Energy Optimization 2011 Annual Report for Michigan Electric Municipal Utilities

Introduction

Pursuant to 2008 Public Act 295 (PA 295), the municipal utilities are filing this annual energy optimization (EO) report with the Michigan Public Service Commission (MPSC). This EO annual report consists of two sections:

- Section 1 will address the requirements under PA 295 Section 97, Subsections 1-3 and Section 71, Subsection 3 (i).
- Section 2 will summarize the EO programs implemented in 2011.

SECTION 1: PA 295 SECTION 97 SUBSECTIONS 1-3 REQUIREMENTS

Section 97 (1) Each provider shall submit to the commission an annual report that provides information relating to the actions taken by the provider to comply with the energy optimization standards.

Each municipal electric provider has continued to offer Energy Optimization programs to all customer classes. Attachment A provides a list of EO programs offered by each provider and the implementation contractors if applicable.

Section 97 (2) Annual reports under subsection (1) shall include the following: **(a) The number of energy optimization credits that the provider generated during the reporting period. (b) Expenditures made in the past year and anticipated future expenditures to comply with this subpart. (c) Any other information that the commission determines necessary.**

The number of energy optimization credits (in megawatt hours) generated for 2011 and the targets for 2012 are shown in Attachment B for the municipal utilities. The expenditures for 2011 for the Low Income, Residential and Commercial/Industrial programs can be found in Attachment C. The EO Residential surcharge for each municipal in cost per kilowatt hour along with the responsible party for administration of programs is listed in Attachment D.

Section 97 (3) Concurrent with the submission of each report under subsection (1), a municipally-owned electric utility shall submit a summary of the report to its customers in their bills with a bill insert, to its governing body, at its office and on its website.

Each municipal electric utility will submit a copy of this annual report to its governing body; make it available at its office; on its website and a summary to its customers.

Section 71 (3)(i) Include a process for obtaining an independent expert evaluation of the actual energy optimization programs to verify the incremental energy savings from each energy optimization program for purposes of section 77.

The verification of the incremental gross energy savings for each municipal electric utility was performed where funding allowed.

SECTION 2: SUMMARY OF EO PROGRAMS IMPLEMENTED IN 2011

Residential Low Income Services

All the municipal electric utilities continued to offer low income programs to their customers in 2011.

Residential Solutions

All the municipal electric utilities offered programs to their residential customers, examples of the types of programs are listed below.

- *Efficient Lighting Program*
- *Refrigerator/Freezer Turn-In and Recycling Program*
- *Residential Education Services*
- *Residential HVAC and Appliances*
- *Residential Multi-Family In-Unit Efficiency*
- *Electric Water Heater Savings Kits*
- *Pilot/Emerging Technology Program*

Business Solutions

All the municipal electric utilities offered programs to their residential customers, examples of the types of programs are listed below.

- *Commercial and Industrial Prescriptive Incentive Program*
- *Commercial and Industrial Custom Incentive Program*
- *Multi-Family Common Area Program*
- *Business Education Services*
- *Pilot/Emerging Technology Program*

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EO Docket # from MPSC	U-15884

ATTACHMENT A

Utility	Sector		Program Type	Year Imp.	Implementation Contractors
Traverse City Light and Power	Residential	1	Residential Low Income	2009	Internal, MCAAA, DHS, TCHC
		2	Efficient Lighting Program	2009	Internal
		3	Refrigerator/Freezer Turn-In	2009	JACO/Franklin
		4	Residential Education Services	2009	Internal
		5	Residential Appliances & HVAC	2009	Internal, Franklin
		6			
		7	Residential Pilot Programs	2009	Internal
	C & I	1	Prescriptive Incentive	2009	Franklin
		2	Custom Incentive	2009	Franklin
		3	Education Services	2009	Internal
		4	Pilot Programs	2009	Internal

ATTACHMENT B

MWh Data

Electric Municipals	0.75%			1.00%
	2011 Target	2011 Actual	% Achieved	2012 Target
Bay City Electric Light & Power				
City of Charlevoix				
Chelsea Electric Department				
Village of Clinton				
Coldwater Board of Public Utilities				
Croswell Light & Power Department				
City of Crystal Falls				
Daggett Electric Department				
Detroit Public Lighting Department				
Dowagiac Department of Public Services				
City of Eaton Rapids				
Escanaba Electric Department				
City of Gladstone Electrical Department				
Grand Haven Board of Light and Power				
Harbor Springs Municipal Utility				
City of Hart Hydro Electric				
Hillsdale Board of Public Utilities				
Holland Board of Public Works				
Village of L'Anse				
Lansing Board of Water & Light				
Lowell Light and Power				
Marquette Board of Light and Power				
City of Marshall Electric Department				
City of Negaunee Electric Department				
Newberry Water & Light Board				
Niles Utilities Department				
City of Norway Electric Department				
Village of Paw Paw				
City of Petoskey				
Portland Light and Power Board				
Sebewaing Light & Water Dept.				
South Haven Department of Public Works				
City of St. Louis				
City of Stephenson				
City of Sturgis				
Traverse City Light & Power	1,704	2,650	156%	3,190
Union City				
City of Wakefield				
Wyandotte Municipal Services				
Zeeland Board of Public Works				

ATTACHMENT C

Actual 2011 Expenditures

Electric Municipals	Total 2011	Residential W/O Low Income	Residential W/Low Income	C&I	Low Income	Admin & Eval
Bay City Electric Light & Power	$0					
City of Charlevoix	$0					
Chelsea Electric Department	$0					
Village of Clinton	$0					
Coldwater Board of Public Utilities	$0					
Croswell Light & Power Department	$0					
City of Crystal Falls	$0					
Daggett Electric Department	$0					
Detroit Public Lighting Department	$0					
Dowagiac Department of Public Services	$0					
City of Eaton Rapids	$0					
Escanaba Electric Department	$0					
City of Gladstone Electrical Department	$0					
Grand Haven Board of Light and Power	$0					
Harbor Springs Municipal Utility	$0					
City of Hart Hydro Electric	$0					
Hillsdale Board of Public Utilities	$0					
Holland Board of Public Works	$0					
Village of L'Anse	$0					
Lansing Board of Water & Light						
Lowell Light and Power	$0					
Marquette Board of Light and Power	$0					
City of Marshall Electric Department	$0					
City of Negaunee Electric Department	$0					
Newberry Water & Light Board	$0					
Niles Utilities Department	$0					
City of Norway Electric Department	$0					
Village of Paw Paw	$0					
City of Petoskey	$0					
Portland Light and Power Board	$0					
Sebewaing Light & Water Dept.	$0					
South Haven Department of Public Works	$0					
City of St. Louis	$0					
City of Stephenson	$0					
City of Sturgis	$0					
Traverse City Light & Power	$546,012	$149,209	$151,507	$316,512	$2,298	$77,993
Union City	$0					
City of Wakefield	$0					
Wyandotte Municipal Services	$0					
Zeeland Board of Public Works	$0					

ATTACHMENT D

Energy Optmization Administration and Residential Surcharges for 2011			
Electric Municipals	**Case No.**	**Administration 2011**	**EO Residential Surcharge per $/kWh or Per Meter**
Bay City Electric Light & Power	U-15849	MPPA	
City of Charlevoix	U-15850	MPPA	
Chelsea Electric Department	U-15851	MPPA	
Village of Clinton	U-15852	Independently	
Coldwater Board of Public Utilities	U-15853	Independently	
Croswell Light & Power Department	U-15854	MPPA	
City of Crystal Falls	U-15855	WPPI	
Daggett Electric Department	U-15856	Efficiency United	
Detroit Public Lighting Department	U-15857	MPPA	
Dowagiac Department of Public Services	U-15858	MPPA	
City of Eaton Rapids	U-15859	MPPA	
Escanaba Electric Department	U-15860	MECA	
City of Gladstone Electrical Department	U-15861	WPPI	
Grand Haven Board of Light and Power	U-15862	MPPA	
Harbor Springs Municipal Utility	U-15863	MPPA	
City of Hart Hydro Electric	U-15864	MPPA	
Hillsdale Board of Public Utilities	U-15865	Independently	
Holland Board of Public Works	U-15866	MPPA	
Village of L'Anse	U-15867	WPPI	
Lansing Board of Water & Light	U-15868	Independently	
Lowell Light and Power	U-15869	MPPA	
Marquette Board of Light and Power	U-15870	MECA	
City of Marshall Electric Department	U-15871	Independently	
City of Negaunee Electric Department	U-15872	WPPI	
Newberry Water & Light Board	U-15873	MECA	
Niles Utilities Department	U-15874	MPPA	
City of Norway Electric Department	U-15875	WPPI	
Village of Paw Paw	U-15876	MPPA	
City of Petoskey	U-15877	MPPA	
Portland Light and Power Board	U-15878	MPPA	
Sebewaing Light & Water Dept.	U-15879	Independently	
South Haven Department of Public Works	U-15880	MPPA	
City of St. Louis	U-15881	MPPA	
City of Stephenson	U-15882	MECA	
City of Sturgis	U-15883	MPPA	
Traverse City Light & Power	U-15884	MPPA	$0.00000
Union City	U-15885	Independently	
City of Wakefield	U-15886	Independently	
Wyandotte Municipal Services	U-15887	MPPA	
Zeeland Board of Public Works	U-15888	MPPA	

Traverse City Light and Power 2011 Energy Optimization Program Summary and 2012 Goals

Program Portfolio	2011 Goals		2011 Actual		2011 Over/(under)		2012 Plan Filing		2012 Revised Goals	
	Gross First Year kWh Savings	Program Budget	Gross First Year kWh Savings	Program Budget	Gross First Year kWh Savings	Program Budget	Gross First Year kWh Savings	Program Budget	Gross First Year kWh Savings	Program Budget
Low Income Services	17,399	$15,640	18,895	$2,298	1,496	-$13,342	21,947	$4,469	20,451	$4,469
Appliance Recycling	156,599	$31,931	195,217	$31,931	38,618	$0	120,707	$28,091		
Residential Services *	150,678	$29,083	319,556	$20,934	168,878	-$8,149	278,418	$42,375	191,629	$70,466
Educational Services	36,392	$5,865	154,981	$24,997	118,589	$19,132	47,849	$7,265	47,849	$7,265
Pilot Programs	48,523	$7,820	53,544	$71,346	5,021	$63,526	79,748	$12,108	74,727	$12,108
Subtotal - Residential Solutions	*409,591*	*$90,339*	*742,193*	*$151,506*	*332,602*	*$61,167*	*548,669*	*$94,308*	*334,656*	*$94,308*
Business Services	1,209,146	$251,880	1,642,390	$202,119	433,244	-$49,761	2,513,671	$341,578	2,080,427	$341,578
Educational Services	36,392	$5,865	154,981	$24,997	118,589	$19,132	47,849	$7,265	47,849	$7,265
Pilot/Emerging Technology Programs	48,523	$7,820	110,514	$89,396	61,991	$81,576	79,748	$12,108	79,748	$12,108
Subtotal - Business Solutions	*1,294,061*	*$265,565*	*1,907,885*	*$316,512*	*613,824*	*$50,947*	*2,641,268*	*$360,951*	*2,208,024*	*$360,951*
Total Program Portfolio	**1,703,652**	**$355,904**	**2,650,078**	**$468,018**	**946,426**	**$112,114**	**3,189,937**	**$455,259**	**2,542,680**	**$455,259**
Program Administration 5%		$26,325		$68,417		$42,092		$19,373		$19,373
Evaluation (EM&V) 4%		$21,060		$9,576		-$11,484		$9,686		$9,686
Subtotal - Admin/Evaluation		**$47,385**		**$77,993**		$30,608		$29,059		$29,059
Projected Annual Totals	**1,703,652**	**$403,289**	**2,650,078** **156%**	**$546,011**	**946,426**	**$142,722**	**3,189,937**	**$484,318**	**2,542,680**	**$484,318**

Traverse City Light & Power
Verification of Savings of 2011 Energy Optimization Programs
Final Report

Traverse City Light & Power
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Clarklake, Michigan, March 30, 2012

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E Executive Summary

The Lansing Board of Water & Light and the Michigan Public Power Agency Energy Efficiency Service Committee (BWL and MPPA EE Service Committee) is a group of twenty-four Michigan municipal electric utilities that was formed to mutually verify the savings of similar 2009 Energy Optimization (EO) programs as required by the State of Michigan's 2008 Public Act 295 (PA 295) SEC. 71. (3)(i).

The evaluation of BWL and MPPA EE Service Committee 2011 EO programs was conducted in fourth quarter of 2011 and the first quarter of 2012. The evaluation estimated verification rates (i.e., the measures that were installed and operating as planned) using statistical sampling of participants across participating municipal utilities. These estimates were then applied to the participation parameters of specific member utilities.

This report presents the verification of energy savings for the EO programs implemented by Traverse City Light & Power. Table 1 recapitulates the verification findings, including the EO savings goals with the claimed (i.e., deemed savings), the verified gross savings and the verified net savings for the Traverse City Light & Power.

Table 1 Traverse City Light & Power Energy Optimization Goal, Actual and Verified Savings (kWh)

Program	Goal	Claimed	Verified-Gross
Residential			
Efficient Lighting Program	135,661	187,253	292,148
Refrigerator/Freezer Turn-In Program	156,599	195,217	195,217
High-Efficiency Appliances/ High-Efficiency HVAC Program	15,017	27,408	27,408
Low Income Program	17,399	20,258	18,895
Pilot Program	48,523	53,544	53,544
Education Services	36,392	154,981	154,981
Commercial and Industrial			
Custom Incentive Program	1	652,007	649,775
Prescriptive Incentive Program	1,209,146	1,000,539	992,076
Pilot Program	48,523	110,514	110,514
Education Services	36,392	154,981	154,981
Total	1,294,062	1,918,041	1,907,346

1 Introduction

The Lansing Board of Water & Light and the Michigan Public Power Agency Energy Efficiency Service Committee (BWL and MPPA EE Service Committee) is a group of twenty-four Michigan municipal electric utilities (For a list of participating utilities, see Appendix A) that was formed to mutually verify the savings of similar 2011 Energy Optimization (EO) programs as required by the State of Michigan's 2008 Public Act 295 (PA 295) SEC. 71. (3)(i).

The ultimate goal of the evaluation was specified as the verification of incremental energy (kWh) savings for the BWL and MPPA EE Service Committee members EO programs. The BWL and MPPA EE Service Committee have chosen to accept the savings estimates from the Michigan Energy Measures Database (MEMD). The MEMD contain values that were current at the time the associated energy optimization plans were approved by the Michigan Public Service Commission (MPSC or the Commission), or engineering estimates current at the time the energy optimization plans were approved by the MPSC for measures not included in the MEMD as the source for gross energy savings.

Accordingly, the objectives of the evaluation are to verify that measures are installed and operating as planned and to deliver a final annual report that provides the energy savings for each utility.

This report presents the verification results for the Traverse City Light & Power (TCL&P). Following this introductory section, the next section presents a recapitulation of the estimates of savings for programs implemented by BCELP. The appendices provide supporting documentation, analytical approaches as well as generic descriptions of programs that the BWL and MPPA EE Service Committee members may have implemented. The appendices provide supporting documentation, analytical approaches as well as generic descriptions of programs that the BWL and MPPA EE Service Committee members may have implemented.

2 Verification of Savings Estimates

Residential

The TCL&P reported that the deemed savings estimate for the Efficient Lighting Program was 187,253 kWh. Based on the analysis of the program the verified gross savings estimate is

292,148 kWh. Using the variance of the estimate yields a confidence interval of ±19,207 kWh (±6.6%).

The TCL&P reported that the deemed savings estimate for the Refrigerator/Freezer Turn-In Program was 195,217 kWh. Based on the analysis of the program the verified gross savings estimate is 195,217 kWh. The variance associated with this estimate was zero.

The TCL&P reported that the deemed savings estimate for the High-Efficiency Appliances/High-Efficiency HVAC Program was 27,408 kWh. Based on the analysis of the program the verified gross savings estimate is 27,408 kWh. The variance associated with this estimate was zero.

The TCL&P reported that the deemed savings estimate for the Low Income Program was 20,258 kWh. Based on the analysis of the program the verified gross savings estimate is 18,895 kWh. Using the variance of the estimate yields a confidence interval of ±3,395 kWh (±18.0%).

The TCL&P reported that the deemed savings estimate for the Residential Pilot Program was 53,544 kWh. These savings are not required to be independently verified.

The TCL&P reported that the deemed savings estimate for the Residential Education Program was 154,981 kWh. These savings are not required to be independently verified. The residential and commercial education programs are similar in nature, so all expenses are divided equally. Energy education information is distributed through billing inserts, web site, press releases, trade shows and green day events, neighborhood meetings, city board meetings, radio advertising and TV interviews, quarterly brochure mailings, TC Chamber of Commerce events, recycling events, emails to customers, residential and commercial customer meetings, residential and commercial energy audits, TC Public Library Kill O Watt meter lending program, etc. The number of participants is unknown.

Commercial and Industrial

The TCL&P reported that the deemed savings estimate for the C&I Custom Incentive Program was 652,007 kWh. Based on the analysis of the program the verified gross savings estimate is 649,775 kWh. Using the variance of the estimate yields a confidence interval of ±4,213 kWh (±0.6%).

The TCL&P reported that the deemed savings estimate for the C&I Prescriptive Incentive Program was 1,000,539 kWh. Based on the analysis of the program the verified gross savings estimate is 992,076 kWh. Using the variance of the estimate yields a confidence interval of ±30,361 kWh (±3.1%).

The TCL&P reported that the deemed savings estimate for the C&I Pilot Program was 110,514 kWh. These savings are not required to be independently verified.

The TCL&P reported that the deemed savings estimate for the C and I Education Program was 154,981 kWh. These savings are not required to be independently verified. Over 2500 commercial customers received energy efficiency information in their monthly bills. Many attended meetings, trade shows, and green day events but it is impossible to estimate how many read the newspaper, viewed the web site, or watched public meetings concerning energy education on TV.

Appendix A The BWL and MPPA Energy Efficiency Service Committee Utilities

The 24 municipal utilities with EO programs to be evaluated include the following:

- Lansing Board of Water & Light
- Lowell Light & Power
- Traverse City Light & Power
- Niles Utility Department
- City of Charlevoix
- City of Paw Paw
- Chelsea Dept. of Electric & Water
- City of Petoskey
- Croswell Light & Power
- City of Portland
- Detroit Public Lighting Department
- City of Sebewaing
- City of Dowagiac
- City of South Haven
- City of Eaton Rapids
- City of St Louis
- Traverse City Light & Power
- City of Sturgis
- City of Harbor Springs
- Traverse City Light & Power
- City of Hart Hydro
- Wyandotte Dept. of Municipal Service
- Holland Board of Public Works
- Zeeland Board of Public Works

Appendix B Program Descriptions

The BWL and MPPA EE Service Committee municipal utility members offered a variety of residential, commercial and industrial EO programs. This appendix briefly and generically describes the programs that may have been offered by the individual utilities. The individual utilities determined which of the specific programs were offered to their customers, as well the appropriate implementation approach.

Residential Programs

Efficient Lighting Program: This program promotes the installation of ENERGY STAR fixtures, compact fluorescent light bulbs (CFLs), ceiling fan lights, and LED holiday lighting. The measures were distributed to participants in various methods, according to the utilities preference. The distribution methods included: in-store promotion; special sales: internet orders; coupons; over the counter at the utility offices; or at events (i.e. home shows) The Efficient Lighting Program was marketed in various ways such as through the utility website and through return cards that were mailed out to customers. The Efficient Lighting Program also provides opportunities for recycling CFLs.

Refrigerator/Freezer Turn-In Program: This program encourages customers to dispose of "second" refrigerators and encourages the accelerated retirement of older, inefficient "primary" refrigerators and freezers. The program offers turnkey pick up and recycling services.

High-Efficiency Appliances/ High-Efficiency HVAC: This program provides incentives to customers to encourage them to replace their older, inefficient dehumidifiers and room air-conditioners with high-efficiency ENERGY STAR qualified units. This program also promotes heating and cooling technologies that can reduce electric energy use. The program focuses on the promotion of high-efficiency central air-conditioning and premium efficiency furnaces that have high-efficiency motors (electrically commutated motors – ECMs). ECM motors save electric energy during the heating and cooling seasons.

Low Income Services Program: This program provides funding to upgrade the energy efficiency of customers living on limited incomes by subsidizing the installation of cost effective electric measures. The delivery of the program is coordinated with local weatherization or Low Income Assistance agencies.

Multifamily In-Unit/ Commercial Services for Multi-Family Property Owners Programs: In 2011 these programs were combined. The Multi-Family In-Unit Efficiency Program provides a turn-key service for helping customers reduce their electric energy use in multi-family buildings. Participants are provided CFL's, along with several low-flow water-saving devices. The service is provided to property owners and occupants at no cost. Services for Multi-Family Property Owners were integrated with the Multi-Family In-Unit Efficiency program, delivering benefits to both property owners and tenants. An Energy Advisor visited targeted properties to offer a free on-site analysis of the building's energy use for common area lighting and appliances and will provide recommendations to the property owner, including estimated costs and payback, lists of qualified products and vendors, and applications for financial incentives.

Education Services: This program provides informative and actionable educational materials to residential customers that communicate to and educate customers on the benefits of energy efficiency and conservation. Such materials include brochures, fact sheets, workshops, web sites and online energy audits.

Pilot/Emerging Technology Program: Residential pilot programs pursue the new initiatives, such as Residential-sized HVAC equipment optimization, advanced residential water heating technology or promotion of LED lighting technology in residential applications
:

Commercial and Industrial Programs

Prescriptive Incentive Program: This program affects the purchase and installation of high-efficiency electric technologies in the commercial and industrial sectors through a combination of market push and pull strategies that stimulate market demand while simultaneously increasing market provider investment in stocking and promoting high-efficiency products. Business customers can apply for incentives averaging 20% to 40% of the incremental cost of purchasing qualifying technologies. The program engages market provider support through a targeted outreach effort.

Custom Incentive Program: This program helps customers and market providers identify more complex energy savings projects, analyze the economics of each project and complete a customized incentive application.

Business Education Services Program: This program provides informative materials and training opportunities to educate business customers on the benefits of energy efficiency and

conservation. Such materials may include brochures, fact sheets, case studies, web sites, and training *seminars*.

Pilot/Emerging Technology Program: C&I pilot programs pursue the new initiatives, such as day lighting, promotion of LED lighting technology in commercial applications, retro-commissioning, etc..

Self-Directed Customers

Certain customers that meet specific criteria can opt out of utility sponsored Energy Optimization Programs, and the attendant rate surcharges. To be eligible to become “self-direct" a customer must have an annual peak demand in the preceding year of at least two megawatts at each site or an aggregate of ten megawatts for all of its sites, and notify its electric provider of its intent to implement a self-directed energy optimization program. The customer was then required to file a self-directed energy optimization plan with their electric provider by January, 2009. For administrative efficiency, customers were required to file their self-directed plans using a Commission-designed standardized template. This template includes projected energy savings estimates. Once a customer began to implement the self-directed plan at a site covered by the plan, the site was exempt from the surcharge and not eligible for the provider's energy optimization activities. A self-directed energy optimization plan was considered complete, and the customer exempt from the provider's surcharge after the start date of the first action item of the customer's self-directed energy optimization plan.

Appendix C Sample Design and Analysis Equations

$$n_0 = \frac{z^2 pq}{d^2}$$

$$n_1 = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

Where,

n0 = the req

The verification used model based statistical sampling (MBSS) to guide the sample design. This technique used a statistical model and its parameters to represent prior information about the population to be sampled. The model describes the nature of the variation in the relationship between a key target variable y of the study (called the dependent variable), in this case the actual amount of program energy savings and an explanatory variable x, in our case the tracking system estimate of savings. The model is used to help choose the sample size n and to help formulate a sample design with near-optimal stratification for stratified ratio estimation. The model describes the trend and the variation around the trend, i.e., the conditional mean and standard deviation of y given x.

The model is used as a guide to the sample design, but the results of the study itself are not strongly dependent on the accuracy of the model. Once the sample design is selected, the subsequent analysis of the data is usually based only on the sample design and not on the model used to develop the sample design. In particular, conventional stratified-sampling techniques can be used to analyze the sample data collected from an MBSS sample design. The resulting estimates will be almost unbiased in repeated sampling and the confidence intervals will also be valid, provided that the sample design is followed.

$$y_k = \beta x_k + \varepsilon_k$$
$$\sigma_k = sd(\varepsilon_k) = \sigma_0 x_k^{\gamma}$$

Equation 1 Primary and Secondary Equations

Equation 3 illustrates the primary and secondary equations of the model that are used in the sample design. Here $x_k > 0$ is the tracking system estimate of energy savings, and is known for each participant, k, in the population. The residuals are considered to be N independent random variables with zero expected value and standard deviations following the secondary equation. There are three parameters in the model: β (beta), σ_0 (sigma-naught), and γ (gamma). The coefficient beta is a fixed constant applied to the known tracking estimate xk to predict the actual savings yk. σ_k is the residual standard deviation of each unit k. Both the expected value σ_k and residual standard deviation σ_k generally vary from one unit to another depending on x_k, following the primary and secondary equations of the model. In statistical jargon, the ratio model is a (usually) heteroscedastic regression model with zero intercept. Gamma describes how the standard deviation varies in relationship to the tracking system estimate of savings.

$$n_0 \approx \left(\frac{z\ er}{D} \right)^2$$
$$n = \frac{n_0}{1 + n_0 / N}$$

Where:

D is the desired relative precision, and

z corresponds to the desired confidence level.

Equation 2 The Initial Sample Size Calculation

Using MBSS techniques in sample design minimizes the uncertainty of the results by controlling the variation of the sample. Accordingly, for the verification the initial sample size was

determined usingEquation 2. Sample size is based on an assumed "error ratio"1.

The true error ratios are not yet known. However, based on last year's evaluation the error ratios can be estimated. From last year's evaluation, the sample could be based on the "gross" savings estimates, or the "net" savings estimates. The net savings results were more variable. However, the gross savings is what is required to be reported. Accordingly, it was decided to use the net savings estimates as a guide to the sample design, as long as the ultimate design would result in acceptable precision for the gross estimates.

Table 1 presents a recap of the sample design, and expected confidence intervals.

Parameter	Gamma	Beta	Error Ratio	Population	Sample	Design Confidence	
	γ	β	ER	N	n	Net	Gross
Program							
Residential							
Lighting	0.80	0.71	0.90	8,271	57	11%	2%
Applicance Pick Up	0.80	0.49	0.82	495	54	23%	5%
HVAC	0.80	0.19	1.20	495	90	23%	2%
Multifamily	0.80	0.77	0.15	66	8	9%	1%
Low Income	0.80	0.68	0.10	389	6	9%	1%
C&I							
Perscriptive	0.80	0.60	0.74	212	32	7%	1%
Custom	0.80	0.42	0.84	68	40	17%	1%

Table 1 Sample Design Parameters, Sample Sizes and Expected Confidence Intervals

The next step in the sample design was to choose the number of strata. Typically, in evaluations such as these three strata are chosen (small, medium and large). Next, stratum boundaries are determined so there is approximately equal amount of variance in each stratum. To do this the tracking estimates of savings are sorted. The participant savings are raised to the assumed (x^{γ}) gamma. This is a proxy for $\sigma_i = \sigma_o x^{\gamma}$. The relative cumulative sum of the x^{γ} is then calculated. The strata cut points identified as the multiples of the cumulative sum divided by the number of strata. For the sample design for all programs, the value of gamma was assumed to be 0.8. The other parameters can be found in Table 1.

[1] The error ratio is defined as the ratio between (a) the sum or average of the residual standard deviations of all customers in the model, and (b) the sum or average of the expected values of y. The error ratio is another kind of coefficient of variation

The final sample designs can be found in Table 2.

Strata	N	n	Max	Sum
Residential				
Lighting				
1	6,098	25	176.40	1,047,199
2	2,166	25	264.60	573,124
3	7	7	882.00	4,498
Appliance Pick Up				
1	1,144		1,672.00	1,566
2	82		3,344.00	3,221
HVAC				
1	399	43	730.00	180,804
2	4	4	780.00	2,988
3	92	43	1,510.00	105,545
Multifamily				
1	54	8	61,651.80	885,357
2	12	8	197,391.00	1,262,847
Low Income				
1	352	3	1,100.00	725
2	37	3	52,540.00	2,677
Commercial and Industrial				
Prescriptive				
1	34	8	15,222.00	215,386
2	12	8	32,169.30	273,535
3	8	8	48,142.00	301,425
4	14	8	1,429,123.00	2,667,593
Custom				
1	38	10	18,683.00	288,046
2	13	10	37,432.60	376,797
3	9	10	62,997.00	459,192
4	8	10	1,429,123.00	2,333,906

Table 2 Sample Designs

Appendix D Analysis Methodology

Model Based Statitical Sampling and analysis was the basis of the anlaysis. For each of the programs, an appropriate evaluation approach was developed. This section describes the methodologies used for each program's analysis approach.

Model Based Statistical Sampling and Analysis

This technique used a statistical model and its parameters to represent prior information about the population to be sampled. The model describes the nature of the variation in the relationship between a key target variable y of the study (called the dependent variable), in this case the actual amount of program energy savings and an explanatory variable x, in our case the tracking system estimate of savings. The model is used to help choose the sample size n and to help formulate a sample design with near-optimal stratification for stratified ratio estimation. The model describes the trend and the variation around the trend, i.e., the conditional mean and standard deviation of y given x.

The model is used as a guide to the sample design, but the results of the study itself are not strongly dependent on the accuracy of the model. Once the sample design is selected, the subsequent analysis of the data is usually based only on the sample design and not on the model used to develop the sample design. In particular, conventional stratified-sampling techniques can be used to analyze the sample data collected from an MBSS sample design. The resulting estimates will be almost unbiased in repeated sampling and the confidence intervals will also be valid, provided that the sample design is followed.

Equation 3 illustrates the primary and secondary equations of the model that is used in the sample design. Here $x_k > 0$ is the tracking system estimate of energy savings, and is known for each participant, k, in the population. The residuals are considered to be *N* independent random variables with zero expected value and standard deviations following the secondary equation. There are three parameters in the model: β(beta), σ_o(sigma-naught), and γ (gamma). The coefficient beta is a fixed constant apply to the known tracking estimate x_k to predict the actual savings y_k . σ_k is the residual standard deviation of each unit *k*. Both the expected value μ_k and residual standard deviation σ_k generally varies from one unit to another depending on x_k, following the primary and secondary equations of the model. In statistical jargon, the ratio model is a (usually) heteroscedastic regression model with zero intercept. Gamma describes how the standard deviation varies in relationship

$$y_i = \beta\, x_i + \varepsilon_i$$
$$\sigma_i = sd(\varepsilon_i) = \sigma_0\, x_i^{\gamma}$$

Equation 3 Primary and Secondary Equations

Using MBSS techniques in sample design minimizes the uncertainty of the results by controlling the variation of the sample. Accordingly, for the verifications the initial sample size was determined using Equation 4. Sample size is based on an assumed "error ratio"[2].

The true error ratios were not known. However, based on past experience, a high level of compliance should be expected.

The next step in the sample design is to choose the number of strata. Typically, in evaluations such as these three strata are chosen (small medium and large). Next, stratum boundaries are determined so there is approximately equal amount of variance in each stratum. To do this the tracking estimates of savings are sorted. The participant savings are raised to the assumed (x^{γ}) gamma. This is a proxy for $\sigma_i = \sigma_o\, x^{\gamma}$. The relative cumulative sum of the x^{γ} is then calculated. The strata cut points identified as the multiples of the cumulative sum divided by the number of strata.

$$n_0 \approx \left(\frac{z\ er}{D} \right)^2$$

$$n = \frac{n_0}{1 + n_0 / N}$$

Where:

D is the desired relative precision, and

z corresponds to the desired confidence level.

[2] The error ratio is defined as the ratio between (a) the sum or average of the residual standard deviations of all customers in the model, and (b) the sum or average of the expected values of y. The error ratio is similar to the coefficient of variation

Equation 4 The Initial Sample Size Calculation

Ratio Estimate

$$\hat{B}_0 = \frac{\sum_{i=1}^{n_0} w_i\ y_i}{\sum_{i=1}^{n_0} w_i\ x_i}$$

Mean

$$\bar{y}_0 = \hat{B}_0\ \mu_{x0}$$

Total

$$\hat{Y}_0 = \hat{B}_0\ X_0$$

where $w_i = N_h / n_h$

Equation 5 Combined Ratio Estimation

1. Calculate the residuals $e_i = y_i - \hat{B}_0\ x_i$

2. Calculate $se\left(\hat{B}_0\right) = \left(\frac{1}{\hat{X}_0}\right)\sqrt{\sum_{1=1}^{n_0} w_i\left(w_i - 1\right)e_i^2}$

   with $\hat{X}_0 = \sum_{i=1}^{n_0} w_i\ x_i$

3. Then $se\left(\bar{y}_0\right) = se\left(\hat{B}_0\right)\mu_{x0}$ and $se\left(\hat{Y}_0\right) = se\left(\hat{B}_0\right)X_0$

Equation 6 Calculating the Statistical Precision

Residential Efficient Lighting Program, Refrigerator/Freezer Turn-In Program, High-Efficiency Appliances/ High-Efficiency HVAC Program, and the Low Income Program

Customer verification data were collected for the Residential Efficient Lighting and the Refrigerator/Freezer Turn-In Programs through the use of a telephone survey. A random sample was selected from all known and available participating efficient lighting and refrigerator turn-in customers. The responses from the sampled customers determined the compliance rate (i.e., the percentage of measures that are installed and operating as planned) for each programs.

The participants were asked:

- To verify they did participate in the program
- How many measures they received
- Are they using all of the measures

- The CFL participants were asked where these lamps were installed (kitchen, bathroom, bedroom, etc.) and the typical hours per day the CFLs were used, by season
- How satisfied were they with the program
- Information to determine the net to gross ratio (free ridership, spillover, etc.)
- Program satisfaction,

From the returned surveys, proportions of the measures that were installed and operating as intended were estimated, net to gross estimates and process information.

Equation 5 was used to determine the verified savings, and Equation 6 was used to estimate the statistical precision of the estimate.

Residential Multifamily Program

Customer verification data were collected for the Multifamily Program through the use of on-site surveys. The on-site engineer verified measures in common areas and in a sample of units. While on site the engineer interviewed the property management. From the on-site inspection and interview, compliance rate (i.e., the percentage of measures that are installed and operating as planned) was determined.

Multifamily participants were asked:

- To verify they did participate in the program
- Verify the measures installed
- Net to gross questions,
- Program satisfaction

Equation 5 was used to determine the verified savings, and Equation 6 was used to estimate the statistical precision of the estimate.

Commercial and Industrial Prescriptive and Custom Programs

For the verification, an energy engineer conducted a quality control inspection of commercial and industrial participants of the C&I Prescriptive Program and C&I Custom Program. The engineer physically inspected all measures and commented on both the quality and the appropriateness for the participant. The inspector noted any problems with measure installation and recorded any customer comments expressing either satisfaction or dissatisfaction with the program, measures, and contractor services. The engineer inspected all of the measures or

activities recorded in the participant's program file. A copy of the on-site inspection form can be found in Appendix E .

The information gathered on site was used to verify the savings of the measures that were installed and operating as intended. The verified estimate of savings and the tracking system estimate of savings were used to develop a stratified ratio estimate of program savings.

Equation 5 shows the ratio estimator. In this equation y denotes the onsite verified estimate of savings, x denotes the tracking system estimate of savings, and w denotes the case weights.

In addition to the estimate of the mean demand and the population total of demand, the statistical precision associated with each variable estimate was also estimated. **Equation 6** presents the three steps necessary to calculate the statistical precision associated with our combined stratified ratio estimator.

Residential Education Services Programs and Commercial and Industrial Education Services Program

The municipal utilities may have self implemented the Residential Low Income Services and Education Services Programs and the Business Education Services Program. Accordingly, the verification of these programs was accomplished by conducting a survey and follow up interviews with the municipal utilities. The survey was designed to identify the actions that were taken by the municipal utility, how the programs were implemented, participation levels, and costs associated with each of these programs. A copy of the interview guide can be found in Appendix G .

The verification was conducted through a brief 15 to 20 minute interview with the municipal utility officer responsible for these programs. A contact list of 24 municipal utilities and corresponding staffs was provided to KEMA. The MPPA initially contacted representatives from each municipal utility to inform them that KEMA would be contacting them to perform this interview. Immediately following, KEMA called a representative from each municipality to arrange a convenient day and time to conduct the interview and the appropriate utility manager or public official to be interviewed. Each official was also given the option of receiving the interview questions ahead of time. Interview questions posed to each official explored the

funding of the various programs in 2011 and what the plans would be for each these programs in 2011. These interviews were conducted by KEMA staff in the fourth quarter of 2011.

Self-Directed Customers

Self-directed customers were asked to submit a report to the municipal utility regarding their EO activities. A qualified independent energy engineer reviewed the submitted documentation and developed a short summation that recapitulates the activities, savings methodology, and savings estimates. The reports included a conclusion as to the veracity of the savings, e.g., the methods use to determine the savings estimates are commonly accepted, and that the savings estimates were reasonable.

Pilot Programs

Utilities that implemented Pilot Programs were asked to submit a documentation that described the program and the expected savings. A qualified independent energy engineer reviewed the submitted documentation and developed a short summation that recapitulates the activities, savings methodology, and savings estimates. The reports included a conclusion as to the veracity of the savings, e.g., the methods use to determine the savings estimates are commonly accepted, and that the savings estimates were reasonable.

Appendix E Surveys

Efficient Lighting Program

Residential Energy Efficient Lighting CATI Survey
Revised – 10/19/2011

Survey house instructions

1. Text in **bold** should be read.
2. Text in brackets [ ] are instructions for interviewer, minor programming such as skips, or answer choices and should NOT be read.
3. Text in carrots < > are database variables that should be filled in on a case-by-case basis.

4. Text in gray boxes is major programming instruction.
5. Unless specifically noted, do NOT read answer choices. [Don't know] and [Refused] should NEVER be read.

INTRODUCTION

Intro1. Hello, my name is _____, and I'm calling on behalf of the Efficient Lighting program offered through <utility>. I'm calling to talk to you about some CFL light bulbs you recently received from your utility. I'm not selling anything; I'd just like to ask your opinions. Your responses will be kept confidential and your individual responses will not be revealed to anyone.

1	[AGREES TO PARTCIPATE]	Intro2
2	[DOES NOT AGREE TO PARTCIPATE]	TERMINATE

Intro2. Our records show that you received some compact fluorescent light bulbs from the program. Are you familiar with these bulbs?

1	[Yes]	Intro6
2	[No]	Intro3
-97	[Don't know]	
-98	[Refused]	

Intro3. Who could I speak to that would be familiar with that process?

	[RECORD FIRST and LAST NAME]	Intro4
-98	[Refused]	
-97	[Don't know]	

Intro4. Could I speak with <Intro3> now?

1	[Yes]	Intro1
2	[No]	Intro5
-97	[Don't know]	
-98	[Refused]	

Intro5. When is a good time I could call back to reach <Intro3>?

	[RECORD DAY and TIME]	Call back later
-98	[Refused]	
-97	[Don't know]	

[If <intro3> ≠ <cont1>, else skip to V1]

Intro6. What is your name?

	[RECORD FIRST and LAST NAME]	V1
-98	[Refused]	
-97	[Don't know]	

Verification

V1 . Just to Verify, did you get one or more compact fluorescent light bulbs (CFL) from your utility this year?

1	Yes	V2
2	No	
-97	[Don't know]	
-98	[Refused]	

V2 . Are you using these CFL light bulbs at <address>?

1	Yes	V3
2	No	
-97	[Don't know]	
-98	[Refused]	

V3. How many light bulbs did you receive?

	[Enter quantity]	V4
-97	[Don't know]	
-98	[Refused]	

V4. How many are currently installed in a socket and being used (as opposed to being in storage)?

	[Enter quantity]	V5
-97	[Don't know]	
-98	[Refused]	

V5. Can you tell me how many of these CFLs are installed in the following room?

	[ROOM_TYPE]		
1	**Kitchen**	RECORD # INSTALLED	V6
2	**Dining room**	RECORD # INSTALLED	
3	**Living room**	RECORD # INSTALLED	
4	**Family room/den**	RECORD # INSTALLED	
5	**Bedroom**	RECORD # INSTALLED	
6	**Bathroom (full bath)**	RECORD # INSTALLED	
7	**Bathroom (half bath)**	RECORD # INSTALLED	
8	**Laundry or utility room**	RECORD # INSTALLED	
9	**Closet**	RECORD # INSTALLED	
10	**Garage**	RECORD # INSTALLED	
11	**Hallway or entryway**	RECORD # INSTALLED	
-77	**Other room (specify)**	RECORD # INSTALLED	
-97	**[Don't know]**		
-98	**[Refused]**		

V6. On average, how many hours per day are the CFLs you installed turned on during the winter?

	[RECORD Hours (max = 24)]	V7
-97	[Don't know]	V7
-98	[Refused]	V7

V7. On average, how many hours per day are the CFLs you installed turned on during the summer?

	[RECORD Hours (max = 24)]	V8
-97	[Don't know]	V8
-98	[Refused]	V8

V8. Had you purchased CFL bulbs before receiving these free bulbs?

1	[Yes]	V9
2	[No]	V9
-97	[Don't know]	V9
-98	[Refused]	V9

NET TO GROSS

DAT0. Next, I have some questions about the effect of the program on your decision to purchase CFLs.

If the program had not given you free CFL bulbs, how likely would you have been to purchase CFLs at the store? Would you say… READ UNBRACKETED OPTIONS]

1	**Very likely**	**DAT1a**
2	**Somewhat likely**	
3	**Not very likely**	
4	**Or very unlikely**	
-97	[Don't know]	
-98	**[Refused]**	

TIMING

DAT1a. **If the program had not given you any free CFLs and you were going to purchase some, would you have purchased them…**[READ UNBRACKETED OPTIONS]

1	**at the Same time**	**DAT2**
2	Earlier	
3	Later	**DAT1b**
4	or never	**DAT2**
97	[Don't know]	
98	**[Refused]**	

IF DAT1a = 3, ask DAT1b, Else SKIP TO DAT2

DAT1b. **Approximately how many months later?**

	[RECORD # months]	DAT2
-97	**[Don't know]**	
-98	[Refused]	

QUANTITY

DAT2. **You said you received <V3> CFLs. If you'd had to purchase them, how many of these bulbs would you have purchased at the store?** [If necessary: For $3 or $4 each]

	[RECORD QUANTITY]	SO0
-97	[Don't know]	SO0
-98	[Refused]	SO0

SPILLOVER

SO0. **Now I'd like to you think of the time since you received the free CFL bulbs.**

SO1. Since you received your free CFL bulbs, have you purchased any other CFL light bulbs on your own?

1	Yes	SO1b
2	No	S0
-97	[Don't know]	
-98	[Refused]	

SO1b. How many have you purchased on your own?

	[Record quantity]	S0
-97	[Don't know]	
-98	[Refused]	

SATISFACTION

S0. Next I have a series of questions about how satisfied you are with different aspects of the CFL program.

S1. Are you satisfied or dissatisfied with the CFL bulbs?

1	Satisfied	S2
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S2. How satisfied or dissatisfied were you with the program as a whole?

1	Satisfied	P1
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

THANK & TERMINATE

END_1. Those are all of the questions I have for you today. Thank you for your time.

Refrigerator/Freezer Turn-In Program

Appliance Recycling Rebate Program
Residential CATI Survey
Revised – 10/25/2011

Survey house instructions

1. **Text in** bold **should be read.**
2. **Text in brackets [ ] are instructions for interviewer, minor programming such as skips, or answer choices and should NOT be read.**
3. **Text in carrots < > are database variables that should be filled in on a case-by-case basis.**
4. **Text in double-carrots << >> are larger blocks of text that will change on a case-by-case basis depending on database variables.**
5. **Text in gray boxes is major programming instruction.**
6. **Unless specifically noted, do NOT read answer choices. [Don't know] and [Refused] should NEVER be read.**
7.

INTRODUCTION

Intro1. May I speak with <cont1>? Hello, my name is _____, and I'm calling on behalf of the Appliance Recycling program offered through <utility>. I'm calling to talk to you about some appliances you recently recycled . I'm not selling anything; I'd just like to ask your opinions. Your responses will be kept confidential and your individual responses will not be revealed to anyone.

1	[AGREES TO PARTCIPATE]	Intro2
2	[DOES NOT AGREE TO PARTCIPATE]	TERMINATE

Intro2. Our records show that you received rebates for <equipment_Text> **you recently recycled. Are you familiar with having a refrigerator or freezer picked up earlier this year?**

1	[Yes]	VG0
2	[No]	Intro3
-97	[Don't know]	Intro3
-98	[Refused]	Intro3

Intro3. Who could I speak to that would be familiar with that process?

	[RECORD FIRST and LAST NAME]	Intro4
-98	[Refused]	Intro4
-97	[Don't know]	Intro4

Intro4. Could I speak with <Intro3> **now?**

1	[Yes]	Intro1
2	[No]	Intro5
-97	[Don't know]	Intro5
-98	[Refused]	Intro5

Intro5. When is a good time I could call back to reach <Intro3>**?**

	[RECORD DAY and TIME]	Call back later
-98	[Refused]	Call back later
-97	[Don't know]	Call back later

Intro6. What is your name?

	[RECORD FIRST and LAST NAME]	VG0
-98	[Refused]	VG0
-97	[Don't know]	VG0

VERIFY GROSS INSTALLATION

VG0. Next, I have some questions about the equipment you recycled.

VG1. Our records show <equipment_text> was picked up from <address>. Is that correct?

1	[Yes]	Next section
2	[No]	VG2
-97	[Don't know]	Thank and Terminate
-98	[Refused]	

VG2. If not, what is the correct information?

	[RECORD VERBATIM]	VG3
-97	[Don't know]	
-98	[Refused]	

VG3. How many refrigerators do you still own and use?

	[RECORD Quantity]	VG4
-97	[Don't know]	
-98	[Refused]	

VG3. How many freezers do you still own and use?

	[RECORD Quantity]	Next section
-97	[Don't know]	
-98	[Refused]	

Start REFRIGERATORS [Ask if <Ref> = 1]

R1. Of the refrigerators that were picked up, how many were being used as a main refrigerator?

	[RECORD QUANTITY]	R2
-97	[Don't know]	
-98	[Refused]	

R2. How many were being used as a spare refrigerator?
IF NEEDED: Units in storage would be considered spare refrigerators.

	[RECORD QUANTITY]	R2a
-97	[Don't know]	
-98	[Refused]	

[Spare Refrigerator questions: Ask if R2 > 0, else go to R3]

R2a. How long had you used the first [next] refrigerator as a spare?

	[Record Years]	R2b
	[Record Months]	
-97	[Don't know]	
-98	[Refused]	

R2b. How many months in the past year was it plugged in and running?

	[Record Months]	R3
-97	[Don't know]	
-98	[Refused]	

[Repeat questions R2a and R2b <<numRepeats>> times]
[End Spare Refrigerator questions block]

R3. Did you replace this recycled refrigerator with another refrigerator?

1	[Yes]	R3a
2	[No]	R4
-97	[Don't know]	
-98	[Refused]	

R3a. Is the replacement refrigerator brand new or used?

1	[Brand new refrigerator]	R3b
2	[Used refrigerator]	R4
-97	[Don't know]	
-98	[Refused]	

R3b. Is the replacement refrigerator an EnergyStar model?

1	[Yes]	R4
2	[No]	
-97	[Don't know]	
-98	[Refused]	

R4. Thinking about your recycled refrigerator, before hearing about this recycling program, had you already considered discarding this refrigerator? IF NEEDED: By discard, we mean selling the unit, giving it away, having someone pick it up or taking it to the dump or a recycling center.

1	[Yes]	R5
2	[No]	
-97	[Don't know]	
-98	[Refused]	

R5. If the recycling program had not picked up the refrigerator when it did, would you have still gotten rid of it, or would you have kept it?

1	[Gotten rid of it]	R6
2	[Kept it]	R7
-97	[Don't know]	End Ref. Section
-98	[Refused]	

R6. How would you have gotten rid of it?

	[Record verbatim]	R6a
-97	[Don't know]	
-98	[Refused]	

F6a. Getting rid of a refrigerator can be a bit of a hassle, when do you think you would have gotten rid of the refrigerator if the program had not picked it up when it did?

1	At the same time	End Ref. section
2	Within 3-4 months	
3	Within 6 months to a year	
4	More than a year later	
5	Actually might have kept it instead	R7
-97	[Don't know]	End Ref. section
-98	[Refused]	

R7. Would it have been stored unplugged, or used as a spare (DO NOT READ)

1	[Stored unplugged]	End Ref. Section
2	[Used as a spare]	
3	[Both – store it and use it some]	
4	[No – Would not have kept it]	
-97	[Don't know]	
-98	[Refused]	

End REFRIGERATORS

Start FREEZERS [Ask if <Frz> = 1]

F1. I'd like to talk about the freezer that was removed. During the time just before deciding to have it removed, was the freezer plugged in and running?

1	[Yes]	F2
2	[No]	
-97	[Don't know]	
-98	[Refused]	

F2. How long had you had the freezer? [PROBE FOR NUMERIC AGE/TIME RESPONSE. USE MONTHS FOR PARTIAL YEARS]

	[Record Years]	F3
	[Record Months]	
-97	[Don't know]	
-98	[Refused]	

F3. How many months in the past year was it plugged in and running?

	[Record Months]	F4
-97	[Don't know]	
-98	[Refused]	

F4. Did you replace this recycled freezer with another freezer?

1	[Yes]	F4a
2	[No]	F5
-97	[Don't know]	
-98	[Refused]	

F4a. Was the replacement freezer brand new or used?

1	[Brand new freezer]	F5
2	[Used freezer]	
-97	[Don't know]	
-98	[Refused]	

F5. Thinking about your recycled freezer, before hearing about this recycling program, had you already considered discarding this freezer? IF NEEDED: By discard, we mean selling the unit, giving it away, having someone pick it up or taking it to the dump or a recycling center.

1	[Yes]	F6
2	[No]	
-97	[Don't know]	
-98	[Refused]	

F6. If the recycling program had not picked up the freezer when it did, would you have still gotten rid of it, or would you have kept it? (DO NOT READ)

1	[Gotten rid of it]	F7
2	[Kept it]	F8
-97	[Don't know]	End freezer Section
-98	[Refused]	

F7. How would you have gotten rid of it?

	[Record verbatim]	F7a
-97	[Don't know]	
-98	[Refused]	

F7a. Getting rid of a freezer can be a bit of a hassle, when do you think you would have gotten rid of the freezer if the program had not picked it up when it did?

1	At the same time	End freezer section
2	Within 3-4 months	
3	Within 6 months to a year	
4	More than a year later	
5	Actually might have kept it instead	F8
-97	[Don't know]	End freezer section
-98	[Refused]	

F8. Would it have been stored unplugged, plugged in and running or both? (DO NOT READ)

1	[Stored unplugged]	End freezer section
2	[Plugged in and running]	
3	[Both – store it and use it some]	
4	[No – Would not have kept it]	
-97	[Don't know]	
-98	[Refused]	

End FREEZERS

ATTRIBUTION

A1. What is the main reason you chose this service to dispose of your appliance(s)?

	[RECORD VERBATIM]	A2
-97	[Don't know]	
-98	[Refused]	

A2. Are there any other reasons? If yes: what were they?

	[RECORD VERBATIM]	A3
-97	[Don't know]	
-98	[Refused]	

A3. Did you receive any incentive?

1	Yes	A3a
2	No, did not receive incentive	A4
-97	[Don't know]	
-98	[Refused]	

A3a. Approximately how long did it take to receive your incentive? (DO NOT READ)

1	[1 week or less]	A4
2	[2-3 weeks]	
3	[More than 3 weeks]	
4	[Got it at time of pickup]	
-97	[Don't know]	
-98	[Refused]	

A4. Did you know about the incentive prior to scheduling the pick-up?

1	[Yes]	A5
2	[No]	
-97	[Don't know]	
-98	[Refused]	

A5. If the incentive had not been offered would you have still used this service?

1	[Yes]	Next Section
2	[No]	
-97	[Don't know]	
-98	[Refused]	

SATISFACTION

S0. Next I have a series of questions about how satisfied you are with different aspects of the Appliance Recycling program.

S1. Are you satisfied or dissatisfied with the pick up process?

1	Satisfied	S2
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S2. How about the dollar amount of the rebate?

1	Satisfied	S3
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S3. How satisfied or dissatisfied were you with the timeliness of the rebate payment?

1	Satisfied	S4
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S4. How about the rebate application forms and other paperwork?

1	Satisfied	S5
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S5. How satisfied or dissatisfied were you with the program as a whole?

1	Satisfied	P1
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

THANK & TERMINATE

END_2. Those are all of the questions I have for you today. Thank you for your time.

Residential High-Efficiency Appliances/ High-Efficiency HVAC

Residential Energy Efficient HVAC CATI Survey
Revised – 10/20/2011

Survey house instructions

1. **Text in** bold **should be read.**
2. **Text in brackets [ ] are instructions for interviewer, minor programming such as skips, or answer choices and should NOT be read.**
3. **Text in carrots < > are database variables that should be filled in on a case-by-case basis.**
4. **Text in gray boxes is major programming instruction.**
5. **Unless specifically noted, do NOT read answer choices. [Don't know] and [Refused] should NEVER be read.**
6.

INTRODUCTION

Intro1. May I speak with <cont1>? Hello, my name is _____, and I'm calling on behalf of the <program> program offered through <utility>. I'm calling to talk to you about some appliances you recently received a rebate for. I'm not selling anything; I'd just like to ask your opinions. Your responses will be kept confidential and your individual responses will not be revealed to anyone.

1	[AGREES TO PARTCIPATE]	Intro2
2	[DOES NOT AGREE TO PARTCIPATE]	END_1

Intro2. Our records show that you received rebates for a/an <Equipment> you recently purchased. Are you familiar with the decision to purchase this equipment?

1	[Yes]	Intro6
2	[No]	Intro3
-97	[Don't know]	
-98	[Refused]	

Intro3. Who could I speak to that would be familiar with that process?

	[RECORD FIRST and LAST NAME]	Intro4
-98	[Refused]	
-97	[Don't know]	

Intro4. Could I speak with <Intro3> now?

1	[Yes]	Intro1
2	[No]	Intro5
-97	[Don't know]	
-98	[Refused]	

Intro5. When is a good time I could call back to reach <Intro3>?

	[RECORD DAY and TIME]	Call back later
-98	[Refused]	
-97	[Don't know]	

[If <intro3> ≠ <cont1>, else skip to V1]

Intro6. What is your name?

	[RECORD FIRST and LAST NAME]	V1
-98	[Refused]	
-97	[Don't know]	

START EQUIPMENT BLOCK: Repeat V1 to DAT3 for each measure that was installed (Equipment1, Equipment2, … Equipment*x*)

Verification

V1 . Just to Verify, did you install a/an <equipment> around <month> of this year?

1	Yes	V2
2	No	
-97	[Don't know]	
-98	[Refused]	

V2 . Our records show that it was installed at <address>, is this correct?

1	Yes	V3
2	No	
-97	[Don't know]	
-98	[Refused]	

V3. Is this unit (Are these units) still operational? [IF NEEDED; ARE COOLING UNITS OPERATIONAL DURING WARM WEATHER]

1	Yes	V4
2	No	
-97	[Don't know]	
-98	[Refused]	

V4. Did you get a rebate for this unit?

1	Yes	DAT0
2	No	V4a
-97	[Don't know]	DAT0
-98	[Refused]	

V4a. How long ago did you apply for this rebate?

	[Record verbatim]	DAT0
-97	[Don't know]	
-98	[Refused]	

NET TO GROSS

DAT0. **Next, I have some questions about the influence of the <program> program had on your decision to purchase the <Equipment>.**

Without the <program>, would you say the likelihood of purchasing the <equipment> was… [READ UNBRACKETED OPTIONS]

1	**Very likely**	DAT1a
2	**Somewhat likely**	
3	**Not very likely**	
4	**Or very unlikely**	
-97	[Don't know]	
-98	[Refused]	

TIMING

DAT1a. **I'd like to know about the effect, if any, that program incentives had on your decision to purchase the <equipment> when you did. I'm referring to your decision to purchase any <equipment>, not just a high-efficiency one. Would you have purchased the <equipment> …**[READ UNBRACKETED OPTIONS]

1	at the Same time	DAT2a
2	Earlier	
3	Later	DAT1b
4	or never	DAT2a
97	[Don't know]	
98	[Refused]	

IF DAT1a = 3, ask DAT1b, Else SKIP TO DAT2a

DAT1b. **Approximately how many months later?**

	[RECORD # months]	**DAT2a**
-97	**[Don't know]**	
-98	**[Refused]**	

EFFICIENCY

DAT2a. **Next, I'd like to know about the effect, if any, that program incentives had on your decision to purchase a *high efficiency* <equipment>.**

Without <program> would you have purchased a/an <equipment> of the … [READ UNBRACKETED OPTIONS]

1	Same efficiency	DAT3
2	Lesser efficiency	DAT2b
3	Greater efficiency	DAT3
-97	[Don't know]	
-98	[Refused]	

IF DAT2a = 2 (Lesser efficiency), ask DAT2b, else SKIP to DAT3

DAT2b. **Without the program, would you have purchased a/an <equipment> that was…** [READ UNBRACKETED OPTIONS]

1	**Standard efficiency on the market at time**	**DAT3**
2	**Slightly higher than standard efficiency**	
3	**Between standard efficiency and what purchased**	
4	**Slightly lower than the high efficiency purchased**	
-97	**[Don't know]**	
-98	**[Refused]**	

QUANTITY

DAT3. **Finally, I'd like to know about the effect, if any, that program incentives and services had on the number of <equipment> that you purchased. Without the program would you have purchased this <equipment>?**

1	**[Yes]**	**IF last equipment, S0, ELSE go to V1**
2	**[No]**	
4	**[None at all]**	
-97	**[Don't know]**	
-98	**[Refused]**	

END EQUIPMENT BLOCK

SATISFACTION

S0. **Next I have a series of questions about how satisfied you are with different aspects of the <program>.**

S1. **Are you satisfied or dissatisfied with the rebated equipment?**

1	Satisfied	S2
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S2. How about the dollar amount of the rebate?

1	Satisfied	S3
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S3. How satisfied or dissatisfied were you with the timeliness of the rebate payment?

1	Satisfied	S4
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S4. How about the rebate application forms and other paperwork?

1	Satisfied	S5
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S5. How satisfied or dissatisfied were you with the program as a whole?

1	Satisfied	S3
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

SPILLOVER

SO0. Now I'd like to you think of the time since you participated in the <program> program in the past year.

SO1. Since you participated in the <program> program, have you purchased any other energy efficient equipment or installed any additional energy efficient measures without a rebate?

1	Yes	SO1b
2	No	P1
-97	[Don't know]	
-98	[Refused]	

SO1b. What were those measures?

	[Record Response verbatim]	SO1c
-97	[Don't know]	
-98	[Refused]	

SO1c. Have you applied for a rebate for those measures?

1	Yes	P1
2	No	
-97	[Don't know]	
-98	[Refused]	

THANK & TERMINATE

END_3. Those are all of the questions I have for you today. Thank you for your time.

Multifamily Program

Multi-Family Onsite Survey Form
2011 MPPA Energy Optimization Program

Contact:

Auditor:

Appt Day/ Time:

Phone:

Utility:

Company:

Address:

City:

Appointment Notes:

Verification

1st Apartment Verified:		Units to Verify (extract from site documentation for Apt. # above.)					
13 Watt Lamp	13 Watt Fixture	20 Watt Lamp	20 Watt Fixture	HH Showerheads	Showerheads	Bath Aerator	Kitchen Aerator

Units Verified during Site Visit

Units Operational during Site Visit

Comments

2nd Apartment Verified:		Units to Verify (extract from site documentation for Apt. # above.)					
13 Watt Lamp	13 Watt Fixture	20 Watt Lamp	20 Watt Fixture	HH Showerheads	Showerheads	Bath Aerator	Kitchen Aerator

Units Verified during Site Visit

Units Operational during Site Visit

Comments

3rd Apartment Verified:		Units to Verify (extract from site documentation for Apt. # above.)					
13 Watt Lamp	13 Watt Fixture	20 Watt Lamp	20 Watt Fixture	HH Showerheads	Showerheads	Bath Aerator	Kitchen Aerator

Units Verified during Site Visit

Units Operational during Site Visit

Comments

NOTE: These questions should be asked of the building manager, not tenants. If the following NTG questions are asked on the telephone as part of scheduling the onsite visit, they need not be included in the onsite form. If they were NOT asked/answered on the phone, then they should be included and the auditor instructed to ask them while on-site.

NET TO GROSS

DAT0. **Next, I have some questions about the effect the program had on your decision to install the equipment.**

Without the MultiFamily Install program, would you say the likelihood of purchasing and installing the equipment on your own was… [READ UNBRACKETED OPTIONS]

1	**Very likely**	DAT1a
2	**Somewhat likely**	
3	**Not very likely**	
4	**Or very unlikely**	
-97	[Don't know]	
-98	[Refused]	

TIMING

DAT1a. **I'd like to know about the effect, if any, that the program had on your decision to install the lighting fixtures (and faucet aerators (if applicable) when you did. I'm referring to your decision to install any equipment, not just a high-efficiency one. Without the MultiFamily Install program installing this equipment free of charge to you, would you have purchased and installed this equipment …**[READ UNBRACKETED OPTIONS]

1	at the Same time	DAT2a
2	Earlier	
3	Later	DAT1b
4	or never	DAT2a
97	[Don't know]	
98	[Refused]	

IF DAT1a = 3, ask DAT1b, Else SKIP TO DAT2a

DAT1b. **Approximately how many months later?**

	[RECORD # months]	**DAT2a**
-97	**[Don't know]**	
-98	**[Refused]**	

EFFICIENCY

DAT2a. **Next, I'd like to know about the effect, if any, that the program had on your decision to install *high efficiency* <equipment>.**

Without the MultiFamily Install program installing this equipment free of charge to you, would you have purchased and installed lighting fixtures and/or flow restriction devices of the … [READ UNBRACKETED OPTIONS]

1	Same efficiency	DAT3
2	Lesser efficiency	DAT2b
3	Greater efficiency	DAT3
-97	[Don't know]	
-98	[Refused]	

IF DAT2a = 2 (Lesser efficiency), ask DAT2b, else SKIP to DAT3

DAT2b. **Without the program, would you have purchased and installed equipment that was…** [READ UNBRACKETED OPTIONS]

1	**Standard efficiency on the market at time**	**DAT3**
2	**Slightly higher than standard efficiency**	
3	**Between standard efficiency and what purchased**	
4	**Slightly lower than the high efficiency purchased**	

-97	**[Don't know]**	
-98	**[Refused]**	

QUANTITY

DAT3. Finally, I'd like to know about the effect, if any, that the program had on the number of lighting fixtures and water saving equipment that was installed. Without the program would you have purchased and installed the same number of fixtures and flow retriction devices?

1	**[Yes]**	**IF last equipment, S0, ELSE go to V1**
2	**[No]**	
4	**[None at all]**	
-97	**[Don't know]**	
-98	**[Refused]**	

END EQUIPMENT BLOCK

SATISFACTION

S0. Next I have a series of questions about how satisfied you are with different aspects of the <program>.

S1. Are you satisfied or dissatisfied with the installed equipment?

1	Satisfied	S2
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S4. How about any application forms and other paperwork?

1	Satisfied	S5
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S5. How satisfied or dissatisfied were you with the program as a whole?

1	Satisfied	S3
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

SPILLOVER

SO0. Now I'd like to you think of the time since you participated in the <program> program in the past year.

SO1. Since you participated in the <program> program, have you purchased any other energy efficient equipment or installed any additional energy efficient measures without a rebate?

1	Yes	SO1b
2	No	P1
-97	[Don't know]	
-98	[Refused]	

SO1b. What were those measures?

	[Record Response verbatim]	P1
-97	[Don't know]	
-98	[Refused]	

END_4. Those are all of the questions I have for you today. Thank you for your time.

Auditor Signature: Date:

Site Comments:

Appendix F On Site Verification Form

Commercial & Industrial Onsite Survey Form
2011 MPPA Energy Optimization Program

Contact:

Auditor:

Appt Day/ Time:

Phone:

Utility:

Company:

Address:

City:

Appointment Notes:

Verification

(this block should be repeated for each measure to be verified)

Qty Measure	Measure: (put the Measure Name here)
(qty to find)	(put all the detailed info we have about the measure here)

Qty Verified _____

Qty Operational _____

Measure Verified: YES NO (comment on difference in Notes)

Notes:

File name: (list of files containing the documentation for this measure (pdf files, jpg images, etc.)

NOTE: if the following NTG questions are asked on the telephone as part of scheduling the onsite visit, they need not be included in the onsite form. If they were NOT asked/answered on the phone, then they should be included and the auditor instructed to ask them while on-site.

NET TO GROSS

DAT0. **Next, I have some questions about the effect the rebates from the <program> program had on your decision to purchase the <Equipment>.**

Without the <program>, would you say the likelihood of purchasing the <equipment> was… [READ UNBRACKETED OPTIONS]

1	**Very likely**	DAT1a
2	**Somewhat likely**	
3	**Not very likely**	
4	**Or very unlikely**	
-97	[Don't know]	
-98	[Refused]	

TIMING

DAT1a. **I'd like to know about the effect, if any, that program incentives had on your decision to purchase the <equipment> when you did. I'm referring to your decision to purchase any <equipment>, not just a high-efficiency one. Would you have purchased the <equipment> …**[READ UNBRACKETED OPTIONS]

1	at the Same time	DAT2a
2	Earlier	
3	Later	DAT1b
4	or never	DAT2a
97	[Don't know]	
98	[Refused]	

IF DAT1a = 3, ask DAT1b, Else SKIP TO DAT2a

DAT1b. **Approximately how many months later?**

	[RECORD # months]	**DAT2a**
-97	**[Don't know]**	
-98	**[Refused]**	

EFFICIENCY

DAT2a. **Next, I'd like to know about the effect, if any, that program incentives had on your decision to purchase a *high efficiency* <equipment>.**

Without <program> would you have purchased a/an <equipment> of the … [READ UNBRACKETED OPTIONS]

1	Same efficiency	DAT3
2	Lesser efficiency	DAT2b
3	Greater efficiency	DAT3
-97	[Don't know]	
-98	[Refused]	

IF DAT2a = 2 (Lesser efficiency), ask DAT2b, else SKIP to DAT3

DAT2b. **Without the program, would you have purchased a/an <equipment> that was…** [READ UNBRACKETED OPTIONS]

1	**Standard efficiency on the market at time**	**DAT3**
2	**Slightly higher than standard efficiency**	
3	**Between standard efficiency and what purchased**	
4	**Slightly lower than the high efficiency purchased**	
-97	**[Don't know]**	
-98	**[Refused]**	

QUANTITY

DAT3. **Finally, I'd like to know about the effect, if any, that program incentives and services had on the number of <equipment> that you purchased. Without the program would you have purchased this <equipment>?**

1	**[Yes]**	**IF last equipment, S0, ELSE go to V1**
2	**[No]**	
4	**[None at all]**	
-97	**[Don't know]**	
-98	**[Refused]**	

END EQUIPMENT BLOCK

SATISFACTION

S0. Next I have a series of questions about how satisfied you are with different aspects of the <program>.

S1. Are you satisfied or dissatisfied with the rebated equipment?

1	Satisfied	S2
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S2. How about the dollar amount of the rebate?

1	Satisfied	S3
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S3. How satisfied or dissatisfied were you with the timeliness of the rebate payment?

1	Satisfied	S4
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S4. How about the rebate application forms and other paperwork?

1	Satisfied	S5
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

S5. How satisfied or dissatisfied were you with the program as a whole?

1	Satisfied	S3
2	Dissatisfied	
-97	[Don't know]	
-98	[Refused]	

SPILLOVER

SO0. Now I'd like to you think of the time since you participated in the <program> program in the past year.

SO1. Since you participated in the <program> program, have you purchased any other energy efficient equipment or installed any additional energy efficient measures without a rebate?

1	Yes	SO1b
2	No	P1
-97	[Don't know]	
-98	[Refused]	

SO1b. What were those measures?

	[Record Response verbatim]	P1
-97	[Don't know]	
-98	[Refused]	

END_5. Those are all of the questions I have for you today. Thank you for your time.

Auditor Signature: Date:

Site Comments:

Appendix G Utility Manager Interview Guides

MUNICIPAL UTILITY NAME
Evaluation of Energy Optimization Programs
Municipal Interview Guide

Thank you for agreeing to participate in this interview, which is being performed by KEMA on behalf of the MUNI NAME. KEMA has been selected by MUNI NAME to perform an evaluation of the Energy Optimization Programs for Low Income Services, Residential Education Services and Business Education Services Programs. Our goal is to gain a better understanding of the actions taken by municipal utilities to implement these programs, as well as the program participation levels and costs.

The following questions will be asked during your scheduled interview. Your answers will help us gather information and insights on the program savings, the steps taken while implementing the programs, and program recommendations.

Please feel free to contact us prior to your scheduled interview if you have further questions. We appreciate your time and participation in the Energy Optimization program and this evaluation.

Sincerely,

KEMA, Inc.

Program Descriptions:

If needed - below are descriptions of the programs that are covered in the interviews.

Low Income Services: This program provides funding to upgrade the energy efficiency of customers living on limited incomes by subsidizing the installation of cost effective electric measures. The delivery of the program is coordinated with local weatherization agencies.

Residential Education Services: This program provides informative and actionable educational materials that communicate to and educate customers on the benefits of energy efficiency and conservation. Such materials include brochures, fact sheets, workshops, web sites, and online energy audits.

Business Education Services: This program provides informative materials and training opportunities to educate business customers on the benefits of energy efficiency and conservation. Such materials may include brochures, fact sheets, case studies, web sites, and training seminars.

Pilot Program: The Municipals are permitted to implement pilot programs to determine the applicability and feasibility of measures in their service territory. Residential pilot programs could pursue the following types of new initiatives: residential-sized HVAC equipment optimized for performance in cold-climate (may include new developments in heat-pump technology), advanced residential water heating technology (including heat pumps and solar water heating), coordinated development of integrated design for net zero-energy new home construction, promotion of LED lighting technology in residential applications, participation in statewide initiatives to reward manufacturers for highest efficiency appliance design, among other examples

Background

1) Just for background, can you please give me a brief description of your professional position:

   a. name of municipal utility -
   b. position title -

2) What was your role with these programs in 2011?

   Low Income Services:

   Residential Education:

   Business Education:

   Pilot Program:

Program Implementation

3) Please briefly describe the overall program design, management and delivery. Were there any materials developed or applications used? For example, did you develop/distribute any of the following: bill stuffers; "goodie bags" (i.e. giveaway bags at events that might hold a CFL, brochure, tchotkes, etc.); brochures; giveaways (tchotkes, info wheels, etc.); EE information packets; CFLs (bought and distributed APART from the residential lighting program), posters, additional or new web site content? [FOR LOW-INCOME: Who did you partner with, please provide contact info]

   Low Income Services:
   a.

   b. Who did you partner with?

c. Please provide contact info (Company, Name, Telephone, Email)

Residential Education:

Business Education:

Pilot Program:

Program Participation

4) From what you know, what has been the actual or estimated number of program participants since its start:

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

Program Costs

5) What were the final costs per each program? Please include any labor and cost of materials if that information is available for the Low Income Services, Residential and Business Education programs, and pilot program.

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

Program Recommendations

6) Is there anything you would do different or change for each of these programs?

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

7) What are you planning to do for these programs in 2011?

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

Program Design, Administration and Implementation

8) According to you, what are the strengths for each program?

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

9) According to you, did the program have any weaknesses? If so, what where they?

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

10) Could you identify areas where the program could be improved?

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

11) Can you identify areas where the program/processes can be improved to enhance third party implementer and customer engagement?

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

Future Evaluation

12) How did the incentive levels impact program participation?

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

13) Should there be incentives for any other measures offered through these programs? If so, what measures?

Low Income Services:

Residential Education:

Business Education:

Pilot Program:

14) Which market channels did you find to be most successful for these programs?

Low Income Services:

Residential Education:

Business Education:

Pilot Program: