful to the environment than other disposal options. They will not be sold, donated to charity, or disposed of in a landfill.

How the Results of the Study Impact each Identified Program's Savings:
Please see Table II.A.9.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: Not Applicable.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why:

1	The PAs have adopted the net savings estimates.
2	The PAs will look into the best approach for handling primary refrigerators in the future.
3	The PAs have looked into partnering with retailers in the past but have not had much success with retailers embracing this program as many/most retailers have pick-up/recycling programs of their own in which they charge customers for picking up appliances and, therefore, make a profit. The PAs will continue to investigate whether

	other retailers are willing to partner with us on this program.
4	JACO (the recycling vendor) currently has a missed appointment procedure where they follow up on all missed appointments via multiple phone calls and letters, if necessary. The PAs will work with JACO to see if setting a priority pick-up for these customers is possible.
5	Currently, each PA adjusts goals annually after assessing the previous year's results.
6	All of the print marketing materials (the primary marketing outlet for this program) refers to "saving energy" and the first sentence of the ad's body copy discusses how an "old refrigerator uses up to four times more electricity than a new one." The PAs will highlight this benefit more often where possible.
7	Marketing materials do mention "We'll even haul it away for FREE." There is potential to highlight this benefit more prominently and the PAs will look into that, where possible.
8	The PAs will continue to promote the program through existing channels. Some PAs have supplemented their program with additional marketing to help lift participation (NSTAR purchased billboards, transit advertising and sent out a direct mail piece to 50,000 customers. NSTAR & NGRID are also purchasing radio advertising).
9	All of the PA's advertising currently highlights energy savings more than once by having a specific call-out on ads with the savings message in a prominent spot as well as text in the ad that states "…you could save up to $150 a year on your electricity usage." The PAs will continue to focus on this energy savings benefit with marketing efforts.
10	If reaching out to Craigslist sellers could be justified with a higher volume of units on the site, then it could be considered. It seems that the majority of listings on Craigslist are priced significantly higher than the program's incentive and this may not be a good use of time and money.
11	Environmental benefits are currently highlighted in most of the PAs marketing materials as the ads state, "Plus, recycling that fridge will keep 10 tons of carbon dioxide out of the atmosphere, which means a lot more clean air for our future." The PAs will continue to focus on this environmental message with marketing efforts.

A copy of the complete study can be found in Appendix C, Study 9.

10. Cross-Cutting Net-to-Gross Methodology Study for Residential Programs – Suggested Approaches (Final) (Study 10)

Type of Study: Process

Objective of the Study: The primary objective of this methodology study was to develop suggested approaches for consideration by the PAs for estimating net program impacts for the Massachusetts PAs' residential programs by reviewing the revised methodology report for C&I programs (2010) and adapting the decision framework and methodology guidelines to programs targeted to residential customers. The study team particularly sought to identify residential programs for which market-level approaches to measuring net-to-gross effects, rather than standard self-report methods, might be appropriate and feasible.

Programs to which the Results of the Study Apply:

- Residential New Construction & Major Renovation (Electric and Gas)
- Residential Cooling & Heating Equipment (Electric)
- Multi-Family Retrofit (Electric and Gas)
- MassSave (Electric and Gas)
- Behavior/Feedback Program (Electric and Gas)
- ENERGY STAR® Lighting (Electric)
- ENERGY STAR® Appliances (Electric)
- Residential Heating and Water Heating (Gas)
- Weatherization Program (Gas)

Recommendations Derived from the Study: The study included suggested methodologies for PAs to consider in future NTG evaluations for the above programs.

How the Study Came to the Recommended Conclusions: The evaluation team first conducted a review of the PAs' current residential programs, focusing on program elements most relevant to methodological decisions regarding the estimation of net effects. As part of the program review, the study team reviewed the three-year plans and information collected from the PAs by the NMR team and interviewed PA staff about their residential programs. Based on the program information garnered from the program review, the Net Savings Scoping Paper, and the decision matrix from the C&I report (adapted to the context of the residential programs), the evaluation developed suggested approaches for consideration by the PAs for estimating net-to-gross effects for each residential program.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: In general, the Cape Light Compact adopts results from an evaluation study which are supported by the data generated from the study. The Cape Light Compact will incorporate the findings of this study into the planning process for future evaluations of Net-to-Gross ratios for residential programs.

A copy of the complete study can be found in Appendix C, Study 10.

11. Estimated Net-To-Gross (NTG) Factors for the Massachusetts Program Administrators (PAs) 2010 Residential New Construction Programs, Residential HEHE[19] and Multi-Family Gas Programs, and C&I Gas Programs (Study 11)

Type of Study: Impact

Objective of the Study: The object of the study was to assist the Massachusetts PAs in identifying a reasonable estimated NTG factor for the 2010 Residential New Construction programs; C&I programs; Multi-Family Retrofit and Residential High Efficiency Heating and Water Heating programs.

Programs to which the Results of the Study Apply:

- Residential New Construction and Major Renovation (Electric & Gas)
- Residential Heating and Water Heating (Gas)
- Multi-Family Retrofit (Gas)
- C&I New Construction & Major Renovation (Gas)
- C&I Retrofit (Gas)
- C&I Direct Install (Gas)

Results of the Study and How the Study Determined those Results:

Program Type	**Recommended NTGR**
Residential New Construction	**1.00**
C&I Gas	
Custom	**0.96**
Prescriptive	**0.83**
Residential HEHE and Multi-family	
Boiler controls—HEHE	NTGR 1.0 (Residential)
Boilers—HEHE	Spillover: 0 .14 (Residential)
Furnace/ECM furnace—HEHE	Spillover: 0.19 (Residential)
Insulation	NTGR 0.8 (Multifamily)
Programmable thermostats	NTGR 0.88 (Multifamily) 0.42 (Residential)
Misc water heating equipment	NTGR 0.63 (Residential)
Water saving devices	NTGR 0.77 (Multifamily)
Windows	NTGR 0.8 (Combined MF & Res)

The evaluation contractors (Tetra Tech, NMR, and KEMA) reviewed secondary literature including program impact evaluations, utility filings, and Market Effects studies to develop the

[19] HEHE is an acronym for the Residential High Efficiency Heating and Water Heating Equipment Program.

above recommendations. Given the short time frame allotted for this work, they focused the search for information on a limited number of readily available sources.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Sections II.A.2 and II.C.2 for each of the programs listed above.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: Not Applicable.

If the Results of the Study are Not Adopted, Fully Explain Why: The results of the study are adopted.

A copy of the complete study can be found in Appendix C, Study 11.

12. HEHE Process and Impact Evaluation (Study 12)

Type of Study: Process and Impact

Objective of the Study: The objective of the process portion of this study was to assess the effectiveness of marketing efforts, program satisfaction and data tracking. The process evaluation focused on understanding the program: (1) from program implementation and delivery perspectives including program staff, implementation contractors, circuit riders, supply houses, rebate processors, and participating and nonparticipating heating and plumbing contractors; and (2) from end use customer perspectives including program participants and nonparticipants.

Programs to which the Results of the Study Apply:

- Residential Heating and Water Heating (Gas)

Recommendations Derived From The Study:

1	Drop all current rebates for furnaces, forced hot water boilers, steam boilers, and water heaters
2	Assess the feasibility of working to effect a change in the state standards for forced hot water boilers to 90% AFUE
3	Consider a new program for early replacement of newer, less efficient boilers
4	Continue to nurture relationship with contractors because of the key role they play in customer education and energy-efficient equipment purchase and installation. i. The program should evaluate the potential savings from offering an installation incentive to contractors for adhering to energy-efficient criteria for equipment

	sizing, duct testing, and duct sealing. ii. The program should educate contractors and participants on correct usage of ECM furnace fans, and check settings during verification visits. iii. The HEHE program can further increase its value to contractors by helping them grow their businesses through energy-efficient installations. Examples of approaches that would be attractive to them include offering co-op advertising and providing referrals. iv. Make greater efforts to reach out to nonparticipating contractors. Approaches to doing so could include: o Facilitating program participation by older contractors. Examples of approaches might be to have exhibits at trade shows that demonstrate installations of high-efficiency systems, and if possible, demonstrate how the installation practices are simply an extension of what techniques they are already familiar with. o Increasing the number and frequency of educational offerings.
5	Conduct a survey of distributors in HEHE states and elsewhere to get a better estimate of market-level sales by efficiency level, and the possible long-term spillover both within and outside the HEHE states

How the Study Came To The Recommended Conclusions: The recommendations were based on information gathered during the data collection activities for the process evaluation. These included in-depth interviews with program staff, program implementer staff, program contractors, rebate processing contractors, circuit riders, and supply houses / big box stores; and telephone surveys of HEHE program participants from the 2007-08 and 2009 program years, oil-to-gas conversion customers including HEHE participants and nonparticipants, general population program nonparticipants, participating and nonparticipating contractors, and contractors attending the Fall 2009 HEHE Annual Conference.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: Not applicable to the Cape Light Compact as the results of this study affect gas PAs only.

A copy of the complete study can be found in Appendix C, Study 12.

13. Massachusetts 2010 Residential Retrofit and Low Income Evaluation – Deep Energy Retrofit (Study 13)

Type of Study: Process

Objective of the Study: The overarching goal of the 2010 Deep Energy Retrofit pilot evaluation was to provide the PAs/implementers with actionable findings and recommendations aimed at increasing customer and contractor participation, as well as refining pilot program's delivery. As the investigations progressed, effort focused on identifying information to aid in

formulating a consensus about the pilot's mission and goals, rather than fine-tuning delivery mechanisms.

Programs to which the Results of the Study Apply:

- Deep Energy Retrofit Pilot (Electric & Gas)

Recommendations Derived from the Study:

1	**Restructure and refocus the pilot.** The pilot is primarily focused on completing projects. Though pilot performance will clearly fall short of the cost-effective energy saving goals, it is still valuable. The Cadmus team recommends restructuring the pilot as a research effort with a voluntary board and implementation team (both of which could include PA members) and refocusing the research on activities that will lead to a scalable program. Resolving some inherent policy issues and establishing a pathway to lowering costs and overall cost-effectiveness should be a near term focus of the research effort.
2	**Seek to fill program gaps**. Customers, as well as some stakeholders, have identified the need for energy efficiency services that fill the gap between basic PA programs (e.g., Home Energy Assessment) and comprehensive deep retrofits: Two possible solutions are: **Partial deep retrofits.** Identify a DER track that meets the needs of customers who are prepared for a major project but are not willing or able to commit to all the requirements of a comprehensive DER project. This could be accomplished by providing incentives for deep retrofits of one building system at a time, possibly when normal maintenance would take place, such as re-roofing, re-siding, or window replacements. Such partial deep retrofits, with much smaller up-front costs, might attract a larger number of homeowners, and would greatly reduce the size of an incentive provided to any one customer. **Deep (but not as deep) retrofits.** As reported by several PAs and also in the Massachusetts Clean Energy and Climate Plan for 2020, there is need for a middle ground between the level of savings provided by the current relatively low-cost programs and the very high savings achieved at a high cost in the pilot homes. Customer re-roofing and re-siding events present opportunities for additional savings at a relatively low cost.

How the Study Came to the Recommended Conclusions: The process evaluation included interviews with 40 of the approximately 120 participating customers (including in process, completed and drop-out participants), fifteen contractors, and nine stakeholders. Pilot material was reviewed, including marketing material, websites, and project files. Based on the information obtained, the Cadmus team used evaluation experience to offer recommendations aimed at improving program processes where appropriate.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: It is both evident in this report and in practice that deep energy retrofits are extremely complex projects and require additional research and cost-effectiveness study for it to be a viable

initiative as a stand-alone program or for its complex measures to be incorporated into existing programs going forward. The Cape Light Compact supports the idea of further research in this area to better quantify incremental costs of these deeper savings measures and to focus on what can be done to reduce the costs associated with complex efforts such as this. Future study should provide PAs with data on the true incremental costs, as well as quantification of all the program benefits (energy, non-energy, and other resources) associated with these projects.

The Cape Light Compact is fully supportive of filling program gaps by implementing deeper measures within programs. However, the Cape Light Compact believes these measures need to be deemed cost-effective before they can be mainstreamed through programs such as the Home Energy Services program.

A copy of the complete study can be found in Appendix C, Study 13.

14. Massachusetts New Homes with ENERGY STAR® Process Evaluation of the Four to Eight Story Multi-Family New Construction Pilot Interim Findings (Study 14)

Type of Study: Process

Objective of the Study: This report presents preliminary findings from interviews with the two Sponsors of the Pilot, NSTAR and National Grid, the Pilot's chief project manager, and two individuals representing the three projects that completed in 2010. The objective of the interviews was to address several process evaluation issues such as the Pilot's goals and objectives, the process of signing up and completing verification, outreach and the types of projects served, the measures covered, the measures installed, barriers to energy efficient multi-family new construction, and satisfaction. The limited number of completed projects did not allow the report to address particular issues such as free-ridership and providing technical assistance for participants to consider the addition of all applicable measures in their projects.

Programs to which the Results of the Study Apply:

- Residential New Construction & Major Renovation (Electric)
- Low-Income Residential New Construction (Electric)

Recommendations Derived from the Study: There are no recommendations from this study as it is an interim report issued until more projects complete the process.

How the Study Came to the Recommended Conclusions: Not Applicable.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: Not Applicable.

A copy of the complete study can be found in Appendix C, Study 14.

15. The Massachusetts New Homes with ENERGY STAR® Program Major Renovations Pilot Evaluation: Preliminary Report on Non-Participant Interviews (Study 15)

Type of Study: Process

Objective of the Study: The purpose of the Major Renovations Pilot, introduced in 2009, is to address the gap between the Home Energy Assessment Program for existing homes and the Massachusetts New Homes with ENERGY STAR® Program. This report presents preliminary findings from interviews with seven homeowners and one builder who had projects eligible to participate in the pilot and considered enrolling in the pilot, but decided not to enroll. The objective of the interviews was to identify how these potential participants learned about the pilot, why they decided not to enroll in the pilot and get their suggestions for how to make participation in the pilot more user-friendly for homeowners.

Programs to which the Results of the Study Apply:

- Residential New Construction & Major Renovation (Electric)
- Low-Income Residential New Construction (Electric)

Recommendations Derived from the Study: There are no recommendations from this report as it is an interim report issued while the PAs wait for more projects to complete.

How the Study Came to the Recommended Conclusions: Not Applicable.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: Not Applicable.

A copy of the complete study can be found in Appendix C, Study 15.

16. The Massachusetts New Homes with ENERGY STAR® Program Version 3 Pilot Evaluation (Study 16)

Type of Study: Process

Objective of the Study: The focus of this report is on lessons learned from the Massachusetts New Homes with ENERGY STAR® Program Version 3 Pilot ("Pilot") and issues the program will face going forward to keep existing builders in the program, as well as recruit new builders, as ENERGY STAR® Version 3 requirements take effect. Version 3 Guidelines for ENERGY STAR® become effective for all new homes, regardless of permit dates, starting January 1, 2012.

Programs to which the Results of the Study Apply:

- Residential New Construction & Major Renovation (Electric)
- Low-Income Residential New Construction (Electric)

Recommendations Derived from the Study:

1	Keep training on code changes and Version 3 requirements separate, to the extent possible. Interviewed builders who attended training covering both topics found it confusing.
2	Focus builder training on the new Thermal Enclosure Checklist ("TEC") section 3 and section 5 requirements that are expected to be the most challenging for builders: One example is the TEC section 5 requirement that sheetrock be sealed to the top plate at all attic/wall interfaces using caulk, foam, or equivalent material. HERS raters say builders are trying out different approaches for meeting this requirement. It may require the sheetrock crew to come back a second time, which is costly and impacts the construction schedule. EnergyComplete™ from Owens Corning is a spray on gasket that can be used at the same time the sheet rock is put up, but the cost is high.
3	Offer training in a variety of formats and use trainers with hands-on experience: Some builders and HVAC contractors prefer classroom training; others prefer more hands-on field training. They also like the idea of having webinar presentations or videos of training presentations available online to view at their convenience. For all training, interviewees stressed the importance of using trainers who have extensive hands-on experience. Also, encourage HVAC contractors to take advantage of other available training options: Air Conditioning Contractors of America and supply houses offer several training options to help contractors interested in being prepared to meet Version 3 requirements. HVAC contractors could also be encouraged to consider participating in the COOL SMART Program, which offers multiple training courses, including training to offer ENERGY STAR® Quality Installations.
4	Include HERS raters in any program sponsored HVAC contractor training: The interviewed HVAC contractors and distributor say it would be useful to have a HERS rater at trainings to explain exactly what HVAC contractors are expected to do in a qualifying home, especially if they are going to guarantee in their contract with the builder that the home will meet program requirements.
5	Review the timeline for moving to an open HERS rater market: Assess the potential negative impact on Program participation of asking builders to assume the full cost of HERS rater services at the same time that builders interested in meeting Version 3 requirements will likely need more HERS rater support and need to pay more for HVAC contractors able to meet Version 3 requirements. Hitting builders with two cost increases at the same time may negatively affect participation.

How the Study Came to the Recommended Conclusions: Recommendations are based on findings from in-depth interviews conducted with 17 builders, 11 HERS raters, 10 HVAC contractors and one HVAC distributor. Interviewees included all six builders who participated in

the Pilot and the HERS raters they worked with, as well as two of the HVAC contractors who worked on Pilot homes with ducted HVAC systems.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: As this report was recently issued, the recommendations are currently under consideration. Version 3 is the latest version of the EPA ENERGY STAR® Homes program. Version 3 is an option of the Massachusetts Residential New Construction program for interested customers.

A copy of the complete study can be found in Appendix C, Study 16.

17. Massachusetts Cross-Cutting Behavioral Process Evaluation (Study 17)

Type of Study: Process and Impact

Objective of the Study: This study is the first annual process evaluation of Massachusetts behavioral programs under the three-year Massachusetts Cross-Cutting Program Evaluation plan. The primary objective of the process portion of the evaluation was to provide preliminary insights into the effectiveness of National Grid's OPower program and the actions that residential customers may take to generate energy savings. The secondary objective of this study was to create a framework to evaluate all Massachusetts behavior programs in upcoming evaluations. Specific research objectives of the process portion of the evaluation include:

- Assess program characteristics that may lead to greater savings
- Determine specific actions taken as a result of the Home Energy Report ("HER") – including conservation behaviors and direct measure installations
- Identify other effects from behavioral program efforts (increased awareness of energy efficiency options, changes in attitudes)
- Develop suggestions for improving the programs to increase savings

In addition to the process portion, this study is the first annual impact evaluation of Massachusetts behavioral programs under the three-year Massachusetts Cross-Cutting Program Evaluation plan. The study objective is to examine the National Grid HER program's ability to generate residential electric and gas savings among targeted Massachusetts' customer households.

Programs to which the Results of the Study Apply: This study applies to two National Grid program efforts:

- OPOWER Electric Program
- OPOWER Gas Program

Recommendations Derived from the Study:

Process: The evaluation identified a number of recommendations in three areas: (1) planning and policy, (2) program implementation, and (3) monitoring and evaluations. Additional analysis supporting the recommendations can be found in "Massachusetts Cross-Cutting Behavioral Program Evaluation Volume I" on pages 5-6 and 41-43.

	Recommendations
1	Planning and Policy • The PAs should continue to develop approaches for targeting different household types with different messages through the HER program. • The PAs should conduct additional research to determine the effective useful life and persistence estimates for the HER program. • The PAs should determine whether the HER and other behavioral programs should aim to channel customers to other rebate and audit programs. o If cross-program promotion is desired, two-three months after the delivery of the first report may be the most appropriate time to do so.
2	Program implementation • The program should consider developing ways to personalize the experience further by providing customers with more household-specific information. • More actively promote the website and increase its prominence on the report. • Provide more explicit, positive affirmations to participants on the Home Energy Report.
3	Monitoring and Evaluation • Program savings forecasts should be developed based on ex post or market-specific findings from the implementers or evaluation. • Continue to employ empirical methods, such as billing analysis using panel data or treatment/control experimental design, to gauge the impact of the report on energy savings, awareness and attitudes. • Continue to incorporate channeling analysis to determine behavioral program impacts. • Enhance participant surveys to gather information on actions participants and non-participants have taken to save energy.

How the Process Study Came to the Recommended Conclusions: The process evaluation recommendations are based on a number of data collection efforts:

1. In-depth interviews with PAs.
2. Telephone surveys with participants and control group members: Telephone survey research was conducted with 501 participant and 501 control group households. The telephone survey was designed to understand differences in energy efficiency and conservation behaviors among participants, compared with control group members, based on participant exposure to the Home Energy Report for approximately one year.
3. In-home ethnographic research: In-home ethnographic research was conducted with 11 participant households. The in-home ethnographic research was designed to supplement insights gained through survey research, and explored participants' responses to the Home Energy Report, changes in behaviors or intentions in direct response to the report, and suggestions for report content and delivery.

Detailed process evaluation research methods and sampling are described in Sections 4.2 and 4.3 of "Massachusetts Cross-Cutting Behavioral Program Evaluation Volume I." Key findings from these methods are described in Sections 5.1 and 5.2 of "Massachusetts Cross-Cutting Behavioral Program Evaluation Volume I."

Results of the Impact Study and How the Study Determined those Results:

OPOWER Electric Program: Electric pilot households averaged 184.1 net annual kWh savings per participant in the first program year, and 1.61% kWh savings from 11,433 kWh per participant expected consumption in the absence of the program. This equates to a total of 4,575 MWh savings across households in the pilot cohort.

OPOWER Gas Program: Gas pilot participants averaged 9.93 net annual therm savings per participant in the first program year, and 0.77% therm savings from 1,286 therms per participant expected consumption in the absence of the program. The billing analysis found that the average reduction in therms was 0.81% and the channeling analysis found that 0.04% of the average reduction was due to incremental savings from other programs. This equates to a total of 248,257 therm savings across all households in the pilot cohort.

Net program savings were determined by conducting billing analysis to estimate annual electric and therm savings. Average annual net savings attributable to the behavioral program were determined using a linear fixed effects regression analysis of customer billing data that included billing data from behavioral program participants (who received the Home Energy Reports), and a matched comparison group of residential customers. The billing analysis approach is described in Section 4.4 of "Massachusetts Cross-Cutting Behavioral Program Evaluation Volume I." For the National Grid gas pilot, a channeling analysis was conducted where net program savings determined by billing analysis were adjusted by factoring out deemed savings values counted in other National Grid programs. The savings values cited here reflect only those program savings directly obtained by the OPower Program, factoring out savings jointly attributable to the OPower program *and* other energy efficiency programs. This adjustment is described in Section

4.5 of "Massachusetts Cross-Cutting Behavioral Program Evaluation Volume I." Percent savings are determined by calculating average annual net program savings as a proportion of energy consumption expected in the absence of the program, described in Section 3.6 of "Massachusetts Cross-Cutting Behavioral Program Evaluation Volume II."

Formulas Necessary To Understand The Impact Of The Study On The Program Administrator's Programs: The TRM for the 2011 Plan contains the algorithms for calculating primary energy impacts for the gas and electric programs:

$$\Delta kWh = (kWh_{BASE})(\%SAVE)$$

$$\Delta MMBtu = (MMBtu_{BASE})(\%SAVE)$$

Where:

Unit = One participant household

kWhBASE = Baseline consumption of kWh

%SAVE = Energy savings percent per program participant

MMBtuBASE = Baseline consumption of MMBtu

The results of this study are used to update the energy savings percent per participant (*%SAVE*) that are used to calculate net unit savings (ΔkWh *or* $\Delta MMbtu$) for OPOWER electric and gas programs. Calculation of the impact metric *%SAVE* is described in Section 3.6 of "Massachusetts Cross-Cutting Behavioral Program Evaluation Volume II." Note that the ex post savings value ($\Delta MMbtu$) used to calculate percent savings (*%SAVE*) factors out deemed savings values counted in other National Grid programs, as explained above and in Section 4.5 of "Massachusetts Cross-Cutting Behavioral Program Evaluation Volume I."

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: Results of this study do not apply to the Cape Light Compact, as it is not implementing an OPOWER pilot.

A copy of the complete study can be found in Appendix C, Study 17.

C. Low-Income Studies

1. Final Report for Low Income Program – Massachusetts 2010 Residential Retrofit and Low Income Evaluation (Study 18)

Type of Study: Process

Objective of the Study: For the 2010 process evaluation, the Cadmus team focused on assessing program processes and identifying similarities and differences between the perspectives and assumptions of program staff, implementation staff, and customers regarding program goals, design, and implementation. The Cadmus team also reviewed the process by which program data are collected, managed, and reported, including an assessment of the quality and consistency of the program data across PAs.

Programs to which the Results of the Study Apply:

- Low-Income 1-4 Family Retrofit (Electric and Gas)
- Low-Income Multi-family Retrofit (Electric and Gas)

Recommendations Derived from the Study:

1	To address any concerns related to funding and resource management, PAs and lead Community Action Program ("CAP") agency could increase communication during the goal-setting processes, and track spending throughout implementation.
2	The PAs should schedule a meeting or series of meetings in coordination with LEAN for the express purpose of clearly defining standardization and integration objectives for the program. Once the definition of standardization is communicated and agreed upon, strategies should be determined for meeting those objectives over a specified time period. This will ensure all stakeholders work toward commonly agreed upon objectives, and enhance progress toward meeting objectives to be measured.
3	The PAs should strongly consider all options for creating a streamlined, independent, third-party QA/QC process that serves the needs of the PA-funded program, while minimizing participant intrusion. Such a process could reduce existing inefficiencies including the potential number of visits to participants' homes, ensure CAPs do not perform quality control on their own projects, free up CAP auditors' time to reach more low income customers, and align this program's QA/QC process with that proposed for the Home Energy Assessment program. This does not necessarily have to be an additional QA/QC process, just a streamlined process that is collaborative in nature.
4	The PAs should maintain a data dictionary for all critical program datasets that includes all field definitions, value definitions, and the sources of the data. The data dictionaries should be provided as part of all data requests thereby allowing evaluators (or any other third-party) to decode field names and data values efficiently. The data dictionaries would also ensure internal knowledge of the database is not lost in the event of critical personnel turnover. Once created, draft data dictionaries should be circulated among the low income working group to ensure that all PAs are collecting the same data and using the same naming conventions whenever possible. If such data dictionaries do not exist, the Data Management Working Group established as part of the 2011 Residential Retrofit and Low Income evaluation could assist with their creation.
5	The PAs should ensure the collection and availability of a minimum set of critical data fields for current and future evaluation work.

6	The PAs should consider mandating that a standard set of critical audit data fields be entered into an electronic format and maintained/archived for future internal and external use. The PAs should collaborate with the CAPs and the evaluators to identify valuable audit information not currently maintained electronically.
7	The PAs should also explore the potential of having field technicians use electronic hardware (a PDA or laptop) to collect and enter onsite data whenever possible. This approach would minimize manual data entry, reduce program administrative costs, and improve data quality through the institution of unique keys, foreign key constraints, lookup tables, and other database design best practices.
8	The PAs should work collaboratively on integration of a common Measure ID system to allow tracking of each installed measure from the participant tracking database to the BCR input sheet and to the TRM. In addition, PAs should develop and maintain standardized ID fields (standardized internally, not across PAs) linking data across programs, customers, contractors, and billing data.
9	Through a collaborative process with the PAs and the TRM working group, continue to develop and employ a standardized measure naming convention for all PAs and CAPs. The TRM should be used as a basis to develop standard names and codes. A naming convention would allow for faster and more accurate statewide reporting, improve evaluability, and add transparency to the measure tracking process. The Cadmus team specifically recommends consideration of a four-part measure naming convention that includes varying levels of detail for each program stakeholder: denoting the measure's end-use, group, type, and detail. Examples of several common program measures are provided in the report.

How the Study Came to the Recommended Conclusions: The Low Income Program evaluation included PA program manager interviews, CAP agency staff interviews, PA data manager surveys, a data review, and participant interviews. Based on information obtained from these stakeholders, the Cadmus team used its professional judgment and experience evaluating low income programs to offer recommendations aimed at improving program processes where appropriate.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: In general, the PAs adopt results from an evaluation study which are supported by the data generated from the study.

The PAs already track spending throughout the implementation. Starting in July 2011, for 2012 goal setting, PAs and LEAN will start discussions about budgets and savings goals in advance of the program year.

The PAs will use the Best Practice Meetings to clearly define standardization and integration objectives for the program and a timeline.

There is already a new QA/QC process being initiated that would minimize the number of visits to customer homes.

The PAs will explore the potential of having field technicians use electronic hardware to collect and enter onsite data. There is some current use of handheld devices for auditors. Due to the high cost and since some of the audits requiring the auditors to crawl into small spaces, it may not be feasible.

The PAs are working with the evaluation team to ensure in the future we are better able to aggregate and/or compare measure savings where possible.

A copy of the complete study can be found in Appendix C, Study 18.

D. C&I Studies

1. Non-Controls Lighting Evaluation for the Massachusetts Small Commercial Direct Install Program (Study 19)

Type of Study: Impact

Objective of the Study: Provide independent estimates of annual energy savings and peak demand impacts for a single type of installed measure: the replacement of lighting fixtures without controls.

Programs to which the Results of the Study Apply:

- C&I Small Retrofit (Electric)

Results of the Study and How the Study Determined those Results: Logged operating hours and installed measure survey data from 130, 2010 program participant sites throughout Massachusetts during the months of December through February were used to calculate summer and winter coincidence factors for ISO on-peak and seasonal peak performance hours. The data were also used to adjust estimates of energy and demand savings to determine realization rates at the statewide level, by PA and for two demand ranges. Information collected on site was compared to that in electronic tracking system files to make documentation, technology and quantity adjustments, as well as incorporating heating and cooling interactive effects.

How the Results of the Study Impact each Identified Program's Savings: Please refer to Table II.C.6.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: The results of this study are used to update uncontrolled lighting realization rates for energy ("RRE"), summer on-peak demand ("RRSP") and winter on-peak demand ("RRWP") savings, and the coincidence factor for winter on-peak demand ("CFWP"). Both the Energy Realization Rate and the Coincidence factors incorporate HVAC interactive effects.

The formulas necessary to understand the impacts are described in the TRM.

If the Results of the Study are Not Adopted, Fully Explain Why: This study collected operating hour data during winter months. A significant number of sampled sites exhibited seasonal variation in operating hours. PAs elected to not adopt the calculated summer coincidence factors at this time and are planning a follow on summer metering study to capture the seasonal variation.

A copy of the complete study can be found in Appendix C, Study 19.

2. Massachusetts Non-Residential Small Business Direct Install Program: Multi-Tier Structure Assessment 2010 Process Evaluation (Study 20)

Type of Study: Process

Objective of the Study: The main objective of the Multi-Tier Program Structure Assessment is to document progress towards statewide integration of the C&I Direct Install programs during 2010, and to gauge customer interest in different program design options such as varying incentive levels, zero interest financing, and on-bill financing options. The assessment is also designed to gather information related to program satisfaction and awareness. In particular, the evaluation sought to address the following research questions:

- What kind of program changes has each PA implemented? How is this process going? What are the challenges? How do customers and market actors view these changes?
- How is the integration of electric and gas progressing? What are the challenges? What is being done to overcome them?
- How has the workload of PA program staff and vendors changed as integration and standardization of the Small Business Direct Install program has moved forward?
- What is the level of program awareness and customer satisfaction with the program? What are the barriers to participation and what are the most important factors in participant decision making around participation?

Programs to which the Results of the Study Apply:

- C&I Small Retrofit (Electric and Gas)

Recommendations Derived from the Study:

1	Use the Direct Install program facility audit as a way to disseminate information about other PA C&I programs. In the process, identify for customers the equipment or systems that may need replacement in the future.

How the Study Came to the Recommended Conclusions: The recommendation presented above is based on results from quantitative telephone surveys with participating customers, as well as a review of program materials and in-depth interviews with PA program staff and vendors. In-depth interviews provided the evaluation team with a comprehensive understanding of the audit process while a review of program materials further contributed to knowledge of what the program currently provides onsite. The survey with 2009 and 2010 program participants allowed the team to assess the degree to which participating customers receive information about other PA programs.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: PAs began addressing the recommendation from this study in the second half of 2010, following an initial focus on integrating electric and gas measures during the first 8 months. An audit checklist was developed that program vendors use to note the existence and condition of energy consuming equipment outside the standard prescriptive measures offered. PAs and their vendors are using the information gathered to inform direct install program participants of other C&I programs that can be accessed.

Future evaluation work during 2011 and 2012 should allow examination of the effectiveness of this approach in motivating direct install program participants to undertake additional energy efficiency projects by channeling them to other C&I programs. This may be accomplished through a combination of additional process interviews and mining of data from PA program tracking database systems.

A copy of the complete study can be found in Appendix C, Study 20.

3. Final Report HBL Market Effects Study Project 1A New Construction Market Characterization (Study 21)

Type of Study: Market Assessment

Objective of the Study: The principal research objectives of the High Bay Lighting Market Effects Study are:

1. Estimate the energy savings associated with the changes to a high bay lighting market in Massachusetts.
2. Assess the attribution of these changes (i.e., market effects) to the PAs' energy efficiency programs.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric)
- C&I Large Retrofit (Electric)
- C&I Small Retrofit (Electric)

Recommendations Derived from the Study: The High Bay Lighting ("HBL") Market Effects Study recommendations are provided in the following table. For a more detailed discussion please refer to the full report.

1	Based on the modeled approach and the preponderance of evidence presented in the market effects study, KEMA recommends the electric PAs claim untracked spillover energy savings associated with Massachusetts HBL measures. KEMA recommends the Scenario 2 energy savings estimate of 12.4 GWh per year or 39 percent of 2010 program tracked gross savings. This value is consistent with the untracked spillover estimate of 34 percent of program tracked savings estimated for Wisconsin in the 2010 Wisconsin HBL study. Several of the electric PAs are currently claiming low levels of participant and or non-participant energy savings for HBL measures. Prior to claiming the untracked spillover savings recommended by this report, the PAs must remove participant and or non-participant spillover energy savings for HBL measures already being claimed to avoid double counting.

How the Study Came to the Recommended Conclusions: The Large C&I Electric Consultant ("LCIEC") team estimated untracked spillover, then assessed the attribution of these savings to the PA's energy efficiency programs based on a comparison of the level of adoption of energy efficient high bay lighting in Massachusetts to a comparison area lacking programs promoting energy efficient high bay lighting.

The primary analytic steps include:

1. Estimate the volume of high bay lighting installed in Massachusetts and the comparison area.
2. Estimate the market share of energy efficient high bay lighting installed in Massachusetts and the comparison area.
3. Assess attribution of untracked spillover to the PA's energy efficiency programs.

Primary data collected for this study includes:

- Surveys with:
  - End Users
  - Lighting Contractors
- In-depth Interviews with:
  - Program staff
  - Lighting Distributors
  - Lighting Manufacturers

Additionally, the study used PA program tracking data, engineering data from various engineering databases, and survey data from a prior study.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Section II.C.2 for each of the programs described above.

Formulas Necessary to Understand the Impact of the Study on the PA's Savings:
Following the recommendations of the study, the PAs have applied the 39 percent spillover factor resulting from this study to all measures associated with high bay lighting, instead of applying any spillover from any other net-to-gross study.

Each PA uses the results of the *2010 Commercial and Industrial Electric Programs Free-ridership and Spillover Study (TetraTech, Study 30)* for the spillover value for all non-high bay lighting savings in 2010. In order to determine the factor for all lighting measures, the following equation is used:

$$SO_{ALL} = \frac{SO_{HBL} \times kWh_{HBL} + SO_{OTH} \times kWh_{OTH}}{kWh_{ALL}}$$

Where:

- SO_{ALL} is the final spillover rate for all lighting measures.
- SO_{HBL} is the spillover rate of 39 percent resulting from this study for High Bay Lighting measures only.
- kWh_{HBL} is the gross annual kWh savings resulting from High Bay Lighting measure installations.
- SO_{OTH} is the spillover rate for all other Non-High Bay Lighting Measures and is specific to each PA.
- kWh_{OTH} is the gross annual kWh savings resulting from all other Non-High Bay Lighting measure installations.
- kWh_{ALL} is the total gross annual kWh savings for all Lighting measures.

Each PA, except Unitil, does this calculation for both the *C&I New Construction and Major Renovation* and the *C&I Large Retrofit* programs, as the spillover rates used for the Non-High Bay Lighting measures are specific to each administrator. The calculation is also done for *C&I Small Business* program for WMECo and the Cape Light Compact, as their programs included high bay lighting installations and these savings were analyzed as part of this study. None of Unitil's projects in 2010 included High Bay Lighting installations. This calculation is therefore unnecessary for Unitil.

The following table shows this calculation for each PA's programs:

PA	**NSTAR**		**National Grid**		**WMECO**			**Cape Light Compact**		
Program	*NC*	*Retrofit*	*NC*	*Retrofit*	*NC*	*Retrofit*	*Small Business*	*NC*	*Retrofit*	*Small Business*
kWh_{HBL}	765,663	4,933,376	3,645,109	19,438,428	534,105	55,859	1,654,904	0	59,015	76,616
kWh_{OTH}	13,451,544	52,632,615	2,723,676	45,575,106	7,423,917	776,427	6,822,148	154,161	386,354	3,398,029
kWh_{ALL}	14,217,207	57,565,991	6,368,785	65,013,534	7,958,022	832,286	8,477,052	154,161	445,369	3,474,645
SO_{HBL}	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%
SO_{OTH}	2.40%	16.50%	16.00%	2.50%	4.70%	0.00%	3.70%	0.00%	0.00%	6.40%
SO_{ALL} (Result)	**4.37%**	**18.43%**	**29.16%**	**13.41%**	**7.00%**	**2.62%**	**10.59%**	**0.00%**	**5.17%**	**7.12%**

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: The PAs have adopted the results of this study.

A copy of the complete study can be found in Appendix C, Study 21.

4. FINAL Commercial New Construction Customer Quantitative Profile Project 1A New Construction Market Characterization (Study 22)

Type of Study: Market Assessment

Objective of the Study: The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the Commercial New Construction Customer Quantitative Profile are:

1. Develop a comprehensive characterization of the large C&I new construction market in Massachusetts, in terms of building type, size, ownership, geographic location, chain or franchise status, and energy use.
2. Assess how the trends for large C&I projects have changed over the past 15 years.
3. Characterize the presence of the PAs new construction projects in the market in terms of the number of projects that participated in them and the portion of floor space and energy use they represent in key commercial market segments.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric and Gas)
- C&I Large Retrofit (Electric and Gas)

Recommendations Derived from the Study: None.

How the Study Came to the Recommended Conclusions: The LCIEC team acquired and analyzed the entire F. W. Dodge Players Database for non-residential construction projects for the State of Massachusetts for the years 1996 through 2009. The Dodge Players database contains retrospective information on C&I construction projects that, according to Dodge, have begun construction. A sample of new construction projects from the Dodge Database were matched with PA billing data and program tracking data to characterize the new construction market and assess program penetration.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: Not Applicable.

A copy of the complete study can be found in Appendix C, Study 22.

5. Supply Chain Profile Project 1A New Construction Market Characterization (Study 23)

Type of Study: Market Assessment

Objective of the Study: The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the New Construction Supply Chain Profile are:

- Characterize the design, engineering, and construction management firms involved with recent large commercial construction projects in Massachusetts.
- Characterize the design and specification practices with regard to energy efficiency.
- Assess changes in design and specification practices as a result of contact with the program.
- Assess awareness and participation in new construction programs offered by the PAs.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric and Gas)
- C&I Large Retrofit (Electric and Gas)

Recommendations Derived from the Study: The New Construction Supply Chain Profile recommendations are provided in the following table. For a more detailed discussion please refer to the full report.

Recommendation Summaries	
1	Consider alternative incentive approaches such as tiered incentives for higher levels of efficiency. Consider expanding financial or technical assistance offerings for life cycle cost analysis to demonstrate the longer term value of accepting higher first costs.
2	Improve the value of technical assistance offerings by being consistently engaged with project design teams. The impact of the utility intervention is not fully realized because information about incentives and alternative technologies choice is not delivered on time to design teams. Modeling firms need to quickly upgrade models and turnaround results to customers.
3	Assist architects and engineers in understanding appropriate high performance building envelope design strategies for the Massachusetts climate. We suggest a two pronged approach to advance high performance envelope design: 1) Convene a working group consisting of stakeholders to study the challenges associated with high performance building envelope design, and 2) based on input from the working group, commission a study of advanced building envelope designs beyond what is required by code and provide examples of appropriate, high performance designs for Massachusetts.
4	Continue to build upon educational seminars, similar to Advanced Building seminars, to provide education and programmatic support on integrated design and whole building performance.
5	Streamline the application process by reducing the amount of paperwork that is required for participation.
6	Establish contacts within the top 25 architects, design engineers and construction management firms.

How the Study Came to the Recommended Conclusions
The New Construction Supply Chain Profile included the follow research activities:

- Examination of the F. W. Dodge Players Database for non-residential construction projects in Massachusetts.
- In-depth Interviews with:
    - 31 architects,
    - 11 design engineers, and
    - 9 construction engineers.

Explain Whether or Not the PA Decided To Adopt Recommendations from the Study and Why: The PAs accept the results of the study and are considering all recommendations at this time. The recommendations resulting from this study are based on solely on interviews with market actors in the commercial new construction market and therefore do not necessarily provide an objective view of the programs.

A copy of the complete study can be found in Appendix C, Study 23.

6. Final Report Project 1B Chain & Franchise Market Characterization (Study 24)

Type of Study: Market Assessment

Objective of the Study: The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the Chain & Franchise ("C&F") Market Characterization are:

1. Characterize the C&F market in Massachusetts, including estimates of size and key segments (big box, retail, restaurant, etc).
2. Identify the key decision-maker at C&F customers and the major barriers to the adoption of energy efficiency measures.
3. Understand the decision-making process, in particular free-ridership, regarding energy efficiency at C&F businesses in Massachusetts and in comparable non-program states.
4. Assess the current level of program participation and methods to increase participation.
5. Identify the opportunities for increased energy efficiency through on-site inventories of building shell characteristics, end use technologies, and missed opportunities.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric and Gas)
- C&I Large Retrofit (Electric and Gas)

Recommendations Derived from the Study: There are no recommendations for program changes resulting from the study.

How the Study Came to the Recommended Conclusions: This project included the follow research activities:

- Literature Review of existing C&F studies.
- Re-analysis of interview data from past NSTAR C&I program impact evaluations in order to investigate potential differences in free-ridership and spillover rates of C&F and non-C&F participants.
- A Customer Quantitative Profile of the C&F Market. This analysis characterizes the size and composition of the population of Massachusetts' C&F customers.
- In-depth Interviews with:
    - PA National Account Managers
    - C&F Cape Light Compact managers.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: There are no recommendations for program changes resulting from the study.

A copy of the complete study can be found in Appendix C, Study 24.

7. Impact Evaluation of 2009 Custom HVAC Installations (Study 25)

Type of Study: Impact

Objective of the Study: The objective of this impact evaluation is to provide verification or re-estimation of electric energy and demand savings estimates for 29 Custom HVAC projects through site-specific inspection, monitoring, and analysis. The results of this study are the final realization rates for Custom HVAC energy efficiency measures.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric)
- C&I Large Retrofit (Electric)

Results of the Study and How the Study Determined those Results: The final Custom HVAC realization rates are calculated using statistical weightings of the results of the (29) studied Custom HVAC applications. This calculation is explained in detail in Section 3 of the "Impact Evaluation of 2009 Custom HVAC Installations" report.

The final Custom HVAC realization rates ("RRs") are calculated individually for National Grid and NSTAR, and at the statewide level. Site level RRs are determined through site inspection, data collection and engineering analysis. Analysis methods include spreadsheet and building simulation modeling.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Section II.C.2 for each of the programs listed above.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: The results of this study are used to update the realization rates for energy ("RRE"), summer on-peak demand ("RRSP"), and winter on-peak demand ("RRWP") savings for the "HVAC" end-use within Custom Measures.

The formulas necessary to understand the impacts are described in the TRM.

If the Results of the Study are Not Adopted, Fully Explain Why: All results have been adopted by the PAs.

A copy of the complete study can be found in Appendix C, Study 25.

8. Final Report Project 1C Combined Heat &Power Market Characterization (Study 26)

Type of Study: Market Assessment

Objective of the Study: The overarching objective of all LCIEC Market Characterization studies is: "To define the attributes of a specific market area in enough detail that the program planners and administrators can use the information for improving program implementation." The principal research objectives of the Combined Heat & Power ("CHP") Market Characterization are:

1. Characterize the CHP market including key players and market segments.
2. Understand the decision making processes used by potential CHP customers including reasons customers elect to install CHP, selection of specific types or configurations of CHP, and the factors most influencing decisions to purchase CHP systems.
3. Identify the current mix of CHP technologies including the CHP systems types deployed, installed and operating costs of the technologies, and identify anticipated changes in the CHP market or improvements in the technologies.
4. Identify barriers impacting entry for customers including the key factors that dissuade potential customers from evaluating CHP technologies or have led customers who evaluated CHP technologies to decide not to install it.
5. Estimate CHP opportunities by key market segments and provide PAs with a list of customers likely suitable for CHP.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric)
- C&I Large Retrofit (Electric)

Recommendations Derived from the Study: The CHP Market Characterization's six short-term recommendations are provided in the following table. For a more detailed discussion please refer to the full report.

1	**Determine realistically achievable targets.** Energy-saving goals of the Program are tied to the time it takes to sell, install and commission CHP systems. The PAs can help insure the Program achieves these goals by taking into account the project development timeframes and establishing a "pipeline" approach that associates the different market segments to the anticipated timeframes.
2	**Outreach to large sites.** The PAs should identify and reach out to high-value large sites using the Account Executive ("AE") teams from the different utilities.
3	**Focused outreach for under 300 kW.** For sites 60 – 300 kW, the PAs should work with partners to promote the incentive program. The PAs role with these customers is to build the credibility of CHP technology and act as the role of energy advisor by providing customers with an integrated solution of energy efficiency measures including CHP systems.

4	**Training Using Webinars.** The evaluation team understands that planning for webinar training sessions is currently underway via the PA Implementers' CHP Working Group. The evaluation team supports this endeavor and recommends training session in several areas.
5	**Program Stability-Coordination.** The program should consider increased coordination with other CHP initiatives (i.e. Alternative Energy Portfolio Standards requirements) to leverage overlapping requirements for cost-effective execution of both programs. Specific areas of consideration include the development of consistent metering approaches.
6	**Partners to collaborate.** The program should consider collaborations with existing groups such as trade groups, vendor associations, and customer groups with the goal of leveraging existing mass marketing efforts.

How the Study Came to the Recommended Conclusions: The CHP Market Characterization included the follow research activities:

- Literature Review of existing major CHP support programs in the U.S.
- In-depth Interviews with:
    - CHP Program staff,
    - 10 CHP vendors,
    - 10 current users of CHP, and
    - 10 potential users of CHP.
- Quantitative Market Assessment based on gas billing data. This task identified high-value CHP opportunities, in terms of number of customers, business types, and equipment size category in the service territories served by the PAs.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: The PAs have accepted the results of the study and are considering all recommendations for adoption.

A copy of the complete study can be found in Appendix C, Study 26.

9. Project 6B Comprehensive Design Approach Process Evaluation (Study 27)

Type of Study: Process

Objective of the Study: This process evaluation had two research objectives. The first was to examine whether the Comprehensive Design Approach ("CDA") tracks that are being delivered by National Grid, Western Massachusetts Electric Company ("WMECo") and NSTAR are meeting their primary goals. These primary goals are to: 1) maximize energy and demand reduction in new construction projects; and 2) influence energy efficiency best practices in the commercial design sector.

CDA is a track within the custom C&I New Construction and Major Renovation programs offered by these PAs. It is an integrated approach that is ideally initiated at the beginning of the building design stage in order to ensure that cost-effective energy efficiency opportunities are incorporated such that energy use reduction of twenty percent or more is achieved relative to the requirements of state building code. The CDA track also offers financial incentives that are usually larger than those offered by prescriptive or the traditional custom new construction programs.

The second research objective was to conduct a comparative study of the Advanced Buildings ("AB") track. This study compares the AB tracks delivered by the Massachusetts PAs to those delivered in Maine and Vermont. The AB track is similar to CDA but it targets smaller buildings within the commercial new construction market and aims to simplify and expedite the participation process by using standardized incentive and savings assumptions. In order for customers to receive monetary incentives through the AB track, they must incorporate a series of thirteen Core Performance requirements into their building designs.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric and Gas)

Recommendations Derived from the Study: The following are two different sets of recommendations, one for the CDA track and one for the AB track.

Recommendation Summaries for CDA Track	
1	**Reduce the costs associated with the energy modeling study required for the CDA or alter the payment arrangement so that it is less burdensome on the customer upfront.** Although technical study costs are split between the PA and the customer, it is still an upfront cost that is incurred by the customer that would not necessarily be faced if a non-comprehensive program track were used. A possible solution would be for the PA to initially absorb the cost of the study, and then deduct the amount from the final incentive offer. This would relieve the customer of the burden of facing an upfront cost to participating in CDA.
2	**Use a variety of marketing methods to inform customers of the CDA track, including printed materials and communication via AEs. In the process, make sure to inform customers of the relative benefits of CDA over competing approaches that may be simpler to use, but result in smaller long-term energy savings and offer lower incentives.** These marketing methods are needed to address key barriers to using the CDA track include a lack of customer awareness about the CDA track and competition with alternative energy efficiency programs that may be simpler or faster to use.
3	**Since AEs are usually the first to hear about new construction projects, the Sponsors should ensure that they are well informed about the CDA track so that they can explain the program requirements and benefits to customers when they are first in contact about a potentially qualifying project.** AEs are in a unique position to guide customers with appropriate projects towards the use of the CDA track since they interact

	most directly with potential participants in the C&I sector.
4	**Incorporate the tracking of project leads into a database so that program staff and AEs can learn about potentially qualifying CDA track projects in time for this approach to be used.** AEs do look to new construction databases such as Reed Connect and Dodge, but a centralized repository of information does not exist. This type of database would assist AEs in the identification and monitoring of potential CDA participants and would potentially increase participation in this track.
5	**By focusing on educating potential design team members about the CDA through workshops and "lunch and learn" events, in addition to informing customers via AEs, PAs are more likely to have their customers learn of CDA track benefits.** According to the new construction PA program managers, customers usually hear about the CDA from AEs. Doing more outreach to the design community could increase the pool of CDA projects.
6	**The PAs should increase their distribution of marketing materials to its customers and potential design team members to more effectively market the CDA track.** It would be worthwhile to invest in the development of CDA-specific brochures to mail out to potential participants, architects, and engineers so they are aware of the track prior to developing building plans.
7	**Create a database, or annual report, of past program participants to document all information about their CDA project.** This will allow AEs to actively follow up with these participants on a regular basis to make sure that they do not miss an opportunity to use the CDA track for future projects. If a database is created, it can also be used to track inquiries made by customers about new construction program approaches so that these customers can be actively marketed to as well.
8	**Divide the rebate payment up into milestone payments over the course of the project.** This recommendation was based on feedback from participants who said it would be beneficial to receive more of the incentive payments upfront, as they could be used to help finance construction costs and would be especially useful given the current state of the economy.
9	**Rather than assuming the CDA will provide the largest incentives to customers, the PAs should evaluate the total incentives customers would be eligible to receive under each of the approaches**. During interviews with CDA non-participants, the evaluation team did find two cases where incentives were actually larger under the alternative program tracks (e.g., AB track and a combination of the prescriptive and custom tracks) than they were under CDA.
10	**Target CDA marketing towards the market segments that have historically used and benefited from the CDA as a way to increase participation in this track.** Certain market sectors -- such as schools, universities, hospitals, supermarkets, and biotech/pharmaceutical companies -- participate in the CDA track more than others. Brochures describing projects specific to these sectors could be created and distributed to potential participants as a way to show how customers in the same lines of business benefited from addressing energy efficiency in a comprehensive manner.

11	**Designate a project champion to ensure clear communications among the various projects involved in a CDA project.** This would be especially useful during the construction phases to minimize the chance that contractors would make an unwarranted equipment substitution.
12	**Streamline the processes related to the implementation and delivery of the CDA track.** The CDA processes were acknowledged to have improved over time, yet there were multiple observations indicating that they still need to be further streamlined. A key complaint was the time required to get the PA's review and approval for a design plan and application. Some projects did not participate because necessary approvals could not be obtained in time to meet the project schedule.
13	**PAs should offer more diverse applications of systems and technology opportunities through the CDA track. Fuel switching and the inclusion of renewable fuels were recommended applications.** This provides customers with a variety of implementation possibilities and ensures incentives are not limited to a certain set of technologies**.**
14	**Improve CDA tracking systems:** The process evaluation had a number of recommendations for improving the CDA data tracking systems including storing electronic copies of project documentation, making CDA reporting more specific, allowing more accessible tracking of measure-level information, expanding the scope of data tracking, addressing the need for data-entry support, and incorporating the tracking of project leads.

Recommendation Summaries for AB Track	
1	**Foster personal relationships with design teams and customers:** An effective implementation plan leverages the strong awareness among the design community to expand awareness at the customer level. A vital component of this strategy is an established rapport between the design community and specific individuals at the program office. The evaluation team recommends the intimate approach used by Efficiency Maine in which they assign 1-2 persons to a given project. This allows the program staff to develop personal relationships with program participants and encourages more proactive communications.
2	**Take advantage of green marketing opportunities:** An effective implementation plan takes advantage of the favorable environment of "green building." Efficiency Vermont, for example, supports the construction of Advanced Buildings with press releases, letters of recognition and NBI certification plaques. These elements of green advertising are particularly attractive to institutional customers, such as universities, who place significant value upon their public image. In Massachusetts, however, none of these green marketing strategies were observed among the implementation activities.
3	**Emphasize importance of long-term savings:** While there is no remedy for the downturn in new construction, it is possible to mitigate the budgetary concerns of customers. A successful program design may benefit from shifting the emphasis from incentives to long-term savings.

4	**Maintain interest with follow-up communications:** It is important for program staff to take a proactive approach in maintaining customer and design team interest. Program staff can't afford to wait for the owner or design firm to call when the critical steps are being made. Staff has to stay on top of the project and do its own duty to ensure that the owners and design team are staying on track.
5	**Improve lead tracking:** A cohesive system of documenting and monitoring the status of program leads is important to the success of program implementation. For example, Efficiency Maine employs Efficiency Reporting & Tracking, an online database, to track project leads, contact and status descriptors. Among the PAs program staff did not use such a method of tracking prospective customers. In the case of National Grid and NSTAR, information such as customers contacted, outreach efforts, and lead status are not linked to their respective tracking system, InDemand or eTrack. According to program managers, the progress and status of project leads is documented in a spreadsheet, which is typically not shared among various levels of staff.
6	**Minimize customer burden:** One of the greatest deterrents to program participation has been apprehension regarding the application process. Therefore an effective implementation strategy should make it well known to customers and design firms that staff will be available to assist in filling out application forms and understanding program requirements. The Efficiency Maine staff said they made ease-of-use a selling point for potential customers.
7	**Take advantage of American Institute of Architects ("AIA") continuing education requirements:** An excellent method of engaging the design community is to take advantage of the AIA continuing education requirements. In order to attract design firms, some implementers offer Advanced Buildings seminars paired with continuing education courses valid for credit towards the continuing education requirement. Under the current MassSAVE platform, attendees may earn four AIA Learning Units but are required to pay $199 per session. PAs should consider waiving this fee in order to increase participation among harder-to-reach firms.
8	**Anticipate advancements in code and standard practice:** The New Buildings Institute ("NBI") – which develops rules for the AB track -- has not been diligent in maintaining AB requirements that exceed building code to a satisfactory degree. The PAs have been active in pushing NBI to keep their product ahead of the model codes. The PA should continue to push NBI to maintain program requirements well ahead of recent code developments and standard building practices.
9	**Present the AB track as a learning opportunity for design firms:** One interviewee suggested that the architects and engineers who work on AB projects are not necessarily of the same caliber as those who work on CDA projects. The program can advertise the expertise brought by experienced program staff as a means of attracting design teams to working with the program.
10	**Discuss ideas with design team before presenting them to the customer:** The actions of program staff have shown that it is best to work out any suggestions or changes to the design plan prior to engaging the customer in significant decisions

	regarding energy efficiency measures. Such consideration is useful in maintaining the support and cooperation of the involved design firms.
11	**Maintain "soft cap" on building size**: Program staff has been receptive towards accommodating a wide range of buildings types, regardless of whether or not the building exceeds stipulated size guidelines. The AB track is offered as an option even for those building greater than 100,000 square feet so that customers are never reluctantly pushed towards the CDA track as the result of size requirements. It is the responsibility of NBI to issue some guiding principles regarding how such offers or exceptions should be framed.
12	**Investigate "box" retail stores as a potential customer segment:** It is recommended that NBI examine the designs of various large retailers with respect to code requirements to identify any buildings that are performing below their potential efficiency. If certain big box stores are not using an efficient building design, program staff should investigate the contributing factors and explore opportunities for program participation. Program implementers can exploit these inefficient building designs and possibly tap into a new customer segment.
13	**Consider the benefits of a common platform:** Under the MassSAVE initiative, the PAs have already taken the first steps in creating such a platform. It is unlikely, however, that various implementers will come to a consensus because there are obvious difficulties in making uniform the AB platform. While it is assumed that the MassSAVE platform is working with the PAs to attain uniformity in implementation, design and marketing, the evaluation team feels that this objective is worth restating in the specific context of program branding.

How the Study came to the Recommended Conclusions: Both the CDA and AB process evaluations relied primarily on in-depth interviews for their program findings. These evaluations completed 58 in-depth interviews with:

- Participating and non-participating customers;
- Participating design teams;
- PA C&I new construction program managers and staff;
- PA AEs;
- PA technical staff;
- Technical assistance consultants; and
- AB program managers and staff in Massachusetts, Maine, and Vermont and other AB program actors.

The evaluations also reviewed 24 new construction projects for a case study analysis. Finally the evaluators also reviewed program tracking databases, program marketing materials, and other program documents.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: All recommendations are being considered for adoption at this time. The PAs have not formally adopted or rejected any recommendations that require changes program design and operations.

A copy of the complete study can be found in Appendix C, Study 27.

10. Impact Evaluation of 2008 and 2009 Custom CDA Installations (Study 28)

Type of Study: Impact

Objective of the Study: The objective of this impact evaluation is to provide verification or re-estimation of electric energy and demand savings estimates for five Custom CDA projects through site-specific inspection, monitoring, and analysis. The results of this study are the final realization rates for Custom Comprehensive energy efficiency measures.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric)
- C&I Large Retrofit (Electric)

Results of the Study and How the Study Determined those Results: The final realization rates are calculated using statistical weightings of the results of the five studied Custom CDA applications. This calculation is explained in detail in Section 3 of the "Impact Evaluation of 2008 and 2009 Custom CDA Installations" report.

Site level RRs are determined through site inspection, data collection and engineering analysis. Analysis methods included building simulation modeling.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Section II.C.2 for each of the programs listed above

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: The results of this study are used to update the realization rates for energy ("RRE"), summer on-peak demand ("RRSP"), and winter on-peak demand ("RRWP") savings for the "Comprehensive" end-use within Custom Measures.

The formulas necessary to understand the impacts are described in the TRM.

If the Results of the Study are Not Adopted, Fully Explain Why: All results have been adopted by the PAs.

A copy of the complete study can be found in Appendix C, Study 28.

11. Project 7 General Process Evaluation Final Report (Study 29)

Type of Study: Process

Objective of the Study: The objective of this process evaluation was to look at ways to improve the design and delivery of Massachusetts C&I energy efficiency programs that would be applicable to multiple programs. Issues that the PAs and the EEAC were particularly interested in included how to increase program participation levels, how to obtain deeper energy savings from energy efficiency projects, how to improve the integration of electric and gas energy efficiency programs, and how to increase the general uniformity of program delivery across the state.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric and Gas)
- C&I Large Retrofit (Electric and Gas)

Recommendations Derived from the Study:

1	**Increase AE and technical advisor staffing levels:** Interviewees with nearly all the PAs cited the need for additional staff to help achieve the expanded program savings goals. Adding AEs will allow more face-to-face meetings with customers, which should yield more projects. Adding technical staff will speed up the project technical analysis process (which was too slow according to some interviewees) and will help make up for the lack of technical knowledge among some AEs.
2	**Increase program incentive levels and limits:** Many interviewees recommended increasing incentives in order to recruit more projects and achieve deeper savings. Raising the limit on the cumulative incentive allowed per project would help C&I customers overcome barriers to participation related to lack of capital. Raising the maximum $/unit (kWh or therms) will encourage customers to install longer-payback measures which are critical to achieving the expanded program savings goals.
3	**Offer turnkey financing:** Nearly all program staff and AEs cited the lack of capital as the primary barrier preventing customers from moving forward with projects. A turnkey financing program to provide financing for eligible efficiency projects would help C&I customers overcome the important lack-of-capital barrier. In 2011 the PAs are preparing to launch several prescriptive loan products for C&I customers that would buy down the interest rate to 0%.
4	**Improve the design of marketing materials**: The AEs recommended that program marketing materials be easier to understand and make greater use of case studies and testimonials.
5	**Organize AEs by industry sector:** At least for the larger PAs, it may be more productive to organize all AEs by industry sector (e.g., vs. by geography). If AEs are only responsible for understanding a few select industries, this should improve their level of technical and business knowledge for those industries.
6	**Tie AE performance to program energy savings:** PAs should consider tying AE bonuses to the level of savings achieved by the projects completed by their customers. Although some PAs currently do consider energy efficiency programs in AE performance assessments, it is not tied to a specific energy savings goal. Only one third

	of the AEs reported that the current performance structure clearly motivates them.
7	**Systematize the process for making requests for technical assistance:** A common complaint among AEs was that technical staff members did not reply promptly to their requests for technical assistance. AEs suggested establishing a central email inbox that technical staff can access and respond to questions. It would also be useful to develop clear guidelines for responding to most technical requests within a certain timeframe so that AEs can notify their customers when to expect a response.
8	**Help large C&I customers establish long-term commitments to energy efficiency:** At least one PA is developing multi-year non-binding commitments with the corporate management of their large C&I customers to establish specific energy-saving goals. An efficiency plan should lead to longer-term consistent budgeting for energy projects and draw the attention of higher-level management.

How the Study Came to the Recommended Conclusions: These conclusions and recommendations are primarily based on 28 in-depth interviews with C&I program staff, AEs, and utility technical staff. These interviews were conducted in September and October 2010 and included representatives from seven different PAs.

Explain Why Or Why Not The Program Administrator Decided To Adopt Recommendations From The Study: The PAs have reviewed the recommendations resulting from this study. As stated in recommendation three, the PAs are now offering financing mechanisms to help address our customer's capital constraints. All other recommendations are being considered for adoption by the PAs at this time.

A copy of the complete study can be found in Appendix C, Study 29.

12. 2010 Commercial and Industrial Electric Programs Free-Ridership and Spillover Study (Study 30)

Type of Study: Impact

Objective of the Study: The primary objective of the 2010 program year free-ridership and spillover study was to quantifying the net impacts of the commercial and industrial electric energy efficiency programs by estimating the extent of program free-ridership, early participant "like" and "unlike" spillover, and non-participant "like" spillover.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric)
- C&I Large Retrofit (Electric)
- C&I Small Retrofit (Electric)

Results of the Study and How the Study Determined those Results: The study produced free-ridership, participant spillover and non-participant spillover rates for each PA by end use. The methodology used for this year's study follows the standardized methodology developed in 2010 and 2011 for the Massachusetts PAs for use in situations where end-users are able to report on program impacts via self-report methods. This study used telephone surveys with samples of 2010 program participants in each of the PAs' C&I electric programs and with design professionals and equipment vendors involved in these 2010 installations.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Section II.C.2 for each of the programs listed above.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: The results of this study are used to calculate the net savings associated with programs listed above. The formulas necessary to understand the impacts are described in the TRM.

If the Results of the Study are Not Adopted, Fully Explain Why: Not Applicable.

A copy of the complete study can be found in Appendix C, Study 30.

13. C&I Lighting Measure Life and Persistence Project (Study 31)

Type of Study: Impact

Objective of the Study: To determine measure lives of five categories of lighting measures installed over a ten year period from 199 to 2009 using statistical analysis techniques.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation
- C&I Large Retrofit
- C&I Small Retrofit

Results of the Study and How the Study Determined those Results: This study determined the measure life of each of five categories of C&I lighting by estimating their mean retention times, defined as the time at which half the units of the measure installed during a program year are not retained. Data for the survival analysis was collected during on-site visits to 224 projects in New England and New York. Estimates from the survival analysis were also compared with research of secondary sources. Measure lives for each category were also estimated for two other strata of interest, self-reported operating hours and building type. All results are presented with a two-tailed error range at the 80% confidence interval.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Section II.C.2 for each of the programs listed above.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: The results of this study were compared with existing values used by PAs. Existing values come from a 2005 Massachusetts study, updated in 2007 for the State Program Working Group, a group of New England electric energy efficiency PAs and state regulators. Measure lives developed from these two studies were based on secondary research of manufacturer literature and surveys of energy efficiency programs in other states.

If the Results of the Study are Not Adopted, Fully Explain Why: The Massachusetts PAs have not yet determined how to apply the results of this study going forward. Application of the results requires consensus on the types of measures in each category that will be affected, differences between new construction versus retrofit installations and necessary changes to tracking system databases.

A copy of the complete study can be found in Appendix C, Study 31.

14. C&I Lighting Loadshape (Study 32)

Type of Study: Impact

Objective of the Study: A regional study conducted by the Northeast Energy Efficiency Partnership's EM&V Forum building upon a 2007 study done for the New England State Program Working Group to develop Commercial and Industrial lighting loadshapes and coincidence factors.

- C&I New Construction (Electric)
- C&I Large Retrofit (Electric)
- C&I Small Retrofit (Electric)

Results of the Study and How the Study Determined those Results: Through the use of data from lighting logger studies conducted by various PAs in New England and New York since 2000 that covered 775 projects and utilized 3,780 loggers, Summer and Winter Coincidence factors for Commercial and Industrial lighting were derived.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Section II.C.2 for each of the programs listed above.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: The results of this study are used to update the coincidence factors for summer on-peak demand ("CFSP"), and winter on-peak demand ("CFWP") savings for non-controlled lighting measures for the Large C&I New Construction and Retrofit programs, and the summer on-peak demand ("CFSP") for the C&I Small Retrofit programs. The Coincidence factors incorporate HVAC interactive effects.

The results of this study were presented for three weather zones; NE-Mass Weather (representing NEMA and SEMA Load zones), NE-North Weather (representing New Hampshire and Maine),

and NE-South Coastal (representing Rhode Island and Connecticut). The Massachusetts PAs used the results from the NE-Mass Weather zone and NE-North Weather zone (this zone was used as the best representation of western Massachusetts weather). The results across these two weather zones were exactly the same to two significant digits.

The formulas necessary to understand the impacts are described in the TRM.

If the Results of the Study are Not Adopted, Fully Explain Why: A separate study conducted in 2010 by the Non-Residential Small Retrofit research area determined winter on-peak ("CFWP") coincidence factors for the C&I Small Retrofit program. Results from that study, where metering was conducted during the on-peak winter months, have been adopted instead of the values produced by this study.

A copy of the complete study can be found in Appendix C, Study 32.

15. C&I Unitary HVAC Loadshape Project Final Report (Study 33)

Type of Study: Impact

Objective of the Study: The primary goal of this project was to develop weather normalized 8,760 (representing every hour of the year) cooling end-use load shapes representative of hourly savings for the target population of efficient unitary HVAC equipment promoted by efficiency programs in New England, New York and mid-Atlantic regions.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric)

Results of the Study and How the Study Determined those Results: The results of the study are hourly weather normalized load shape profiles for different weather regions in the northeast. These profiles are then used to calculate the Equivalent Full Load Hours for the equipment and the coincidence factors for the ISO New England summer peak periods.

Results were determined through four to five months of direct on-site energy metering at 511 individual units from May through October 2010. Metering data and weather for the period was then processed to develop an hourly annual load shape normalized to a typical meteorological year.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Section II.C.2 for each of the programs listed above.

Formulas Necessary to Understand the Impact of the Study on the Program Administrator's Programs: The formulas necessary to understand the impacts are described in the TRM. Gross energy and demand savings use the following four formulas.

For units with cooling capacities less than 65 kBtu/h (for National Grid):

$$\Delta kWh = (kBtu/h)\left(\frac{1}{SEER_{BASE}} - \frac{1}{SEER_{EE}}\right)(EFLH_{Cool})$$

$$\Delta kW = (kBtu/h)\left(\frac{1}{SEER_{BASE}} - \frac{1}{SEER_{EE}}\right)$$

For units with cooling capacities equal to or greater than 65 kBtu/h (all PA's):

$$\Delta kWh = (kBtu/h)\left(\frac{1}{EER_{BASE}} - \frac{1}{EER_{EE}}\right)(EFLH_{Cool})$$

$$\Delta kW = (kBtu/h)\left(\frac{1}{EER_{BASE}} - \frac{1}{EER_{EE}}\right)$$

If the Results of the Study are Not Adopted, Fully Explain Why: All results of the study have been adopted by the PAs as follows:

Cape Light Compact - This study represents the best available information regarding installations in the Cape Light Compact's territory for this end use. The Cape Light Compact has used the results of the study to create realization rates on energy and demand for the measures studied. These realization rates will apply to results for the 2010 and 2011 program years. For program years starting in 2012, the equivalent full load hours and coincidence factors determined through this study will be used to calculate gross savings for installations in the Cape Light Compact's service territory.

To calculate gross energy savings in 2010, Cape Light Compact used an equivalent full load hours of 777 for all installations. The results of this study are equivalent full load hour estimations encompassing all installations in the three load zones within Massachusetts. Cape Light Compact exists entirely within the SEMA load zone and therefore used only the results from this zone to calculate all realization rates. This calculation is shown in the following table.

Load Zone	Cape Light Compact Load Zone Weight	NEEP Result EFLH	NEEP Result ISO-NE On-Peak Summer Coincidence Factor (1-5PM, WDNH, Jun-Aug)
SEMA	1.0000	1,172	0.448
NEMA	0.0000	1,172	0.448
WCMA	0.0000	719	0.332
Cape Light Compact Results		**1,172**	**0.448**
Gross Estimate		777	0.820
Realization Rate		**150.08%**	**54.63%**

Net Savings for each installation, before Freeridership and Spillover adjustment, is therefore calculated as.

$$\Delta kWh = (kBtu/h)(\Delta kW)(777)(150.08\%)$$

$$\Delta kW\ Summer = (kBtu/h)(\Delta kW)(0.820)(54.63\%)$$

See the TRM for further discussion of this measure and details on the equations used.

National Grid - This study represents the best available information regarding installations in National Grid's territory for this end use. National Grid has used the results of the study to create realization rates on energy and demand for the measures studied. These realization rates will apply to results for the 2010 and 2011 program years. For program years starting in 2012, the equivalent full load hours and coincidence factors determined through this study will be used to calculate gross savings for installations in National Grid's service territory.

To calculate gross energy savings in 2010, National Grid used an equivalent full load hours of 777 for all installations. The results of this study are equivalent full load hour estimations encompassing all installations in the three load zones within Massachusetts. National Grid has chosen to use its load zone peak demands to consolidate the three zones into one National Grid specific value. This calculation was also done for the summer coincidence factor. This calculation is shown in the following table.

Load Zone	National Grid Load Zone Weight	NEEP Result EFLH	NEEP Result ISO-NE On-Peak Summer Coincidence Factor (1-5PM, WDNH, Jun-Aug)
SEMA	0.3234	1,172	0.448
NEMA	0.2378	1,172	0.448
WCMA	0.4388	719	0.332
National Grid Results		**973**	**0.397**
Gross Estimate		777	0.441
Realization Rate		**125.23%**	**89.94%**

Net Savings for each installation, before Freeridership and Spillover adjustment, is therefore calculated as.

$$\Delta kWh = (kBtu/h)(\Delta kW)(777)(125.23\%)$$

$$\Delta kW\ Summer = (kBtu/h)(\Delta kW)(0.441)(89.\%)$$

See the TRM for further discussion of this measure and details on the equations used.

NSTAR - This study represents the best available information regarding installations in NSTAR's territory for this end use. NSTAR has used the results of the study to create realization rates on energy and demand for the measures studied. These realization rates will be applied to results for the 2010 program year. For program year 2011 and beyond, the equivalent full load hours and coincidence factors determined through this study will be used to calculate gross savings for installations in NSTAR's service territory.

To calculate gross energy savings in 2010, NSTAR used several equivalent full load hour values, depending on the type of installation. The results of this study are equivalent full load hour estimations encompassing all installations in the three load zones within Massachusetts. NSTAR's service territory is contained within the NEMA and SEMA load zones. The realization rate developed for 2010, as indicated in the table below, is based on an analysis of savings for all 2010 unitary HVAC equipment measures in the company's tracking system.

Load Zone	NSTAR 2010 Gross kWh Savings	NSTAR Load Zone Weight	NEEP Result EFLH	NEEP Result ISO-NE On-Peak Summer Coincidence Factor (1-5PM, WDNH, Jun-Aug)
SEMA		1	1,172	0.448
NEMA		1	1,172	0.448
WCMA		0	719	0.332
NSTAR Results			**1172**	**0.448**
Gross Savings	1,885,314			
Incremental Savings Based On New EFLH	340,223			
Realization Rate	**118%**			**54.6%**

Unitil - This study represents the best available information regarding installations in Unitil's territory for this end use. Unitil has used the results of the study to create realization rates on energy and demand for the measures studied. These realization rates will apply to results for the 2010 and 2011 program years. For program years starting in 2012, the equivalent full load hours and coincidence factors determined through this study will be used to calculate gross savings for installations in Unitil's service territory.

To calculate gross energy savings in 2010, Unitil used an equivalent full load hours of 777 for all installations. The results of the NEEP study are equivalent full load hour estimations encompassing all installations in the three load zones within Massachusetts. Unitil exists entirely within the WCMA load zone and therefore used only the results from this zone to calculate all realization rates. This calculation is shown in the following table.

Load Zone	Unitil Load Zone Weight	NEEP Result EFLH	NEEP Result ISO-NE On-Peak Summer Coincidence Factor (1-5PM, WDNH, Jun-Aug)
SEMA	0.0000	1,172	0.448
NEMA	0.0000	1,172	0.448
WCMA	1.0000	719	0.332
Unitil Results		**719**	**0.332**
Gross Estimate		777	0.820
Realization Rate		**92.53%**	**40.49%**

Net Savings for each installation, before Freeridership and Spillover adjustment, is therefore calculated as.

$$\Delta kWh = (kBtu/h)(\Delta kW)(xxxx)(yyyy\%)$$

$$\Delta kW\ Summer = (kBtu/h)(\Delta kW)(0.82)(54.6.\%)$$

See the TRM for further discussion of this measure and details on the equations used.

WMECO - The best available information for WMECo is the realization rates from the WMECo-specific Large C&I evaluation study completed in May 2011. That study provides one realization rate for all WMECo HVAC in its Large C&I programs.

Since WMECo uses site-specific operating hours in most cases, and default operating hours in just a few, the retrospective use of the NEEP Unitary HVAC study is problematic, since its use would require a substantial number of site-specific calculations instead of a blanket calculation. In addition, WMECo lacks a separate category for unitary HVAC; we lump it in with all HVAC. Since unitary HVAC is only a few percent of all HVAC, reverse calculating a (residual) realization rate for all other WMECo HVAC, from the WMECo-specific study, would not be worth the cost of doing so.

However, for program years starting in 2012, the equivalent full load hours and coincidence factors determined through the NEEP study will be used as defaults to calculate gross savings for installations in the WMECo's service territory.

A copy of the complete study can be found in Appendix C, Study 33.

16. Cross Cutting C&I Free-Ridership and Spillover Methodology Study Final Report (Study 34)

Type of Study: Process

Objective of the Study: The focus of this study was on the general methods for estimating what would have happened absent C&I programs in Massachusetts. The net program effect is the observed effect, less the estimate of what would have happened absent the program. The objectives of this study were to develop a standardized methodology for situations where C&I end-users are able to report on program impacts via self-report methods, and to provide a decision framework and guidelines for when the standardized self-report methodology is appropriate and when other methods need to be used (e.g., upstream programs).

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Electric & Gas)
- C&I Large Retrofit (Electric)
- C&I Small Retrofit (Electric)
- C&I Retrofit (Gas)
- C&I Direct Install (Gas)

Recommendations derived from the study: There were no recommendations derived from this study, rather, the study suggested methodologies for PAs to consider in future NTG evaluations.

Explain Why Or Why Not The Program Administrator Decided To Adopt Recommendations From The Study: In general, the Cape Light Compact adopts results from an evaluation study which are supported by the data generated from the study. The Cape Light Compact will incorporate the findings of this study into the planning process for future evaluations of Net-to-Gross ratios for Commercial & Industrial programs.

A copy of the complete study can be found in Appendix C, Study 34.

17. Prescriptive Condensing Boiler Impact Evaluation Project 5 Prescriptive Gas (Study 35)

Type of Study: Impact

Objective of the Study: The objective of this impact evaluation was to develop annual gas savings impacts for all five size categories of prescriptive condensing boilers installed through the C&I gas programs.

Programs to which the Results of the Study Apply:

- C&I New Construction and Major Renovation (Gas)

- C&I Large Retrofit (Gas)

Results of the Study and How the Study Determined those Results: The study produced impact estimates for condensing boilers in all size categories. The results were also presented as realization rates to apply to prescribed savings provided in the 2011 Program Year TRM. The results were developed using telephone and on-site sample interview results to update estimates of site-level savings. The updated results were combined in a ratio estimator framework to produce estimates of realization rates and impacts.

How the Results of the Study Impact each Identified Program's Savings: Please refer to the tables in Section II.C.2 of the Gas Energy Efficiency Annual Reports for each of the programs listed above.

Formulas Necessary to Understand the Impact of the Study on the PA's Programs: The report provides realization rates and updated unit level savings estimates for:

- Condensing boiler <= 300 mbh
- Condensing boiler 301-499 mbh
- Condensing boiler 500-999 mbh
- Condensing boiler 1000-1700 mbh
- Condensing boiler 1701+ mbh

The formulas necessary to understand the impacts are described in the TRM.

If the Results of the Study are Not Adopted, Fully Explain Why: Not applicable to the Compact as the results of this study affect gas PAs only.

A copy of the complete study can be found in Appendix C, Study 35.

E. Special and Cross Sector Studies

1. Industry Practices and Policies on Energy Efficiency Program Rebate/Incentives (Study 36)

Type of Study: Process

Objective of the Study: Tetra Tech and the Energy Center of Wisconsin ("ECW") ("the research team") conducted a high-level scoping study of statewide energy efficiency program incentive and rebate levels to help inform the policy debate for statewide programs in Massachusetts and to support fourth quarter 2010 programmatic planning.

Programs to which the Results of the Study Apply:

- ENERGY STAR® Lighting (Electric)
- Residential Cooling and Heating Program (Electric)

- Residential Heating and Water Heating (Gas)
- Residential Weatherization (Gas)
- C&I Large Retrofit (Electric)
- C&I Small Retrofit (Electric)
- C&I Retrofit (Gas)
- C&I Direct Install (Gas)

Recommendations derived from the study: The study presented key findings without specific recommendations. The key findings indicated that residential incentives and rebates in Massachusetts were not consistently higher or lower than those in the other states programs. Those incentives that were not in the mid-range when compared to other industry programs included:

- Residential gas furnace incentives in Massachusetts are among the higher incentives offered and are currently under review. Massachusetts also ranked the highest for hot water boiler rebates.
- Massachusetts weatherization incentives fall in the upper half of offerings, but these are complex programs and difficult to compare.
- Massachusetts commercial rebates examined for lighting were on the low end of lighting rebates offered in other states.
- The Massachusetts small business incentive at 70 percent of installed cost of existing building projects is higher than two other state programs and higher than the cap on custom incentives for large commercial projects.
- Massachusetts rebates appear to be at the high end of offerings in other states for hot-air furnaces.

Explain Why Or Why Not The Program Administrator Decided To Adopt Recommendations From The Study: Not Applicable

A copy of the complete study can be found in Appendix C, Study 36.

2. Community Based Partnership Interim Process Evaluation (Study 37)

Type of Study: Process

Objective of the Study: The overall objectives of the evaluation are to assess the effectiveness of each community-based partnership that falls within the scope of the evaluation and determine their potential for replication and/or full-scale implementation.

As the evaluation of community-based partnerships is still ongoing, the *Interim Process Evaluation* provides an overview of each effort's structure and performance against the goals and presents findings from the research activities already conducted with a goal of providing early feedback and identifying areas for program improvement early on. The report also presents

comparative analysis of community-based efforts under evaluation with the goal of developing best practices for design and implementation of such efforts.

Programs to which the Results of the Study Apply:

- Renew Boston (Electric and Gas)
- Western Mass Saves Challenge (Electric)
- New Bedford Community Mobilization Initiative (Electric and Gas)

Recommendations Derived from the Study:

Overarching Findings
Articulate program design to reflect the target market – when planning and designing a community outreach effort, it is important to lay out what each partnership is intending to accomplish, why such an effort is needed for a specific population, and how they fit into existing programs. This will help ensure that the target audience and barriers are clearly documented, and the most effective interventions are selected.
Draw on the strengths of local and existing resources and ensure that the community group efforts align with partnership goals – while there is no right or wrong model for structuring a community engagement network, it is important to consider the existing infrastructure and the amount of resources required to engage the network when planning and designing a community-based effort. A full analysis of the financial and local resources may also enhance these efforts. In addition, program leaders or organizers should focus local organizations on their strengths and, where relevant, consider the sustainability of the effort if this is a desired outcome.
Understand the unique nature of the target market – community-based efforts could benefit from bringing together local knowledge on the front end and revisiting the existing program designs to ensure that they are anticipating unique characteristics in the population to the extent that they can prior to fielding the effort. This would include looking beyond the assumed cultural barriers to understand what other logistical or technical barriers may present a challenge to program implementation in the specific market (and finding resources to overcome these challenges). Pre-screening communities and their barriers will be useful to this effort.
Tracking information to help improve efforts and demonstrate success – tracking core performance metrics is integral to the success of any effort. Effective tracking is essential to measuring milestones and progress, as well as energy impacts of community-based efforts. When designing and implementing community-based efforts, stakeholders should carefully consider which performance metrics to track, and develop mechanisms to track them, while balancing this effort with resource constraints.

How the Study Came to the Recommended Conclusions: The findings presented in the study were developed through analysis of program materials and tracking databases, in-depth

interviews with the PA staff, and in-depth interviews with program stakeholders and community groups. As part of the research, the evaluation team has also conducted a literature review of community-based programs implemented across the United States, and developed both partnership-specific logic models and an overarching theory of change for community-based partnerships. Additional primary research will be conducted in 2011.

Explain Whether or Not the PA Decided to Adopt Recommendations from the Study, and Why: These initial findings are targeted at future efforts, and will be considered by the PAs and interested stakeholders as additional efforts are launched.

A copy of the complete study can be found in Appendix C, Study 37.

F. Cape Light Compact-Specific Studies

1. Findings from In-depth Interviews with Smart Energy Monitoring Pilot Participants (Study 38)

Objective of the Study: The purpose of the study was to supplement findings from the first evaluation of the Pilot that was completed in Spring 2010, and inform the Pilot's future expansion.

Programs to Which the Results of the Study Apply:

- Power Monitor Pilot (also referred to as the Smart Home Energy Monitoring Pilot)

Recommendations Derived From The Study:

- *Additional training opportunity.* General sentiment from participants was that initial training on the Internet Dashboard and monitoring system was brief, and possibly insufficient for some of the less tech-savvy participants. We suggest an optional follow-up training, possibly a webinar, after participants have had a little time to become familiar with the website, to help them learn more about what is available, how to take advantage of it, and how to interpret the energy use feedback.
- *Energy use disaggregation.* At least one-half of participants interviewed expressed interest in using a more detailed sub-circuit monitoring system that would allow the viewing of detailed electricity demand by end use. We are not aware of Grounded Power's "next step" monitoring technologies; however, end-use monitoring appears to be an option in some systems, since one participant mentioned Powerhouse Dynamics (http://www.powerhousedynamics.com/) as a monitoring system option that allows for sub-circuit electricity use feedback.
- *Maintain consistent feedback (including additional energy saving resources).* In-depth interview findings corroborate our 2010 evaluation findings that consistent interaction either with the monitor or e-mail updates keeps their energy saving habits "top of mind," and increases the likelihood of actual energy savings. We recommend

that any future program include feedback mechanisms similar to that of the pilot. Some participants suggested that since the weekly e-mail from Cape Light Compact is especially salient to them, it could be used to provide supplemental energy saving information and resources to participants.

- *Solar PV systems.* Two participants discussed their interest in investing in solar PV systems. Another participant dropped out of the pilot because of an incompatibility between the pilot monitoring system and the solar PV system. This may not be an important issue currently, however, as residential solar PV systems increase in popularity, the compatibility of monitoring systems and solar PV systems should be considered in long-term program strategies.
- *Inclusion of "child friendly" mechanisms.* Households with small children or teenagers faced unique challenges and opportunities when participating in the pilot program. Parents view the program as a teaching opportunity, however, attempts to get children involved were usually short-lived and not successful in changing behaviors. Several participants commented that the proposed indicator light may increase children's interest, and there are additional mechanisms (e.g., simplified visual indicators of energy use, energy games, and child-friendly challenges) possible within future iterations of the Internet Dashboard and monitoring system as a whole.
- *Additional opportunity for social interaction.* Most participants exhibited a sense of pride in being part of the pilot group. Identification with the group and the online discussion forum creates a set of shared social norms regarding energy use and behaviors among the participants. Social science research suggests that direct social contact, such as informal meetings or workshops, will strengthen social norms and increase commitment among participants to change energy use behaviors. These occasions would also provide an additional forum for information on the "next steps" and strategies for participants, a topic that was frequently requested in the interviews.

How The Study Came To The Recommended Conclusions: The conclusions are based on the 10 in depth interviews completed as part of the study.

Explain Why Or Why Not The Program Administrator Decided To Adopt Recommendations From The Study:

- *Regarding Recommendation 1:* Cape Light Compact is working with the vendor selected to implement Phase II of the Pilot to provide more robust training to participants in Phase II. Also, the dashboard and monitoring system provide the participant direct email access to the implementation vendor so that questions and/or problems can be addressed.
- *Regarding Recommendation 2:* Cape Light Compact will consider implementing this recommendation if the Pilot is transitioned to a Program.
- *Regarding Recommendation 3:* Cape Light Compact agrees with and will continue to implement this recommendation.
- *Regarding Recommendation 4:* Cape Light Compact attempted to include in Phase II of the Pilot, but no respondents to the RFP offer monitoring systems that are

compatible with the solar PV system. Cape Light Compact is working with the selected implementation vendor to explore this option and future capability.

- *Regarding Recommendation 5:* The recommended child friendly mechanisms are not offered in the current version of the dashboard and monitoring system provided by the selected implementation vendor.
- *Regarding Recommendation 6:* Cape Light Compact is considering this recommendation for Phase II of the Pilot.

A copy of the complete study can be found in Appendix C, Study 38.

G. Future Studies

Table III.B summarizes the studies expected to be included in next year's Annual Report.

Table III.B: Evaluation Studies in Next Annual Report		
Studies	Docket & Exhibit Approving Planned Evaluation Studies	Expected to be Implemented as Approved? (yes/no)
Residential Studies		
Residential Products - Market assessment on CFL use, saturation and reported purchase behaviors	Study is planned but not yet submitted for approval	Yes
Residential Products - Shelf stocking survey of MA retailers	Study is planned but not yet submitted for approval	Yes
Residential Products - Lighting Exploratory Evaluation	Study is planned but not yet submitted for approval	Yes
Residential Retrofit & Low Income -Impact evaluation of Mass Save program	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Residential Retrofit & Low Income -Potential Study of the Multifamily Program	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010). Study was initiated prior to the filing of the MTM.	Yes
Residential Retrofit & Low Income -Process and Impact evaluation of Multifamily Program	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Residential Retrofit & Low Income -Net-to-Gross study on Residential Cooling & Heating Equipment (Cool Smart)	Study is planned but not yet submitted for approval	Yes
Residential New Construction - Phase II: Baseline Study/Code Compliance Assessment	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Residential New Construction - Major Renovation Pilot	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Residential New Construction - Homebuyer Survey	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Residential New Construction - Assessment of New Technologies	Study is planned but not yet submitted for approval	Yes
Residential New Construction - Builder Focus Groups	Study is planned but not yet submitted for approval	Yes

Table III.B: Evaluation Studies in Next Annual Report (cont'd)		
Studies	Docket & Exhibit Approving Planned Evaluation Studies	Expected to be Implemented as Approved? (yes/no)
Low-Income Studies		
Residential Retrofit & Low Income -Process and Impact evaluation of Low Income program	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Commercial & Industrial Studies		
Small C&I - Integrated Program Process Evaluation	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Small C&I - Lighting Billing Analysis Evaluation	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Small C&I - Lighting Fixture Summer Metering Impact Evaluation	Study is planned but not yet submitted for approval	Yes
Small C&I - Lighting Controls Impact Evaluation	Study is planned but not yet submitted for approval	Yes
Large C&I - Process Evaluation of the Large Commercial and Industrial Energy Efficiency Programs	Study is planned but not yet submitted for approval	Yes
Large C&I - Phase II: Non-Residential New Construction Market Assessment Study	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Large C&I - Custom Electric Measures Impact Evaluations (Lighting, Process, Compressed Air)	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Large C&I - Prescriptive Gas Measures Impact Evaluation	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Large C&I - Custom Gas Measures Impact Evaluation	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Large C&I - Prescriptive Measure Impact Evaluation (Lighting, VSDs)	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Large C&I - CHP Impact Evaluation	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Large C&I - Impact of Gas Training	Study is planned but not yet submitted for approval	Yes

Table III.B: Evaluation Studies in Next Annual Report (cont'd)		
Studies	Docket & Exhibit Approving Planned Evaluation Studies	Expected to be Implemented as Approved? (yes/no)
Special & Cross-Cutting Studies		
Phase II: Behavioral Pilots	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Phase II: Community Based Pilots	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Phase II: Umbrella Marketing	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
C&I Net-to-Gross Study	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes
Non-Energy Impacts 2011 - Residential & Low Income	Study is planned but not yet submitted for approval	Yes
Non-Energy Impacts 2011 - Deep Energy Retrofit	Study is planned but not yet submitted for approval	Yes
Non-Energy Impacts 2011 - C&I: non-Custom	Study is pending approval of the 2011 MTM, D.P.U. 10-147, Exhibit C (filed Oct. 2010)	Yes

IV. STATUTORY BUDGET REQUIREMENTS

A. Introduction

The Green Communities Act requires that energy efficiency programs minimize administrative costs, utilize competitive procurement processes, and spend a certain amount on low-income programs. G.L. c. 25, §§ 19(a)-(c). The purpose of this section is to address these statutory budget requirements.

For each sector, Tables IV.A through IV.C summarize and compare planned and actual PP&A costs, outsourced activities, and budget allocation, respectively.

B. Minimization of Administrative Costs

The most significant factor in the Cape Light Compact's approach to controlling administrative costs is its active participation in the statewide planning process. While this participation requires a significant dedication of resources, the benefits of collaborative planning, the adoption of consistent programs and processes and the coordination of program design, EM&V studies, and regulatory proceedings outweigh the cost of participation and bring immense benefits to the Cape Light Compact's customers. The extent and benefits of the statewide planning process were reflected in the Statewide Three-Year Electric/Gas Plans which created the over-arching framework for the Cape Light Compact's individual Three-Year Plan filing. This included a significant commitment to competitive procurement and program integration, as well as other design features described in detail in both the Statewide and Cape Light Compact-specific Plans.

A second factor in the Cape Light Compact's efforts to control administrative costs is its grassroots service to the community through its volunteer and Town or County appointed Governing Board Members. The Cape Light Compact Board Members bring their expertise to community civic and business outreach events, through their role on the energy efficiency committee provide guidance to staff on policies and new innovative initiatives, and support the multiple Town Energy Committees so as to inform and encourage participation in energy efficiency program – all through volunteer service at no cost to ratepayers.

The Cape Light Compact continues to be committed to managing its energy efficiency programs in the most cost-effective manner possible. T his includes careful attention to controlling administrative costs. All of the PAs recognize that high quality and effective administration at the lowest possible cost is essential to the delivery of quality programs and achievement of maximum benefits and savings to customers.

Table IV.A provides a summary of the percent change in actual Program Planning and Administration Costs relative to plan, at the program, sector, and portfolio level.

Table IV.A: Program Planning and Administration Costs						
Customer Sector / Program	**Planned**		**Actual**		**Change from Planned to Actual**	
	Value ($)	% of Total Program Costs	Value ($)	% of Total Program Costs	Value ($)	% of Total Program Costs
Residential						
Residential New Construction & Major Renovation	12,301	3%	20,457	4%	8,156	1%
Residential Cooling & Heating Equipment	20,731	3%	22,955	4%	2,224	1%
Multi-Family Retrofit	12,722	3%	483	1%	-12,238	-2%
MassSAVE	238,857	4%	246,357	7%	7,499	2%
O Power	n/a	n/a	n/a	n/a	n/a	n/a
ENERGY STAR Lighting	36,570	3%	71,091	9%	34,520	6%
ENERGY STAR Appliances	8,059	3%	23,727	6%	15,668	3%
Residential Education Program	0	0%	0	0%	0	0%
Workforce Development	0	0%	0	0%	0	0%
Heat Loan Program	0	0%	0	0%	0	0%
Deep Energy Retrofit	0	0%	813	3%	813	3%
Power Monitor Pilot	0	0%	1,618	2%	1,618	2%
Residential New Construction & Major Renovation - Major Renovation statewide pilot	0	0%	352	1%	352	1%
Residential New Construction Multi Family (4-8 story) statewide pilot	n/a	n/a	0	n/a	n/a	n/a
Residential New Construction Lighting Design statewide pilot	0	0%	417	4%	417	4%
Residential New Construction V3 Energy Star Homes statewide pilot	0	0%	0	-	0	0%
Heat Pump Water Heater Pilot	0	0%	99	1%	99	1%
Residential Technical Development	0	0%	467	4%	467	4%
Hot Roofs	0	0%	0	-	0	0%
Home Automation	0	0%	0	-	0	0%
Community Based Pilot	n/a	n/a	n/a	n/a	n/a	n/a
Statewide Marketing & Education	0	0%	0	0%	0	0%
EEAC Consultants	93,555	100%	0	-	-93,555	0%
DOER Assessment	28,456	100%	46,639	100%	18,183	0%
Sponsorships & Subscriptions	11,967	100%	24,010	100%	12,043	0%
Residential Total	**463,219**	**5%**	**459,486**	**7%**	**-3,733**	**2%**

Table IV.A: Program Planning and Administration Costs (cont'd)						
Customer Sector / Program	**Planned**		**Actual**		**Change from Planned to Actual**	
	Value ($)	% of Total Program Costs	Value ($)	% of Total Program Costs	Value ($)	% of Total Program Costs
Low-Income						
Low-Income Residential New Construction	705	2%	3,554	4%	2,849	1%
Low-Income 1 to 4 Family Retrofit	56,462	3%	89,401	6%	32,939	2%
Low-Income MuiltiFamily Retrofit	15,497	4%	7,850	4%	-7,647	0%
Statewide Marketing & Education	n/a	n/a	n/a	n/a	n/a	n/a
Low-Income Energy Affordability Network Funding	0	0%	0	0%	0	0%
DOER Assessment	4,774	100%	10,309	100%	5,535	0%
Low-Income Total	**77,438**	**4%**	**111,114**	**6%**	**33,676**	**2%**
Commercial & Industrial						
C&I New Construction and Major Renovation	33,008	4%	60,518	8%	27,510	5%
C&I New Construction and Major Renovation - Government						
C&I Large Retrofit	23,505	1%	58,777	4%	35,272	2%
Large C&I Retrofit - Government						
C&I Small Retrofit	177,582	4%	148,723	5%	-28,859	1%
C&I Small Retrofit - Government						
Community Based Pilot	n/a	n/a	n/a	n/a	n/a	n/a
Statewide Marketing & Education	n/a	n/a	n/a	n/a	n/a	n/a
EEAC Consultants	70,295	100%	0	-	-70,295	0%
DOER Assessment	15,380	100%	35,036	100%	19,656	0%
Sponsorships & Subscriptions	10,033	100%	3,945	100%	-6,088	0%
C&I Total	**329,803**	**5%**	**306,999**	**6%**	**-22,804**	**1%**
GRAND TOTAL	**870,460**	**5%**	**877,598**	**6%**	**7,138**	**2%**

None of the sectors experienced variances of 10% or greater as compared to planned Program Planning and Administration costs.

C. Competitive Procurement

Table IV.B provides a summary of the percent change in actual cost allocations to In-House and Outsourced Activities (including Competitively Procured and Non-Competitively Procured Activities) relative to plan, at the sector and portfolio level.

Table IV.B: Outsourced & Competitively Procured Services									
Customer Sector	**In-House Activities**		**Outsourced Activities**						**TOTAL Activities**
			Competitively Procured		Non-Competitively Procured		Total Outsourced Activities		
	$	% of Total Activities	$	% of Total Outsourced	$	% of Total Outsourced	$	% of Total Activities	$
Residential									
Planned	$238,475	9%	$1,848,178	77%	$552,725	23%	$2,400,903	91%	$2,639,379
Actual	$467,822	27%	$1,088,289	86%	$176,150	14%	$1,264,439	73%	$1,732,261
% Difference from Planned to Actual		18%		9%		-9%		-18%	
Low-Income									
Planned	$46,599	7%	$181,889	30%	$422,351	70%	$604,240	93%	$650,838
Actual	$112,270	27%	$270,637	89%	$32,753	11%	$303,390	73%	$415,659
% Difference from Planned to Actual		20%		59%		-59%		-20%	
Commercial & Industrial									
Planned	$282,576	21%	$769,617	71%	$318,176	29%	$1,087,793	79%	$1,370,369
Actual	$367,888	36%	$368,984	57%	$272,942	43%	$641,926	64%	$1,009,814
% Difference from Planned to Actual		16%		-13%		13%		-16%	
TOTAL									
Planned	$567,650	12%	$2,799,684	68%	$1,293,252	32%	$4,092,936	88%	$4,660,586
Actual	$947,980	30%	$1,727,910	78%	$481,844	22%	$2,209,754	70%	$3,157,734
% Difference from Planned to Actual		18%		10%		-10%		-18%	

Only Low Income experienced a significant variance between planned to actual by outsource category.

There was a shift from Outsourced Activities to In-House Activities across all sectors. In general, outsourced EM&V costs and vendor implementation costs (which are captured in the Sales, Technical Assistance and Training budget category) were significantly lower than planned for all sectors. Also, in-house Marketing and Sales, Technical Assistance and Training costs were significantly higher than planned.

As the Cape Light Compact did not know the exact cost of EM&V when it filed its plan, it assumed that 4% of its total budget would be spent on EM&V activities in its plan. However, the Cape Light Compact did not need to leverage all of the money set aside for EM&V due to the fact that most studies were conducted and cost-shared on a statewide basis among PAs and as a result were less costly for each PA.

When formulating its plan, the Cape Light Compact inquired about implementation costs with its vendors and used these inputs to develop its plan. However, as implementation occurred, vendors realized that they could provide services more cost effectively than they had estimated at the time the plan was developed.

Conversely, in-house Marketing and Sales, Technical Assistance and Training costs were significantly higher than planned as internal resources were leveraged more than planned. The Cape Light Compact did not know the exact in-house costs Marketing and Sales, Technical Assistance and Training costs that would be needed when it filed its plan, and the assumptions made did not reflect the actual requirements.

In terms of the shift from non-competitive to competitive procurement, Low-Income experienced an increase in competitive procurement due to the fact that more outsourced costs were leveraged by implementation vendors that were competitively procured.

D. Low-Income Spending

Table IV.C provides a summary of the percent change in actual costs at the sector and portfolio levels, relative to plan.

Table IV.C: Customer Sector Budget Allocation

Customer Sector	Planned		Actual		Change from Planned to Actual	
	Total Program Costs	% of Total Program Costs	Total Program Costs	% of Total Program Costs	Total Program Costs	% of Total Program Costs
Residential	$9,449,462	51%	$6,388,566	47%	-$3,060,896	-3%
Low-Income	$2,088,750	11%	$1,826,691	13%	-$262,058	2%
Commercial & Industrial	$7,098,577	38%	$5,315,961	39%	-$1,782,616	1%
TOTAL	$18,636,789	100%	$13,531,218	100%	-$5,105,571	0%

The statutory requirement regarding the Low-Income budget is as follows:

"Electric and gas energy efficiency program funds shall be allocated to customer classes, including the low-income residential subclass, in proportion to their contributions to those funds; provided, however, that at least 10 per cent of the amount expended for electric energy efficiency programs and at least 20 per cent of the amount expended for gas energy efficiency programs shall be spent on comprehensive low-income residential demand side management and education programs."[20]

20 Massachusetts Session Laws. Chapter 169. An Act Relative to Green Communities. Approved by the Governor July 2, 2008. Available at: http://www.malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169. Section 19. (c).

The Low-Income budget represents greater than 10% of the amount expended for electric energy efficiency programs by the Cape Light Compact. Therefore, the Cape Light Compact met the Low-Income budget statutory requirement in 2010.

V. PERFORMANCE INCENTIVES

The purpose of this section is to address the performance incentives that each PA proposes to collect. As a public entity and municipal aggregator, the Cape Light Compact does not collect performance incentives. As such, this section is not applicable to the Cape Light Compact.

VI. AUDITS

The purpose of this section is to address audits conducted during the past 5 program years. The Cape Light Compact has not had an internal or external audit that related to its energy efficiency activities during the last five years (2006-2010). Therefore, no audit summaries are provided in this section, and no audits are provided in Appendix E.2.

VII. APPENDICES

The purpose of this section is to provide detailed supporting documentation.

Appendix	Appendix Contents
A	Glossary
A.1.a	Types of Costs in Each Budget Category
A.1.b	Glossary of Terms and Abbreviations
B	Cost-Effectiveness Supporting Tables and Documentation
B.1.a	D.P.U. 08-50 Tables: 2010 Annual Report Filing
B.1.b	D.P.U. 08-50 Tables: 2010 Mid-Year Revisions Filing (Docket 10-106)
B.2.a	Screening Tool: Preliminary
B.2.b	Screening Tool: Evaluated
B.3	TRM
C	Program and Pilot Program EM&V Studies
D	Performance Incentives Supporting Documentation
E	Other Supporting Documentation
E.1.a	Statewide RFPs
E.1.b	Cape Light Compact-Specific RFPs
E.2	Audit Documentation
E.3	Cape Light Compact-Specific Sample Contracts
E.4	Cape Light Compact Town Activity Reports
E.5	2010 Energy Education Program Activity
F	Lost Base Revenue Information