Evaluation of the Program Year 10 Entergy New Orleans Energy Smart Programs

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Acronyms/Abbreviations

Table 1 Commonly Used Acronyms and Abbreviations

Acronym	Term
AC	Air Conditioner
AOH	Annual operating hours
APS	Advanced Power Strip
C&I	Commercial and Industrial
CEE	Consortium for Energy Efficiency
CF	Coincidence factor
CFL	Compact fluorescent lamp (bulb)
CFM	Cubic feet per minute
DI	Direct install
DLC	Design Lights Consortium
EER	Energy efficiency ratio
EFLH	Equivalent full-load hours
EISA	Energy Independence and Security Act
EL	Efficiency loss
EM&V	Evaluation, Measurement, and Verification
EUL	Estimated Useful Life
ES	ENERGY STAR®
GPM	Gallons per minute
HDD	Heating degree days
HID	High intensity discharge
HOU	Hours of Use
HP	Heat pump
HSPF	Heating seasonal performance factor
HVAC	Heating, Ventilation, and Air Conditioning
IEF	Interactive Effects Factor
IEER	Integrated Energy Efficiency Ratio
IPLV	Integrated part load value
ISR	In-Service Rate
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light Emitting Diode
M&V	Measurement and Verification
NC	New Construction
MW	Megawatt
MWh	Megawatt-hour
NTG	Net-to-Gross
PCT	Participant Cost Test
PY	Program Year
QA	Quality Assurance
QC	Quality Control
RCA	Refrigerant charge adjustment

Acronym	*Term*
RIM	Ratepayer Impact Measure
ROB	Replace on Burnout
RR	Realization Rate
RUL	Remaining Useful Life
SEER	Seasonal Energy Efficiency Ratio
TRC	Total Resource Cost Test
TRM	Technical Reference Manual
UCT	Utility Cost Test
VFD	Variable Frequency Drive

Savings Types

Table 2 Types of Savings Referenced in this Evaluation Report

Savings Types	***Definition***
Energy Savings (kWh)	The change in energy (kWh) consumption that results directly from program-related actions taken by participants in a program.
Demand Reductions (kW)	The time rate of energy flow. Demand usually refers to electric power measured in kW (equals kWh/h) but can also refer to natural gas, usually as Btu/hr., kBtu/hr., therms/day, etc.
Expected / *Ex Ante* Gross	The change in energy consumption and/or peak demand that results directly from program-related actions taken by participants in a program, regardless of why they participated.
Verified / *Ex Post* Gross	Latin for "from something done afterward" gross savings. The energy and peak demand savings estimates reported by the evaluators after the gross impact evaluation and associated M&V efforts have been completed.
Annual Savings	Energy and demand savings expressed on an annual basis, or the amount of energy and/or peak demand a measure or program can be expected to save over the course of a typical year. The TRM provides algorithms and assumptions to calculate annual savings and are based on the sum of the annual savings estimates of installed measures or behavior change.
Lifetime Savings	Energy savings expressed in terms of the total expected savings over the useful life of the measure. Typically calculated by multiplying the annual savings of a measure by its EUL. The TRC Test uses savings from the full lifetime of a measure to calculate the cost-effectiveness of programs.

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1 Executive Summary

1.1 Executive Summary

This report provides a summary of the evaluation effort of the 2020 (“Program Year 10” or “PY10”) Energy Efficiency (EE) and Demand Response (DR) portfolio by Energy New Orleans (ENO). The Energy Smart Programs were administered between April 1, 2020 and December 31, 2020. This evaluation was led by ADM Associates Inc. (herein known as “ADM”, or “the Evaluators”).

1.2 PY10 and the COVID-19 Pandemic

Due to the delayed launch of the of the program year, lower than average customer intervention rates, and interruptions to on-sites due to safety, the performance of the programs (and the evaluation results), in many cases, should be interpreted as idiosyncratic to PY10 because of the COVID-19 pandemic.

Additionally, several PY10 primary data collection efforts were restricted due to the COVID-19 pandemic. The Evaluators did not perform site visits for any PY10 projects/installations. In some cases, for residential projects, the Evaluators examined past site visit data and estimated measure-level verification rates. For C&I projects, the Evaluators limited field data collection in instances where data was available from the program implementation contractor's end-use metering or where impacts were analyzable via Option C and Option D analyses.

1.3 Summary of ENO Energy Efficiency Programs

In PY10, the ENO Energy Smart Program contained the following offerings:

- Home Performance with ENERGY STAR® (HPwES);
- Income Qualified Weatherization (IQW);
- Multifamily Solutions;
- Residential Lighting and Appliances (RLA);
- A/C Solutions;
- School Kits and Education (SK&E);
- Behavioral;
- EasyCool Direct Load Control (DLC);
- Residential EasyCool Bring Your Own Thermostat (BYOT);
- Commercial EasyCool Bring Your Own Thermostat (BYOT);
- Small Commercial & Industrial Solutions (Small C&I);
- Large Commercial and Industrial Solutions (Large C&I);

- Publicly Funded Institutions (PFI); and
- Commercial & Industrial Construction Solutions (C&I NC).

In PY10, APTIM served as the prime contractor and was responsible for the overall implementation and the performance of the program, and they are also responsible for the marketing and outreach, trade ally management, rebate processing, and project verification and quality control for the Small C&I, Large C&I, and PFI offerings. APTIM is also responsible for management of subcontractors.

Franklin Energy served as the prime subcontractor for the following residential programs:

- Home Performance with ENERGY STAR;
- Income Qualified Weatherization;
- Multifamily Solutions;
- Residential Lighting and Appliances;
- A/C Solutions; and
- EasyCool DLC.

For these programs, Franklin Energy was responsible for marketing and outreach, tracking progress to goals and program budgets, verification and quality control, trade ally management, performing energy assessments for HPwES, LIA&Wx and Multifamily programs, rebate processing and reporting. The role of Energy Wise Alliance remains consistent with prior years. They perform outreach for the residential programs in the form of event participation and implementation of the school kits program.

1.4 Evaluation Objectives

The goals of the PY10 EM&V effort were as follows:

- For prescriptive measures, verify that savings are being calculated according to the appropriate protocols.
- For custom measures, this effort comprises the calculation of savings according to accepted protocols (e.g., IPMVP, etc.). These protocols ensure that custom measures are cost-effective and provide reliable savings.
- Conduct process evaluations of select programs. Process evaluation activities included interviews with utility staff, implementation contractor staff and brief surveys of program participants.
- Conduct cost-effectiveness evaluation of the Energy Smart Programs.

1.5 Summary of Data Collection

The Evaluators completed surveys of 132 customers as part of the PY10 evaluation to collect information for use in verifying participation, assessing net savings, assessing the customer experience and satisfaction with programs, and levels of program awareness.

Table 1-1 Summary of Customer and Trade Ally Surveys Completed

Survey Group	***Mode***	***Survey Fielding Time Frame***	***Number of Contacts****	***Number of Completions***
Rewards Participants	Online	January/ February 2021	525	60
Small Commercial Participants	Online/ Phone	October 2020/ February 2021	61	17
Large C&I Participants	Online/ Phone	October 2020/ February 2021	52	23
Publicly Funded Institutions	Online/ Phone	October 2020/ February 2021	9	1
Small Commercial Solutions Business Kits (retail)	Online/ Phone	October 2020/ February 2021	18	5
Small Commercial Solutions Business Kits (office)	Online/ Phone	October 2020/ February 2021	46	9
Small Commercial Solutions Business Kits (restaurant)	Online/ Phone	October 2020/ February 2021	37	5
Residential Trade Allies	Online/ Telephone	October 2020	15	5
Commercial Trade Allies	Online	October 2020	105	7
Total			**864**	**132**

*For some groups, the number of contacts equaled all of the participants with contact information available. For others, the contacts were a sample of all available contacts.

In-depth interviews with program staff provided insight into program management and operations. Interviews were completed with eight Entergy and implementation contractor staff.

Table 1-2 Summary of Staff Interviews

Programs	Organizational Role	Interviewed Staff Roles	Number of Staff Interviewed
Energy Smart EasyCool (BYOT)	Implementation Contractor	Client Success Manager	1
Behavioral (with Rewards)	Entergy	Project Manager	1
School Kits and Education	Implementation Subcontractor	Executive Director	1
C&I Programs	Entergy	Commercial Program Manager	1
Easy Cool (BYOT) & A/C Solutions	Entergy	Operations Manager	1
Easy Cool (BYOT) & A/C Solutions	Entergy	Program Manager	1
Portfolio Level	Implementation Contractor	Lead Energy Engineer	1
C&I Programs	Entergy	Program Director	1
Total			**8**

1.6 Impact Findings

ENO's portfolio achieved 94.77% of the verified energy (kWh) savings goal and 117.85 kW above the demand reduction (kW) target. See those results by program in the table below.

Table 1-3 PY10 Verified Savings, kWh Goals and kW Targets

PY10 Program	Verified kWh	kWh Goal	% of kWh Goal	Verified kW	kW Target	Diff. from Target
HPwES	1,081,372	1,640,521	65.92%	217.58	1,090.19	-872.61
RLA	9,889,557	6,890,189	143.53%	1,074.61	545.38	529.23
Multifamily	497,487	437,472	113.72%	114.87	163.70	-48.83
IQW	899,228	656,208	137.03%	729.27	445.44	283.83
A/C Solutions	814,856	1,312,417	62.09%	339.51	553.29	-213.78
SK&E	468,115	350,297	133.63%	67.28	41.61	25.67
Behavioral	15,549,735	12,230,000	127.14%	3,333.88	N/A	N/A
EasyCool DLC	0	N/A	N/A	980.37	764.10	216.27
EasyCool BYOT	0	N/A	N/A	0.00	130.50	-130.50
Small C&I	3,355,719	6,971,994	48.13%	644.44	1,397.02	-752.58
Large C&I	18,903,086	24,180,632	78.17%	1,824.42	3,245.61	-1,421.19
PFI	1,876,035	1,672,804	112.15%	132.24	219.73	-87.49
C&I NC	279,621	230,403	121.36%	64.58	44.53	20.05
EasyCool for Business	0	N/A	N/A	0.00	764.10	-764.10
Portfolio Total	**53,614,811**	**56,572,937**	**94.77%**	**9,523.05**	**9,405.20**	**117.85**

The table below outlines the gross impacts, first year expected gross energy savings (kWh) (38,792,290 kWh) and expected gross demand reductions (kW) (5,867.78 kW), gross realization rates (138% for kWh, 162% for kW).

Table 1-4 PY10 Gross Savings Summary

PY10 Program	Expected kWh	Verified kWh	RR (kWh)	Expected kW	Verified kW	RR (kW)
HPwES	1,099,012	1,081,372	101.63%	163.55	217.58	75.17%
RLA	9,822,743	9,889,557	99.32%	1,819.10	1,074.61	169.28%
Multifamily	454,304	497,487	91.32%	111.67	114.87	97.21%
IQW	793,585	899,228	88.25%	702.54	729.27	96.33%
A/C Solutions	786,017	814,856	96.46%	328.49	339.51	96.75%
SK&E	468,034	468,115	99.98%	67.27	67.28	99.98%
Behavioral	0	15,549,735	0.00%	0.00	3,333.88	0.00%
EasyCool DLC	0	0	N/A	0.00	980.37	0.00%
EasyCool BYOT	0	0	N/A	0.00	0.00	N/A
Small C&I	3,590,542	3,355,719	107.00%	641.24	644.44	99.50%
Large C&I	19,571,940	18,903,086	103.54%	1,842.50	1,824.42	100.99%
PFI	1,924,976	1,876,035	102.61%	126.84	132.24	95.92%
C&I NC	281,137	279,621	100.54%	64.58	64.58	100.00%
EasyCool for Business	0	0	N/A	0.00	0.00	N/A
Portfolio Total	**38,792,290**	**53,614,811**	**138.21%**	**5,867.78**	**9,523.05**	**162.29%**

The table below outlines net impacts (49,599,652 kWh and 8,919.46 kW), net-to-gross (NTG) ratios (93% kWh and 94% kW). NTG ratios were estimated at the measure-level. However, program-level NTG ratios may differ due to variances in contribution to program savings by measure rebated through each program.

Table 1-5 PY10 Net Savings Summary

PY10 Program	Verified kWh	Net kWh	NTG (kWh)	Verified kW	Net kW	NTG (kW)
HPwES	1,081,372	838,013	77.50%	217.58	178.10	81.85%
RLA	9,889,557	7,208,743	72.89%	1,074.61	759.72	70.70%
Multifamily	497,487	447,291	89.91%	114.87	106.01	92.29%
IQW	899,228	899,228	100.00%	729.27	729.27	100.00%
A/C Solutions	814,856	732,556	89.90%	339.51	305.22	89.90%
SK&E	468,115	368,181	78.65%	67.28	51.69	76.83%
Behavioral	15,549,735	15,549,735	100.00%	3,333.88	3,333.88	100.00%
EasyCool DLC	0	0	N/A	980.37	980.37	100.00%
EasyCool BYOT	0	0	N/A	0.00	0.00	N/A
Small C&I	3,355,719	3,355,719	100.00%	644.44	644.44	100.00%
Large C&I	18,903,086	18,146,963	96.00%	1,824.42	1,641.98	90.00%
PFI	1,876,035	1,773,603	94.54%	132.24	124.20	93.92%
C&I NC	279,621	279,621	100.00%	64.58	64.58	100.00%
EasyCool for Business	0	0	N/A	0.00	0.00	N/A
Portfolio Total	**53,614,811**	**49,599,652**	**92.51%**	**9,523.05**	**8,919.46**	**93.66%**

The table below outlines gross and net lifetime impacts (417,032,565 kWh). The levelized cost of energy savings (kWh) for the PY2020 portfolio is $0.046 ($/kWh).

Table 1-6 PY10 Lifetime Savings Summary

PY10 Program	Verified kWh	Average EUL	Verified Lifetime (kWh)	Net Lifetime (kWh)
HPwES	1,081,372	14.06	15,203,453	11,889,317
RLA	9,889,557	16.35	161,689,481	116,628,885
Multifamily	497,487	18.43	9,169,999	8,244,746
IQW	899,228	17.03	15,314,876	15,314,876
A/C Solutions	814,856	12.21	9,951,605	8,946,493
SK&E	468,115	13.00	6,085,495	4,786,353
Behavioral	15,549,735	1.00	15,549,735	15,549,735
EasyCool DLC	0	N/A	0	0
EasyCool BYOT	0	N/A	0	0
Small C&I	3,355,719	10.00	33,557,190	33,557,190
Large C&I	18,903,086	10.00	189,030,860	181,469,626
PFI	1,876,035	10.00	18,760,350	17,736,035
C&I NC	279,621	10.40	2,909,310	2,909,310
EasyCool for Business	0	N/A	0	0
Portfolio Total	**53,614,811**	**8.90**	**477,222,353**	**417,032,565**

In addition to verifying the savings reported by ENO, the Evaluators calculated lifetime impacts. As part of this process, in the body of the report we refer to the impacts (energy savings (kWh) or demand reduction (kW)) accrued during the program year being evaluated (PY10) as “first year” or annual impacts.

1.1.1 Summary of Program Adjustments

The Evaluators made several types of adjustments to program savings. They include:

- **Measurement and Verification Adjustment:** These adjustments include changes made based upon field data collection findings but does not include a change to deemed savings.
- **Deemed vs TRM Algorithm:** These adjustments are differences between deemed per-unit savings estimates and calculated savings using TRM algorithms and inputs specific to the measure installation.
- **Corrections to Calculations:** These adjustments are revisions to ex ante calculations which have used either an incorrect method to calculate expected savings or incorrect inputs in said calculations.
- **Ineligible Measures:** These adjustments exclude savings from measures not eligible for program savings.

1.7 Cost-Benefit Results

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Table 1-7 PY10 Cost-Effectiveness by Program

Program	*Verified Energy Savings (kWh)*	*Verified Demand Reductions (kW)*	*Total Program Expenditures*	*Total Resource Cost Test (TRC)*	*Utility Cost Test (UCT)*
HPwES	1,081,372	217.58	$375,700	1.40	1.13
IQW	899,228	729.27	$662,978	1.69	1.51
Multifamily	497,487	114.87	$219,278	1.28	1.28
RLA	9,889,557	1,074.61	$1,686,951	1.54	2.03
A/C Solutions	814,856	339.51	$282,451	1.28	1.47
SK&E	468,115	67.28	$309,485	0.52	0.50
Behavioral	15,549,735	3,333.88	$158,333	4.26	4.26
EasyCool DLC	0	980.37	$335,984	0.25	0.21
EasyCool BYOT	0	0.00	$266,057	0.00	0.00
C&I NC	279,621	64.58	$271,588	0.37	0.41
Large C&I DR	0	0.00	$821,993	0.00	0.00
EasyCool for Business	0	0.00	$78,918	0.00	0.00
PFI	1,876,035	132.24	$654,206	0.63	0.79
Small C&I	3,355,719	644.44	$1,271,228	0.80	0.95
Large C&I	18,903,086	1,824.42	$4,112,990	1.03	1.35
Total	**53,614,811**	**9,523.05**	**$11,508,140**	**1.04**	**1.20**

The portfolio passed the TRC and UCT cost tests. Some programs had expenditures, but no claimed kWh or kW. For example, for DR programs where there were no calls in PY10, there were incentives paid to keep customers enrolled.

See Appendix D: Cost Benefit Testing for additional details.

1.8 Process Findings and Recommendations

The PY10 residential process evaluation activities were limited to:

- **An evaluation of the Rewards Program.** The Rewards Program was introduced in PY10. For the evaluation, the Evaluators reviewed program documents, interviewed program staff, and surveyed a sample of program participants.
- **An evaluation of the Bring Your Own Thermostat Program.** The Bring Your Own Thermostat Program was introduced in PY10. The program is available to residential and small commercial customers. For the evaluation, the Evaluators reviewed program documents and interviewed program staff. A participant survey was not performed because no load management events were called during the program year.
- **A survey of trade allies that provide services through the residential programs.** The survey was performed to collect data on trade ally perceptions of the program, customer's interest in energy efficiency, and impacts COVID-19 had on their participation. The surveyed trade allies provide services through multiple residential programs.
- **Interviews with program staff to understand cross-cutting program changes.** These interviews focused primarily on how the Energy Smart program responded to COVID-19.
- **Interview with Energy Wise Alliance on the School Kits and Education Program.** The interview was conducted to collect data on recent program changes and responses to COVID-19.

Process evaluations were not performed for the following mature and well-established programs. Process evaluations for these programs will be reconsidered for PY11.

- Home Performance with ENERGY STAR (HPwES);
- Income Qualified Weatherization (IQW);
- Multifamily Solutions;
- Residential Lighting and Appliance (RLA);
- A/C Solutions;
- School Kits and Education Program (SK&E);
- Behavioral;
- EasyCool Direct Load Control Program (DLC); and
- Residential EasyCool Bring Your Own Thermostat.

The following subsections summarize findings of the PY10 process evaluation.

1.8.1 Residential Portfolio Findings and Recommendations

1.8.1.1 *Cross-Cutting Residential Portfolio* Findings

Below are the key findings from program staff interview and review of COVID-19 related events that are cross-cutting and relevant to residential programs.

The residential programs were impacted by COVID-19 and several steps were taken to adapt to these challenging circumstances.

- **COVID-19 posed a significant challenge for the residential Energy Smart Residential Programs in PY10.** Program staff indicated they struggled to keep programs going during the slow period of the lockdown. When Governor Edwards issued a stay-at-home order back in March, people began to spend more time at home. As a result, where and how people work, invest their time, and even how they shop has also drastically changed the economic landscape.
- **Virtual home energy assessments were introduced in PY10.** COVID-19 forced the program to shut down all residential field services. The virtual home assessments imitate the onsite evaluation. Using a virtual platform (e.g., Zoom, Facetime), home assessors guide the customer around their own home. Once the virtual assessment is completed, program staff offer energy-efficient related recommendations and build kits based on the home's needs (e.g., LED lightbulbs, showerheads). After the equipment is sent, staff follow up with the customer to ensure the kit items were installed. At the time of the interview, five virtual assessments had been performed. Program staff indicated they have received positive feedback.
- **Changes in quality assurance and control practices have taken place due to COVID-19.** At the time of the interviews, Energy Smart program staff indicated that they have not been sending field technicians back into the field due to COVID-19 and instead have adopted remote verification. Examples of this include a virtual home energy assessment that was introduced this year.
- **Energy kits were provided to Entergy New Orleans' customers after the onset of the COVID-19 pandemic.** The outreach approach during the COVID-19 pandemic included handing out of 250 free energy kits at food banks and churches. Franklin and APTIM program staff, alongside with City Council members, provided energy saving kits to residential customers.
- **Energy Smart School Kits and Education adapted delivery of energy saving kits in response to the Pandemic.** Energy Wise Alliance indicated that the utility, APTIM, and Green Coast worked together to continue the program and deliver the kits to the students by participating in the school lunch meal site pick-ups back in March. Students were offered the energy efficiency kits as they picked up their meals.

- **Health and safety videos developed to highlight the precautionary measures Energy Smart program staff will take when interacting with customers.** The purpose of these safety videos is to demonstrate the precautions that program staff will take when entering customers' homes, including the type of personal protective equipment (PPE) they will utilize. Staff hopes the videos will help customers feel comfortable once field technicians return to working onsite.

Residential trade allies provided feedback on the program and how COVID-19 impacted their participation. The key findings from the residential trade ally survey are presented below.

- **Less than half of residential trade allies were satisfied with the Energy Smart Program.** Surveyed trade allies provided suggestions for improving the Energy Smart programs. For example, three respondents suggested streamlining the assessments better by addressing their issues with Franklin. Other recommendations included improving communication with the allies, increasing the number of eligible measures, and reducing payment turnaround times.
- **COVID-19 pandemic impacted the ability to complete projects.** Trade allies indicated that COVID-19 restrictions affected their ability to do work or finish projects, but the extent of the impact varied from trade ally. One trade ally stated they experienced a significant impact. Furthermore, some trade allies indicated they could not participate because Entergy New Orleans closed its offices. Trade allies were sent flyers and other informational material on how to stay safe and do fieldwork during the pandemic. One respondent stated they also received webinars on this training.
- **The trade allies promoted energy efficiency programs to their customers.** Some of the trade allies focused more on the benefits of lowering utility bills when speaking to customers about energy efficient equipment. Trade allies have also noticed that the perception of energy efficiency has changed over the years. Eighty percent of trade allies indicated that customers are more likely to purchase more energy efficient products than in previous years.

The Evaluators' recommendations are as follows:

- **Address trade ally program dissatisfaction.** Multiple trade allies expressed dissatisfaction with the processing of rebate payments and communications on the status of the program budget. Because trade ally participation in the programs are central to the ongoing success of the programs, staff should make an effort to address these concerns. This may include holding meetings or workshops to discuss issues about the programs and areas for improvement, reviewing rebate processing, and providing regular and accurate updates on program incentive budgets.

1.8.1.2 School Kits and Education

The key findings and conclusions of the evaluation of the program are as follows:

- **Program underwent improvements and changes during PY10.** Energy efficiency educational programs led by non-profit organizations like Energy Wise Alliance adapted to the pandemic and modified the program to meet public health guidelines. With support from Entergy New Orleans, APTIM, and Green Coast, Energy Wise expected to have a successful year teaching many students about the importance of being energy efficient in the home. Energy Wise Alliance also stated they included new components to their curriculum in hopes of increasing program participation. They also changed the outer presentation of their kits to include the logo and teacher's information. Additionally, QR codes provided links to instructional videos.
- **Communication among Energy Wise Alliance, Entergy New Orleans, APTIM, and Green Coast was constructive and open since schools closed back in March.** Energy Wise Alliance indicated that the utility, APTIM, and Green Coast worked together to continue the program and deliver the kits to the students by participating in the school lunch meal site pick-ups back in March. Students were offered the energy efficiency kits as they picked up their meals.
- **Program expects more changes in the upcoming years.** Since May, Energy Wise Alliance worked on improving their material to better address the digital divide present in New Orleans. For example, they made content that will help students walk through the installation process while they are at home.

1.8.1.3 Behavioral Program

The key findings and conclusions of the evaluation of the program are as follows:

- **Recruitment email drove program participation.** Most respondents learned about the offering in an email from ENO, which was centered on Rewards. Other sources of awareness included the Entergy website or from the Energy Smart website.
- **Most survey respondents reported taking at least one energy saving action in the last 12 months.** The most common actions taken were adjusting thermostat settings in the winter and summer and making efforts to converse energy in the home. They also reported running the dishwasher with a full load. Almost all participants are motivated in reducing their utility bill costs or about conserving the environment.
- **Many survey respondents were affected by the COVID-19 pandemic during PY10.** Since the pandemic began, most survey respondents indicated the amount of time they spent at home greatly increased, followed by those who reported it somewhat increased the amount of time they spent at home. Three participants stated it did not change. Many survey respondents stated they noticed a change in their electricity bill since the pandemic began. Among those who noticed a change, most indicated their bills increased by about $10 a month or more.

The Evaluators' recommendations are as follows:

- **Ensure the Customer Engagement Portal (CEP) and Rewards have links that take users to the Energy Smart website with information about the programs.** The Customer Engagement Portal provides customers with valuable information (e.g., home energy usage, energy saving tips, etc.). It is recommended that the CEP link back to the Energy Smart website and to information about energy efficiency programs.
- **Provide periodic communications on earned rewards and tips for using the portal.** None of the survey respondents reported earning rewards and some respondents reported challenges in understanding how to use the portal.

1.8.1.4 EasyCool Bring Your Own Thermostat (Residential)

The key findings and conclusions of the evaluation of the program are as follows:

- **There was strong enrollment in PY10 but security reviews prevented dispatch.** For PY10, the program hit the target of 2,066 enrolled thermostats by December 31, 2020. No events were called during the year as the majority of the cycling season was used to complete necessary technological and data security requirements.
- **Quality assurance and control procedures include enrollment and dispatchment.** Enrollment and dispatchment procedures were put through a careful quality assurance and control process prior to launch. EnergyHub indicated when there are updates with their thermostat partners, they put those changes through QA/QC before they go to the live programs. EnergyHub is working on an autoenrollment verification tool to streamline processes. The tool will match applications with Entergy New Orleans' file on customer eligibility.
- **COVID-19 did not significantly impact BYOT.** Program staff did not believe that the pandemic had a major impact on this program because of how this program was designed. Staff suggested that with more people home it could potentially boost enrollment into this type of program, thus growing consumer interest in smart home devices to save energy and money. Staff did indicate they anticipated that customers who are at home more often may opt-out of demand response events more frequently compared to previous years.

The Evaluators recommendations are as follows:

- **Call demand events in PY11 regardless of status of Nest security assessment.** One of the reasons that program staff refrained from calling events in PY10 because of an ongoing security assessment of Nest thermostats. While Nest thermostats account for significant share of enrolled devices, the program should strongly consider calling events in PY11 that even if certain devices are excluded. Calling an event can also provide an opportunity to test system functioning prior to full rollout.
- **Continue to refine the educational strategies to help customers better understand the Bring Your Own Thermostat and EasyCool program.** BYOT is

intended to replace the DLC program and additional tactics may help customers to switch the program. One approach may be to include a page on the website on the benefits of switching to BYOT (including the benefits of smart thermostats). Additionally, at some point it may be cost effective to offer a bonus incentive to encourage DLC customers to switch to BYOT to enable shutting down of the DLC program and minimizing the loss of curtailments.

1.8.1.5 EasyCool Bring Your Own Thermostat (Commercial)

The key findings and conclusions of the evaluation of the program are as follows:

- **Relatively few devices were installed in small businesses.** Tracking data indicated that 22 of the devices registered with the program were installed in small businesses.

The Evaluators' recommendations are as follows:

- **Consider developing marketing materials that specifically address barriers to enrollment faced by small businesses.** Many small businesses may have concerns about participating in a demand response program because adjustments may impact customer comfort. Directly addressing this barrier in marketing materials such as on the program website may help minimize customer concerns. Addressing the barrier can be accomplished by emphasizing minimal comfort impacts such as through case studies (once events have occurred) and the ability of customers to opt-out if they find that that events have too great of an impact (i.e., noting that they are in control and no risk of participating).

1.8.2 Commercial Portfolio Findings and Recommendations

The PY10 commercial program process evaluation activities consisted of the following:

- **Evaluation of the Small Commercial Solutions Program.** This is a mature program, but a kits component was added for PY10. The Evaluator reviewed program documents, a surveyed a sample of participants in Small Commercial Solutions and surveyed a sample of customers who received an energy efficiency kit through Small Commercial Solutions.
- **Evaluation of the Commercial New Construction Program.** This is a new program that launched in PY10 and customers completed a few program projects in PY10. The Evaluators completed interviews with program staff to collect information the program design and operations. The Evaluators attempted to a survey both of the program participants, but neither completed the survey.
- **Evaluation of the Large Commercial and Industrial Program.** This is a mature program. The Evaluators reviewed program documents, completed interviews with program staff to collect information the program design and operations, and completed a survey of program participants.

- **Evaluation of the Publicly Funded Institutions Program.** This is a mature program. The Evaluators reviewed program documents, completed interviews with program staff to collect information the program design and operations, and completed a survey of program participants.
- **A survey of trade allies that provide services through the commercial.** The survey was performed to collect data on trade ally perceptions of the program, customer's interest in energy efficiency, and impacts COVID-19 had on program participation.

1.8.2.1 Cross-Cutting Commercial Portfolio Findings

The findings and conclusions that cut across programs are summarized below.

- **Programs can pay incentives for a project to multiple payees.** Program staff indicated they can now pay multiple people for one project where in the past they did not have this ability. In addition, incentive checks are now processed in-house.
- **Onset of COVID-19 forced significant changes to quality assurance and control (QA/QC) procedures.** Program staff indicated that pre and post site visits have been eliminated due to COVID-19. Staff are now utilizing video and photo documentation for project verification.

The following summarizes the main findings from the survey of trade allies. Because these respondents participated in multiple Energy Smart programs, the findings are applicable to SCS, Large C&I, CNC, and PFI.

- **Trade allies were satisfied with the Energy Smart Commercial Program overall.** Six of the seven survey respondents stated they were either somewhat or completely satisfied with the program. Many expressed their satisfaction with communication between program staff, incentive amount, and the range of program-qualifying equipment.
- **The trade allies identified some barriers or obstacles to program participation**. Although most trade allies are pleased with the program, they did mention issues regarding the application process. For example, two trade allies stated they had installed qualifying equipment without applying for program incentives because the amount of paperwork and process can be time consuming. They also stated that by not applying for the incentive, the project's turnaround time is shorter. One respondent suggested Entergy New Orleans create an online application process to streamline the process, keep a better track of the status of the project, and improve communication with the trade allies.
- **Most of the trade allies found the training conducted by Entergy New Orleans or APTIM to be useful.** Furthermore, the respondents expressed they would like to participate in more virtual trainings (e.g., telephonically or webinars). One trade ally listed specific training topics of interest. Some of these include duct blaster/commercial blower door test, solar, energy efficiency for large buildings, or more on-site "hands-on" training.

Some trade allies also expressed a need to train on how to approach and market the programs to owners of small businesses, including interest in training on how to effectively communicate with marginalized groups and ethnic minority business owners.

- **The trade allies reported that COVID-19 affected them in some way during PY10**. Seventeen percent indicated they were greatly impacted by COVID-19 and 33% indicating they were somewhat impacted. The restrictions implemented due to safety concerns affected the trade allies' operations. Most projects have been postponed to 2021 or delayed. One trade ally reported facing labor shortages (e.g., many employees being out because they contracted the virus). Multiple trade allies expressed that with more projects postponed by their clients, they cannot participate in the Energy Smart Program. At the time of the survey, four of the seven trade allies stated they had at least one pending project.
- **The trade allies are continually promoting incentives to their customers.** The seven survey respondents stated they either recommend high-efficiency equipment to customers most of the time or always during their sales process. A common approach to selling efficient equipment is to emphasize the return on investments customers will receive if they choose energy efficient over standard equipment. Trade allies promote the energy efficiency programs to their customers by program educational material or providing them with information on the incentive and how it might help with upfront costs. Most respondents said that the incentive also influenced their decisions to recommend efficient equipment.

The Evaluators' recommendations related to cross cutting findings are:

- **Explore program virtual, online trainings for trade allies.** A trade ally suggestion was to offer online trainings and webinars. Although the ENO service territory is relatively small in terms of geographic size, online options may offer convenience that increases attendance and provides a way to further engage contractors. Furthermore, online trainings could present the opportunity to develop an online knowledge bank with information on program processes, as well as energy efficiency education. Trade allies also suggested technical topics like blower door testing, efficiency in large buildings, as well as topics related to reaching diverse business owners (such as ethnic minorities) in the region.

1.8.2.2 Small Commercial Solutions

The key findings and conclusions of the evaluation of the program are as follows:

- **Contractors/trade allies were important drivers of program awareness.** Thirty-six percent of respondents reported learning of the program from program contractors or trade allies.
- **Program trade allies and representatives are providing multiple forms of support to participants to help them complete program projects.** Forty-one percent of respondents indicated they received application assistance. In addition, 35% of respondents received a facility assessment, 29% received calculation assistance, and 18% received some other type of technical assistance from an Energy Smart representative.

- **Reducing energy costs was the main motivation for participating in the program**. Seventy-one percent of respondents stated that they participated in the program to reduce their energy cost, and 29% of respondents stated that they participated to replace old or outdated equipment. Other common motivations included to improve equipment to reduce energy use/power outages, to improve the product quality, and to get a rebate.
- **Most small business customers surveyed said COVID-19 impacted their business, but few said it impacted their program participation.** Ninety-four percent said their business was impacted by COVID-19. Most respondents also stated that the pandemic did not affect their ability to participate in the Energy Smart program, but we note that this is the perspective of customers who did participate in the program. There may large numbers of customers who did not participate because of COVID-19. Among those who said their participation was impacted by COVID-19, two respondents stated they had to put the project on hold for a month and one other stated time constraints resulting from COVID-19.
- **All survey respondents were very satisfied with the Energy Smart SCS program.** All survey respondents were satisfied with the contractors' explanation of the program rules and processes, the contractor they worked with, the proposal they received, and the technical assistance they received. Most respondents agreed that they would recommend the Energy Smart Program to others and one respondent was unsure.
- **Less than half of kit measures have been installed**. The top three items currently installed by recipients who received office kits were the advanced power strip, the LED light bulbs, and the energy saving low-flow bathroom aerator. The top measures installed from the retail kit were LED light bulbs, directional/spot LEDs, low-flow bathroom aerator, and the LED exit light retrofit. Customers who received the restaurant kit stated they installed the bathroom or kitchen aerators and the LED light bulbs. The most common reason respondents gave for not installing the measures was they had not had enough time to install them.
- **Most of the kit recipient respondents had not participated in other Energy Smart programs before receiving the kits.** The kits may be a useful tool for engaging customers in the Energy Smart program, but participation in the program by kit recipients should be monitored to see if there is evidence that the kits are driving program participation.
- **Most of the SCS participants indicated they had been affected by the coronavirus pandemic**. The impacts noted included diminished sales, business closings, and fewer members of the public in the participant buildings.

The Evaluators' recommendations are as follows:

- **Monitor kit measure in-service rates.** In-service rates were low for certain measures (e.g., 1 of 13 respondents installed the LED exit signs). Not having enough time to install the measures was the most common reason customers gave for not having installed the measures.

However, other reasons given included not understanding how to install the measure and not having a purpose for the measure. These responses suggest there may be barriers other than time to installing some measures. If low install rates persist for certain measures, the program should consider removing them from the kit or consider allowing customers to customize the kit measures to their needs (beyond the market segment-based customization).

- **Monitor program participation among kit recipients.** Future program participation among kit recipients should be monitored as a performance metric.
- **Continue to offer Small Business Energy Saving Kits programs.** In addition to providing the energy savings resulting from the measures, the kits also provide information about the programs and survey results suggest that the kits largely reached businesses that had not participated in the program in the past three years. This benefit adds value beyond the energy savings resulting from the kits.

1.8.2.3 Commercial New Construction

The key findings and conclusions of the evaluation of the program are as follows:

- **Participation was limited to two prescriptive projects.** New construction projects take time to develop and complete and the projects completed met the programs first year target, despite a short program year and potential headwinds from the COVID-19 pandemic. Both projects were prescriptive measure projects.
- **The individual outreach approach is appropriate for a new construction program.** Staff reported that outreach is focused on engaging with general contractors and architects. Interfacing with these types of market actors is valuable for increasing awareness of the program during the building design.

The Evaluator's recommendations are summarized below:

- **Explore program building design assistance.** Design assistance focused on energy code requirements and modifications that can help buildings exceed building code requirements can increase program activity and increase the program's impact on completed projects.
- **Continue maintaining a presence in the building design community.** Keeping contact with design professionals will help maintain awareness of the program programs as new projects arise.
- **Future evaluations should consider interviews with design professionals, general contractors, and program participants to explore potential barriers to whole building incentive projects.** Whole building incentive projects have the potential to encourage deeper energy savings. Future evaluations should explore completion of interviews with these market actors to identify any barriers to whole building incentives that the program may be able to address.

1.8.2.4 Large Commercial Solutions

The key findings and conclusions of the evaluation of the program are as follows:

- **Contractors and trade allies are driving program participation.** The most common source of awareness was from a contractor or program trade ally. Most large business customers reported working with a trade ally through the entire project (e.g., design through installation). Many respondents reported that a contractor who they had worked with before installed the equipment for their project.
- **Most Large C&I customers agreed that the overall application process was smooth.** Most survey respondents agreed that the time it took to approve the application was acceptable, that the information on how to complete the application was clear and providing the required invoices or other supporting documentation was effortless.
- **Most survey respondents were very satisfied with the Energy Smart Large C&I Program.** Most respondents who had a post-installation inspection agreed that the inspector was courteous and efficient. Additionally, many were satisfied with the contractors' explanation of the program rules and processes, the contractor they worked with, the proposal they received, and the technical assistance they received. Large business customers who participated in the program were satisfied with the amount of time it took to complete the project, the time between the audit and installation, and the steps to complete the project. Furthermore, all respondents agreed that they would recommend the Energy Smart Program to others.
- **A significant proportion of large business customers surveyed reported impacts from the COVID-19 pandemic on their business.** Among those who reported effects, many were somewhat or greatly impacted. However, most respondents stated that the pandemic has not at all affected their ability to participate in the Energy Smart program. It should be noted that the pandemic may have affected others who did not participate in the program.

1.8.2.5 Publicly Funded Institutions

The key findings and conclusions of the evaluation of the program are as follows:

- **The survey respondent was satisfied with the program participation process and the technical services provided through the program.** One customer that completed a PFI project responded to the survey. The respondent was satisfied with their program experience.

1.9 Report Organization

This report is organized with one chapter providing the full impact and process summary of a specified program. The report is organized as follows:

- Chapter 2 provides general methodologies;
- Chapter 3 provides results for Home Performance with ENERGY STAR (HPwES);
- Chapter 4 provides results for Income Qualified Weatherization (IQW);
- Chapter 5 provides results for Multifamily Solutions (MF);
- Chapter 6 provides results for Residential Lighting and Appliances (RLA);
- Chapter 7 provides results for AC Solutions;
- Chapter 8 provides results for School Kits and Education (SK&E);
- Chapter 9 provides results for Behavioral;
- Chapter 10 provides results for EasyCool Direct Load Control (DLC);
- Chapter 11 provides results for EasyCool Bring Your Own Thermostat (Residential);
- Chapter 12 provides results for EasyCool Bring Your Own Thermostat (C&I);
- Chapter 13 provides results for Small Commercial Solutions (Small C&I);
- Chapter 14 provides results for Commercial and Industrial Construction Solutions (C&I NC);
- Chapter 15 provides results for Large Commercial and Industrial Solutions (Large C&I);
- Chapter 16 provides results for Publicly Funded Institutions (PFI);
- Appendix A provides the site-level custom reports;
- Appendix B provides the survey instruments and interview guides used in this evaluation;
- Appendix C provides a copy of the Energy Smart Saver Kit Product Guide; and
- Appendix D presents cost-benefit results.

2 General Methodology

This section details general impact evaluation methodologies by program-type as well as data collection methods applied. This section will present full descriptions of:

- Gross Savings Estimation;
- Sampling Methodologies;
- Process Evaluation Methodologies; and
- Data Collection Procedures.

2.1 Glossary of Terminology

As a first step to detailing the evaluation methodologies, the Evaluators provide a glossary of terms to follow:

- Baseline: Conditions, including energy consumption, which would have occurred without implementation of the subject energy efficiency activity. Baseline conditions are sometimes referred to as “business-as-usual” conditions.
- Deemed Savings: An estimate of an energy savings or demand savings outcome (gross savings) for a single unit of an installed energy efficiency measure. This estimate (a) has been developed from data sources and analytical methods that are widely accepted for the measure and purpose and (b) is applicable to the situation being evaluated (e.g., assuming 284 kWh savings for a low-flow showerhead)
- Effective useful life (EUL): Sometimes referred to as measure life and often used to describe persistence. EUL is an estimate of the duration of savings from a measure.
- Evaluation: The performance of a range of assessment studies and activities aimed at determining the effects of a program (and/or portfolio) and understanding or documenting program performance, program or program-related markets, program induced changes in energy efficiency markets, levels of demand or energy savings, or program cost-effectiveness.
- Evaluation, Measurement and Verification (EM&V): Catch-all term for evaluation activities at the measure, project, program and/or portfolio level; can include impact, process, market and/or planning activities. EM&V is distinguishable from Measurement and Verification (M&V) defined below.
- Ex ante Gross (Expected) Savings: Forecasted savings used for program and portfolio planning purposes (from the Latin for “beforehand”)
- Ex post Gross (Verified) Savings: Savings estimates reported by the Evaluators after the energy impact evaluation has been completed (From the Latin for “from something done afterward”)

- Ex post Net (Net) Savings: Savings estimates reported by the Evaluators after the net-to-gross has been applied to ex post gross savings.
- Impact Evaluation: Determination of the program-specific, directly, or indirectly induced changes (e.g., energy and/or demand usage) attributable to an energy efficiency program.
- International Performance Measurement and Verification Protocol (IPMVP): A guidance document with a framework and definitions describing the four M&V approaches; a product of the Energy Valuation Organization (www.evo-world.org).
- Measure: Installation of a single piece of equipment, subsystem or system, or single modification of equipment, subsystem, system, or operation at an end-use energy consumer facility, for the purpose of reducing energy and/or demand (and, hence, energy and/or demand costs) at a comparable level of service.
- Measurement and Verification (M&V): A subset of program impact evaluation that is associated with the documentation of energy savings at individual sites or project, using one or more methods that can involve measurements, engineering calculations, statistical analyses, and/or computer simulation modeling. M&V approaches are defined in the International Performance Measurement and Verification Protocol (IPMVP - available at www.evoworld.org).
- Portfolio: Collection of all programs conducted by an organization. In the case of ENO, portfolio includes electric energy EE and DR programs that address different customer segments. Portfolio can also be used to refer to a collection of similar programs addressing the market. In this sense of the definition, ENO has an electric portfolio with programs addressing the various customer segments.
- Process Evaluation: A systematic assessment of an energy efficiency program or program component for the purposes of documenting operations at the time of the examination and identifying and recommending improvements to increase the program's efficiency or effectiveness for acquiring energy resources while maintaining high levels of participant satisfaction.
- Program or offering: An activity, strategy or course of action undertaken by an implementer. Each program or offering is defined by a unique combination of program strategy, participation pathway, market segment, marketing approach and energy efficiency measure(s) included. Examples are a program to install energy-efficient lighting in commercial buildings and residential weatherization program.
- Project: An activity or course of action involving one or multiple energy efficiency measures at a single facility or site.
- Realization Rate: Ratio of Ex post Gross Savings / Ex ante Gross Savings (e.g., if the Evaluators verify 268 kWh per showerhead, Gross Realization Rate = 268/274= 99% realization rate
- Rigor: The level of expected confidence and precision. The higher the level of rigor, the more confident one is that the results of the evaluation are both accurate and precise, i.e., reliable.

- Technical Reference Manual: A prepared resource document that contains (ex-ante) savings estimates, assumptions, sources for those assumptions, guidelines, and relevant supporting documentation for the ENO electricity energy efficiency prescriptive measures which is populated and vetted by the implementers and Evaluators.
- Uncertainty: The range or interval of doubt surrounding a measured or calculated value within which the true value is expected to fall within some degree of confidence.
- Verification: An assessment that the program or project has been implemented per the program design. An assessment that the program or project has been implemented per the program design. For example, the objectives of measure installation verification are to confirm (a) the installation rate, (b) that the installation meets reasonable quality standards, and (c) that the measures are operating correctly and have the potential to generate the predicted savings.

2.2 Overview of Methodology

The proposed methodology for the evaluation of the PY10 ENO Portfolio is intended to provide:

- Impact results; and
- Program feedback and recommendations via process evaluation

In doing so, this evaluation will provide the verified gross savings results, provide the recommendations for program improvement, and ensure cost-effective use of ratepayer funds. Leveraging experience and lessons learned from impact evaluation can provide greater guidance as to methods by which program and portfolio performance could be improved.

2.2.1 Sampling

Programs are evaluated on one of three bases:

- Census of all participants;
- Simple Random Sample; and
- Stratified Random Sample.

2.2.1.1 *Census*

A census of participant data was used for select programs where such review is feasible. All program measures were evaluated. Programs that received analysis of a census of participants include: HPwES, IQW, A/C Solutions, RLA and SK&E.

2.2.1.2 *Simple Random Sampling*

For programs with relatively homogenous measures (largely in the residential portfolio), the Evaluators conducted a simple random sample of participants. The sample size for

verification surveys is calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirements is calculated based on the coefficient of variation of savings for program participants. Coefficient of Variation (CV) is defined as:

$$CV = \frac{Standard\ Deviation_x}{Mean_x}$$

Where x is the average kWh savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of .5 in residential program evaluations. The resulting sample size is estimated at:

$$n_0 = \left(\frac{1.645 * CV}{RP}\right)^2$$

Where:

1.645 = Z Score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

RP = Required Precision, 10% in this evaluation

2.2.1.3 *Stratified Sampling*

For the ENO Small C&I and Large C&I programs, Simple Random Sampling is not an effective sampling methodology as the CV values observed in business programs are typically very high because the distributions of savings are generally positively skewed. Often, a relatively small number of projects account for a high percentage of the estimated savings for the program.

To address this situation, we use a sample design for selecting projects for the M&V sample that takes such skewness into account. With this approach, we select a number of sites with large savings for the sample with certainty and take a random sample of the remaining sites. To further improve the precision, non-certainty sites are selected for the sample through systematic random sampling. That is, a random sample of sites remaining after the certainty sites have been selected is selected by ordering them according to the magnitude of their savings and using systematic random sampling. Sampling systematically from a list that is ordered according to the magnitude of savings ensures that any sample selected will have some units with high savings, some with moderate savings, and some with low savings. Samples cannot result that have concentrations of sites with atypically high savings or atypically low savings. As a result of this methodology, the required sample for Small C&I and Large C&I were reduced to the following strata:

Table 2-1 Stratified Sampling Summary

Program	Strata	Sites Sampled
Small Commercial Solutions	5	20
Large Commercial and Industrial	4, plus 1 certainty	16
Publicly Funded Institutions	3, plus 1 certainty	9

2.2.2 Gross Impact Calculations

The general approach for calculation of verified kWh and kW savings was to use the New Orleans TRM V2.0. Further detail can be found in each program chapter for relevant measures.

The gross impact evaluation effort included the following:

- **Desk Reviews.** The Evaluators utilized the ENO Technical Reference Manual (TRM) values in assessing *ex post* gross energy savings (kWh) and demand reductions (kW). In addition to the TRM, the Evaluators also examined Excel workbooks and supplemental documentation used by implementation staff to assess savings by measure. The workbook utilizes TRM savings algorithms with Contractor inputs to calculate savings based on the measure and input parameters. The Evaluators verified the factor tables for each measure to ensure the values were appropriate.
- **Data Tracking Review**: Project data from the implementers was reviewed to ensure that tracking systems followed the TRM.
- **Site Visits.** Due to the COVID-19 pandemic, the Evaluators were unable to perform verification site visits for projects in PY10.
- **Survey Analysis**: Where applicable, results from participant survey results were utilized to determine in-service-rates (ISRs).

2.2.3 Net Impact Calculations

Table 2-2 summarizes the net savings approach used for each program.

Table 2-2 Summary of Net Savings Approaches

Program	*Self-Report Surveys*	*Literature Review*	*Billing Analysis/Price Response Modeling*	*Deemed Value*
Home Performance with ENERGY STAR	✓			
Home Performance with ENERGY STAR (Kits)	✓			
Income Qualified Weatherization (IQW)				✓
Multifamily Solutions	✓			✓
Residential Lighting and Appliances			✓	✓
AC Solutions				✓
School Kits and Education				✓
Behavioral			✓	
EasyCool Direct Load Control			✓	
Small Commercial Solutions	✓			
Large Commercial and Industrial Solutions	✓			
Publicly Funded Institutions	✓			

2.2.3.1 *Residential Program Self-Report Approach*

The following sections describes the self-report approaches to estimating free ridership and participant spillover for the residential programs. Self-report was used to assess free ridership for the HPwES, HPwES efficiency kits, and the Multifamily Solutions (for participants that completed projects at multiple residences.).

2.2.3.1.1 Major Measure Free Ridership Assessment

The objective of the free ridership analysis is to estimate the share of program activity would have occurred in the absence of the program. To accomplish this, the Evaluators administered a survey to program participants that contained questions regarding the participants' plans to implement the incentivized measures and the likelihood of implementing those measures in the absence of program incentives and informational support. Program participants were asked questions regarding:

- Whether or not they had plans to complete the project and if they could afford to complete it without the program discount;
- The likelihood of completing the project without the discount or the incentivized assessment;
- The timing of the project in the absence of the program.

Prior Plans

Respondents who indicated that they did not have plans to install the efficient measure or the financial ability to do so were determined to not be free riders. Free ridership scores were developed for the remaining respondents using survey response data on likelihood

of completing the efficiency project or installing the efficient equipment and the program's impact on when that would have occurred.

Likelihood of Project Completion Score

The score reflecting the likelihood of completing the project in the absence of the program was based on the following questions:

- Prior to learning about the program, did you have plans to have an energy assessment of your home performed?
- How likely is it that you would have completed the same < MEASURE> project that you completed through the program if the rebate was not available?
- How likely is it that you would completed the same < MEASURE> project had it not been recommended through the energy assessment of your home?

The first question assesses the existence of prior plans to have the assessment performed while the second and third questions assess the likelihood of the customer implementing the project in the absence of the rebate or energy assessment. A score was assigned to each response for the second and third questions as follows:

- Very likely: 1
- Somewhat likely: .75
- Neither particularly likely or unlikely: .5
- Somewhat unlikely: .25
- Very unlikely: 0

If the participant did not have an assessment performed, or had prior plans to have an assessment performed, the score based on the rating for the likelihood of completing the project without the discount.

If the participant had an assessment and did not have prior plans to have an assessment, the score is based on the minimum of the following two scores:

- The likelihood of completing the project without the assessment; and
- The likelihood of completing the project without the incentive.

Timing Score

To account for the impact the program may have had on project timing, the likelihood score was multiplied by a timing score. The timing score was developed from responses to a question on when the participant might have completed a project in the absence of the program.

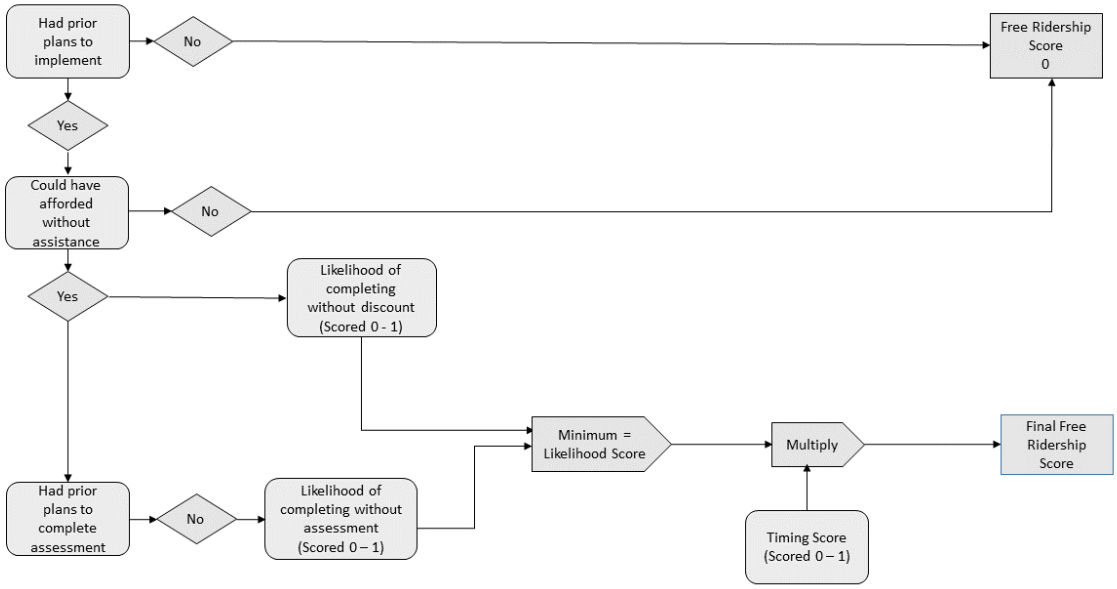
Specifically, timing was scored as follows:

- Project would have been completed in 0 to 6 months: 1
- Project would have been completed in 6 months to a year: .67
- Project would have been completed in 1 to 2 years: .33
- Project would have been completed in more than 2 years: 0

Final Free Ridership Score

The procedures used to estimate free ridership are summarized below in Table 2-3.

Table 2-3 Summary of Free Ridership Scoring Algorithm

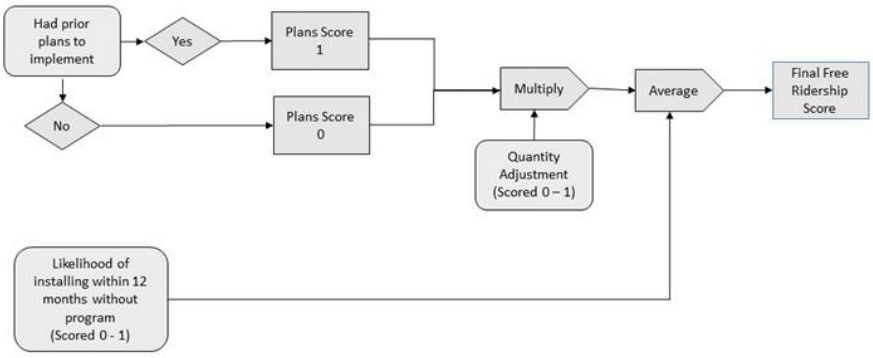


2.2.3.1.2 HPwES Direct Install Free Ridership Assessment

The approach to estimating free-ridership for the direct install measures was similar to the approach described above but differs in three regards. First, because the direct install measures are relatively low-cost items, financial ability is less likely to be a factor for participants. Second, because of their relatively low cost and the ability to easily self-install the items, it is unlikely that participants would have had plans to install the equipment for an extended period. As such, the free-ridership methodology did not factor in financial ability or the program's impact on the projects timing. Third, for LED light bulbs, which respondents received several of, the respondent's plans may have been to install fewer than the total number of bulbs received through the program. Consequently, then number of lamps that would have been installed in the absence of the program was taken into consideration.

The free-ridership scoring is summarized in Figure 2-4 Under this approach, a respondent is considered to have prior plans to implement the measure if they 1) stated that they had prior plans and 2) that they had previously purchased that measure type.

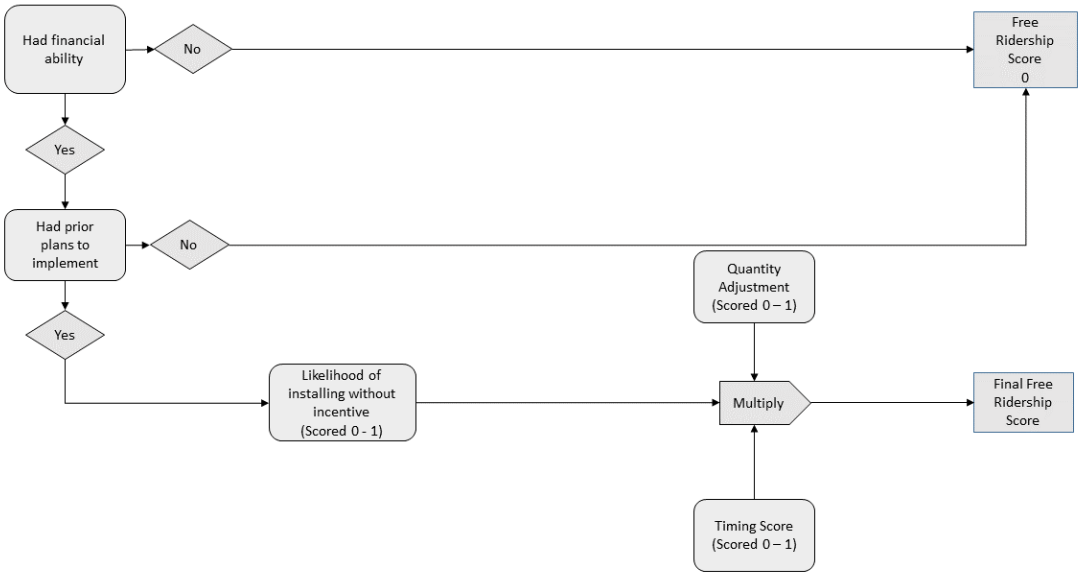
Figure 2-4 HPwES Direct Install Free Ridership Scoring Methodology



2.2.3.1.3 Multifamily Direct Install Free Ridership Assessment

The multifamily direct install free ridership assessment approach similar to the approach used for Home Performance with ENERGY STAR but differed because it included an assessment of financial ability. The assessment of financial ability because the cost of the low-cost direct install measures can be higher when installed in multiple residences. The

Figure 2-5 Multifamily Direct Install Free Ridership Assessment



2.2.3.1.4 HPwES Energy Efficiency Kit Free Ridership

Participants that received an energy efficiency kit responded to questions about each of the measures provided through the kit to assess the likelihood that they would have installed the measures in the absence the program. The respondents were asked questions on the following topics.

- If they had previously installed the kit item before receiving it for free.
- If they had plans to purchase the kit item before receiving it for free.
- How likely they would have been to purchase the items in the next 12 months if they had not received them for free.

Kit recipients who indicated that they did not have plans or had not previously installed the kit items were determined to not be free riders. For all other respondents, free ridership was based on the respondent's likelihood that they would have installed the kit item in the next 12 months.

Specifically, the rate likelihood was scored as follows:

- Very likely: 1
- Somewhat likely: .75
- Neither particularly likely or unlikely: .5
- Somewhat unlikely: .25
- Very unlikely: 0

2.2.3.1.5 Participant Spillover Assessment

To estimate participant spillover impacts, participant survey respondents were asked if they had purchased any additional items because of their experience with the program without receiving an incentive.

Participants that indicated one or more energy efficiency purchases were asked additional questions about what was purchased, and the number of units purchased to estimate the savings impact. Additionally, the following two questions were asked to determine whether the energy savings resulting from measures that were attributable to the program:

- On a scale of 0 to 10, where 0 represents "not at all important" and 10 represents "extremely important", how important was the experience with the program in your decision to purchase the items you just mentioned?
- On a scale of 0 to 10, where 0 represents "not at all likely" and 10 represents "extremely likely," how likely would you have been to purchase those items if you had not participated in the program?

If the average of the first response and 10 – the second response is 7 or greater, the savings associated with the measures were attributed to the program.

2.2.3.2 *Commercial* Program Self-Report Approach

Free ridership was assessed using self-report for all of the commercial programs.

2.2.3.2.1 Free Ridership Assessment

Several criteria were used for determining what portion of a customer's savings for a particular project should be attributed to free ridership. The first criterion was based on the response to the question: "Would you have been financially able to install energy efficient [Measure/Equipment] at the location without the financial incentive from the Program?" Customers that answer "No" to this question are asked to confirm that they would not have allocated funds to the project without the incentive. If a customer confirms that they would not have allocated the funds if the incentives were not available, the customer was not deemed a free rider.

For decision makers that indicated that they were able to undertake energy efficiency projects without financial assistance from the program, three factors were analyzed to determine what percentage of savings may be attributed to free ridership. The three factors were:

- Plans and intentions of firm to install a measure even without support from the program;
- Influence that the program had on the decision to install a measure; and
- A firm's previous experience with a measure installed under the program.

For each of these factors, rules were applied to develop binary variables indicating whether or not a participant's behavior showed free ridership.

The first factor requires determining if a participant stated that his or her intention was to install an energy efficiency measure even without the program. The answers to a combination of several questions were used with a set of rules to determine whether a participant's behavior indicates likely free ridership. Two binary variables were constructed to account for customer plans and intentions: one, based on a more restrictive set of criteria that may describe a high likelihood of free ridership, and a second, based on a less restrictive set of criteria that may describe a relatively lower likelihood of free ridership.

The first, more restrictive criteria indicating customer plans and intentions that likely signify free ridership are as follows (Definition 1):

- The respondent answers "yes" to the following two questions: "Did you have plans to install energy efficient [Measure/Equipment] at the location before deciding to

participate in the program?" and "Would you have gone ahead with this planned project if the you had not received the rebate through the program?"

- The respondent answers "definitely would have installed" to the following question: "If the rebates from the program had not been available, how likely is it that you would have installed energy efficient [Measure/Equipment] at the location anyway?"
- The respondent answers "no, program did not affect timing of purchase and installation" to the following question: "Did you purchase and install energy efficient [Measure/Equipment] earlier than you otherwise would have without the program?"
- The respondent answers "no, program did not affect level of efficiency chosen for equipment" in response to the following question: "Did you choose equipment that was more energy efficient than you would have chosen had you not participated in the program?"

The second, less restrictive criteria indicating customer plans and intentions that likely signify free ridership are as follows (Definition 2):

- The respondent answers "yes" to the following two questions: "Did you have plans to install energy efficient [Measure/Equipment] at the location before participating in the program?" and "Would you have gone ahead with this planned installation even if you had not participated in the program?"
- Either the respondent answers "definitely would have installed" or "probably would have installed" to the following question: "If the rebates from the program had not been available, how likely is it that you would have installed energy efficient [Measure/Equipment] at the location anyway?"
- Either the respondent answers "no, program did not affect timing of purchase and installation" to the following question: "Did you purchase and install energy efficient [Measure/Equipment] earlier than you otherwise would have without the program?" or the respondent indicates that while program information and financial incentives did affect the timing of equipment purchase and installation, in the absence of the program they would have purchased and installed the equipment within the next two years.
- The respondent answers "no, program did not affect level of efficiency chosen for equipment" in response to the following question: "Did you choose equipment that was more energy efficient than you would have chosen had you not participated in the program?"

The second factor requires determining if a customer reported that a recommendation from a program representative or past experience with the program was influential in the decision to install a particular piece of equipment or measure.

The criterion indicating that program influence may signify a lower likelihood of free ridership is that either of the following conditions is true:

- The respondent answers “very important” to the following question: “How important was previous experience with the program in making your decision to install energy efficient [Measure/Equipment] at the location?”
- The respondent answers “probably would not have” or “definitely would not have” to the following question: “If the program representative had not recommended [Measure/Equipment], how likely is it that you would have installed it anyway?”

The third factor requires determining if a participant in the program indicates that he or she had previously installed an energy efficiency measure similar to one that they installed under the program without an energy efficiency program incentive during the last three years. A participant indicating that he or she had installed a similar measure is considered to have a likelihood of free ridership.

The criteria indicating that previous experience may signify a higher likelihood of free ridership are as follows:

- The respondent answers “yes” to the following question: “Before participating in the Program, had you installed any equipment or measure similar to energy efficient [Measure/Equipment] at the location?”
- The respondent answers “yes” to the following question: “Has your organization purchased any significant energy efficient equipment in the last three years at the location?” and answered “yes” to the question: “Did you install any of that equipment without applying for a financial incentive through an energy efficiency program?”

The four sets of rules described above were used to construct four different indicator variables that address free ridership behavior. For each customer, a free ridership value was assigned based on the combination of variables. With the four indicator variables, there are 11 applicable combinations for assigning free ridership scores for each respondent, depending on the combination of answers to the questions creating the indicator variables. Table 2-6 shows these values.

Table 2-6 Free Ridership Scores for Combinations of Indicator Variable Responses

Indicator Variables				***Free Ridership Score***
Had Plans and Intentions to Install Measure without Program? (Definition 1)	***Had Plans and Intentions to Install Measure without Program? (Definition 2)***	***Program had influence on Decision to Install Measure?***	***Had Previous Experience with Measure?***	
Y	N/A	Y	Y	100%
Y	N/A	N	N	100%
Y	N/A	N	Y	67%
Y	N/A	Y	N	67%
N	Y	N	Y	67%
N	N	N	Y	33%
N	Y	N	N	33%
N	Y	Y	N	0%
N	N	N	N	0%
N	N	Y	N	0%
N	N	Y	Y	0%

2.2.3.2.2 Participant Spillover Assessment

Program participants may implement additional energy saving measures without receiving a program incentive because of their participation in the program. The energy savings resulting from these additional measures constitute program participant spillover effects.

To assess participant spillover savings, survey respondents were asked whether or not they implemented any additional energy saving measures for which they did not receive a program incentive. Respondents that indicated that they did install additional measures were asked two questions to assess whether or not the savings are attributable to the program. Specifically, respondents were asked:

“How important was your experience with the <PROGRAM> in your decision to implement this Measure, using a scale of 0 to 10, where 0 is not at all important and 10 is extremely important?”

“If you had not participated in the <PROGRAM>, how likely is it that your organization would still have implemented this measure, using a 0 to 10 scale, where 0 means you definitely WOULD NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure?”

The energy savings associated with the measure are considered attributable to the program if the average of the rating for the first question, and 10 – the rating for the second question, is greater than seven, the savings are counted as attributable to the program.

2.2.3.3 Billing Analysis/Price Response Modeling

Savings for Behavioral and EasyCool Direct Load Control were assessed through an analysis of participant energy consumption (i.e., billing analysis). The energy impacts developed through these approaches are net impacts. The approaches used are described in additional detail in the program chapters.

For the lighting component of RLA, free ridership was assessed using price response modeling. The approach used is described in additional detail in the program chapter.

2.2.3.4 Deemed Values

The net-to-gross ratio for IQW was deemed to be 1.0 in line with common practice for estimation of low-income program net savings.[1]

The NTG ratios for participants with single residences participating in Multifamily, and for the appliance component of RLA, A/C Solutions, and SK&E were deemed based on prior evaluation findings.

2.1.1 Process Evaluation

The PY10 residential process evaluation activities were limited to:

- **An evaluation of Behavioral.** This was introduced in PY10. For the evaluation, the Evaluators reviewed program documents, interviewed program staff, and surveyed a sample of program participants.
- **An evaluation of the Bring Your Own Thermostat Program.** The Bring Your Own Thermostat Program was introduced in PY10. The program is available to residential and small commercial customers. For the evaluation, the Evaluators reviewed program documents and interviewed program staff. A participant survey was not performed because no load management events were called during the program year.
- **A survey of trade allies that provide services through the residential programs.** The survey was performed to collect data on trade ally perceptions of the program, customer's interest in energy efficiency, and impacts COVID-19 had on their participation.
- **Interview with Energy Wise Alliance on SK&E.** The interview was conducted to collect data on recent program changes and responses to COVID-19.
- **Interviews with program staff to understand cross-cutting program changes.** These interviews focused primarily on how the Energy Smart program responded to COVID-19.

[1] See Violette and Rathbun, Chapter 17: Estimating Net Savings: Common Practices. The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, available electronically at http://www.nrel.gov/docs/fy14osti/62678.pdf, p. 50.

Full process evaluations were not performed for the following mature and well-established programs. Process evaluations for these programs will be reconsidered for PY11:

- Home Performance with ENERGY STAR Program (HPwES);
- Income Qualified Weatherization (IQW);
- Multifamily Solutions;
- Residential Lighting and Appliances (RLA);
- AC Solutions;
- School Kits and Education Program (SK&E); and
- Behavioral.

The PY10 commercial program process evaluation activities consisted of the following:

- **Evaluation of the Small Commercial Solutions Program.** This is a mature program, but a kits component was added for PY10. The Evaluator reviewed program documents, a surveyed a sample of participants in Small Commercial Solutions and surveyed a sample of customers who received an energy efficiency kit through Small Commercial Solutions.
- **Evaluation of the Commercial New Construction Program.** This is a new program that launched in PY10 and customers completed a few program projects in PY10. The Evaluators completed interviews with program staff to collect information the program design and operations. The Evaluators attempted to a survey of a census of participants, but none completed the survey.
- **Evaluation of the Large Commercial and Industrial Program.** This is a mature program. The Evaluators reviewed program documents, completed interviews with program staff to collect information the program design and operations, and completed a survey of program participants.
- **Evaluation of the Large Commercial and Industrial Program.** This is a mature program. The Evaluators reviewed program documents, completed interviews with program staff to collect information the program design and operations, and completed a survey of program participants.
- **A survey of trade allies that provide services through the commercial.** The survey was performed to collect data on trade ally perceptions of the program, customer's interest in energy efficiency, and impacts COVID-19 had on program participation.

Table 2-7 Summary of Process Evaluation Activities

Program	Data and Documents Review	Staff Interviews	Participant Surveys	Trade Ally Survey
HPwES	✓			✓
IQW	✓			
Multifamily Solutions	✓			
RLA	✓			
SK&E		✓		
A/C Solutions	✓			✓
Behavioral	✓	✓		
EasyCool DLC (Residential)	✓	✓		
EasyCool DLC (C&I)	✓	✓		
Small C&I	✓		✓	✓
C&I NC	✓	✓	Attempted	
Large C&I	✓	✓	✓	
PFI	✓	✓	✓	

2.2.3.5 Data and Document Review

The Evaluators reviewed program data to characterize participation during the year. Additionally, documents such as materials on the program website and information on program designs and implementation plans were reviewed.

2.2.3.6 Program Staff Interviews

In-depth interviews with program staff provided insight into program management and operations. Interviews were completed with eight Entergy, implementation contractor, and program partner staff.

Table 2-8 Summary of Staff Interviews

Programs	Organizational Role	Interviewed Staff Roles	Number of Staff Interviewed
EasyCool (BYOT)	Implementation Contractor	Client Success Manager	1
Behavior (Rewards)	Entergy	Project Manager	1
School Kits and Education	Implementation Subcontractor	Executive Director	1
C&I Programs	Entergy	Commercial Program Manager	1
Energy Smart Easy Cool (BYOT) and A/C Solutions	Entergy	Operations Manager	1
Energy Smart Easy Cool (BYOT) and A/C Solutions	Entergy	Program Manager	1
Portfolio	Implementation Contractor	Lead Energy Engineer	1
C&I Programs	Entergy	Program Director	1
Total			**8**

2.2.3.7 Participant Surveys

Telephone or online surveys were administered to program participants. The surveys were used to collect data on participants experience with the program and how the program affected their decision to implement the efficiency measures, for use in estimating net savings.

For telephone surveys, at least five attempts were made to contact each participant contact. For online surveys, three email invitations were sent to the participants.

Table 2-9 Summary of Participant Survey Response

Survey Group	*Mode*	*Survey Fielding Time Frame*	*Number of Contacts**	*Number of Completions*
Behavioral	Online	January/ February 2021	525	60
Small Commercial Participants	Online/Phone	October 2020/ February 2021	61	17
Large Commercial and Industrial Participants	Online/Phone	October 2020/ February 2021	52	23
Publicly Funded Institutions	Online/Phone	October 2020/ February 2021	9	1
Small Commercial Solutions Business Kits (retail)	Online/Phone	October 2020/ February 2021	18	5
Small Commercial Solutions Business Kits (office)	Online/Phone	October 2020/ February 2021	46	9
Small Commercial Solutions Business Kits (restaurant)	Online/Phone	October 2020/ February 2021	37	5
Residential Trade Allies	Online/ Telephone	October 2020	15	5
Commercial Trade Allies	Online	October 2020	105	7
Total			**864**	**132**

*For some groups the number of contacts equaled all of the participants with contact information available. For others, the contacts were a sample of all available contacts.

3 Home Performance with ENERGY STAR

3.1 Program Description

Home Performance with ENERGY STAR (HPwES) is designed to promote energy efficiency by providing home energy walkthrough assessments by the program team and deeper energy assessments to customers through the implementation team. HPwES provides residential customers with access to qualified vendors (Trade Allies) within ENO' service territory. The program team provides home energy assessments that analyze customer energy use and identify energy efficiency improvements. The assessments include a visual inspection of the living space, attic, and crawl space/basement, mechanical systems, and exterior of the home, as well as discussion of lifestyle and customer behaviors that impact energy use. Following the assessment, the Energy Smart Energy Advisor performs direct installation of basic measures, including LED lighting, faucet aerators, smart power strips and smart thermostats, and recommends deeper home improvements to increase energy efficiency that can be performed by trade allies. HPwES provides incentives for measures such as attic insulation, appliances, air conditioner tune-ups, duct sealing, and air infiltration sealing.

The PY10 program was open and available to customers between April 1, 2020 and December 31, 2020.

3.1.1 Program Changes

In response to COVID-19, the program began offering virtual home energy assessments in PY10. Customers were provided the option to participate in a virtual home assessment through their smart phone or tablet. Following the assessment, the program shipped a customized box of measures to the customer's home for self-installation.

3.1.2 Program Delivery Channels and Expected Savings

A total of 4,879 households participated in PY10 :

- 169 traditional assessments;
- 6 virtual assessments;
- 129 participating with a major measure;
- 176 participating with direct install measures and
- 4,174 receiving a kit.

3.1.2.1 *Home Energy Savings Kits (HESKs)*

A total of 4,174 kits were distributed to residences through orders from the Online Marketplace. An additional 225 were distributed at promotional events.

Kits were free of charge and included the following items:

- (3) 9W A-Type LEDs;
- (1) 15W A-Type LED;
- (1) 1.5 gpm Kitchen Aerator;
- (1) 1.0 gpm Bathroom Aerator;
- (1) 1.5 gpm Showerhead;
- Literature on included measures and
- Energy Smart promotional materials.

Expected and verified savings from HESKs is presented in section 3.3.

3.1.2.2 Direct Install and Major Measure

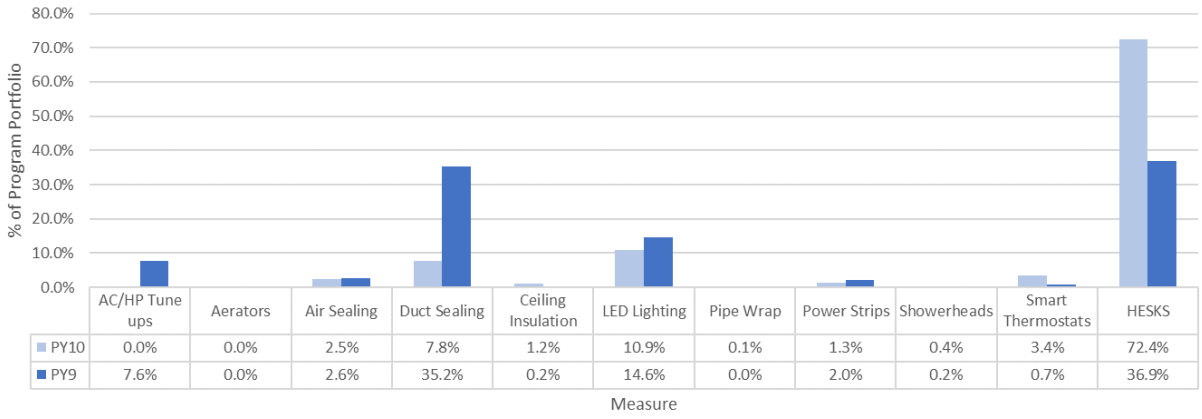
Below, Table 3-1 summarizes the total number of measures installed and the expected kWh and peak kW savings by measure. HESK savings is presented as a single line item in the table for continuity.

Table 3-1 Summary of Measures and Expected Savings

Measure	*Count of Measures Distributed*	*Expected kWh Savings*	*Expected kW Savings*	*Percent of kWh Contribution*
Assessments	169	0	0.00	0.0%
Aerators	13	509	0.05	0.0%
Air Sealing	20	27,513	10.79	2.5%
Duct Sealing	47	85,875	32.19	7.8%
Insulation	4	13,045	31.70	1.2%
LEDs	3,160	99,560	16.92	9.1%
Pipe Wrap	26	671	0.08	0.1%
Power Strips	69	14,090	1.34	1.3%
Showerheads	18	4,104	0.43	0.4%
Smart Thermostats	108	37,044	0.00	3.4%
HESKs	4,174	795,907	67.30	72.4%
Kit Giveaway	225	20,694	2.75	1.9%
Totals:	**8,033**	**1,099,012**	**163.55**	

Below, Figure 3-1 illustrates and compares the differences in kWh savings contributions by each DI and major measure provided during PY9 and PY10. Savings associated with HESKs are excluded from this table.

Figure 3-1 Combined Savings Contribution by Measure[2], PY9/10 Comparison



Duct sealing contributes 7.8% of expected savings and LEDs contribute an additional 10.9%. 72.4% percent of PY10 expected savings are from mailer kits.

In PY9, there were 906 non-HESK projects summing to 2,262,170 kWh completed during an extended 15-month period. Normalizing these figures to a 12-month program year for an 'apples-to-apples' comparison yields an expected 651 projects summing to 1,554,997 kWh. During PY10 the program ran for only nine months, completing 585 projects summing to 282,412 kWh in non-HESK expected savings. A similar normalization process yields 780 projects and 376,549 kWh in a 12-month period. This is an approximate 76% drop in expected savings, which is most likely due to the COVID-19 pandemic. Due to the delayed launch of the of the program year, low customer intervention response rates, and interruptions to on-sites due to the pandemic, the performance of the program (and the evaluation results), in many cases, should be interpreted as idiosyncratic to PY10 because of the COVID-19 pandemic.

Table 3-2 Participation and Expected Savings by Program Year

PY	Count Homes	Expected kWh	Expected kWh per Home
PY7 (nominal)	348	1,139,700	3,275
PY7 (adjusted)	496	1,624,400	3,275
PY8	739	2,416,122	3,269
PY9 (total)[3]	906	2,262,170	2,497
PY9 (calendar)[4]	651	1,554,997	2,389
PY10 (nominal)	585	282,412	483
PY10 (adjusted)	780	376,549	483

[2] DI and Major Measure only. HESKs are not included.
[3] Shown without HES Kits. Including data from HESKs, PY9 total household count is 6,280 and savings per home is 146 kWh.
[4] PY9 was an extended year, lasting 15 months. Figures presented here are normalized to represent a full program year (12 months).

Between PY9 and PY10 HESK distribution and savings increased by approximately 33%.

Table 3-3 HESK Comparison by Program Year

PY	Count Homes	Expected kWh
PY8	4,926	714,270
PY9 (total)	6,302	913,769
PY9 (calendar)	6,280	910,579
PY10 (nominal)	4,465	468,666
PY10 (adjusted)	5,953	624,887

3.1.3 Goal Achievement

Total verified savings and percentage of goals for the HPwES are summarized in the table below.

Table 3-4 HPwES Summary of Goal Achievement

kWh Goal	Verified kWh	% of Goal Attained	kW Target	Verified kW	Difference from Target
1,640,521	1,081,372	65.92%	1,090.19	217.58	-872.61

In PY10 the program had a savings goal of 1,640,521 kWh and a 1,090.19 target kW reduction. The program achieved 1,081,372 kWh in verified kWh, 65.92% of goal, and was 872.61 kW below that target.

3.2 EM&V Methodology

The HPwES Program has received comprehensive impact and process evaluations in PY5 through PY9. The evaluations provided free ridership estimates, discussions of program satisfaction and strategic recommendations for program improvement, and most/all measures offered by the program have deemed TRM savings. In the initial review of the PY10 program, the Evaluators concluded that the HPwES Program did not warrant more than a brief overview of program activity, supplemented with brief surveys of program trade allies.

The PY10 evaluation of HPwES included the following:

- Surveys with trade allies that participate in HPwES and other Energy Smart residential programs;
- Previous program year field visit results review instead of on-site testing and data collection.

Verified savings were calculated using methods and inputs in the New Orleans TRM v3.0 and incorporated results from reviewing prior program years' field visit results to determine appropriate adjustment factors. PY10 major savings components are duct sealing and LEDs. The following section discusses savings calculation methods for these measure in detail.

3.3 Verified Savings by Measure

After reviewing the tracking data and inputs for savings calculations, the Evaluators provided verified savings using deemed values developed for New Orleans combined with adjustments factors applied to both the Air Infiltration and Duct Sealing measures.

3.3.1 Infiltration Reduction Savings Calculations

Methods for calculating he deemed savings values for air infiltration reduction came from the New Orleans TRM v3.0, section C.4.7. Deemed savings multipliers were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in in developing savings values denominated in deemed savings per CFM50 of air leakage rate reduction. Table 3-5 summarizes the deemed savings values for New Orleans.

Table 3-5 Deemed Savings Values for Air Infiltration Reduction[5]

Equipment Type	*kWh/CFM Savings*	*kW/CFM Savings*
Electric AC with Gas Heat	0.4108	0.000331
Elec. Resistance w/ AC	1.0180	0.000332
Heat Pump	0.7210	0.000332

For example, consider a residence with electric AC and gas heat located. If the residence had a leakage rate of 7,200 CFM50 before air infiltration reduction and a leakage rate of 3,500 CFM50 after, then the residence would have an annual savings of:

$$Air\ Infiltration\ Savings = 0.4108 \frac{kWh\ Savings}{CFM_{50}} \cdot \left(7{,}200\ CFM_{50\ pre} - 3{,}500\ CFM_{50\ post}\right)$$

$$Air\ Infiltration\ Savings = 1{,}519.96\ kWh$$

3.3.2 Adjustments from Historic Field Data Collection

During the site visits conducted in PY5 to PY8, the Evaluators' field staff conducted blower door testing from 198 homes in an effort to validate post-retrofit leakage estimates indicated in program tracking data. The resulting average is 101.96%. That is, of 198 homes the Evaluators found that air sealing $CFM50_{post}$ results were 1.96% higher than those reported in tracking data. This factor was used to adjust the reported $CFM50_{post}$ values in air sealing program data before conducting the final analysis.

3.3.3 Air S*ealing Savings Results*

The savings resulting from using TRM algorithms and deemed savings parameters, plus the application of the field result average are summarized in Table *3-6*.

[5] New Orleans TRM V2.0, Table 97, page C-121.

Table 3-6 Expected and Verified Air Sealing Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
27,513	27,442	99.74%	10.79	10.70	99.17%

Before applying field testing results, realized savings were 103.5%. The application of these results brought the realization rate to 99.7%.

3.3.4 Duct Sealing Savings Calculations

Duct sealing savings was calculated using the following savings algorithms from the New Orleans TRM v3.0, section C.3.8.

3.3.4.1 Cooling Savings (Electric)

$$kWh_{savings,C} = \frac{(DL_{pre} - DL_{post})\ x\ EFLH_C\ x\ (h_{out}\rho_{out}\ - h_{in}\rho_{in})\ x\ 60}{1{,}000\ x\ SEER}$$

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft3/min)

DL_{post} = Post-improvement duct leakage at 25 Pa (ft3/min)

ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05

$EFLH_C$ = Equivalent Full Load Hours. (1,637)

h_{out} = Outdoor design specific enthalpy (Btu/lb)

h_{in} = Indoor design specific enthalpy (Btu/lb.)

Table 3-7 Deemed Savings Values for Duct Sealing Calculations

Parameter	Value
EFLHC	1,637
HDD	1,349
hout	40
hin	30
ρin	0.076
Pout	0.074
SEER	11.5

ρ_{out} = Density of outdoor air at 95°F = 0.0740 (lb/ft3)[6]

ρ_{in} = Density of conditioned air at 75°F = 0.0756 (lb./ft3)[4]

[6] ASHRAE Fundamentals 2009, Chapter 1: Psychometrics, Equation 11, Equation 41, Table 2

60 = Constant to convert from minutes to hours

CAP = Cooling capacity (Btu/hr)

$1{,}000$ = Constant to convert from W to kW

$SEER$ = Seasonal Energy Efficiency Ratio of existing system (Btu/W·hr)

Default value for SEER = 13

TRM EFLHc were developed during analysis of the PY6 pilot load control program, which involved logging residential air conditioner and heat pump operation in New Orleans. This monitoring data was analyzed via regression, which produced EFLHc of 1,637 based upon direct metering for a sample of New Orleans residential air conditioners.

As an example, assume the duct leakage before sealing was measured at 360 CFM and the leakage after sealing was 90 CFM. Using the SEER value of 11.5, the annual savings would be:

kWh per year = (360 – 90) x 1,637 x (40 x 0.076 – 30 x 0.074) x 60 / (1000 x 11.5) = 1,891 kWh per year.

Default value for HSPF = 7.30.7

3.3.4.2 *Heating Savings (Electric Resistance):*

$$kWh_{Heating,Electric\ Resistance} = \frac{(DL_{pre} - DL_{post})/((CAP/12{,}000) * 400) * EFLH_h * CAP * TRFheat}{\eta\text{Heat} / 3{,}412}$$

DLpre = Pre-measurement of leakage to unconditioned space

DLpost = Post-measurement of leakage to unconditioned space

CAP = Heating output capacity (Btu/hr) of electric heat = Actual. Use 72,829 Btu/hr if CAP unavailable.

12,000 = Btu/ton conversion factor

400 = CFM/ton conversion factor

EFLHh = Equivalent full load heating hours = 396

TRFheat = Thermal Regain Factor for heating by space type = 1.0 for Unconditioned Spaces = 0.40 for Semi-Conditioned Spaces

ηHeat = Efficiency in COP of Heating equipment = Actual. If unavailable, use 1.0.

3,412 = Conversion of BTU/kWh.

3.3.4.3 *Demand Savings (Cooling):*

$$kW_{savings,C} = \frac{kWh_{savings,C}}{EFLH_C}\ x\ CF$$

Where:

[7] Average of Department of Energy minimum allowed HSPF for new heat pumps from 1992-2006 (6.8 HSPF) and after January 23, 2006 (7.7 HSPF)

kWhsavings$_c$ = Calculated kWh savings for cooling

EFLH$_C$ = Equivalent full load cooling hours

CF = Coincidence factor = 0.77[8]

3.3.4.4 *Adjustments from Historic Field Data Collection*

During the site visits conducted in PY5 – PY8, the Evaluators' field staff conducted blower door testing from 320 homes in an effort to validate post-retrofit leakage estimates indicated in program tracking data. The resulting average is 93.78%. That is, of 320 homes the Evaluators found that duct sealing CFM25$_{post}$ results were 6.22% lower than those reported in tracking data. This factor was used to adjust the reported CFM25$_{post}$ values in air sealing program data before conducting the final analysis.

3.3.4.5 Duct Sealing Savings Results

The savings resulting from applying TRM algorithms and deemed savings parameters, plus the application of field results are summarized in Table 3-8.

Table 3-8 Expected and Verified Duct Sealing Savings

Expected kWh Savings	*Verified kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Verified Peak kW Savings*	*Peak kW Realization Rate*
85,875	128,627	149.78%	32.19	36.32	112.83%

3.3.5 LED Savings Calculations

Methods for calculating the deemed savings values for LEDs came from New Orleans TRM, sections C.5.3. ENERGY STAR Directional and Decorative LEDs and C.5.4. ENERGY STAR Omni-Directional LEDs. Deemed per-unit kWh and kW savings were applicable to several lamp types installed during PY10.

3.3.5.1 Calculated Energy Savings and Peak Demand Savings

$$kWh_{savings} = \left((W_{base} - W_{post})/1000\right) \times Hours \times ISR \times IEF_E$$

$$kW_{savings} = \left((W_{base} - W_{post})/1000\right) \times CF \times ISR \times IEF_D$$

Where:

W_{base} = Based on wattage equivalent of the lumen output of the installed LED[9]

W_{post} = Actual wattage of LED installed

$Hours$ = Average hours of use per year (880.5)

[8] Developed through direct monitoring during the development of the New Orleans TRM

[9] Determined using lamp type, base type and lumen output.

IEF_E = Interactive Effects Factor to account for cooling energy savings and heating energy penalties

IEF_D = Interactive Effects Factor to account for cooling demand savings

CF = Coincidence Factor, (11.12%)

ISR = In Service Rate (98.0% for DI)

Table 3-9 Energy and Demand Interactive Factors

Heating Type	*IEF_E*	*IEF_D*
Gas Heat with AC	1.10	1.29
Electric Resistance Heat with AC	0.83	1.29
Heat Pump	0.96	1.29
Heating/Cooling Unknown[10]	0.91	1.21

3.3.5.2 Direct Install LED Savings Results

The savings resulting from applying TRM algorithms and deemed savings parameters are summarized in Table *3-10*.

Table 3-10 Expected and Verified LED Savings

Expected kWh Savings	*Verified kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Verified Peak kW Savings*	*Peak kW Realization Rate*
99,560	102,987	103.44%	16.92	16.42	97.04%

Verified savings were based on actual home heating types.

3.3.6 Deemed Savings for Other Measures

For remaining program measures, the Evaluators used the following TRM 3.0 sections and tables to verify savings.

Table 3-11 Summary of Measures and Expected Savings

Measure	*TRM Section*	*Calculated/Deemed*	*TRM Table(s)*	*Table Page(s)*
Aerators	C.2.4	Deemed	Table 42	C-55
Ceiling Insulation	C.4.2	Calculated	N/A	C-106
Pipe Wrap	C.2.3	Deemed	Table 40	C-51
Power Strips	C.1.6	Deemed	Table 12	C-19
Showerheads	C.2.5	Deemed	Table 47	C-60
Smart Thermostats	C.3.9	Deemed	Table 75	C-102

[10] Unknown factors are based on EnergyStar Interactive effects, weighted by primary data collected on New Orleans typical HVAC arrangements.

3.3.7 Savings from Home Energy Savings Kits

Savings for HESKs was calculated using applicable sections from Table 3-11. The Evaluators interviewed 178 PY9 HESK recipients to develop PY9 in-service rates and the percentage of homes with electric resistance water heating. Overall results are shown below.

Table 3-12 Kit Device Recipient Survey Results

Kit Device	In-Service Rate	% ER Water Heater
Aerator 1.0	53.13%	40.79%
Aerator 1.5	40.99%	40.79%
LED 9	82.04%	-
LED 15	82.04%	-
Showerhead	52.41%	40.79%

Using the TRM 3.0 supplemented with this data, verified Mailer Kit savings are found in the table below.

Table 3-13 Mailer Kit Realization Rates

Kit Device	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Aerator 1.0	46,331	40,394	87.2%	0.00	4.16	N/A
Aerator 1.5	27,548	18,705	67.9%	0.00	1.95	N/A
LED 15	141,382	167,422	118.4%	23.94	31.94	133.4%
LED 9	253,404	299,596	118.2%	43.36	57.14	131.8%
Showerhead	327,242	203,445	62.2%	0.00	21.15	N/A
Total	**795,907**	**729,562**	**91.7%**	**67.30**	**116.35**	**172.9%**

3.4 Verified Gross Savings Summary

Verified savings is presented by measure in Table 3-14 below.

Table 3-14 Program Gross Realization Summary

Measure	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Aerator	509	509	100.00%	0.05	0.05	100.00%
Air Sealing	27,513	27,442	99.74%	10.79	10.70	99.17%
Duct Sealing	85,875	128,627	149.78%	32.19	36.32	112.83%
Insulation	13,045	13,873	106.35%	31.70	32.35	102.05%
LED	99,560	102,987	103.44%	16.92	16.42	97.04%
Pipe Wrap	671	671	100.00%	0.08	0.08	100.00%
Power Strip	14,090	14,090	100.00%	1.34	1.34	100.00%
Showerhead	4,104	4,104	100.00%	0.43	0.43	100.00%
Smart Thermostat	37,044	37,058	100.04%	0.00	0.00	N/A
HESKs	795,907	729,562	91.66%	67.30	116.35	172.88%
Kit Giveaway	19,130	22,449	117.35%	2.54	3.54	139.37%
Total	**1,099,012**	**1,081,372**	**98.39%**	**163.55**	**217.58**	**133.04%**

Overall, the program resulted in 1,081,372 saved kWh and peak kW was reduced by 217.58 kW.

3.5 Estimation of Net Savings

During PY9 the Evaluators conducted NTG surveys. Their results have been applied to PY10. Below, PY9 methods are discussed below.

- Participant survey responses were used to estimate the net energy impacts of the program. The program net savings are equal to gross savings, less savings associated with free ridership, plus participant spillover savings. The methodology used is described in detail in Section in 2.2.3.
- To estimate program-level free ridership, the Evaluator calculated free ridership scores for major and direct install measures, weighted by the participants' gross energy savings and demand reductions. The major and direct install measure free ridership ratios were used to factor the program verified gross savings for the two measure types to estimate free ridership.
- A spillover ratio was developed by dividing the total energy savings and demand reductions resulting from spillover measures by the total gross energy savings and demand reductions for the sample of survey respondents.

3.5.1 Net Savings Results

Table 3-15 summarizes free ridership findings by measure type. As shown, free ridership was higher for the direct install measures than the rebated measures.

Table 3-15 Free Ridership by Measure Type

Measure	Number of Responses	Average Free Ridership
Energy efficient air conditioner tune up	10	0%
Duct sealing	34	2%
Air sealing	3	0%
LED light bulbs	76	39%
Energy efficient smart strip	33	18%
Smart thermostat	3	33%
High efficiency showerheads	2	25%

Three respondents reported installing additional measures determined to qualify as spillover savings.

Table 3-16 summarizes the program net kWh savings and peak kW demand reduction impacts of major measure and direct install items in the HPwES Program. Net to gross ratios in above tables represent overall ratios, accounting for both major and DI measures. Individually, major measure NTG is 89.06% and DI is 72.67%.

Table 3-16 Major Measure and DI Summary of Verified Net Savings

Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
329,361	49,461	279,900	84.98%	97.69	8.57	89.12	91.23%

The overall NTGRs are 84.98% for kWh and 91.23% for kW.

3.5.2 HESK Net Savings Results

The net savings of the kit measures was assessed using survey responses from a sample of 178 customers that received the kit. Table 3-17 summarizes the assessed free ridership by measure type.

Table 3-17 HESK Free Ridership by Measure Type

Measure	Average Free Ridership
Bathroom Aerator	6%
Kitchen Aerator	7%
Showerhead	9%
LED	36%

Table 3-18 summarizes the net savings results for the kits (mailer and giveaway distribution channels).

Table 3-18 HESK Summary of Verified Net Savings

Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
752,011	193,898	558,113	74.22%	119.89	30.91	88.98	74.22%

Overall HESK NTGRs are 74.22% for kWh and 74.22% for kW.

3.5.3 Overall Program Net Savings Results

Table 3-19 summarizes the overall Net savings results of the Program as a whole.

Table 3-19 Net kWh Savings and Net Peak kW Reductions

Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
1,081,372	243,359	838,013	77.50%	217.58	39.48	178.10	81.85%

NTG ratios in above tables represent overall ratios, accounting for major and DI measures and HESKs.

Net kWh savings totaled to 838,013, kWh and equal 77.50%% of gross program savings. Net kW reductions totaled 178.10 kW and equal 81.85%% of verified gross program savings.

3.6 Process Evaluation Findings

The process evaluation was limited to the summary of program data and a survey of program trade allies. Findings from these activities are summarized below.

3.6.1 Summary of Program Participation

Table 3-20 summarizes participation in the program, including HESKs. Table 3-21 summarizes participation in the offering, excluding HESKs. As shown, among the group where HESKs were excluded, 62% received direct install measures and approximately 51% implemented a major measure (e.g., insulation, duct sealing). Eighteen percent of participants received direct install and implemented a major measure, excluding kit recipients.

Program data indicated that 70% of non-kit recipient customers received an assessment.

Table 3-20 Share of Customers Receiving Measures, Kits and Assessments

Number of Participants*	Percent Receiving Direct Install Measures	Percent Receiving Major Measures	Percent Receiving Direct Install and Major Measures	Percent Receiving an Assessment	Percent Receiving a Kit	Average Expected Savings per Participant
4,699	3%	3%	1%	4%	95%	234

***Including HESKs, unique address count.*

Table 3-21 Share of Customers Receiving Measures and Assessments

Number of Participants*	Percent Receiving Direct Install Measures	Percent Receiving Major Measures	Percent Receiving Direct Install and Major Measures	Percent Receiving an Assessment	Average Expected Savings per Participant
252	62%	51%	18%	70%	1,121

***Excluding HESKs, unique address count.*

Table 3-22 summarizes project savings by measure type. The table shows that that kit items accounted for 74% of program expected savings, followed by LED lighting and duct sealing.

Table 3-22 Summary of Measures Installed

Measure	Expected kWh Savings	Incentives Paid	Number of Participants	Percent of Expected Savings	Incentive Dollars per kWh Saved
Kit item	816,601	$122,690	4,481	74%	$0.15
LED	99,560	$15,020	320	9%	$0.15
Duct Sealing	85,875	$13,560	47	8%	$0.16
Smart Thermostat	37,044	$15,950	103	3%	$0.43
Air Sealing	27,513	$11,167	20	3%	$0.41
Power Strip	14,090	$3,078	61	1%	$0.22
Insulation	13,045	$2,245	4	<1%	$0.17
Showerhead	4,104	$200	11	<1%	$0.05
Pipe Wrap	671	$22	8	<1%	$0.03
Aerator	509.1	$38	9	<1%	$0.07

3.6.2 Trade Ally Participant Feedback

The Evaluators administered trade allies that participated in the 2020 Energy Smart Residential Program. All of the trade allies that completed the survey provide weatherization services and three provide AC tune ups. The summary of these findings are presented in this chapter.

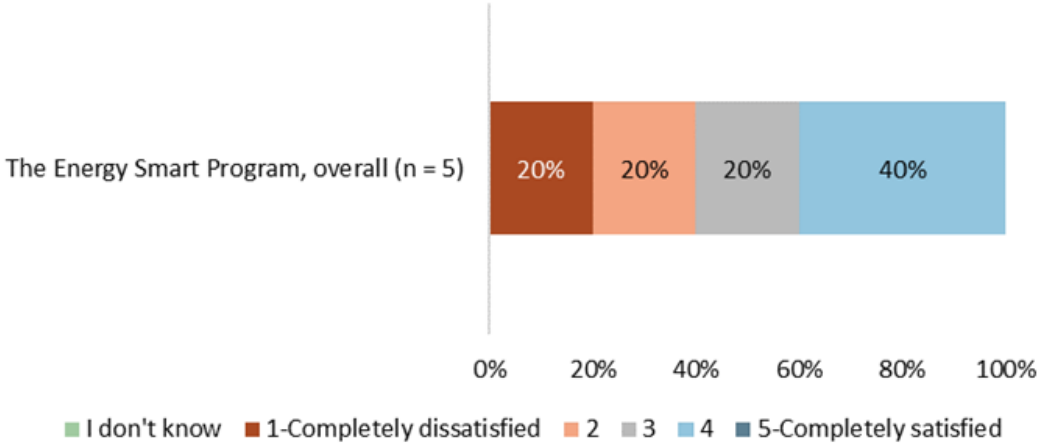
The survey was administered online, and recruitment was primarily by email. Telephone recruitment was also performed to increase the number of responses (see Table 3-23).

Table 3-23 Email Campaign and Response Rate

Metric	Number
Initially contacted	15
Undeliverable	1
Completed Online	3
Completed Telephonically	2
Total emails sent (including reminders)	38
Response rate	33%

Less than half of residential trade allies were satisfied with the Energy Smart Program. Overall, 40% of respondents stated they were somewhat satisfied with the program (see Figure 3-2) and it should be noted that the sample size was small with only five respondents. Residential trade allies provided their feedback and expressed their issues with the program.

Figure 3-2 Program Satisfaction

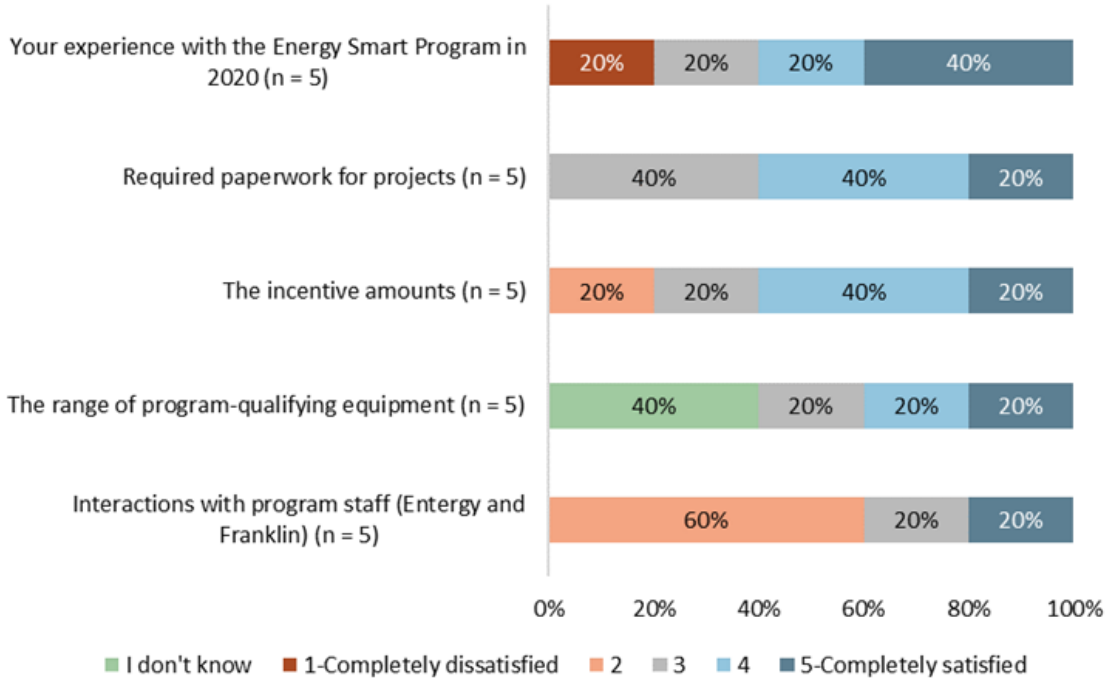


The reasons for dissatisfaction included:

- The perception that incentives for gas heated homes were too low.
- The removal of duct blast testing from the AC Tune-Up Program. This respondent stated that the assessments are done by the program implementation contractor who does not perform assessments fast enough and this results in some homes not having their ducts tested.
- Rebate processing is slow and the program does not have an up-to-date understanding of the amount of budget that remains.

Respondents also rated other aspects of the program. Dissatisfaction was highest for interactions with program staff. Based on the comments provided on the reasons for dissatisfaction, these comments appear to be directed towards the implementation contractor. See Figure 3-3 for more details.

Figure 3-3 Satisfaction with Different Aspects of the Program



The trade allies offer recommendations on how to improve residential offerings. Surveyed trade allies provided suggestions for improving the Energy Smart offerings. For example, three respondents suggested streamlining the assessments better by addressing their issues with Franklin (see Table 3-24). Other recommendations include improving communication with the allies, increasing the number of eligible measures, and reducing payment turnaround times.

Table 3-24 Examples of Recommendations

Categories	***Respondents (n = 5)***	***Responses***
Streamline the assessment	3	"Let the Trade Allies complete their energy assessments for Entergy customers. Having Franklin as the middleman does not work. Trade Allies do not need [incorrect energy audits on] their customer's homes before work can be done. We are capable of determining what can be done. That is why we take pre and post pictures." "[…] the QA guys you can get in touch with them. We are usually calling because a customer has a question and someone [should] answer the phone. It makes it difficult. If they call us they want us to respond immediately." "They just need to find someone better to implement the program or work closer with Franklin to straighten out these concerns. Our company is not the only company that feels that way. We have no contact with Entergy and we don't know if they even care."

Improve communication with trade allies	1	"[…] I feel like they have too many people pushing around paper. You cannot get in touch with anyone, you always get the voicemail."
Increase number of eligible measures	1	"Expand services/application that would earn rebates. (radiant barrier)"
Reduce payment turnaround time	1	"Streamline the money and the funding. [Timely payment; can we get paid in thirty days or less[?] Eight weeks is too long.]"

COVID-19 impacted the ability to complete projects. Trade allies indicated that COVID-19 restrictions affected their ability to do work or finish projects, but the extent of the impact varied from trade ally. One trade ally stated they experienced a significant impact. Furthermore, some trade allies indicated they could not participate because the programs had to halt residential field work in response to state and local Stay-At-Home mandates. All trade allies stated they received COVID-19 related training and materials for their organization from program staff. Trade allies were sent flyers and other informational material on how to stay safe and do fieldwork during the pandemic. One respondent stated they also received webinars on this training.

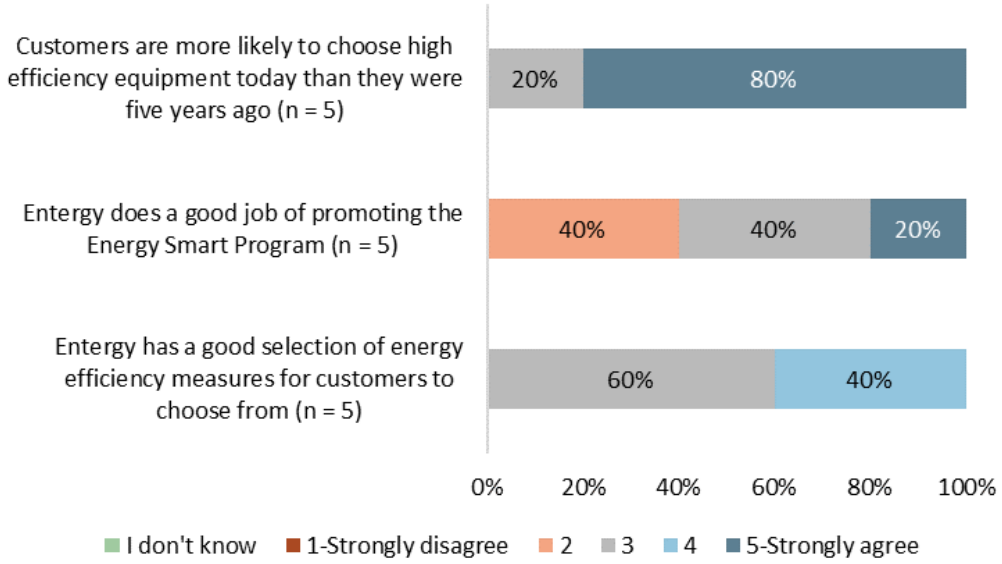
The trade allies promote energy efficiency offerings to their customers. Some of the trade allies focused more on the benefits of lowering utility bills when speaking to customers about energy efficient equipment (see Table 3-25).

Table 3-25 How Often Trade Allies Recommend High-Efficiency Equipment

Categories	***Percentage (n = 5)***
1-Never	40%
2	0%
3	40%
4	0%
5-Always	20%

Trade allies have also noticed that the perception of energy efficiency has changed over the years. Eighty percent of trade allies indicated that customers are more likely to purchase more energy-efficient products than they were five years ago (see Figure 3-4).

Figure 3-4 Perception of Energy Efficiency Among Customers



Generally, the trade allies use different strategies to promote the energy efficiency offerings. Some of these strategies include a referral program their company has, mentioning the offerings to all customers, or develop a quick questionnaire to rate customer eligibility. One trade ally shared they have created their own marketing tools because Entergy has not provided them with certain materials. They also stated that Entergy promotes their company on their website but nothing else.

3.7 Key Findings and Conclusions

The key findings from the trade ally survey are summarized here but are related to multiple program across multiple programs.

- **The program did not make the kWh savings goal or kW reduction target.** In PY10 the program had a savings goal of 1,640,521 kWh and a 1,090.19 target kW reduction. The program achieved 1,081,372 kWh in verified kWh, 65.92% of goal, and was 872.61 kW below the kW target.
- **Less than half of residential trade allies were satisfied with the Energy Smart Program.** Surveyed trade allies provided suggestions for improving the Energy Smart offerings. For example, three respondents suggested streamlining the assessments better by addressing their issues with the implementation contractor. Other recommendations included improving communication with the allies, increasing the number of eligible measures, and reducing payment turnaround times.

- **COVID-19 pandemic impacted the ability to complete projects.** Trade allies indicated that COVID-19 restrictions affected their ability to do work or finish projects, but the extent of the impact varied from trade ally. One trade ally stated they experienced a significant impact. Furthermore, some trade allies indicated they could not participate because the programs had to halt residential field work in response to state and local Stay-At-Home mandates. Trade allies were sent flyers and other informational material on how to stay safe and do fieldwork during the pandemic. One respondent stated they also received webinars on this training.
- **The trade allies promoted energy efficiency offerings to their customers.** Some of the trade allies focused more on the benefits of lowering utility bills when speaking to customers about energy efficient equipment. Trade allies have also noticed that the perception of energy efficiency has changed over the years. Eighty percent of trade allies indicated that customers are more likely to purchase more energy efficient products than in previous years.

3.8 Recommendations

The Evaluators' recommendations are as follows:

- **Address trade ally program dissatisfaction.** Multiple trade allies expressed dissatisfaction with the processing of rebate payments and communications on the status of the program budget. Because trade ally participation in the programs is central to the ongoing success of the programs, staff should make an effort to address these concerns. This may include reviewing rebate processing and providing regular and accurate updates on program incentive budgets. Program staff noted that they currently hold quarterly meetings with a trade ally advisory group to solicit feedback and suggestions.

4 Income Qualified Weatherization

4.1 Program Description

The Income Qualified Weatherization (IQW) offering targets and offers comprehensive weatherization services to qualified low-income, single-family homes and low-rise, multi-family dwellings of four or fewer units. The IQW program offers comprehensive home assessments and the direct installation of measures through program staff, followed by deeper energy efficiency upgrades implemented through trade allies. The Program's objective is to educate customers on how they are using energy, identify opportunities for energy savings specific to their home, and prioritize a wide range of energy conservation measures that will allow them to save energy immediately.

The IQW offering provides customers with household incomes of 200% the federal poverty level with home energy upgrades at low or no cost. The offering includes a free home energy assessment performed by the implementation contractor.

Contractors collect information to vet customers' income qualification through a series of questions.

The PY10 program was open and available to customers between April 1, 2020 and December 31, 2020.

4.1.1 Program Changes

Gas-heated homes are now eligible for the air sealing, attic insulation, and smart thermostat upgrades or installations through the offering, beginning in PY10.

Programmable thermostats have been removed from the offering due to their ineligibility.

4.1.2 Summary of Activities

A total of 424 households participated in IQW, Table 4-1 summarizes the total number of homes that received an assessment or had a measure performed and the expected kWh and peak kW savings by measure.

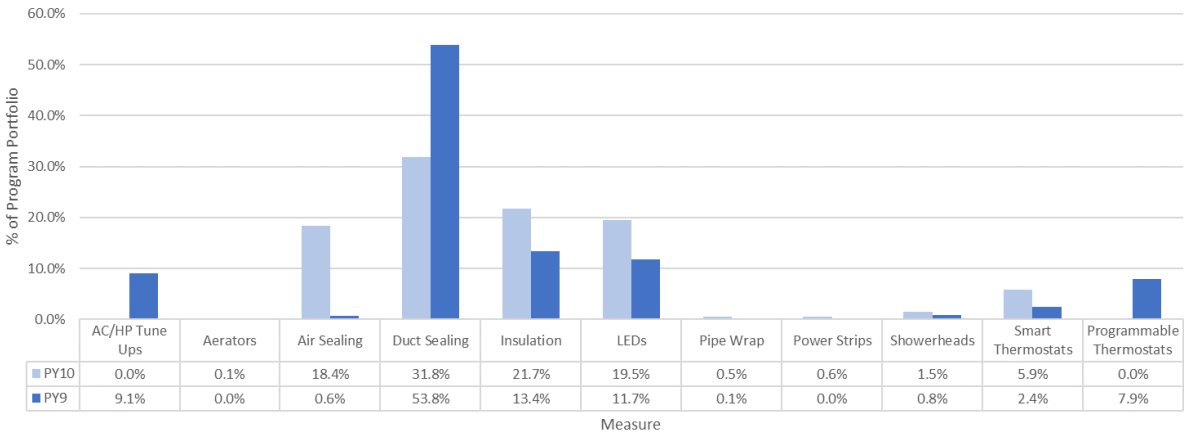
Table 4-1 Summary of Measures and Expected Savings

Measure	Number of Measures Distributed	Expected kWh Savings	Expected kW Savings	Percent of Program Savings (by kWh)
Assessments	354	0	0.00	0.0%
Aerators	28	947	0.10	0.1%
Air Sealing	113	145,852	64.11	18.4%
Duct Sealing	118	252,502	90.78	31.8%
Insulation	57	172,466	519	21.7%
LEDs	5,268	154,600	26.28	19.5%
Pipe Wrap	144	3,994	0.46	0.5%
Power Strips	22	4,492	0.43	0.6%
Showerheads	53	12,084	1.26	1.5%
Smart Thermostats	136	46,648	0.00	5.9%
Total	**6,293**	**793,585**	**702.54**	

Seven of the 354 assessments completed were virtual assessments.

Below, Table 4-2 shows individual measure contribution as part of the overall offering expected savings, comparing PY9 with PY10.

Table 4-2 Savings Contributions by Measure



	AC/HP Tune Ups	Aerators	Air Sealing	Duct Sealing	Insulation	LEDs	Pipe Wrap	Power Strips	Showerheads	Smart Thermostats	Programmable Thermostats
PY10	0.0%	0.1%	18.4%	31.8%	21.7%	19.5%	0.5%	0.6%	1.5%	5.9%	0.0%
PY9	9.1%	0.0%	0.6%	53.8%	13.4%	11.7%	0.1%	0.0%	0.8%	2.4%	7.9%

In PY9, there were projects in 824 dwellings summing to 1,747,799 kWh of savings completed during an extended 15-month period. Normalizing these figures to a 12-month program year for a more accurate comparison yields an expected 659 dwellings summing to 1,398,239 kWh. During PY10 the offering ran for only nine months, completing projects in 424 dwellings summing to 793,585 kWh in expected savings. Normalizing these to a normal (12 month) program year yields 565 projects and 1,058,114 kWh in expected savings. These normalized sums are only used for illustrative comparative purposes.

Comparing these figures translates into a 24.3% drop in expected kWh savings, while average dwelling kWh savings decreased by 11.8%. This is mostly due to the COVID-19 pandemic.

Table 4-3 compares program years over a 5-year period.

Table 4-3 Participation and Expected Savings by Program Year

Program Year	Count Homes	Expected kWh per Home
PY6	265	6,003
PY7 (nominal)	316	3,307
PY7 (normalized)	421	3,307
PY8	521	3,586
PY9 (total)	824	2,121
PY9 (calendar)	659	2,171
PY10 (nominal)	424	1,872
PY10 (normalized)	565	1,872

4.1.3 Goal Achievement

Table 4-4 IQW Summary of kWh Goal Achievement

Verified kWh	kWh Goal	Percent of Goal Attained	Verified kW	kW Target	Difference from Target
899,228	656,208	137.03%	729.27	445.44	283.83

In PY10 the offering had a savings goal of 656,208 kWh and a 445.44 target kW reduction. The program achieved 899,228 kWh in verified kWh, 137.03% of goal, and was 283.83 kW above the kW target.

4.2 EM&V Methodology

Evaluation of IQW included the following:

- Desk reviews;
- Interviews with program staff; and
- Previous program year field visit results review instead of on-site testing and data collection.

Impact savings were calculated using methods and inputs in the New Orleans TRM 3.0 and incorporated results from historic on-site testing where appropriate. PY10 major savings components are ceiling/attic insulation, duct sealing and air sealing. Impact methodologies for IQW are the same as described for HPwES, described in section 2.3.3.

4.3 Verified Savings by Measure

4.3.1 Aerators

Table 4-5 Expected and Verified Aerators Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
947	946	99.89%	0.10	0.10	100.00%

4.3.2 Air Sealing

Table 4-6 Expected and Verified Air Sealing Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
145,852	142,935	98.00%	64.11	62.67	97.75%

Like duct sealing, the Evaluators applied the results of field testing from previous years to air sealing (102.0% of reported post CFM reading). This lowered realization from 100.0% to 98.0%.

4.3.3 Duct Sealing Savings

Table 4-7 Expected and Verified Duct Sealing Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
252,502	296,101	117.27%	90.78	106.52	117.34%

4.3.4 Insulation

Table 4-8 Expected and Verified Insulation Savings – R0 to R30

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
172,466	179,193	103.90%	519.14	532.10	102.50%

All projects were R-30 insulation.

4.3.5 LEDs

Table 4-9 Expected and Verified LED Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
154,600	212,816	137.66%	26.28	25.73	97.91%

LED savings were calculated using actual home heating types specific to residence the lamps were installed in.

4.3.6 Pipe Wrap

Table 4-10 Expected and Verified Pipe Wrap Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
3,994	3,995	100.03%	0.46	0.46	100.00%

4.3.7 Power Strips

Table 4-11 Expected and Verified Power Strip Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
4,492	4,492	100.00%	0.43	0.43	100.00%

4.3.8 Showerheads

Table 4-12 Expected and Verified Showerhead Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
12,084	12,084	100.00%	1.26	1.26	100.00%

4.3.9 Smart Thermostats

Table 4-13 Expected and Verified Smart Thermostat Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
37,044	37,058	100.04%	0.00	0.00	N/A

4.4 Verified Gross Savings Summary

Verified savings and realization rates are presented by measure in Table 4-14.

Table 4-14 Gross Realization Summary

Measure	Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	kW Realization Rate
Aerators	947	946	99.89%	0.10	0.10	100.00%
Air Sealing	145,852	142,935	98.00%	64.11	62.67	97.75%
Duct Sealing	252,502	296,101	117.27%	90.78	106.52	117.34%
Insulation	172,466	179,193	103.90%	519.14	532.10	102.50%
LEDs	154,600	212,816	137.66%	26.28	25.73	97.91%
Pipe Wrap	3,994	3,995	100.03%	0.46	0.46	100.00%
Power Strips	4,492	4,492	100.00%	0.43	0.43	100.00%
Showerheads	12,084	12,084	100.00%	1.26	1.26	100.00%
Smart Thermostats	46,648	46,666	100.04%	0.00	0.00	N/A
Total	**793,585**	**899,228**	**113.31%**	**702.54**	**729.27**	**103.80%**

PY10 verified savings are 899,228 kWh and 729.27 kW, 113.31% and 103.80% of expectations, respectively.

4.5 Estimation of Net Savings

The NTG ratio for the IQW offering was assumed to be 100% in line with common practice for estimation of low-income offering net savings, thus offering net savings are equal to program gross savings.

4.5.1 Net Savings Results

Table 4-15 summarizes the program net kWh savings and peak kW demand reduction impacts of the IQW Program.

Table 4-15 IQW Summary of Verified Net Savings

Verified kWh	NTGR	Net kWh	Verified kW	Net kW
899,228	100%	899,228	729.27	729.27

4.6 Process Evaluation Findings

The IQW offering is well-established with high levels of participant satisfaction. All measures installed in IQW have deemed savings based on primary data collection provided in the New Orleans TRM 3.0. Evaluators conducted comprehensive process evaluations of the program during program years five through nine. Participants expressed high levels of satisfaction with the overall offering experience. Due to these reasons, in the initial review of the PY10 IQW program the Evaluators concluded that the offering did not warrant more than a brief discussion of offering changes and activity. The Evaluators plan to conduct a process evaluation during the next program cycle or after major changes to the offering.

4.6.1 Summary of Program Participation

Table 4-16 summarizes program activity. As shown, 83% of customers received direct install measures and 56% received major measures. Thirty-six percent of customers received both direct install and major measures.

The tracking data indicated that 83% of customers received an assessment. This is likely an undercount reflecting incomplete data since the program design is such that participation begins with an assessment. In some cases, the assessment may have occurred in the previous program year.

Table 4-16 Share of Customers Receiving Measures and Assessments

Number of Participants	*Percent Receiving Direct Install Measures*	*Percent Receiving Major Measures*	*Percent Receiving Direct Install and Major Measures*	*Percent Receiving an Assessment*	*Average Expected Savings per Participant*
424	83%	56%	36%	83%	1,867

As shown in Table 4-17, insulation and duct sealing accounted for 54% of the kWh savings.

Table 4-17 Summary of Measures Installed

Measure	*Number of Measures*	*Expected kWh Savings*	*Percent of kWh Contribution*	*Incentives*	*Incentive Dollars per kWh*
Assessments	354	0	0.0%	$70,800	N/A
Aerators	28	947	0.1%	$123	$0.13
Air Sealing	113	145,852	18.4%	$96,672	$0.66
Duct Sealing	118	252,502	31.8%	$83,009	$0.33
Insulation	57	172,466	21.7%	$77,168	$0.45
LEDs	5,268	154,600	19.5%	$24,888	$0.16
Pipe Wrap	144	3,994	0.5%	$322	$0.08
Power Strips	22	4,492	0.6%	$981	$0.22
Showerheads	53	12,084	1.5%	$1,295	$0.11
Smart Thermostats	136	46,648	5.9%	$20,350	$0.44
Totals:	**6,293**	**793,585**		**$375,607**	**$0.47**

4.7 Key Findings and Conclusions

- **The program exceeded the savings goal and the kW reduction target.** In PY10 the offering had a savings goal of 656,208 kWh and a 445.44 target kW reduction. The program achieved 899,228 kWh in verified kWh, 137.03% of goal, and was 283.83 kW above the kW target.
- **The IQW offering is well-established.** All measures installed have deemed savings based on primary data collection provided in the New Orleans TRM 3.0. The Evaluators concluded that the offering did not warrant more than a brief discussion of its changes and activity in PY10.

4.8 Recommendations

The Evaluators' do not have recommendations for the IQW offering for PY10. This offering will be reconsidered for process evaluation in PY11.

5 Multifamily Solutions

5.1 Program Description

The Multifamily Solutions (Multifamily) offering was introduced in PY7. The offering is designed to promote energy efficiency in the multifamily sector by offering home energy walkthrough assessments and deeper energy assessments to multifamily customers. Incentives are provided to contractors for installation of pre-approved measures. The program has the same design elements as HPwES, but targets homes with five or more attached dwelling units. Any property with more than one meter is considered a multifamily property. This channel was developed to work towards overcoming the "split incentive" barrier to multifamily program participation; multifamily dwelling units have historically been underserved as owners are often unwilling to make significant investments in energy efficiency when the utility bill is paid by tenants. Multifamily tenants who meet requirements for the Income Qualified Weatherization program are assessed and served through that channel instead of the traditional Multifamily channel.

The PY10 program was open and available to customers between April 1, 2020 and December 31, 2020.

5.1.1 Program Changes

In PY10, the Program changed the definition of Multifamily from two or more units to five or more units. This change was made because housing with four or fewer units operate similar to single-family homes and tend to have a similar trade ally base. In response to public health concerns, the program offered virtual home energy assessments for PY10.

5.1.2 Summary of Activities

Records indicated a total of 544 projects were completed in two large apartment complexes. Table 5-1 summarizes the total number of homes a measure was installed in and/or performed at, total measures installed/performed and the expected kWh and peak kW savings by measure.

Table 5-1 Summary of Measures and Expected Savings

Measure	***Number of Measures Distributed***	***Expected kWh Savings***	***Expected kW Savings***	***Percent of kWh Contribution***
Aerators	156	4,181	0.44	0.4%
Duct Sealing	103	313,486	88.49	79.2%
LEDs	4,758	125,911	21.39	19.2%
Refrigerator	140	5,255	0.78	0.7%
Showerheads	24	5,472	0.57	0.5%
Assessments	409	0	0.00	0.0%
Total	**5,590**	**454,304**	**111.67**	**100.0%**

Duct sealing contributes 79.2% of expected savings and LEDs contribute an additional 19.2%. All other measures each contribute less than 1% each.

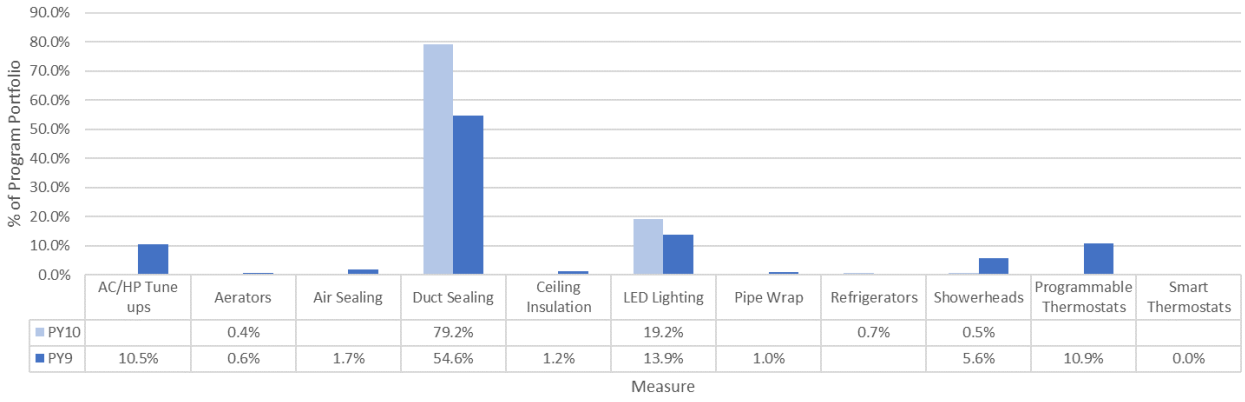
In PY9 468 projects, summing to 1,329,283 kWh, were completed during an extended 15-month period. During the 2019 calendar year the program achieved 1,244,469 kWh from 466 households. During PY10 the offering ran for only nine months, completing 544 projects summing to 454,304 in expected savings. Normalizing these to a 12 month program year for a more accurate comparison yields 725 projects and 605,739 kWh in expected savings, a 56.7% decrease overall. These normalized sums are only used for illustrative comparative purposes.

Table 5-2 Program Year Comparison

PY	# Participants	Expected kWh	Expected kWh per Project
PY7 (nominal)	261	343,424	1,316
PY7 (adjusted)	348	457,898	1,316
PY8	504	836,131	1,659
PY9 (total)	468	1,329,283	2,840
PY9 (calendar)	466	1,244,469	2,671
PY10 (nominal)	544	454,304	835
PY10 (adjusted)	725	605,739	835

Below, Figure 5-1 illustrates the differences in offering kWh savings contributions PY9 and PY10.

Figure 5-1 PY9 and PY10 Measure Contribution Comparison



5.1.3 Goal Achievement

Total verified savings and percentage of goals for the Multifamily Program are summarized in Table 5-3.

Table 5-3 Multifamily Summary of Goal Achievement

kWh Goal	Verified kWh	% of Goal Attained	kW Target	Verified kW	Difference from Target
437,472	497,487	113.72%	163.70	114.87	-48.83

In PY10 the program had a savings goal of 437,472 kWh and a 163.70 target kW reduction. The program achieved 497,487 kWh in verified kWh, 113.72% of goal, but was 48.83 kW below that target.

5.2 EM&V Methodology

The Multifamily Solutions offering has received comprehensive impact and process evaluations in PY7 through PY9. The evaluations provided free ridership estimates, discussions of program satisfaction and strategic recommendations for program improvement, and most/all measures offered by the program have deemed TRM savings. In the initial review of the PY10 program, the Evaluators concluded that the Multifamily offering did not warrant more than a brief overview of program activity.

Impact methodologies for Multifamily are the same as for HPwES, described in section 3.3.

5.3 Verified Savings by Measure

5.3.1 Aerators

Table 5-4 Expected and Verified Aerators Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
4,181	4,179	99.95%	0.44	0.43	97.73%

5.3.2 Duct Sealing Savings

Duct sealing savings was calculated using the following savings algorithms from the New Orleans TRM 3.0, section C.3.8.

5.3.2.1 *Adjustments from Historic Field Data Collection*

During the site visits conducted in PY5 – PY8, the Evaluators' field staff conducted blower door testing from 320 homes in an effort to validate post-retrofit leakage estimates indicated in program tracking data. The resulting average is 93.78%. That is, of 320 homes the Evaluators found that duct sealing CFM25post results were 6.22% lower than those reported in tracking data. This factor was used to adjust the reported CFM25post values in air sealing program data before conducting the final analysis.

The savings resulting from applying TRM algorithms and deemed savings parameters, plus the application of field results are summarized in Table 5-5.

Table 5-5 Expected and Verified Duct Sealing Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
313,485	332,767	106.15%	88.49	93.95	106.17%

5.3.3 LED Lighting Savings

The savings resulting from applying TRM algorithms and deemed savings parameters are summarized in HPwES, section 2.3.3.

Table 5-6 Expected and Verified LED Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
125,911	149,170	118.47%	21.39	19.06	89.11%

LED savings were calculated using actual home heating types specific to residence the lamps were installed in.

5.3.4 Refrigerators

During PY10 140 refrigerators were installed in dwellings throughout a large multifamily complex. The management group for the apartments wanted to participate in the RL&A offering via the purchases of ENERGY STAR refrigerators. Through discussion on which program offering was the best place for these refrigerators, it was decided that Multifamily was best since it was not individual customers who purchased and installed the refrigerators, but rather the owner of the multifamily complex. The management company

took additional steps to make their units more energy efficient including receiving duct sealing and direct install measures from the Energy Smart Program.

Table 5-7 Expected and Verified Refrigerator Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
5,255	5,899	112.25%	0.78	0.86	110.26%

5.3.5 Showerheads

Table 5-8 Expected and Verified Showerheads Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
5,472	5,472	100.00%	0.57	0.57	100.00%

5.4 Verified Gross Savings Summary

Verified savings is presented by program channel in Table 5-9

Table 5-9 Gross Realization Summary

Measure	Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	kW Realization Rate
Aerators	4,181	4,179	99.95%	0.44	0.43	97.73%
Duct sealing	313,485	332,767	106.15%	88.49	93.95	106.17%
LED	125,911	149,170	118.47%	21.39	19.06	89.11%
Refrigerator	5,255	5,899	112.25%	0.78	0.86	110.26%
Showerhead	5,472	5,472	100.00%	0.57	0.57	100.00%
Totals:	**454,304**	**497,487**	**109.51%**	**111.67**	**114.87**	**102.87%**

Overall verified savings are 497,487 kWh and 114.87 kW, 109.51% and 102.87% of respective kWh and kW expectations.

5.5 Estimation of Net Savings

Participant survey responses were used to estimate the net energy impacts of the program. The offering net savings are equal to gross savings, less savings associated with free ridership, plus participant spillover savings.

For the Multifamily offering, the Evaluators developed estimates of net savings using a combination of deemed values and PY9 results and applied them to PY10. The methodology used to calculate the net savings from the survey responses for these projects is described in detail in Section 2.2.3.

The net to gross ratios applied were: 89.9% for energy savings; and 92.3% for peak demand reductions.

5.5.1 Net Savings Results

Table 5-10 and Table 5-12 summarize the program net kWh savings and peak kW demand reduction impacts of the Multifamily offering.

Table 5-10 Multifamily Summary of Verified Net Savings

Verified kWh	*NTGR*	*Net kWh*	*Verified kW*	*Net kW*	*NTGR*
497,487	89.9%	447,291	114.87	106.01	92.3%

The overall kWh NTG ratio is 89.9% and the over kW NTG ratio is 92.3%. Net kWh savings totaled to 497,487 kWh and net kW reductions totaled 114.87 kW.

5.6 Process Evaluation Findings

5.6.1 Summary of Program Participation

This section summarizes findings from the analysis of the program tracking data provided by the implementation contractor.

The table below summarizes the program activity. As shown, two large multifamily apartment complex received program services – 100% received direct install measures and 50% installed major measures. One customer received direct install and major measures.

Table 5-11 Share of Customers Receiving Measures and Assessments

Number of Participating Large Complexes[11]	*Percent Receiving Direct Install Measures*	*Percent Receiving Major Measures*	*Percent Receiving Direct Install and Major Measures*	*Percent Receiving an Assessment*	*Average Expected Savings per Large Complex*
2	100%	50%	50%	0%	227,152

Duct sealing accounted for 79.2% of the program savings (Table 5-16) and was the major measure most implemented.

[11] The entirety of PY10 participation came from two large apartment complexes.

Table 5-12 Summary of Measures Installed

Measure	Number of Measures	Expected kWh Savings	Percent of kWh Contribution	Incentives	Incentive Dollars per kWh
Aerators	156	4,181	0.4%	$780	$0.19
Duct sealing	103	313,485	79.2%	$53,940	$0.17
LED	4,758	125,911	19.2%	$20,381	$0.16
Refrigerator	140	5,255	0.7%	$7,000	$1.33
Showerhead	24	5,472	0.5%	$360	$0.07
Assessments	409	0	0.0%	$6,885	N/A
Total	**5,590**	**454,304**	**100.0%**	**$89,346**	**$0.20**

5.6.2 Offering Operations Perspectives

Multifamily Solutions is a well-established offering in the Energy Smart Program. All measures installed in Multifamily have deemed savings based on primary data collection provided in the New Orleans TRM 3.0. Evaluators conducted comprehensive process evaluations of the offering during program years five through nine. Participants expressed high levels of satisfaction with the overall offering experience. For these reasons, the Evaluators concluded that the offering did not warrant more than a brief discussion of its changes and activity in PY10.

5.6.3 Participant Feedback

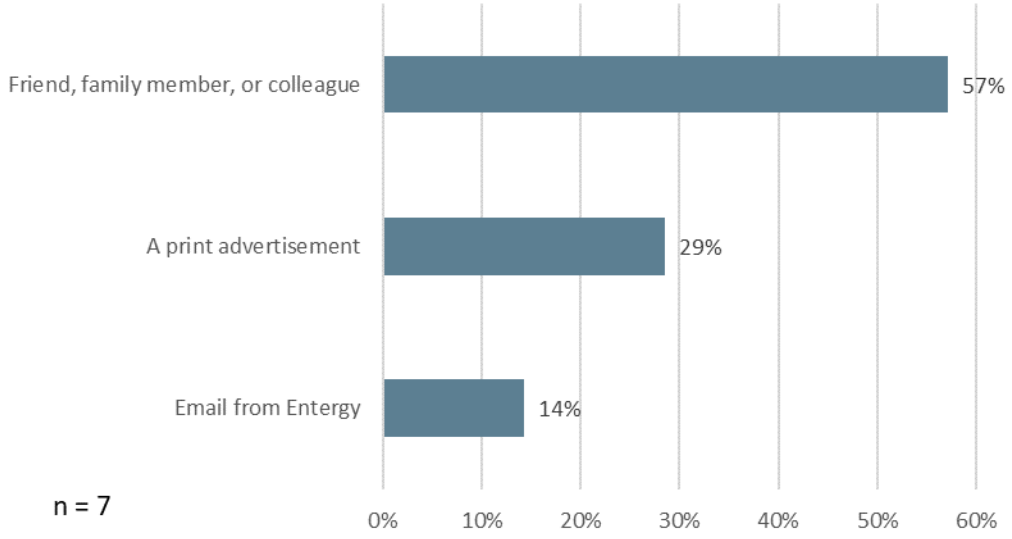
The Multifamily offering is well-established with high levels of participant satisfaction; therefore, the Evaluators did not survey offering participants in PY10. The Evaluators plan to survey Multifamily offering participants in PY11. Below are the results of the PY9 participant survey.

The Evaluators surveyed seven program participants. Seventy-one percent of survey respondents rented their residence.

5.6.3.1 *How Customers Learned of the Program*

The most common reported source of awareness was word-of-mouth (learning through a friend, family member, or colleague). Other reported sources of awareness included a print advertisement (29%) and an email from Entergy (14%). Figure 5-2 summarizes how participants learned of the program.

Figure 5-2 Sources of Program Awareness



5.6.3.2 *Motivations for* Participating

The main motivation for completing the efficiency improvements were to reduce property utility bills. Eighty-six percent of respondents stated that their main motivation for deciding to complete the efficiency improvements at the property were due to this reason. Other common reasons were to improve tenant comfort and satisfaction (57%), reduce tenant utility bills (57%), and to take advantage of rebates/no-cost efficiency improvements (57%). Results are summarized in Table 5-13.

Table 5-13 Motivations for Participating

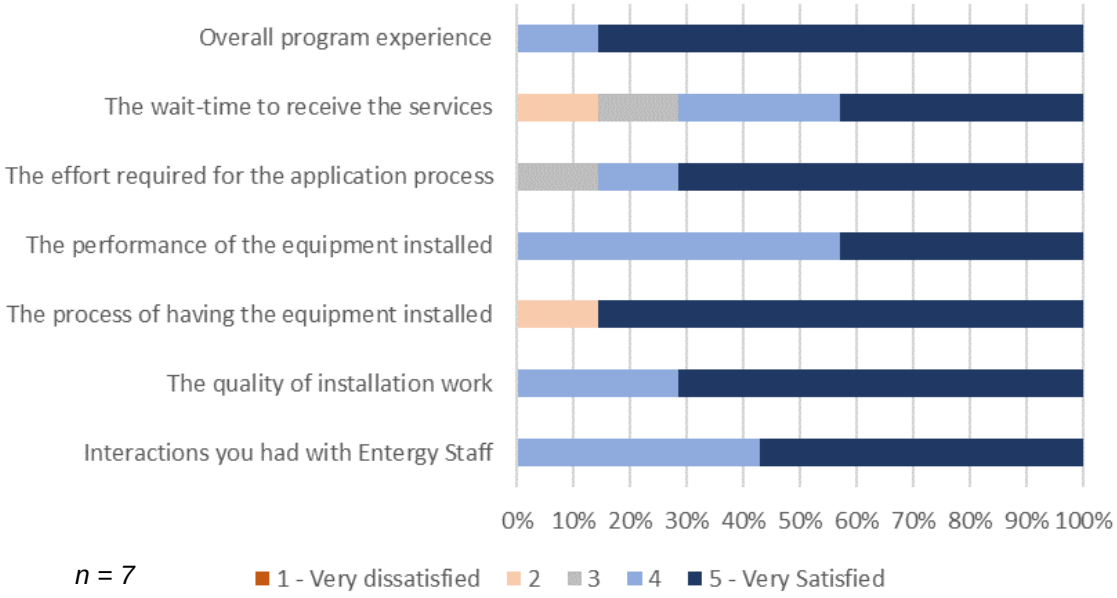
Responses	***Percent of Respondents (n = 7)***
Improve tenant comfort and satisfaction	57%
Reduce tenant utility bills	57%
Reduce property utility bills	86%
To take advantage of rebates/no-cost efficiency improvements	57%
To replace old or non -functioning equipment	29%
To make units more attractive to prospective tenants	14%

*The sum of responses is greater than 100% because respondents were able to select more than one response.

5.6.3.3 *Participant Satisfaction*

Overall, participants were satisfied with the Multifamily Solutions offering. All respondents reported that they were 'very satisfied' or 'satisfied' with the overall offering experience, the quality of installation work, and with interactions they had with the Entergy staff. One respondent expressed dissatisfaction with the process of having the equipment installed and another respondent expressed dissatisfaction with the wait time to receive the services. Results are summarized in Figure 5-3.

Figure 5-3 Participant Satisfaction



5.6.3.4 *Property Characteristics*

The majority of the properties were built before the 1970s. Seventy-one percent of respondents reported that their property was built before the 1970s, and 14% reported that the property was built in the 1970s. Fourteen percent reported that the property was built between 2000-2009. Results are summarized in Table 5-14.

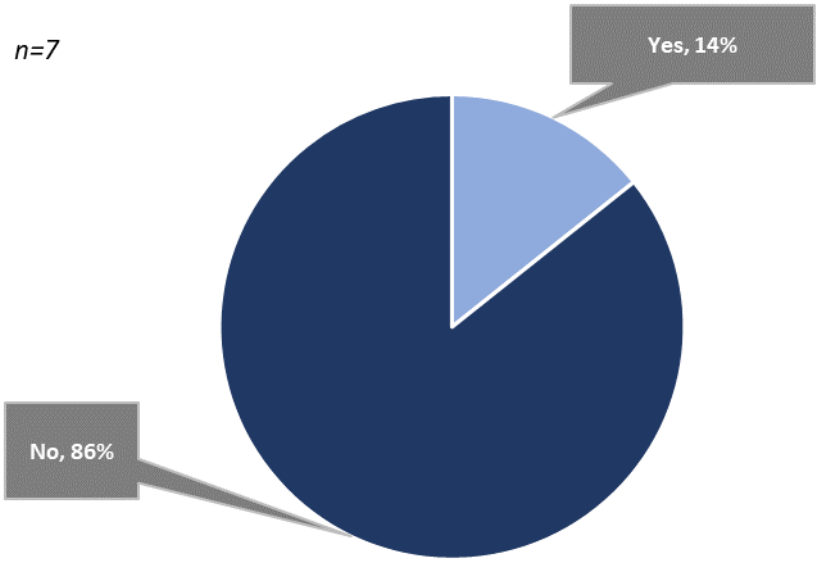
Table 5-14 Year Built

When was this property built?	*Percent of Respondents (n = 7)*
Before 1970s	71%
1970s	14%
1980s	0%
1990s	0%
2000-2009	14%

It was also found that six out of seven respondents stated that their properties are duplexes or triplexes while only one person stated that theirs is an apartment building with more than 10 units.

The majority of the units in the properties are not receiving any type of federal, state or other housing assistance. Eighty-six percent of respondents stated their units at the property do not receive housing assistance while 14% of respondents stated that some of the units are receiving housing assistance. Results are summarized in Figure 5-4.

Figure 5-4 Received Housing Assistance



This section summarizes findings from the analysis of the program tracking data provided by the implementation contractor.

Table 5-15 summarizes the program activity. As shown, two multifamily customers received program services – 100% received direct install measures and 50% installed major measures. One customer received direct install and major measures.

Table 5-15 Share of Customers Receiving Measures and Assessments

Number of Participants	***Percent Receiving Direct Install Measures***	***Percent Receiving Major Measures***	***Percent Receiving Direct Install and Major Measures***	***Percent Receiving an Assessment***	***Average Expected Savings per Participant***
2	100%	50%	50%	0%	227,152

Duct sealing accounted for 69% of the program savings (Table 5-16) and was the major measure most implemented.

Table 5-16 Summary of Measures Installed

Measure	*Expected kWh Savings*	*Incentives Paid*	*Number of Participants*	*Percent of Expected Savings*	*Incentive Dollars per kWh Saved*
Duct Sealing	313,486	$53,940.00	103	69%	$0.17
LED Lighting	125,911	$20,380.89	677	28%	$0.16
Showerheads	5,472	$360.00	24	1%	$0.07
Aerators	4,181	$780.00	156	1%	$0.19
MF Direct Install Measures - Misc.	0	$6,885.00	409	<1%	--
ENERGY STAR Refrigerator	5,255	$7,000.00	8	1%	$1.33

5.7 Key Findings and Conclusions

The key findings and conclusions of the evaluation of the program are as follows:

- **The program exceeded the savings goal but did not reach the kW reduction target.** In PY10 the program had a savings goal of 437,472 kWh and a 163.70 target kW reduction. The program achieved 497,487 kWh in verified kWh, 113.72% of goal, but was 48.83 kW below that target.
- **The MF offering is well-established.** All measures installed in MF have deemed savings based on primary data collection provided in the New Orleans TRM 3.0. The Evaluators concluded that the offering did not warrant more than a brief discussion of its changes and activity in PY10.

5.8 Recommendations

The Evaluators' do not have recommendations for the Multifamily Solutions offering for PY10. This offering will be reconsidered for process evaluation in PY11.

6 Retail Lighting and Appliances

6.1 Program Description

The Retail Lighting and Appliances (RLA) offering provides Point-of- Purchase discounts for light emitting diodes (LEDs) through participating retailers, as well as mail-in rebates (downstream rebates) for refrigerators, window ACs, pool pumps, smart thermostats, and heat pump water heaters. A complete list of eligible items is listed below:

- Light Emitting Diodes (LEDs);
- ENERGY STAR Pool Pumps;
- ENERGY STAR smart thermostats;
- ENERGY STAR dehumidifiers;
- ENERGY STAR water coolers;
- ENERGY STAR refrigerators;
- ENERGY STAR Window ACs; and
- ENERGY STAR Heat Pump Water Heaters.

The Energy Smart Online Marketplace is an online sales platform that provides discounts on energy conservation products. This component of the offering was added at the end of PY9 but saw increased activity in PY10. The Online Marketplace was the primary driver of participation during Q2 when COVID-19 mandated Stay-At-Home Orders were in effect. The Online Marketplace was offered as a way for customers to continue participating in a virtual manner. The products available through the marketplace include:

- Smart thermostats;
- LED light bulbs;
- Advanced power strips;
- Low-flow showerheads and aerators; and
- Hot water pipe insulation.

6.1.1 Activity and Expected Savings

The tables below summarize the total number of measures distributed through the program and expected savings.

Table 6-1 Summary of Measures and Expected Savings

Measure	Number of Measures	Expected kWh Savings	Expected kW Savings	Percent of kWh Contribution
Aerator	753	27,522	2.85	0.3%
Dehumidifier	5	530	0.12	0.0%
HPWH	2	2,670	0.23	0.0%
LEDs	211,536	6,454,515	1,103.26	65.7%
Pipe Insulation	387	9,799	1.12	0.1%
Pool Pump	7	17,612	3.33	0.2%
Power Strip	904	44,206	5.06	0.5%
Refrigerator	117	6,976	1.00	0.1%
Showerhead	601	137,028	14.24	1.4%
Smart Thermostats	9,958	3,118,556	686.00	31.7%
Window A/C	40	3,329	1.89	0.0%
Total	**212,690**	**9,822,743**	**1,819.10**	

Stores carrying bought-down lighting dropped from 21 stores in PY9 to 12 stores in PY10. The Online Marketplace is established and taking the place of these retailers. Despite the lower number of stores, expected lighting savings is 61% higher than the previous year. The table below shows year-to-year comparisons.

Table 6-2 Store Participation per Year

Store Type	Count PY7	Count PY8	Count PY9	Count PY10
Dollar Store / Discount Store	1	6	7	0
Membership Store	1	1	1	1
Big Box Retail Store	-	6	9	4
Big Box Construction Store	1	2	2	2
Hardware Store	1	1	2	3
Supermarket	0	0	0	2
Total Number of Stores	**4**	**16**	**21**	**12**
Expected Lighting kWh Savings	**548,008**[12]	**4,111,210**[13]	**5,333,831**[14]	**8,606,021**[15]

Table 6-3 shows the number of mail-in appliance rebate (non-lighting) participants by year.

[12] 'Normalized' to full program year
[13] Does not include giveaways
[14] PY9 ran for 15 months. This number is the expected savings from 2019 only.
[15] The number has been 'normalized' to represent a full year.

Table 6-3 Program Year Comparison

PY	Appliance Rebates	Expected kWh	Expected kWh per Rebate
PY7 (nominal)	120	14,227	119
PY7	160	18,970	119
PY8	162	23,359	144
PY9 (total)	176	37,000	211
PY9 (calendar)	145	28,881	199
PY10 (nominal)	5,856	3,368,227	575
PY10	7,808	4,490,969	575

In PY9, during 2019 only (12 months) the RLA offering issued 145 rebates, totaling 28,881 kWh in expected savings. During PY10, the offering ran for nine months, so the 5,856 rebates and 3,368,227 kWh in non-lighting savings was normalized to a 12-month program year to allow for a more accurate comparison.

6.1.2 Goal Achievement

Total verified savings and percentage of goals for the RLA Program are summarized in Table 6-4.

Table 6-4 RLA Summary of Goal Achievement

kWh Goal	Verified kWh	% of Goal Attained	kW Target	Verified kW	Difference from Target
6,890,189	9,889,557	143.53%	545.38	1,074.61	529.23

In PY10, the offering had a savings goal of 6,890,189 kWh and a 545.38 target kW reduction. The offering achieved 9,889,557 kWh in verified kWh, or 143.53% of goal, and was 529.23 kW above the kW target.

6.2 EM&V Methodology

The RLA offering has received comprehensive impact and process evaluations in PY5 through PY9. The evaluations provided free ridership estimates, discussions of program satisfaction and strategic recommendations for program improvement, and most/all measures offered by the program have deemed TRM savings. In the initial review of the PY10 program, the Evaluators concluded that the RLA offering did not warrant more than a brief overview of program activity.

[16] PY7 ran for approximately nine months only. This value is the extrapolation of existing values to a full year, allowing for a more direct comparison.
[17] Figures adjusted to reflect 9-month PY10 program period.

Electricity and peak demand reductions of the PY10 RLA offering were estimated using the New Orleans TRM 3.0

Evaluation of the RLA offering included the following:

- Updating pool pump calculations to reflect ENERGY STAR parameters by drive type and horsepower;
- Manufacturer-rated efficient lighting wattages;
- Review of program tracking and recreation of deemed savings calculations; and
- Review of program Memoranda of Understanding (MOU).

For equipment and retrofits rebated through the PY10 RLA offering, calculation methodologies were performed as described in the New Orleans TRM. Measure-specific impact methodology and results are discussed below.

6.3 Verified Gross Savings by Measure

6.3.1 Heat Pump Water Heater (HPWH) Calculations

HPWH savings were calculated using the savings methodology from the New Orleans TRM 3.0, section C.2.1.5.

Table 6-5 HPWH Realization Summary

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
2,670	2,670	100.00%	0.23	0.23	100.00%

$$kWh_{Savings} = \frac{\rho \times C_p \times V \times \left(T_{SetPoint} - T_{Supply}\right) \times \left(\frac{1}{EF_{pre}} - \left(\frac{1}{(EF_{post} \times (1 + PA\%)} \times Adj\right)\right)}{3{,}412\ Btu/kWh}$$

$$kW_{savings} = kWh_{savings} \times Ratio_{Annual\ kWh}^{Peak\ kW}$$

6.3.2 LEDs

Methods for calculating the deemed savings values for LEDs came from the New Orleans TRM, sections C.5.3. ENERGY STAR Directional LEDs and C.5.4. ENERGY STAR Omni-Directional LEDs.

6.3.2.1 Deemed Savings

The table below outlines deemed savings by lamp type.

Table 6-6 ENERGY STAR Omnidirectional LEDs – Deemed Savings Per Lamp[18]

Minimum Lumens	Maximum Lumens	Incandescent Equivalent 1st Tier EISA 2007 (Wbase)	LED Wattage	kWh/Lamp	kW/Lamp
310	749	29	7	16.04	0.00333
750	1,049	43	9	24.79	0.00514
1,050	1,489	53	12	29.89	0.00620
1,490	2,600	72	15	41.56	0.00862

6.3.2.2 *Calculated Savings*

Table 6-7 ENERGY STAR Directional LEDs – Reflector Lamps Baseline Watts[19]

Lamp Type (a)	Incandescent Equivalent (Pre-EISA) (b)	WattsBase (Post-EISA) (c)
PAR20	50	35
PAR30	50	35
R20	50	45
PAR38	60	55
BR30	65	EXEMPT
BR40	65	EXEMPT
ER40	65	EXEMPT
BR40	75	65
BR30	75	65
PAR30	75	55
PAR38	75	55
R30	75	65
R40	75	65
PAR38	90	70
PAR38	120	70
R20	≤ 45	EXEMPT
BR30	≤ 50	EXEMPT
BR40	≤ 50	EXEMPT
ER30	≤ 50	EXEMPT
ER40	≤ 50	EXEMPT

[18] TRM Table 105, page B-138

[19] TRM Table 98, page B-131

Table 6-8 ENERGY STAR Directional LEDs –Baseline Watts EISA-Exempt[20]

Minimum Lumens	Maximum Lumens	Incandescent Equivalent (Wbase)
310	749	40
750	1,049	60
1,050	1,489	75
1,490	2,600	100

6.3.2.3 LED Buydown Savings Results

The savings resulting from applying TRM algorithms are summarized in Table 6-9.

Table 6-9 Expected and Verified LED Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
6,454,515	6,623,507	102.62%	1,103.26	1,053.37	95.48%

Verified savings estimates are based on the tables above and Table 1-14 ENERGY STAR Omni-Directional LEDs – EISA Baselines,[21] using actual efficient wattages of bought-down lamps.

6.3.3 ENERGY STAR Pool Pump Calculations

6.3.3.1 Deemed Energy Savings

ENERGY STAR Pool Pump savings were calculated using the savings methodology from the New Orleans TRM 3.0, section C.1.8.5.1.

The kWh realization rate is 100.0% and the kW realization rate is 99.5%. Ex ante savings were calculated using the New Orleans 3.0 deemed savings approach. The Evaluators used the calculated methodology for verified savings.

Table 6-10 Pool Pumps Realization Summary

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
17,612	17,612	100.00%	3.33	3.33	100.00%

[20] TRM Table 99, page B-IJ

[21] Page C-41.

6.3.4 ENERGY STAR Refrigerator Calculations

6.3.4.1 Deemed Energy Savings

ENERGY STAR Refrigerator savings were calculated using the deemed savings from the New Orleans TRM 3.0, section C.1.4.1. After verifying model configurations and features, deemed savings were assigned to each unit using TRM Table 22: Formulas to Calculate the ENERGY STAR Refrigerator Criteria[22].

Table 6-11 ENERGY STAR Refrigerator Realization Summary

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
6,976	6,841	98.06%	1.00	1.00	100.00%

6.3.5 Smart Thermostats

6.3.5.1 Deemed Energy Savings

Savings for smart thermostats were calculated using the savings methodology from the New Orleans TRM 3.0, section C.3.9.

Table 6-12 Smart Thermostat Realization Summary

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
3,118,556	3,119,738	100.04%	686.00	0.00	0.00%

While 686.00 kW were claimed in expected savings from smart thermostats, there is no peak kW reduction for smart thermostats in the New Orleans TRM 3.0, thus no peak reduction is verified for this measure.

6.3.6 Window Air Conditioner Calculations

6.3.6.1 *Deemed Energy Savings*

Window air conditioner savings were calculated using the following:

$$kW_{Savings} = CAP_c \times \frac{1}{1{,}000} {}^{W}/_{kW} \times \left(\frac{1}{CEER_{base}} - \frac{1}{CEER_{Eff}} \right) \times \%CF$$

$$kWh_{Savings} = CAP_c \times \frac{1}{1{,}000} {}^{W}/_{kW} \times \left(\frac{1}{CEER_{base}} - \frac{1}{CEER_{Eff}} \right) \times EFLH_C \times RAF$$

[22] Pages C-16 to C-19

Where:

CAP_c = Cooling capacity (in BTU)
$CEER_{base}$ = Full-load efficiency of baseline equipment
$CEER_{eff}$ = Full-load efficiency of baseline equipment
$CEER_{base}$ = Seasonal efficiency of baseline equipment
$CEER_{eff}$ = Seasonal efficiency of efficient equipment
EFLHc = Equivalent Full-Load Cooling Hours, 1,637
%CF = Peak Coincidence Factor, 77%
RAF = Room AC Adjustment Factor, .49[23]

Table 6-13: Window Air Conditioner – Baseline and Efficiency Levels[24]

Reverse Cycle?	Louvered Sides?	Capacity	Baseline CEER	Efficient CEER
No	Yes	< 8,000	11.0	12.1
		≥ 8,000 and < 14,000	10.9	12.0
		≥ 14,000 and < 20,000	10.7	11.8
		≥ 20,000	9.4	10.3
	No	< 8,000	10.0	11.0
		≥ 8,000	9.6	10.6
Yes	Yes	< 20,000	9.8	10.8
		≥ 20,000	9.3	10.2
	No	< 14,000	9.3	10.2
		≥ 14,000	8.7	9.6

Table 6-14 Window AC Realization Summary

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
3,329	3,335	100.18%	1.89	4.07	215.34%

6.3.7 Deemed Savings for Other Measures

For remaining program measures, the Evaluators used the following TRM 3.0 sections and tables to verify savings.

[23] This is a factor derived from the ENERGY STAR calculator which corrects for the fact that window AC's are typically not run as often as central AC systems. This value comes from the Arkansas TRM, which developed estimates based on the ENERGY STAR Room AC calculator.
[24] Page C-70

Table 6-15 Summary of Measures and Expected Savings

Measure	TRM Section	Calculated/Deemed	TRM Table(s)	Table Page(s)
Aerators	C.2.4	Deemed	Table 42	C-55
Dehumidifiers	C.1.7	Deemed	Table 16	C-22
Pipe Wrap	C.2.3	Deemed	Table 40	C-51
Power Strips	C.1.6	Deemed	Table 12	C-19
Showerheads	C.2.5	Deemed	Table 47	C-60
Smart Thermostats	C.3.9	Deemed	Table 75	C-102

6.4 Verified Gross Savings Summary

Table 6-16 summarizes the savings from the RLA offering.

Table 6-16 kWh and Peak kW Realization Summary

Measure	Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	kW Realization Rate
Aerators	27,522	11,226	40.79%	2.85	1.16	40.70%
Dehumidifiers	530	532	100.38%	0.12	0.12	100.00%
HPWHs	2,670	2,670	100.00%	0.23	0.23	100.00%
LEDs	6,454,515	6,623,507	102.62%	1,103.26	1,053.37	95.48%
Pipe Insulation	9,799	3,997	40.79%	1.12	0.46	41.07%
Pool Pumps	17,612	17,612	100.00%	3.33	3.33	100.00%
Power Strips	44,206	44,206	100.00%	5.06	5.06	100.00%
Refrigerators	6,976	6,841	98.06%	1.00	1.00	100.00%
Showerheads	137,028	55,893	40.79%	14.24	5.81	40.80%
Smart Thermostats	3,118,556	3,119,738	100.04%	686.00	0.00	0.00%
Window A/Cs	3,329	3,335	100.18%	1.89	4.07	215.34%
Total	**9,822,743**	**9,889,557**	**100.68%**	**1,819.10**	**1,074.61**	**59.07%**

Verified gross savings for the PY10 RLA offering are 9,889,557 kWh and 1,074.61 kW reduced, 100.68% and 59.07% of respective ex ante estimates.

6.5 Estimation of Net Savings

To estimate net savings in the PY10 offering, the Evaluators applied the results from PY9 measurements. The following sections describes the approach used to measure net savings for the lighting and appliance components of the PY9 RLA offering.

6.5.1 Lighting Component

6.5.1.1 *Lighting Methodology*

The Evaluators estimated NTG for upstream bulbs using a price response model, wherein a regression is developed to estimate the relationship between price and quantity sold. Program sales data are, by their nature, non-negative integer values (i.e., count data). Typical ordinary least squares (OLS) estimation procedures are designed to deal with

continuous dependent variables that are normally distributed. Count data dependent variables can be adapted for OLS estimation through logarithmic or square root transformations, but these models may produce nonsensical predictions, such as negative sales. The Evaluators used a negative binomial model to account for the right-skewed relationship between prices and quantities.

The typical price elasticity model is based on the assumption that four broad factors affect bulb sales: prices, bulb models, promotional events, and seasonal trends. The final model used dummy variables to control for seasonal effects (month dummies) and bulb type (model number dummies). A separate model was run for each bulb type (Omni-directional LED and Specialty LED). The basic equation of the price response model was structured as follows (for bulb model i, in period t):

$$\ln(Q_{it}) = \beta_1 + \beta_2 * \ln(P_{it}) + \beta_3 EventDummy_{it} + \sum_{\pi} \beta_{\pi} ModelNumberDummy_i + \sum_{\gamma} \beta_{\gamma} MonthDummy_t + \varepsilon_{it}$$

Where:

ln = natural logarithm

Q = quantity of bulb packs, i, sold during week t

P = retail price (after markdown) for package of bulbs, i, during week t

EventDummy = a binary variable equaling 1 if a promotional event occurred at the retailer selling bulb pack, i, during week t; 0 otherwise

ModelNumberDummy = a binary variable equaling 1 for each unique model number; 0 otherwise

MonthDummy = a binary variable equaling 1 in a given month; otherwise

The β2 coefficient in the model represents average price elasticity of demand holding the effects of all other independent variables constant. The β3 coefficient captures the impact of promotional events on bulb sales. Under the counterfactual scenario where no program exists, the EventDummy variable is always zero, indicating the absence of program sponsored promotional events.

Free ridership ratios were calculated as follows. First, the price response model was used to estimate bulb package sales under program and non-program pricing scenarios. The non-program scenario represents pricing at original retail levels along with the absence of any program-sponsored promotional events. Bulb package sales under both scenarios were multiplied by the number of bulbs per package to arrive at total bulb sales under the program and non-program scenarios. Finally, deemed savings values (gross kWh) were applied to the estimated number of bulbs sold under both scenarios. The final price response model was used to estimate a free ridership as described in the equation below:

$$Free\ ridership\ ratio = \frac{\sum_i^n (E[Bulbs_{NoProgram_i}] * kWh_i)}{\sum_i^n (E[Bulbs_{Program_i}] * kWh_i)}$$

Where:

$E[Bulbs_{NoProgram_i}]$ = the expected number of bulbs of type, i, purchased given original retail pricing (as predicted by the model).

$E[Bulbs_{Program_i}]$ = the expected number of bulbs of type, i, given program discounted pricing (as predicted by the model).

kWh_i = the average gross kWh savings for bulb type, i.

The price response modeling approach is advantageous in that it is built upon actual sales data from participating retailers (as opposed to relying on consumer self-report surveys). There are, however, a number of limitations for the approach. Most importantly, non-program sales data was unavailable for inclusion in the model. As a result, the modeling of price impacts may fit program sales data well, but it is uncertain whether those price effects apply well to prices outside of program ranges. Additionally, for past analyses, during the sales period analyzed there is normally pricing variation for a subset of bulb models, limiting the ability of the model to predict price response effects in a robust manner. Finally, there were likely variables that affect sales levels for LEDs that were not captured by the program tracking data; thus, presenting a risk of omitted variable bias in addition to the inherent amount of error from statistical modeling.

6.5.1.2 Lighting Results

The Evaluators ran separate models for each bulb type (i.e., LED Standard/Omni-directional, and LED Specialty/Directional). The model coefficients for each model are shown in the tables below. The Evaluators normally include a variable for promotional extra markdown/giveaway events, but no promotional events took place in PY9. The effect of promotional events is therefore absorbed by the other covariates although its omission usually has an insignificant effect on the overall free ridership rate. Additional covariates were tested in the modeling process, including store number and retailer type, but these did not result in a better fit and caused issues with overfitting. The coefficients on program price are negative (the expected direction) and statistically significant at the 99% level.

As shown in Table 6-17, the Evaluators estimated the free-ridership rate for upstream LEDs overall to be 33.4% using the price response model. The free-ridership rate for Specialty LEDs is 66.9%, while the free-ridership rate for Omni-directional LEDs is 21.4%.

The Evaluators also performed a literature review for spillover and estimated a spillover rate of 8%[25].

[25] Entergy Arkansas Evaluation Report - Program Year 2017, April 20., Table 4-30, page 229.

Table 6-17 Results of Spillover Benchmarking Study

Program Administrator	Year	Methodology	Spillover
Progress Energy Carolinas	2012	General population survey	7%
Xcel Energy Minnesota	2012	Participant survey	10%
Public Service Company of New	2013	Participant survey	11%
Xcel Energy Colorado	2015	Lighting saturation trend analysis	8%
ComEd Illinois	2015	In-store intercepts	7%
Ameren Illinois	2015	In-store intercepts	7%
Average			**8%**

The NTG ratio for the program overall is 74.6%. The NTG ratio is estimated using the following formula: NTG = 1 – Free Ridership + Spillover.

Table 6-18 NTG Ratio Results by Bulb Type

Bulb Type	Free Ridership	Spillover	NTGR
Specialty LED	66.9%	8.0%	41.1%
Omni-directional LED	21.4%	8.0%	86.6%
All	**33.4%**	**8.0%**	**74.6%**

Table 6-19 Price Response Model Results: Specialty LEDs

Coefficient	Estimate	Std Err	Statistic	P Value	90% CI Lower	90% CI Upper
(Intercept)	5.277	0.275	19.163	0.000	4.823	5.731
Program Price	-0.036	0.009	-3.930	0.000	-0.052	-0.021
Aug	-0.427	0.095	-4.508	0.000	-0.583	-0.271
Dec	-0.526	0.081	-6.457	0.000	-0.660	-0.391
Feb	-0.420	0.230	-1.825	0.068	-0.800	-0.040
Jan	-0.795	0.135	-5.865	0.000	-1.018	-0.571
July	-0.721	0.101	-7.105	0.000	-0.888	-0.553
June	-0.668	0.090	-7.400	0.000	-0.817	-0.519
Mar	0.008	0.071	0.112	0.911	-0.109	0.125
May	-0.558	0.098	-5.701	0.000	-0.719	-0.396
Nov	-0.582	0.166	-3.502	0.000	-0.856	-0.308
Oct	-0.621	0.094	-6.624	0.000	-0.776	-0.466
Sept	-0.556	0.103	-5.394	0.000	-0.726	-0.386
LEDspec_BA10_6[26]	1.041	0.541	1.924	0.054	0.148	1.933

[26] Only one bulb model number is shown here for the sake of brevity, although each bulb model received its own coefficient.

Table 6-20 Price Response Model Results: Omni-directional LEDs

Coefficient	Estimate	Std Err	Statistic	P Value	90% CI Lower	90% CI Upper
(Intercept)	2.695	0.106	25.364	0.000	2.519	2.870
Program Price	-0.211	0.011	-19.889	0.000	-0.229	-0.194
Aug	-0.429	0.103	-4.167	0.000	-0.598	-0.259
Dec	-0.489	0.093	-5.261	0.000	-0.643	-0.336
Feb	-1.381	0.286	-4.837	0.000	-1.852	-0.910
Jan	-0.803	0.192	-4.177	0.000	-1.120	-0.486
July	-0.602	0.109	-5.530	0.000	-0.781	-0.422
June	-0.509	0.094	-5.426	0.000	-0.664	-0.354
Mar	-0.202	0.084	-2.411	0.016	-0.340	-0.064
May	-0.321	0.116	-2.759	0.006	-0.514	-0.129
Nov	-0.632	0.190	-3.323	0.001	-0.946	-0.318
Oct	-0.267	0.106	-2.518	0.012	-0.441	-0.092
Sept	-0.330	0.114	-2.908	0.004	-0.518	-0.143
LEDstd_A19_2[Error! B]	0.928	0.109	8.535	0.000	0.749	1.108

6.5.2 Appliance Component

Participant survey responses were used to estimate free ridership for ENERGY STAR refrigerators and room air conditioners, and participant spillover for the offering. The methodology used is described in detail in Section 5.2.4, Estimation of Net Savings.

A literature review was performed for ENERGY STAR pool pumps and heat pump water heaters. Table 6-21 and Table 6-22 summarize the free ridership findings for these two measures. The Evaluators applied the average free ridership ratio.

Table 6-21 Free Ridership Findings for Heat Pump Water Heaters

Program Year	State	Free Ridership Estimate
2015-2016	WY	18%
2015	MO	19%
2012	IL	14%
Average		**17%**

Table 6-22 Free Ridership Findings for Pool Pumps

Program Year	State	Free Ridership Estimate
2014	MI	0%
2015	MI	0%
2018	TX	7%
2017	NV	30%
2016	CO	20%
Average		**11%**

6.5.3 Net Savings Results

The shape-specific NTGR in Table 6-18 were applied to verified gross savings. Results are shown below in Table 6-23.

Table 6-23 Summary of Verified Net Savings – Lighting Component

Verified kWh	NTGR (kWh)	Net kWh	Verified kW	Net kW
6,623,507	70.6%	4,676,280	1,053.37	743.69

Table 6-24 summarizes the free ridership findings for refrigerators, window air conditioners, pool pumps and HP water heaters.

Table 6-24 Summary of Free Ridership Self-Reported Net to Gross

Measure	Net to Gross
ENERGY STAR refrigerator	51.6%
ENERGY STAR window air conditioner	63.1%
ENERGY STAR Pool Pumps	89.2%
Heat Pump Water Heaters	83.6%

One respondent reported installing an ENERGY STAR dishwasher that qualified as spillover.

Free ridership for the appliance component of the offering was estimated by applying the measure-level free ridership to the measure savings. Program level spillover was estimated by applying a ratio of the survey respondent reported spillover savings to the

total verified gross savings for survey respondents to the program gross savings. values.[27]

Table 6-25 summarizes the application of PY9 NTG surveys results to the appliances portion the PY10 RLA Program.

Table 6-25 Summary of Verified Net Savings – Appliance Component

Verified kWh	NTGR (kWh)	Net kWh	Verified kW	Net kW
3,266,050	77.54%	2,532,463	21.24	16.02

Below, Table 6-26 shows overall net savings.

Table 6-26 Summary of Verified Net Savings

Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions
9,889,557	72.9%	7,208,743	1,074.61	759.72

Verified net savings are 7,208,743 kWh and 759.72 kW, 72.9% of gross savings.

6.6 Process Evaluation Findings

The process evaluation was limited to the summary of program data and a survey of program trade allies. Findings from these activities are summarized below.

6.6.1 Summary of Program Participation

Table 6-27 summarizes the program activity by measure type. The majority of the kWh savings are from midstream lighting measures.

[27] Net savings estimates were based on all survey respondents and the same value was applied to ENO and Algiers projects.

Table 6-27 Summary of Measures Installed

Measure	Expected kWh Savings	Incentives Paid	Number of Participants	Percent of Expected Savings	Incentive Dollars per kWh Saved
LED Lighting	6,454,516	$ 395,916.62	1,435	66%	$ 0.06
Smart thermostat	3,118,556	$ 930,019.20	5,478	32%	$ 0.30
Showerhead	137,028	$ 5,380.00	350	1%	$ 0.04
APS	44,206	$ 18,003.00	544	<1%	$ 0.41
Aerators	27,522	$ 1,673.00	324	<1%	$ 0.06
ENERGY STAR Pool Pump	17,612	$ 2,100.00	7	<1%	$ 0.12
Pipe Insulation	9,798.7	$ 1,548.00	138	<1%	$ 0.16
ENERGY STAR Refrigerator	6,975.5	$ 5,850.00	117	<1%	$ 0.84
ENERGY STAR Window AC	3,328.7	$ 2,000.00	36	<1%	$ 0.60
ENERGY STAR HP Water Heater	2,670	$ 800.00	2	<1%	$ 0.30
ENERGY STAR Dehumidifier	530	$ 125.00	5	<1%	$ 0.24

6.7 Key Findings and Conclusions

The key findings and conclusions of the evaluation of the program are as follows:

- **The RLA offering met its savings goal and kW target**. In PY10 the program had a savings goal of 6,890,189 kWh and a 1,074.61 target kW reduction. The program achieved 9,889,557 kWh in verified kWh, 143.53% of goal, and was 529.23 kW over that target.
- **The RLA offering is well-established**. All measures installed in RL&A have deemed savings based on primary data collection provided in the New Orleans TRM 3.0. and the program has received through process evaluations in PYs 5-9. For these reasons the Evaluators concluded that the program did not warrant more than a brief discussion of its changes and activity PY10.

6.8 Recommendations

The Evaluators do not have recommendations for the Retail Lighting and Appliances offering for PY10. This offering will be reconsidered for process evaluation in PY11.

7 A/C Solutions

7.1 Program Description

A/C Solutions provides financial incentives to encourage residential customers to improve the efficiency of their HVAC systems. Incentives are provided for a tune-up of the system, HVAC system replacements, duct sealing and installing smart thermostats.

Tune-ups are provided by a qualified trade ally and involve testing the performance of the unit before and after measures are implemented. Typical measures implemented as part of the tune-up procedure include air flow correction; cleaning of the indoor blower, evaporator coils, condenser coils; and correction of refrigerant charge (if necessary).

Duct sealing is performed by applying mastic sealant or metal tape to the distribution system of air conditioning systems. Duct sealing performance is tested by taking the pre-measurement and post-measurement cubic feet per minute (CFM) leakage rate.

Incentives are provided for replacement of air conditioning systems and heat pump systems. Incentives for air conditioner replacements range from $50 to $150, depending on the size and SEER of the new unit. Incentives for ducted heat pumps range from $150 to $250, depending on size and SEER of the new unit. Ductless heat pumps may receive incentives ranging from $250 to $500 depending on the size of the unit.

7.1.1 Changes

In PY10, A/C Solutions began offering incentives for installing new smart thermostats through an approved trade ally.

7.1.2 Summary of Activities

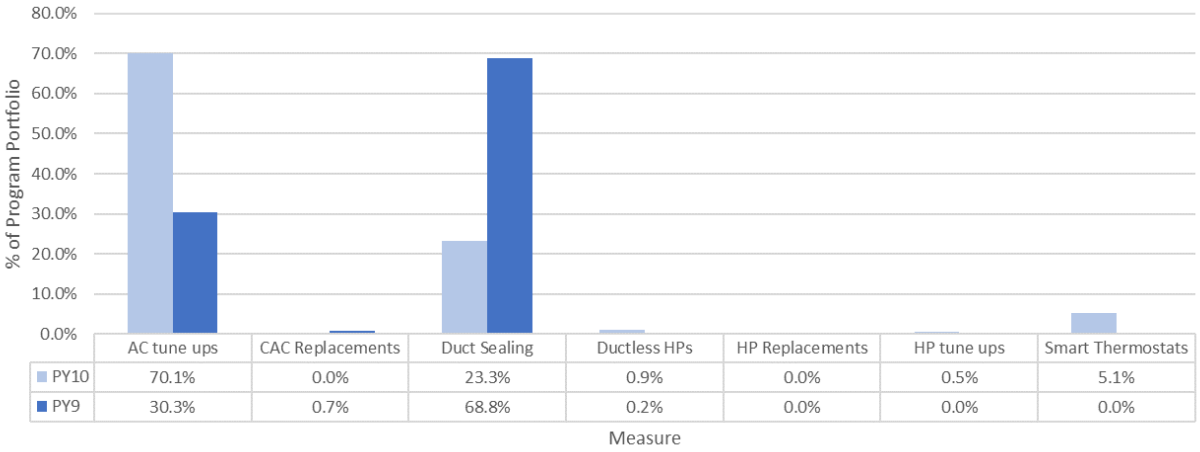
A total of 540 households participated in A/C Solutions, Table 7-1 summarizes the total number of measures installed and/or performed and the expected kWh and peak kW savings by measure.

Table 7-1 Summary of Measures and Expected Savings

Measure	*Number of Measures Distributed*	*Expected kWh Savings*	*Expected kW Savings*	*Percent of Program Savings (by kWh)*
AC tune ups	587	547,703	257.54	69.68%
Duct Sealing	94	183,433	67.82	23.34%
Ductless HPs	10	7,450	1.03	0.95%
HP tune ups	6	3,646	0.59	0.46%
Smart Thermostats	118	40,474	0.00	5.15%
AC Replacement	16	3,312	1.51	0.42%
Total	**831**	**786,017**	**328.49**	

Below, Table 7-2 shows individual measure contribution to the overall program expected savings, comparing PY9 with PY10.

Table 7-2 Savings Contributions by Measure



	AC tune ups	CAC Replacements	Duct Sealing	Ductless HPs	HP Replacements	HP tune ups	Smart Thermostats
PY10	70.1%	0.0%	23.3%	0.9%	0.0%	0.5%	5.1%
PY9	30.3%	0.7%	68.8%	0.2%	0.0%	0.0%	0.0%

In PY9, there were 687 households summing to 2,294,095 kWh that participated during an extended 15-month period. During the 2019 calendar year the program achieved 2,287,604 kWh of savings from 682 households. During PY10 the program ran for only nine months, completing projects in 540 dwellings summing to 786,017 kWh in expected savings. Normalizing these to a 12-month program year for a more accurate comparison yields 720 projects and 1,048,023 kWh in expected savings. These normalized sums are only used for illustrative comparative purposes. Comparing these figures translates into a 65.7% drop in expected kWh savings, while average dwelling kWh savings decreased by 56.3%.

However, due to the delayed launch of the of the program year and interruptions to on-sites due to the pandemic, the performance of the program (and the evaluation results), in many cases, should be interpreted as idiosyncratic to PY10 because of the COVID-19 pandemic.

Comparisons are shown below in Table 7-3 below.

Table 7-3 Program Year Comparison

PY	# Participants	Expected kWh	Expected kWh per Home
PY6	1,048	2,342,703	2,235
PY7 (nominal)	372	1,218,180	3,275
PY7 (adjusted)	496	1,624,239	3,275
PY8	850	2,245,602	2,642
PY9 (total)	687	2,294,095	3,334
PY9 (calendar)	682	2,287,604	3,354
PY10 (nominal)	540	786,017	1,456
PY10 (adjusted)	720	1,048,023	1,456

7.1.3 Goal Achievement

Table 7-4 A/C Solutions Summary of kWh Goal Achievement

kWh Goal	Verified kWh	% of Goal Attained	kW Target	Verified kW	Difference from Target
1,312,417	814,856	62.09%	553.29	339.51	-213.78

In PY10 the offering had a savings goal of 1,312,417 kWh and a 553.29 target kW reduction. The program achieved 817,259 kWh in verified kWh, 62.09% of goal, and was 213.78 kW below the target kW reduction.

7.2 EM&V Methodology

The evaluation approach for PY10 included the following activities:

- Desk reviews; and
- Application of previous program year field visit results review instead of on-site testing and data collection.

Impact savings were calculated using methods and inputs in the New Orleans TRM 3.0 and incorporated results from historic on-site testing where appropriate. PY10 major savings components are AC tune-ups and duct sealing. Impact methodologies for A/C Solutions are the same as described for HPwES, described in section 3.3. Measures not covered in section 3.3 are covered below.

7.3 Verified Gross Savings by Measure

7.3.1 Central Air Conditioner and Heat Pump Tune-Up Savings Calculations

Central Air Conditioner and Heat Pump Tune-Up savings were calculated using the following savings algorithms from the New Orleans TRM 3.0, section C.3.7.

Deemed savings was calculated using test-in and test-out efficiency data.

$$kWh_{Savings\_Cooling} = CAP_c \times 1{,}000\,{}^{W}/_{kW} \times \left(\frac{1}{EER_{pre}} - \frac{1}{EER_{post}}\right) \times EFLH_C$$

$$kWh_{Savings\_Heating} = CAP_c \times 1kW/1{,}000W \times \left(\frac{1}{HSPF_{pre}} - \frac{1}{HSPF_{post}}\right) \times EFLH_H$$

$$kW_{Savings} = CAP_c \times 1{,}000\,{}^{W}/_{kW} \times \left(\frac{1}{EER_{pre}} - \frac{1}{EER_{post}}\right) \times \%CF$$

Where,

CAPc = Cooling capacity (in BTU)

EERpre = Efficiency of the equipment prior to tune-up

EERpost= Nameplate efficiency of the existing equipment

EFLHc = Equivalent Full-Load Cooling Hours (1,637)

EFLHh = Equivalent Full-Load Heating Hours = 600

HSPFpre = Measured efficiency of the heating equipment before tune-up

HSPFpost = Measured efficiency of the heating equipment after tune-up

%CF = Peak Coincidence Factor (.77)

Figure 7-1 below shows the efficiency gains from each unit tuned up.

Figure 7-1 EER Gain

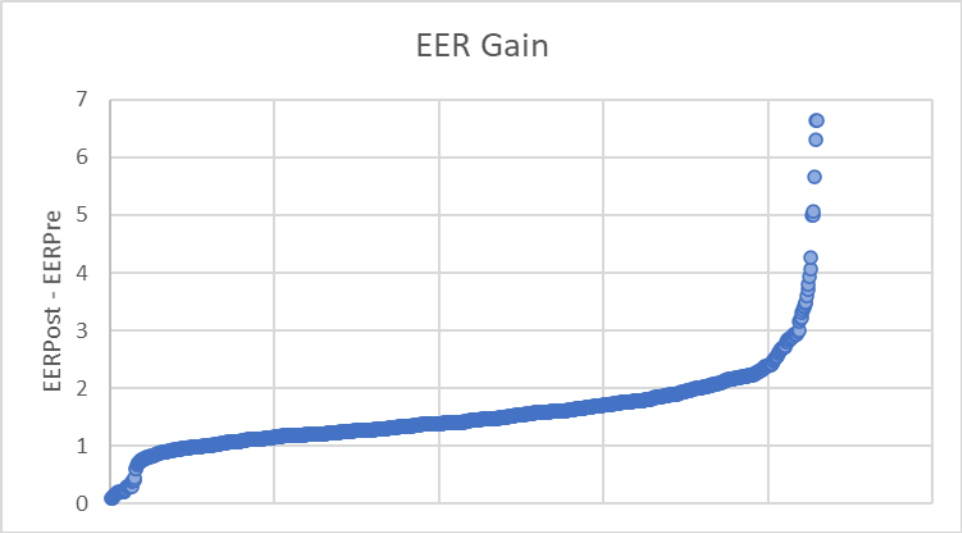


Table 7-5 AC Tune-Up Savings Summary

Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	Peak kW Realization Rate
547,703	548,411	100.1%	257.54	257.88	100.1%

Table 7-6 HP Tune-Up Savings Summary

Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	Peak kW Realization Rate
3,646	4,288	117.61%	0.59	0.99	167.80%

7.3.2 Central Air Conditioner Replacement

In PY10, the A/C Solutions offering incentivized 16 Central AC replacements. Methods for calculating the deemed savings values came from the New Orleans TRM 3.0.

Table 7-7 AC Replacement Savings Summary

Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	Peak kW Realization Rate
3,312	4,112	124.15%	1.51	1.93	127.81%

7.3.3 Ductless Heat Pump

The PY10 A/C Solutions Program rebated 10 ductless heat pumps. The Evaluators calculated savings for all replacements as NC/normal replacement with the current minimum code as baseline: 14 SEER, 11.8 EER and 8.2 (split) or 8.0 (packaged) HSPF. Methods for calculating the deemed savings values came from the New Orleans TRM 3.0, section C.3.6. Ductless Heat Pump. Deemed per-unit kWh and kW reductions were applied to all units installed during PY10.

Table 7-8 Ductless HP Deemed kWh[28]

Timing	kWh Per Ton	kW per Ton	Average Tons	kWh per Unit	kW per Unit
New Construction and Normal Replacement	599	0.0606	3.01	1,801	0.18
Early Replacement – Heat Pump	745	0.1026	3.01	2,239	0.31

Table 7-9 Ductless HP Savings Summary

Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	Peak kW Realization Rate
7,450	7,450	100.00%	1.03	1.03	100.00%

The Evaluators found that ex-ante savings estimates were from TRM deemed savings values. The Evaluators also used TRM deemed savings values in ex post calculations, giving overall kWh and kW realization rates of 100.0%.

[28] TRM Table 67, page C-85

7.3.4 Duct Sealing

Duct sealing savings was calculated using the following savings algorithms from the New Orleans TRM 3.0, section C.3.8.

During the site visits conducted in PY5 – PY8, the Evaluators' field staff conducted blower door testing for 320 homes in an effort to validate post-retrofit leakage estimates indicated in program tracking data. The resulting average is 93.78%. That is, of 320 homes the Evaluators found that duct sealing CFM25 post results were 6.22% lower than those reported in tracking data. This factor was used to adjust the reported CFM25 post values in the duct sealing program data before conducting the final analysis.

The savings resulting from applying TRM algorithms and deemed savings parameters, plus the application of field results are summarized in Table 7-10.

Table 7-10 Expected and Verified Duct Sealing Savings – New Orleans

Expected kWh Savings	***Verified kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Verified Peak kW Savings***	***Peak kW Realization Rate***
183,433	210,106	114.54%	67.82	77.68	114.54%

Ex ante calculations assumed the maximum pre-installation leakage rate of 35% percent of total fan flow[29], rather than 40% specified in the TRM, resulting in an underestimation of savings. Using 40%, these homes' kWh realization rate was 111.6% before M&V adjustments.

After M&V adjustments, the overall kWh realization rate for duct sealing is 114.5% and the overall kW realization rate is 114.5%.

7.4 Verified Gross Savings Summary

Verified savings are summarized in Table 7-11.

[29] Total Fan Flow = Cooling Capacity (tons) × 400

Table 7-11 Gross Realization Summary

Measure	Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	kW Realization Rate
AC tune ups	547,703	548,411	100.13%	257.54	257.88	100.13%
Duct Sealing	183,433	210,106	114.54%	67.82	77.68	114.54%
Ductless HPs	7,450	7,450	100.00%	1.03	1.03	100.00%
HP tune ups	3,646	4,288	117.61%	0.59	0.99	167.80%
Smart Thermostats	40,474	40,489	100.04%	0.00	0.00	N/A
AC Replacement	3,312	4,112	124.15%	1.51	1.93	127.81%
Total	**786,017**	**814,856**	**103.67%**	**328.49**	**339.51**	**103.35%**

PY10 verified savings are 814,856 kWh and 339.51 kW, 103.67% and 103.35%, respectively, of expectations.

7.5 Estimation of Net Savings

The Evaluator applied the PY9 net-to-gross ratio to estimate the net impacts of the A/C Solutions offering. As in PY9, program savings were largely the result of duct sealing and tune-up measures with system replacements accounting for a limited share of projects, thus results are still applicable. The net to gross ratios applied were:

- 89.9% for energy savings; and
- 89.8% for peak demand reductions.

7.5.1 Net Savings Results

Using the results of the net savings survey above, the Evaluators calculated net kWh savings and kW reductions by measure. Results for overall verified net savings are shown below in Table 7-12.

Table 7-12 Summary of Verified Net Savings

Verified kWh	NTGR	Net kWh	Verified kW	Net kW
814,856	90%	732,556	339.51	305.22

7.6 Process Evaluation Findings

7.6.1 Summary of Program Participation

A/C Solutions is a well-established offering in the Energy Smart offering. Most measures installed in A/C Solutions have deemed savings based on primary data collection provided in the New Orleans TRM 3.0. In addition, the Evaluators conducted comprehensive process evaluations of the offering during program years five through

nine. For these reasons, the Evaluators concluded that the offering did not warrant more than a brief discussion of its changes and activity in the initial review of PY10.

7.6.2 Summary of Program Participation

This section summarizes findings from the analysis of the offering tracking data provided by the implementation contractor.

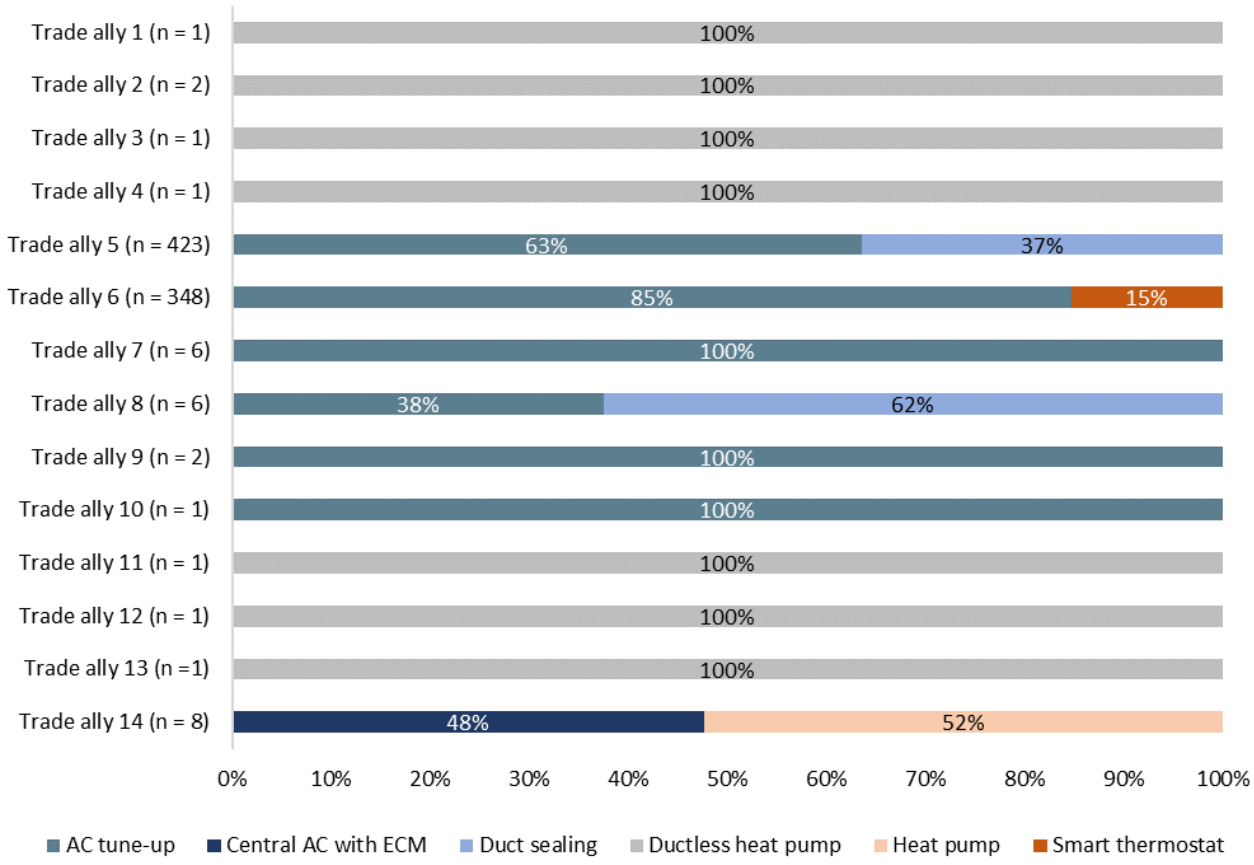
Table 7-13 summarizes the PY10 program activity by measure. As shown, duct sealing and AC tune-ups accounted for most of the program savings. Smart thermostats, new to the program in PY10, account for the next highest contribution at 5.1%.

Table 7-13 Summary of Measures Installed

Measure	*Number of Measures*	*Expected kWh Savings*	*Percent of kWh Contribution*	*Incentives*	*Incentive Dollars per kWh*
AC tune ups	587	547,703	257.54	69.7%	88,050
Duct Sealing	94	183,433	67.82	23.3%	29,108
Ductless HPs	10	7,450	1.03	0.9%	3,500
HP tune ups	6	3,646	0.59	0.5%	500
Smart Thermostats	118	40,474	0.00	5.1%	29,500
AC Replacement	16	3,312	1.51	0.4%	950
Total	**815**	**786,017**	**328.48**		**151,608**

FFigure 7-2 summarizes trade ally projects by the type of project implemented. Two trade allies (5 and 6) were more active than others with 92% of the total completed projects. AC tune-ups and duct sealing accounted for 93% of the savings amongst trade allies.

Figure 7-2 Trade Ally Company Share of Savings



7.6.3 Offering Operations Perspectives

7.7 Key Findings and Conclusions

- **The program did not meet the savings goal and the kW reduction target.** In PY10 the offering had a savings goal of 1,312,417 kWh and a 553.29 target kW reduction. The program achieved 817,259 kWh in verified kWh, 62.09% of goal, and was 213.78 kW below the target kW reduction.
- **COVID-19 likely created barriers for A/C Solutions.** COVID-19 created barriers for trade ally driven programs in PY10.
- **The IQW offering is well-established.** All measures installed have savings based on primary data collection provided in the New Orleans TRM 3.0. The Evaluators concluded that the offering did not warrant more than a brief discussion of its changes and activity in PY10.

7.8 Recommendations

The Evaluators' do not have recommendations for the A/C Solutions offering for PY10.

8 School Kits and Education

8.1 Program Description

School Kits and Education (SK&E) provides classroom education on energy use and saving energy, as well as energy efficiency kits to students. In addition, the SK&E staff performs outreach activities to promote energy efficiency, and the rebates and discounts offered by Entergy through the Energy Smart Program.

The School Kits component of the program includes a 45 to 90-minute presentation given by program staff to 6th and 10th grade students. The presentation focuses on energy use and the importance of conservation. Students also receive an energy efficiency kit that contains the following items:

- Four 9W LEDs and two 15W LEDs;
- Two low-flow faucet aerators;
- One low-flow showerhead;
- A flow-rate bag for measuring the flow rate of faucets and showers;
- A flyer that describes the kit items and their benefits, and other Energy Smart offerings; and
- QR codes printed by each item that link to installation videos to aid in installation.

The adult outreach activities are intended to educate the organizations' members about energy efficiency and the Entergy New Orleans Energy Smart program. The outreach activities include:

- Presentations at neighborhood groups and churches;
- Attendance at fairs and festivals; and
- Hosting tables at public events and public buildings.

8.2 EM&V Methodology

The SK&E Program received comprehensive impact and process evaluations in PY5 and PY6. The evaluations provided free ridership estimates, discussions of program satisfaction and strategic recommendations for program improvement. In the initial review of the PY10 program, the Evaluators concluded that the SK&E program did not warrant more than a brief overview of program activity.

In PY10 the program had a savings goal of 350,297 kWh and a 41.61 target kW reduction. The program achieved 468,115 kWh in verified kWh, 133.63% of goal, and was 25.66 kW above that target.

Table 8-1 SK&E Savings Goals by Utility

kWh Goal	Verified kWh	% of Goal Attained	kW Target	Verified kW	Difference from Target
350,297	468,115	133.63%	41.61	67.27	25.66

8.2.1 Impact Calculation Methodology

Electricity savings and peak demand reductions of the PY10 SK&E offering were estimated using inputs from the New Orleans TRM 3.0. Measure-specific savings are provided below.

8.2.1.1 Savings Calculations

Table 8-2 ENERGY STAR Omnidirectional LEDs – Deemed Savings Per Lamp[30]

Minimum Lumens	Maximum Lumens	LED Wattage	Incandescent Equivalent 1st Tier EISA 2007 (W_{base})
310	749	7	29
750	1,049	9	43
1,050	1,489	12	53
1,490	2,600	15	72

$$kWh_{savings} = \left((W_{base} - W_{post})/1000\right) \times Hours \times ISR[31] \times IEF_E[32]$$

$$9W\ LED\ kWh_{savings} = 4 \times \left((43-9)/1000\right) \times 819.43 \times 1 \times 0.91 = 101.41\ kWh$$

$$15W\ LED\ kWh_{savings} = 2 \times \left(\frac{(72-15)}{1000}\right) \times 819.43 \times 1 \times 0.91 = 85.01\ kWh$$

Table 8-3 Faucet Aerators – Deemed Savings[33]

Efficient GPM Rating	kWh	kW
1.5 GPM	26.80	0.0028
1.0 GPM	44.66	0.0046

[30] New Orleans TRM V2.0, Table 116, page C-141.
[31] 100% in this calculation. Measure-specific ISR applied after.
[32] Unknown heating type: 0.91
[33] New Orleans TRM V3.0, Table C-42, page C-55.

Table 8-4 Low Flow Showerhead Retrofit Deemed Energy Savings[34]

1.5 GPM Showerhead		
Water gal. saved /year/showerhead @ 1.5 GPM	2,860	
$T_{\_Supply}$	74.8°F	
$T_{\_Mixed}$	106.8°F	
Water heater EF (excluding standby losses)	0.98 (Electric Resistance) / 2.2 (Heat Pump)	
Energy Savings	Electric: 26.8 kWh	Heat Pump: 11.94 kWh
Demand Savings	Electric: 0.0028 kW	Heat Pump: 0.0012 kW

8.2.1.2 In-Service Rates

Kits were distributed along with a survey form to be filled out by students and parents, then returned. The forms included questions regarding which measures had been installed in the home as well as home characteristics. This information was used to determine in-service rates of each measure provided, and the prevalence of electric water heating in homes as a whole. Data from PY6 - PY8 were averaged to create deemed ISRs for each measure. These ISRs were applied to PY10.

Table 8-5 the ISRs found in the PY6 - PY8 evaluations. Along with resulting averages, which were applied to savings estimates shown above.

Table 8-5 SK&E Summary of In-Service and Water Heating Type Rates

Item	***PY6***	***PY7***	***PY8***	***Average***
9W LED	68%	72%	70%	**70.1%**
15W LED	62%	75%	77%	**71.2%**
Bathroom Aerator 1.5	41%	47%	47%	**45.3%**
Kitchen Aerator 1.5	42%	46%	47%	**44.8%**
Showerhead	58%	64%	64%	**62.1%**
Electric Water heating	55%	47%	59%	**55.4%**

8.3 Verified Savings by Measure

For the SK&E offering, the New Orleans TRM is utilized to estimate the savings for each measure in the kit. Those per measure savings can be found in the table below.

Table 8-6 Gross Savings by Measure

Measure	***Verified kWh Savings***	***Verified kW Savings***
9W LED	75.60	0.01
15W LED	64.36	0.01
Kitchen Aerator	6.72	0.00
Bathroom Aerator	6.65	0.00
Showerhead	78.40	0.01
Total	**231.74**	**0.03**

[34] New Orleans TRM V3.0, Table C-45, page C-61.

8.4 Verified Savings Summary

Table 8-7 Verified Gross Savings

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
468,034	468,115	100.02%	67.27	67.28	100.02%

The overall program gross realization rates are 100.02% for kWh and 100.02% for peak kW reductions.

8.5 Estimation of Net Savings

The Evaluators established NTG ratios based on primary research completed in PY5 and PY6. In total, 43 program participants completed the survey for the 2015 and 2016 evaluations. The Evaluators surveyed 43 parent/guardian participants and estimated NTG ratios for each of the kit's measures. These NTG ratios were applied to the PY10 participants.

8.5.1 Measure Level Free Ridership Results

Table 8-8 summarizes the average free ridership scores by measure. The results presented show free ridership highest for LEDs. This indicates that a higher percentage of participants are more familiar with energy efficient lighting measures.

Table 8-8 SK&E Average Free Ridership by Measure

Measure	Average Free Ridership
Bathroom Aerator 1.5 GPM	13%
Kitchen Aerator 1.5 GPM	13%
Showerhead	11%
9W LED	33%
15W LED	22%[35]

8.6 Net Savings Results

Free ridership for the program was estimated by applying measure level free ridership to verified gross kWh savings and peak kW reductions. As seen Table 8-9, the overall Net-to-Gross ratio for this program was 78.7%.

[35] Based on PYs 5 and 6 18W CFL responses.

Table 8-9 SK&E Summary of Verified Net kWh Savings and Peak kW Reductions

Verified kWh	NTGR	Net kWh	Verified kW	Net kW
468,115	78.7%	368,181	67.28	51.69

Net kWh savings totaled to 368,181 kWh and equal 78.7% of gross program savings. Net kW reductions totaled 67.28 kW.

8.7 Process Evaluation Findings

8.7.1 Summary of Program Participation

Table 8-10 summarizes the program activity for the School Kits and Education offering for PY10. As shown below, 25 schools participated in 2020, with an average of 81 kits sent to each school.

Table 8-10 Summary of School Kits

Number of Participating Schools in PY10	Expected kWh Savings	Incentives Paid	Total Number of Kits Sent	Average kWh Saving per School	Average Number of Kits Sent per School
25	468,034	$52,568.28	2,020	16,716	81

8.7.2 Process Findings

The Evaluators interviewed School Kits and Education (SK&E) offering implementation subcontractor staff from Energy Wise Alliance to learn of any changes to offering design, operation, and delivery. The interview focused on how the implementers planned to meet PY10 goals, which began on April 1st, 2020. Energy Wise decided to focus their efforts on repackaging their content material, improving their delivery mechanisms, and encouraging more offering participation. Below are the key findings from the interview with Energy Wise.

8.7.3 PY10 Program Changes

EnergyWise Alliance adapted its curriculum to meet public health guidelines for schools during PY10. EnergyWise Alliance indicated that the utility and APTIM worked together to continue the offering and deliver the kits to the students by participating in the school lunch meal site pick-ups back in March. Students were offered the energy efficiency kits as they picked up their meals. Program staff stated they plan to implement the School Kit offering remotely until at least Q2 of 2021.

EnergyWise Alliance has included a new component to its curriculum in hopes of increasing offering participation. Program staff stated they had created an interschools competition to see which school showed the highest level of engagement. Program staff indicated they will be using a landing page where students can post themselves unboxing

the kit items or taking before and after photos of installing the measures. Table 8-11 the different activities that students can do to earn points.

Table 8-11 Interschool Contest Point System

Activities	Points
Returned Homework Forms	200 points total (split up per student)
100% Returned Homework Forms	50 points
Highest Energy Savings from	100 points
Each Virtual Session	10 points
Each Lesson Taught	5 points
Poster Contest Winner	50 points
Unboxing Video Contest Winner	50 points
Each Instagram post	10 points/10% participation
Each Tiktok post	15 points/10% participation

When schools started closing, EnergyWise Alliance was unable to retrieve some of the kits that had already been sent to some of the schools. This is due to the rapid closure of schools that made recovery impossible until Fall 2020. After schools reopened, these kits were recovered and distributed to students in the same program year.

8.8 Key Findings and Conclusions

- **The program made goal.** In PY10 the program had a savings goal of 350,297 kWh and a 41.61 target kW reduction. The program achieved 468,115 kWh in verified kWh, 133.63% of goal, and was 25.66 kW above that target.
- **The program underwent operations changes during PY10 to accommodate public health concerns.** The Program continued the offering and delivered the kits to the students by participating in the school lunch meal site pick-ups in March. Students were offered the energy efficiency kits as they picked up their meals. Program staff stated they plan to implement the School Kit offering remotely until at least Q2 of 2021.
- **The program introduced a gamification component.** To drive engagement, program administrators introduced a new points-based reward system and have created an inter-schools competition to see which school showed the level highest of engagement.
- **Instructional materials have been added to kits.** Although no changes were made to the kit items, PY10 kits now include QR codes that offer how-to videos for students about installation.

8.9 Recommendations

Consider adding the following measures to kits:

- **Advanced Power Strips:** Though these will have an in-service penalty in this type of distribution, they are cost-effective measures which also provide an opportunity for the program to educate students about “vampire loads” (i.e., the passive power drain from consumer electronics).
- **Hot Water Restrictor Valves:** These come in both automatic and manual configurations, with both functioning to cut water use from the shower prior to reaching temperature. The manual version of the restrictor valve can be installed alongside a low flow showerhead, or a showerhead can be included instead which has this functionality integrated.

9 Behavioral

9.1 Program Description

The Behavioral offering ("Behavioral") is intended to use social norming to leverage energy savings; this is a long-known behavioral science tenet that individuals desire to be at a similar or better level than their peers, and thus, the report drives high users to reduce their energy consumption[36]. The offering was implemented by Franklin Energy Services ("Franklin") and administered by APTIM.

The program provides tailored reports to residential customers that include:

- Comparisons of customers' current energy use to their past use;
- Comparison of energy use to similar homes in the area;
- Tips on how customers can reduce their energy use as well as information on other Energy Smart offerings; and
- An alternative participation pathway called, "Rewards" that does not claim savings or pay additional incentives, however, participants receive an assessment and cross-program participation encouragement.

9.2 EM&V Activities

During PY10 the Evaluators performed measurements of kWh savings and kW reductions but did not complete more than a brief process evaluation. Evaluators conducted comprehensive process evaluations of the program during program years eight and nine. Participants expressed high levels of satisfaction with the overall program experience. Due to these reasons, in the initial review of the PY10 program the Evaluators concluded that the program did not warrant more than a brief review. The Evaluators plan to conduct a process evaluation during the next program cycle or after major changes to the program.

9.2.1 Program Goals

In PY10 the program had a savings goal of 12,230,000 kWh and no kW reduction target. The program achieved 15,549,735 kWh in verified savings, reaching 127.14% of goal.

9.3 Impact Savings Methodology

The impact evaluation approach for this program is as follows:

- The remaining control groups for each treatment group were tested for validity as a statistical match for the treatment households in the baseline year;

[36] Davis, Matt. 2011. *Behavior and Energy Savings: Evidence from a Series of Experimental Interventions*. Environmental Defense Fund.

- Cohorts were attempted to be matched to an ad-hoc control group created via propensity score matching;
- Control group post-period was forecasted using pre-period and actual weather data in PY10;
- Energy savings were estimated via regression modeling; and
- Demand (kW) savings were estimated from the validated energy savings.

Reports were delivered starting May 4, 2018 for the Initial group, July 16, 2018 for the Second group, and December 27, 2018 for the Third group. A summary of data used in this analysis is provided in Table 9-1:

Table 9-1 Time Periods Data Summary

Group	*Intervention Date*	*Pre-Intervention*	*Post-Intervention*
Initial	May 2018	May 1, 2017 – Apr 31, 2018	April 1, 2020 –December 31, 2020
Second	Jul 2018	Jul 1, 2017 – Jun 31, 2018	April 1, 2020 –December 31, 2020
Third	Dec 2018 - Jan 2019	Dec 1, 2017 – Nov 31, 2018	April 1, 2020 –December 31, 2020

In addition, Franklin implemented an additional five waves since the transfer of the program implementation from Accelerated Innovations to Franklin Energy Services. The following table summarizes the new cohorts implemented during PY10.

Table 9-2 Franklin Cohorts

Group	*Treatment*	*Control*	*Intervention Date*
Neighbor compare - new	4,705	1,267	October 29, 2020
Neighbor compare - original	33,023	5,199	July 9, 2020
Neighbor compare - print	7,547	1,586	October 29, 2020
Self compare – new	4,753	1,372	October 29, 2020
Self compare – original	17,191	3,786	July 10, 2020
Total	**67,219**	**13,210**	-

The Evaluators did not evaluate the Franklin cohorts for PY10, as they were implemented during mid-to-late PY10 and therefore the customers do not yet have a full 12 months of post-period data to analyze. The Evaluators will estimate verified program savings for these cohorts during PY11.

9.3.1 Control Groups

For reliable estimation of savings effects, it is ideal to have a randomized control trial (RCT). In this experimental design, a group of eligible customers are randomly assigned to treatment or control groups. The offering was a randomized control trial (RCT),

however, due to changes in program design, the previously defined RCT groups were altered. The Evaluators instead forecasted the RCT control group post-period usage to utilize in a regression against the original RCT treatment group, where possible. The Third group, which was not created with RCT design, was evaluated using a treatment-only regression model with adjustments.

9.3.2 Remaining Control Group Validity Testing

The remaining control groups' alteration was tested for statistically significant differences in usage between the treatment and control groups for each of the 12 pre-period months. The control groups were validated in prior evaluations of this program, however due to treatment and control groups decay, and more importantly, due to changes to an opt-out program for all residential customers in December 2018 there is a possibility of the groups ceasing to be a statistical match. More than 75% of each the Initial and Second control groups were reassigned to the Third treatment group. Validity testing was completed to determine if propensity score matching is required to create an ad-hoc, quasi-experimental control group for any of the cohorts.

Error! Reference source not found. summarizes the total number of households from t he raw data provided and total number of households utilized in the analysis.

Table 9-3 Treatment and Control Group Totals

Group	Raw		After Franklin Restrictions		Analysis	
	Treatment	Control	Treatment	Control	Treatment	Control
Initial	26,169	9,975	13,045	9,975	8,136	6,070
Second	25,045	9,967	12,699	9,967	13,134	5,843
Third	61,379	70,038	22,302	0	11,633	0

*A subset of customers was used in analysis in order to retain validity in comparison groups

When the implementation of the offering was transferred from AI to Franklin, a large portion of treatment customers had treatment halted due to duplicate or lack or email addresses as well as insufficient usage history and square footage data necessary to produce the Home Utility Reports (HURs). Therefore, seen in the table above is a large drop between the raw number of customers selected at the onset of each cohort and the number of treatment customers after Franklin restrictions. The Evaluators estimated savings displayed in the customers that continued treatment through the transfer of implementors. The Evaluators note that the usage history and square footage data will no longer be necessary for producing HURs in the future program years. In addition, the lack of valid email addresses is being resolved on a continual basis. Therefore, the Evaluators expect the number of treatment customers within these original cohorts to increase significantly for the evaluation of PY11.

The Evaluators found the Initial group no longer retained a statistically valid control group, as the t-test displayed a rejection of one or more months in the pre-period. However, the Evaluators were able to find a valid comparison group by randomly selecting a subset of treatment and control customers to use in the analysis; therefore, the number of customers used in analysis for this cohort is lower than the other cohorts. This subset created by the Evaluators passed the validity testing for each month in the pre-period.

The Third Group did not have a randomly assigned control group. This cohort was not created with an RCT design. The Evaluators attempted to create a counterfactual group for the Third Group, but the remaining nonparticipant customers were unable to provide a valid match. Therefore, the Evaluators elected to evaluate this cohort via treatment-only regression model and no counterfactual group was included in the analysis for this cohort. The Evaluators did not employ propensity score matching to attempt to create an ad-hoc control group for any of the three cohorts.

9.3.3 Forecasting Control Group Post-Period

Due to the altered RCT groups, the Evaluators included a control group for the Initial and Supplemental waves by selecting the original RCT control group and forecasting post-period consumption. This is necessary because a portion of the RCT control groups started receiving treatment in the post-period. Therefore, the Evaluators forecasted what each control customer's consumption would have been had they not started receiving treatment in the post-period.

The Evaluators accomplished this forecasting by linearly adjusting the control group's consumption from the pre-period to the post-period using weather data. This is accomplished using the following equation:

Equation 9-1 Linear Scale Adjustment

$$Linear\ Scale = \frac{(HDD + CDD)_{Post-Period}}{(HDD + CDD)_{Pre-Period}}$$

Where,

$(HDD)_{Post-Period}$ = Average daily heating degree days (HDD) during the post-period for household *i* during period *t*

$(CDD)_{Post-Period}$ = Average daily cooling degree days (CDD) during the post-period for household *i* during period *t*

$(HDD)_{Pre-Period}$ = Average daily heating degree days (HDD) during the pre-period for household *i* during period *t*

$(CDD)_{Post-Period}$ = Average daily cooling degree days (CDD) during the pre-period for household *i* during period *t*

Equation 9-2 Forecasted Average Daily Consumption

$$Forecasted\ ADC = ADC * Linear\ Scale$$

These calculations were completed for each customer during each bill month in order to estimate post-period average daily consumption. The resulting values were included in the linear regressions for the Initial and Second Groups.

9.3.4 kWh Savings Calculation Methodologies

For the impact evaluation of the Initial and Second Groups, the Evaluators employed a fixed effects Difference-in-Difference regression model to evaluate verified savings. For the impact evaluation of the Third Group, due to the inability to create a valid control group, a treatment-only model was used for this evaluation.

The following section details the regression models employed to estimate savings for each group.

9.3.4.1 Fixed Effects Difference-in-Difference Regression Model

The fixed-effects model specification contains customer-specific dummy variables to account for exogenous heterogeneity that cannot be explicitly controlled for and is not relevant to the estimation of program savings. The specification of customer specific effects allows the model to capture much of the baseline differences across customers while obtaining reliable estimates of the impact of the report.

The Evaluators included independent variables such as Heating Degree Days (HDD) and Cooling Degree Days (CDD) for weather control and other household characteristics, where applicable, to improve model confidence. The Evaluators then fit a fixed effects panel regression model to estimate weather-dependent daily consumption differences between treatment and control households.

Equation 9-3 Fixed-Effects Difference-in-Difference (D-in-D) Panel Regression Model Specification

$$ADC_{it} = \alpha_0 + \beta_1(Post)_{it} + \beta_2(HDD)_{it} + \beta_3(CDD)_{it} + \beta_4(Post \times HDD)_{it} + \beta_5(Post \times CDD)_{it} + \beta_6(Post \times Treatment)_{it} + \beta_7(Post \times HDD \times Treatment)_{it} + \beta_8(Post \times CDD \times Treatment)_{it} + \varepsilon_{it}$$

Where,

ADC_{it} = Estimated average daily consumption (dependent variable) in home *i* during period *t*

$Post_{it}$ = Dummy variable indicating whether period *t* was in pre- or post- retrofit

$Treatment_i$ = Dummy variable indicating whether household i was in treatment group or control group

HDD_{it} = Average heating degree days during period *t* at home *i*

CDD_{it} = Average cooling degree days during period *t* at home *i*

ε_{it} = Customer-level random error

α_0= The model intercept for home *i*

β_{1-8} = Coefficients determined via regression

And parameter definitions are:

α_0 is an intercept term for household *i;*

δ_1 through δ_8 are the effect of each of the independent variables on the dependent variable;

ε_{it} is the cluster-robust error term for customer *i* during billing cycle *t*. Cluster- robust errors account for heteroscedasticity and autocorrelation at the customer level.[37]

The coefficients β_6 and β_7 represent the average change in daily weather-related consumption between the groups in the post-period. HDD and CDD are calculated from local weather data. HDD and CDD will be estimated using a range of balance points (55- to 75-degree temperature base) and the HDD and CDD combination that yields the greatest model R-square will be used in the final analysis. This accounts for the "dead-band" in residential heating and cooling loads, as there is a range of temperatures in which a residential customer will be neither heating nor cooling.

9.3.4.2 *Random Effects Treatment-Only Regression Model*

The treatment-only fixed effects regression model uses pre- and post-program data from the treatment group to estimate the change in treatment group usage, without netting out the effects of any change observed in the control group. This model incorporates controls for HDD and CDD and pre-post program usage. The model specification is as follows:

Equation 9-4 Treatment-Only Model Specifications

$$Usage_{it} = \alpha_0 + \delta_1 * Post_{it} + \delta_2 * HDD_{it} + \delta_3 * CDD_{it} + \delta_4 * HDD_{it} * Post_{it} + \delta_5 * CDD_{it} * Post_{it} + \varepsilon_{it}$$

Where,

i denotes the *i*th customer;

t denotes the first, second, third, etc. month of the post-treatment period;

$Usage_{it}$ is the average daily use for read *t* for household *i* during the post-treatment period;

$Post_{it}$ is the status of the *i*th customer treatment dummy during month *t;*

HDD_{it} is the total monthly Heating Degree Days during month *t* for household *i;*

CDD_{it} is the total monthly Cooling Degree Days during month *t* for household *i;*

[37] For examples of academic applications of the approach to energy behavioral programs see: Alcott, Hunt. "Social Norms and Energy Conservation", Working paper, Massachusetts Institute of Technology (MIT), Cambridge, MA, 2009. Ayres, I., S. Raseman and A. Shih. "Evidence from Two Large Field Experiments that Peer Comparison Feedback Can Reduce Residential Energy Usage", NBER working paper no. 15386, September 2009. Costa, D.L. and M.E. Kahn. "Energy Conservation "Nudges" and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment", NBER working paper no. 15939, April 2010.

And parameter definitions are:

α_0 is an intercept term for household *i;*

δ_1 through δ_8 are the effect of each of the independent variables on the dependent variable;

ε_{it} is the cluster-robust error term for customer *i* during billing cycle *t*. Cluster- robust errors account for heteroscedasticity and autocorrelation at the customer level.[38]

In this model, δ_1, δ_4, δ_5, and typical meteorological year (TMY3) weather data are used to extrapolate average daily energy savings due to program participation. Program savings are the product of the average daily savings estimate, the number of days in the program, the number of Heating Degree Days and Cooling Degree Days in TMY, and the total number of participating customers' days in the analysis.

9.3.5 Demand Reduction Estimation

The relationship between annual usage savings and peak demand savings has not been defined for HURs. Program savings rely on monthly meter reading data provided by AI. At this time, smart meter data (hourly usage data) are not yet available for the majority of Entergy residential customers. Thus, the resolution of billing data provided for analysis is unsuitable for the direct evaluation of peak demand savings. It can be assumed that total monthly usage can be attributed to the usage of other residential components (e.g., HVAC, lighting, etc.) and that any reduction in usage is proportional to the overall usage of these components. Load factors are available for these components at an hourly resolution; thus, the Evaluators have developed a model for predicting coincident peak demand savings from component load factors from the gross energy savings calculated using the above methodology.

9.3.5.1 *Normalize* kWh Usage

In order to increase the generalizability of the model, the Evaluators will first normalize the kWh savings value predicted by the impact evaluation regression model into a percent savings value by dividing each month's savings by the total annual savings, as represented in Equation 9-5.

[38] For examples of academic applications of the approach to energy behavioral programs see: Alcott, Hunt. "Social Norms and Energy Conservation", Working paper, Massachusetts Institute of Technology (MIT), Cambridge, MA, 2009. Ayres, I., S. Raseman and A. Shih. "Evidence from Two Large Field Experiments that Peer Comparison Feedback Can Reduce Residential Energy Usage", NBER working paper no. 15386, September 2009. Costa, D.L. and M.E. Kahn. "Energy Conservation "Nudges" and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment", NBER working paper no. 15939, April 2010.

Equation 9-5 Monthly Savings Normalization Calculation

$$\%\ savings\frac{month}{year} = {kWh\ savings_m}/{kWh\ savings_y}$$

Where,

M = Value for given program month *m*.

Y = Value for given program year *y*.

9.3.5.2 *Calculate Monthly Load Factors for Component Variables*

The model assumes a linear relationship between the component variables and the percent savings calculated above. Because load shape information is available for residential components at an hourly resolution, the Evaluators can estimate the relationship between component load and percent savings in order to estimate total demand savings. To make sure that the model is interpretable, hourly load factors must be converted to monthly load factors. The Evaluators sourced hourly load data from the U.S. Department of Energy Open Data Catalog39 of residential hourly load profiles. The database contains hourly load profiles for all TMY3 locations in the United States. The specific location chosen for this evaluation was the New Orleans International Airport.

9.3.5.3 *Simple Regression*

In order to determine the relationship between the percent savings and the component load factors, the Evaluators ran a simple linear regression. Because the model is used to predict savings from known variables, we hold the intercept constant at 0 to ensure that the majority of the variability will be explained by the component load factors. The following equation displays an example regression equation used to predict percent savings attributable to a higher resolution time period.

Equation 9-6 Percent Savings Prediction

$$\%\ savings\frac{month}{year} = \beta_1 lf_{Total\ kWh}$$

Where,

Lf = Load factor for each component variable of interest

Total kWh = All end-uses combined

The regression coefficients for the above regression equation represent the relationship of each of the component variables to percent savings. Because both independent and dependent variables are calculated in units of months, the numerator of the regression

[39] https://openei.org/doe-opendata/dataset/commercial-and-residential-hourly-load-profiles-for-all-tmy3-locations-in-the-united-states

weights are time invariant and can be used to estimate the percentage of savings across any unit of time of interest in a year.

9.3.5.4 Demand Calculation

Coincidence peak load was estimated for the total electric load by summing the total electric load over peak hours as defined by the TRM—non-weekend and non-holiday days between 4:00 p.m. and 5:00 p.m. for the months of June through August. The following equation illustrates the calculation for calculating the peak load factor.

Equation 9-7 Peak Load Factor Calculation

$$Peak\ load\ factor_x = \sum_{i=1}^{n} Hourly\ load\ factor_x$$

Where,

X = Component variable of interest (Total electric load)

I = First peak hour for the entire annual peak period

N = Last peak hour for the entire annual peak period

This will generate the percent of annual savings that took place in the total peak period. Equation 9-8 demonstrates this calculation.

Equation 9-8 Percent Savings Attributable to Peak Period

$$\%\ savings\frac{peak}{year} = \beta_x \cdot Peak\ load\ factor_x$$

Multiplying this value by the total annual savings will then generate the kWh savings that took place during the peak period, as illustrated by Equation 9-9

Equation 9-9 Energy Savings During Peak Period

$$Peak\ kWh\ savings = Total\ kWh\ savings\ \cdot \%\ savings\frac{peak}{year}$$

Dividing this value by the total number of peak hours will generate coincident peak demand savings in units of kW, as shown in Equation 9-10.

Equation 9-10 Peak Demand Savings

$$Peak\ kW\ savings = \frac{Peak\ kWh\ savings}{Anual\ Peak\ Period} \cdot \frac{Annual\ Peak\ Period}{Number\ of\ peak\ hours}$$

As with gross usage savings, the Evaluators anticipates that some participants in the treatment group will also participate in other Entergy programs. The adjusted savings per month is an input for the demand savings estimation with this method. The Evaluators adjust the savings per month by weighing the HVAC measures by degree day.

9.4 Impact Evaluation Results

Table 9-4 summarizes the verified gross and net energy savings. The Behavioral Program NTG ratio is 100% due to the nature of the program. Overall verified gross and net savings were 15,550 MWh for the savings between April 1, 2020 and December 31, 2020. Table 9-5 summarizes the final verified net savings. The Initial Group and the Third Group displayed statistically significant savings. However, the Second Group displayed statistically significant negative savings. The aggregated savings across all three cohorts results in positive savings for the program.

Table 9-4 Overall Savings Summary

Variable	*Initial Group*	*Second Group*	*Third Group*
Number of Treatment Customers	9,864	8,999	15,058
Number of Control Customers	6,070	5,843	0
Verified Gross Savings (MWh)	**14,294**	**-1,467**	**2,723**
Verified Net Demand Savings (kW)	**2,897.90**	**-139.19**	**575.17**

Table 9-5 Savings by Group

Variable	*Initial Group*	*Second Group*	*Third Group*
Number of Weighted Treatment Customers	9,864	8,999	15,058
Percent Savings	8.37%	-1.83%	1.93%
Average Daily Savings per Customer (kWh)	5.27	-0.59	0.66
Final Verified Net Savings (MWh)	**14,294**	**-1,467**	**2,723**
Verified Net Demand Savings (kW)	**2,897.90**	**-139.19**	**575.17**

The Initial Group displays an average household annual savings of 8.37%. Typically, behavioral energy report programs display a range between 0.5% and 2.5% annual household savings. However, this wave displayed abnormally large savings due to the following factors: the participants within this cohort are within the top 25% of annual household energy consumers in the territory; the Evaluators were unable to use observed post-period data for the control group and instead used a forecasted monthly energy usage value; and the PY10 post-period was impacted by COVID19 stay-at-home orders. The Evaluators forecasted post-period control group consumption values on weather but were unable to forecast COVID19 behaviors in the post-period. Although the Evaluators were unable to separate COVID19 effects from the treatment effect, the 8.37% annual household savings represents the average annual consumption differences between the treatment group in the observed post-period and the control group in a typical post-period.

The Evaluators would like to emphasize that the PY10 results for this wave are atypical, due to atypical COVID19-impacted post-period. For future program years and program planning, the Evaluators estimate a range between 0.5% and 2.5% annual household savings would better align with typical year savings.

9.4.1.1 Model Output

The three models all display statistically significant energy savings coefficients. In addition, the Initial and Second Group models display sufficient model fit with the Fixed-Effects D-in-D model. The Third Group model displays a low adjusted r-squared value due to the selection of the treatment-only model, which is unable to include fixed effects due to collinearity with the treatment variable. The treatment-only model was the only regression model available to evaluate this group due to the lack of RCT design and lack of valid ad-hoc counterfactual control group. However, savings for this group was statistically significant as seen by the t-values for the coefficients used to extrapolate savings. The table below summarizes the model output coefficients and adjusted r-squared values for each of the models.

Table 9-6 Regression Estimates

Variable	*Initial Group*		*Second Group*		*Third Group*	
	Coefficient	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*
Post	-7.55	-22.46	-4.41	-21.80	6.61	18.63
Treatment*Post	15.38	38.24	8.02	35.66	-	-
Average Daily HDD	3.01	216.30	1.63	220.92	1.69	88.10
Average Daily CDD	4.13	286.14	2.29	323.36	2.14	127.13
Average Post-Period Daily HDD	0.23	5.50	0.32	12.46	-0.41	-10.44
Average Post-Period Daily CDD	0.65	26.49	0.30	20.81	-0.86	-33.32
Average Treatment Post-Period Daily HDD	-1.03	-19.74	-0.54	-18.49	-	-
Average Treatment Post-Period Daily CDD	-2.10	-76.57	-0.70	-45.36	-	-
Adjusted R-Squared	**0.6025**		**0.5975**		**0.0842**	

*Statistically significant at the 95% confidence interval

9.4.1.2 *Treatment-Only Model Adjustment Factor*

An adjustment factor between a model with a control group and a model without a control group from the evaluation of PY9 was included to account for changes throughout the program period that may have impacted treatment billed usage. The adjustment factor was calculated by dividing the PY9 Initial group PPR savings estimate by the PY9 Initial group treatment-only savings estimate. This adjustment factor is applied to the Third Group for to estimate verified energy savings for the PY10 impact evaluation. The Initial

and Second Groups did not have the adjustment factor applied to the regression results, as the verified savings for these groups were calculated using a D-in-D model, not the treatment-only model.

The following table demonstrates the calculation of the treatment-only adjustment factor:

Table 9-7 PY9 Treatment-Only Model Adjustment Factor

Term	***Value***
PY9 Initial Group PPR Model Daily Savings	1.39
PY9 Initial Group Treatment-Only Model Daily Savings	3.75
PY9 Adjustment Factor	0.3692

The 0.3692 value was used as a multiplier on the daily savings values for the Third Group to account for control usage.

9.4.1.3 Demand Reduction Results

The Evaluators estimated demand reduction by dividing the annual energy savings by integrating hourly load factors with monthly estimated energy savings for each group for both the annual program year and the extended program year.

The following figures display average residential load by end use from the Energy Open Data Catalog database[40].

[40] Using TMY3 data from the New Orleans International Airport weather station

Figure 9-1 Typical Annual Load Profile

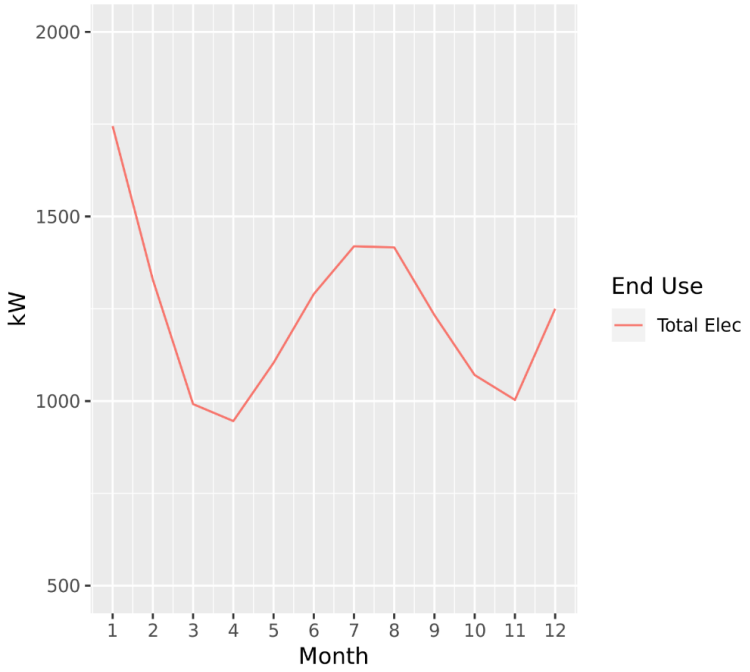
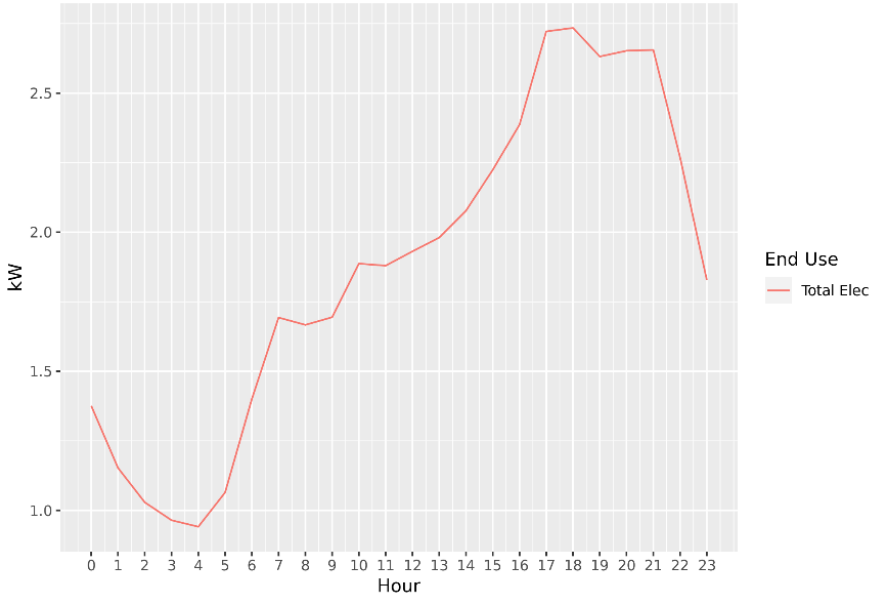
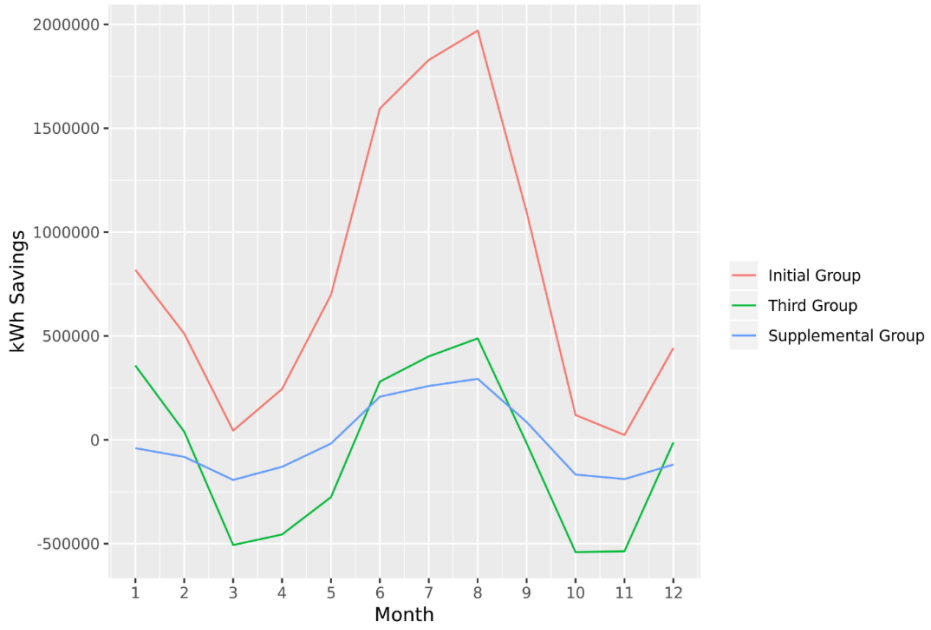


Figure 9-2 Typical Daily Load Profile



The following figure displays the monthly estimated energy savings for each group.

Figure 9-3 Net Energy Savings by Group



The Evaluators conducted the steps presented in the demand calculation methodology in Section 9.3.5. The following table displays the resulting demand savings for each group, for both the annual program year.

Table 9-8 Gross and Net Energy and Demand Savings by Group

Variable	*Initial Group*	*Second Group*	*Third Group*
PY10 Verified Net Demand Savings (kW)	2,897.90	-139.19	575.17

The Second Group displayed negative savings. In summary, PY10 is estimated to save 3,333.88 kW.

9.4.2 Verified Savings

Below, Table 9-9 shows final verified savings and kW reductions for the PY10 Behavioral program.

Table 9-9 Gross and Net Energy and Demand Savings by Group

Group	*kWh Savings per Participant*	*kWh Savings for Group*	*kW Reduction for Group*
Initial	1,449	14,293,812	2,897.90
Second	-163	-1,466,612	-139.19
Third	181	2,722,535	575.17
Totals:	**1,467**	**15,549,735**	**3,333.88**

The program achieved 15,549,735 kWh in savings and a peak reduction of 3,333.88 kW.

9.5 Key Findings

- **Recruitment email drove program participation.** Most respondents learned about the offering in an email from ENO, which was centered on Rewards. Other sources of awareness included the Entergy website or from the Energy Smart website.
- **Most survey respondents reported taking at least one energy saving action in the last 12 months.** The most common actions taken were adjusting thermostat settings in the winter and summer and making efforts to converse energy in the home. They also reported running the dishwasher with a full load. Almost all participants are motivated in reducing their utility bill costs or about conserving the environment.
- **Many survey respondents were affected by the COVID-19 pandemic during PY10.** Since the pandemic began, most survey respondents indicated the amount of time they spent at home greatly increased, followed by those who reported it somewhat increased the amount of time they spent at home. Three participants stated it did not change. Many survey respondents stated they noticed a change in their electricity bill since the pandemic began. Among those who noticed a change, most indicated their bills increased by about $10 a month or more.

9.6 Recommendations

The Evaluators' recommendations are as follows:

- **Ensure the Customer Engagement Portal (CEP) and Rewards have links that take users to the Energy Smart website with information about the programs.** The Customer Engagement Portal provides customers with valuable information (e.g., home energy usage, energy saving tips, etc.). It is recommended that the CEP link back to the Energy Smart website and to information about energy efficiency programs.
- **Provide periodic communications on earned rewards and tips for using the portal.** None of the survey respondents reported earning rewards and some respondents reported challenges in understanding how to use the portal.

10 EasyCool - Direct Load Control (Residential)

10.1 Program Background

The EasyCool - Direct Load Control ("DLC") offering is comprised of remote control switches installed on residential air conditioners or heat pump units. Control switches were installed on these units in order to run events. The control strategies employed were fixed cycling. In such a strategy, a duty cycle is selected *a priori* and all participants have their air conditioner limited to a maximum of this duty cycle[41].

The program offered $40 to customers for participating for the year.

10.1.1 Changes

During PY10 program implementors began a three-year process of transitioning from the existing switch-based offering to a thermostat-based demand reduction offering. The details of this transition are discussed in Section 2.11 EasyCool – Bring Your Own Thermostat.

10.1.2 Summary of Activities

PY10 tracking shows a total of 1,884 actives switches at 1,543 locations at the end of the year. Program implementors only completed one event during PY10, on Sept. 2nd from 2pm-6pm, when a total of 1,884 switches were still active.

10.2 Goal Achievement

The DLC only has a peak kW reduction target: 764.10 kW.

Table 10-1 DLC Target Achievement

kW Target	*Verified kW Reduction*	*Difference from Target*
764.10	980.37	216.27

The program was 216.27 above that kW target.

10.3 M&V Methodology

The DLC offering is being converted to the new Bring Your Own Thermostat offering. Further, the Evaluators conducted thorough event monitoring and process evaluations during PY6 through PY9. For these reasons, the PY10 offering did not receive a process

[41] For example, a 33% duty cycle cap would limit controlled air conditioners to running for 20 minutes in an event hour.

evaluation and the impact evaluation was based on PY9 average kW reductions per AC/HP capacity connected to a switch. The methodology used to develop those estimates is described below.

10.3.1 PY9 Methodology

The Evaluator was provided participation and recruited households to participate in the metering component of the study. Recruited households were compensated with a $50 Visa gift card upon completion of the metering and successful collection of the equipment. All four events had differing meter deployment. Table 10-2 summarizes the number of meters deployed each event after filtering for valid logger data.

Table 10-2 Meter Deployment

Event Date	Percent Deployed
6/26/2019	87
7/9/2019	91
8/8/2019	89
8/29/2019	89
9/4/2019	88

10.3.1.1 Data Collection

The assessment of load reductions was based on data collected for a sample of 94 central air conditioning units. The Evaluator's field staff took one-time power measurements of the CAC unit's compressor and air handler to determine its kW load and installed loggers to monitor indoor temperature and run time of the CAC compressor.

Information collected on the characteristics of each monitored unit included the following:

- Btu/hr. cooling capacity
- Rated unit efficiency, size, make and model
- Number of AC zones

Data on the power performance of sample unit was supplemented by also taking one-time readings of the following:

- Electrical input
- Dry bulb temperatures
- Relative humidity

Monitoring equipment was installed to measure the run time of the air conditioning system. A time-of-use motor logger was installed either in the condensing unit control compartment or in the disconnect switch box feeding the unit. By sensing the AC field generated by the current draw of the compressor, the logger could record the dates and

times of each event when the compressor was turned on or off. Indoor temperature and humidity loggers were used to collect data on ambient and indoor air conditions.

10.3.1.2 Calculation Methodology

The approach in analyzing the demand reductions from the DLC events was to calculate baseline load based on prior-day averaging. This approach is as follows:

- First, the average load from the baseline days specified is collected for each hour of the event. For example, in a 3-of-5 baseline, we would examine the load data from the last five non-event, non-holiday weekdays and take the mean values of the three highest loads.
- Second, loads were compared for the hour prior to the event. This is used to create a prior-hour adjustment factor. This corrects the baseline to align with the weather and load demonstrated on the event day.

The events were analyzed using the following baseline criteria:

- 3-of-5
- 3-of-8
- 3-of-10
- 5-of-10

The reductions are calculated in terms of kW per ton of cooling capacity.

10.4 Events

Table 10-3 summarizes the dates and times of events as well as the control strategy applied.

Table 10-3 Event Summary

Date	Event Time	Control Strategy
6/26/2019	2:00 PM - 6:00 PM	50% Cycling
7/9/2019	2:00 PM - 6:00 PM	50% Cycling
8/8/2019	2:00 PM - 6:00 PM	50% Cycling
8/29/2019	2:00 PM - 6:00 PM	50% Cycling
9/4/2019	2:00 PM - 6:00 PM	50% Cycling

10.4.1 Event Summary Baselines

Table 10-4 through Table 10-7 summarize the event load reductions in terms of kW/Ton for each baseline specification.

Table 10-4 Event Performance — 3-out-of-5 Baseline

Date	Hour 1	Hour 2	Hour 3	Hour 4
6/26/2019	0.164506	0.170319	0.161784	0.154976
7/9/2019	0.178667	0.207037	0.221723	0.20309
8/8/2019	0.134566	0.133144	0.135039	0.115713
8/29/2019	0.071111	0.053652	0.106737	0.086297
9/4/2019	0.171352	0.210286	0.20982	0.184054

Table 10-5 Event Performance — 3-out-of-8 Baseline

Date	Hour 1	Hour 2	Hour 3	Hour 4
6/26/2019	0.164506	0.170319	0.161784	0.154976
7/9/2019	0.170634	0.197255	0.215607	0.203044
8/8/2019	0.134566	0.133144	0.135039	0.115713
8/29/2019	0.072013	0.042087	0.121986	0.106526
9/4/2019	0.171352	0.210286	0.20982	0.184054

Table 10-6 Event Performance — 3-out-of-10 Baseline

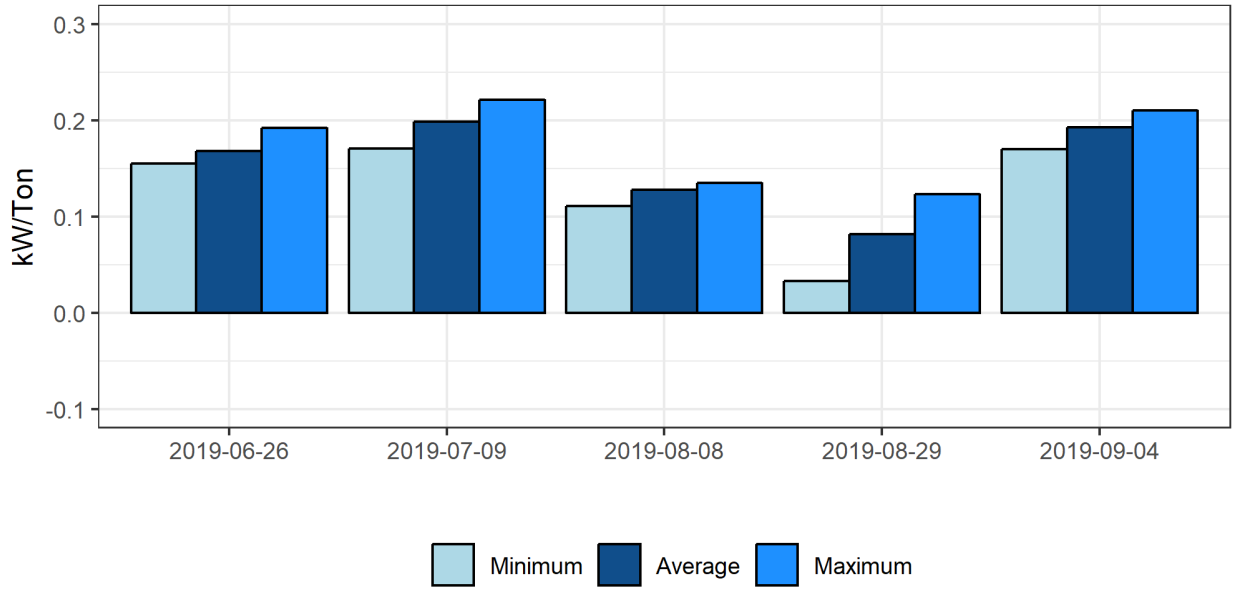
Date	Hour 1	Hour 2	Hour 3	Hour 4
6/26/2019	0.164506	0.170319	0.161784	0.154976
7/9/2019	0.170634	0.197255	0.215607	0.203044
8/8/2019	0.134566	0.133144	0.135039	0.115713
8/29/2019	0.069577	0.032803	0.12012	0.089982
9/4/2019	0.171352	0.210286	0.20982	0.184054

Table 10-7 Event Performance — 5-out-of-10 Baseline

Date	Hour 1	Hour 2	Hour 3	Hour 4
6/26/2019	0.16638	0.188538	0.191087	0.192013
7/9/2019	0.172073	0.199909	0.219711	0.203059
8/8/2019	0.131445	0.129296	0.122797	0.110659
8/29/2019	0.069854	0.037423	0.12321	0.102607
9/4/2019	0.170274	0.205784	0.199257	0.182648

Figure 10-1 summarizes the spread of load reductions for each hour of each event when comparing all four baseline specifications. Load reductions vary significantly, especially for lower-performing events. All events had positive load reductions during the course of the system event.

Figure 10-1 Variation in Load Reduction from Baseline Specification



10.4.2 Event Load Profiles

Figure 10-2 through Figure 10-6 presents the kW/ton load profiles for the analyzed events. These are provided for illustrative purposes and use the three-of-five baseline data.

Figure 10-2 Event 1 Load Profile

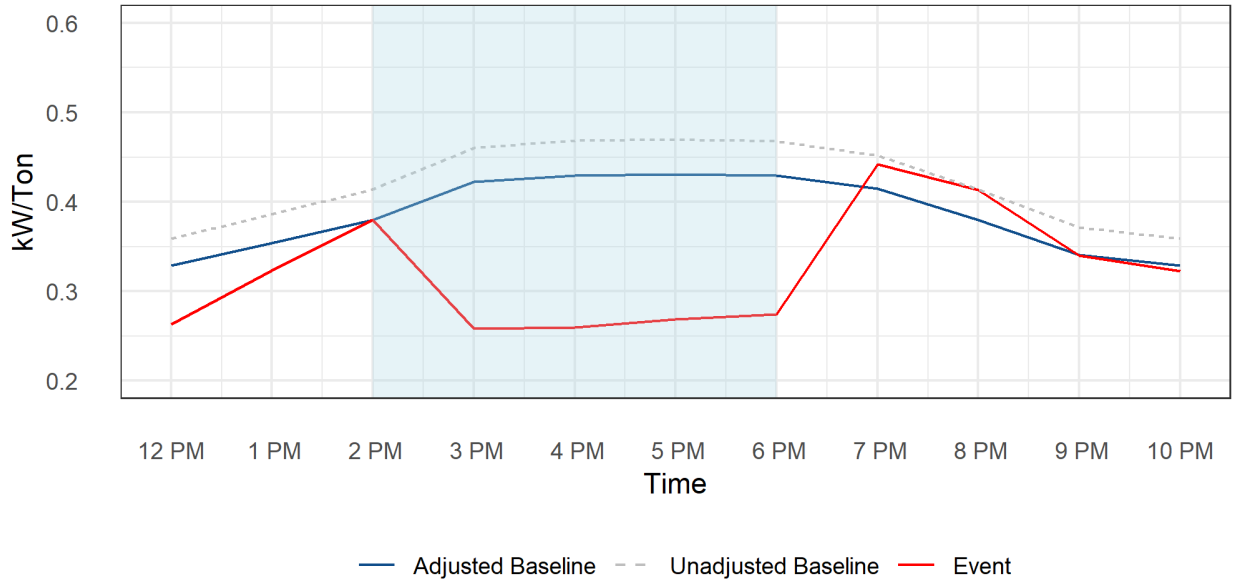


Figure 10-3 Event 2 Load Profile

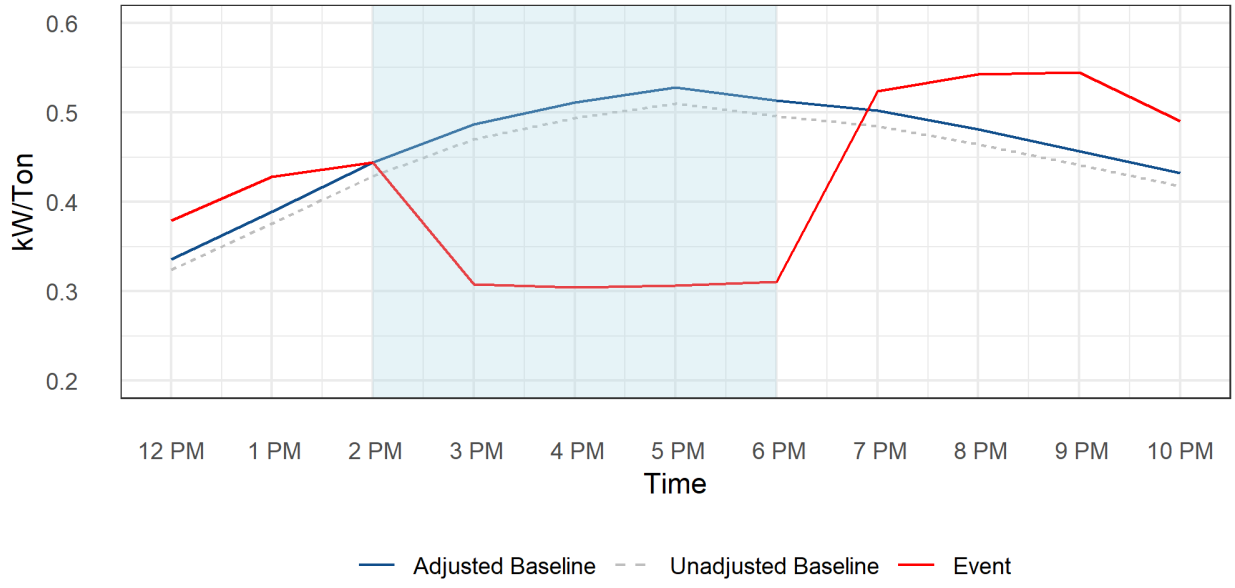


Figure 10-4 Event 3 Load Profile

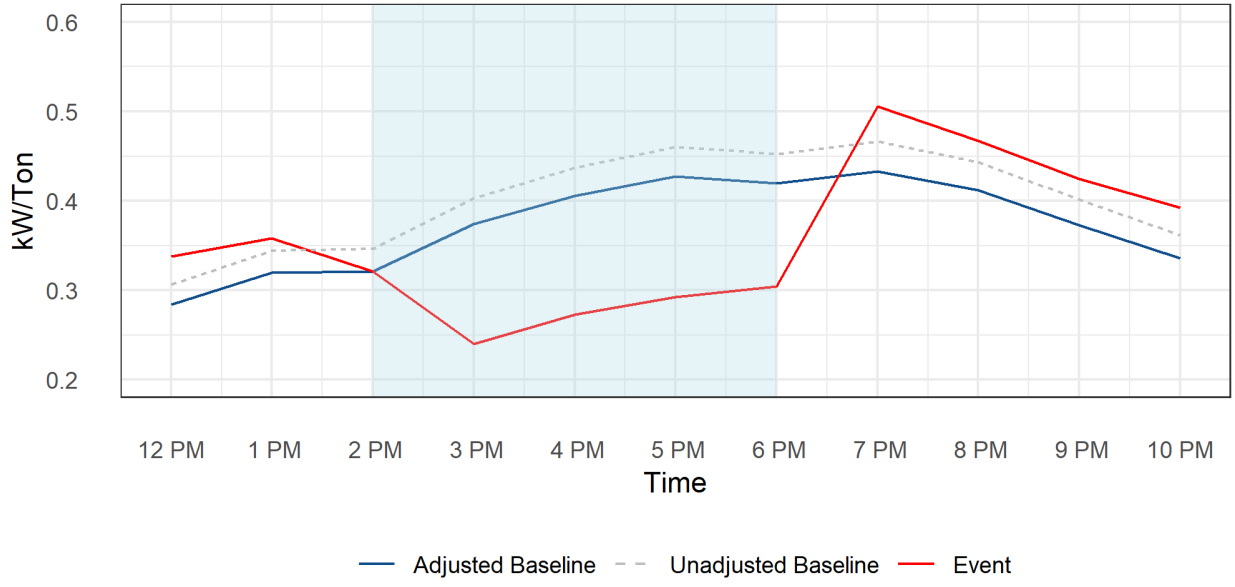


Figure 10-5 Event 4 Load Profile

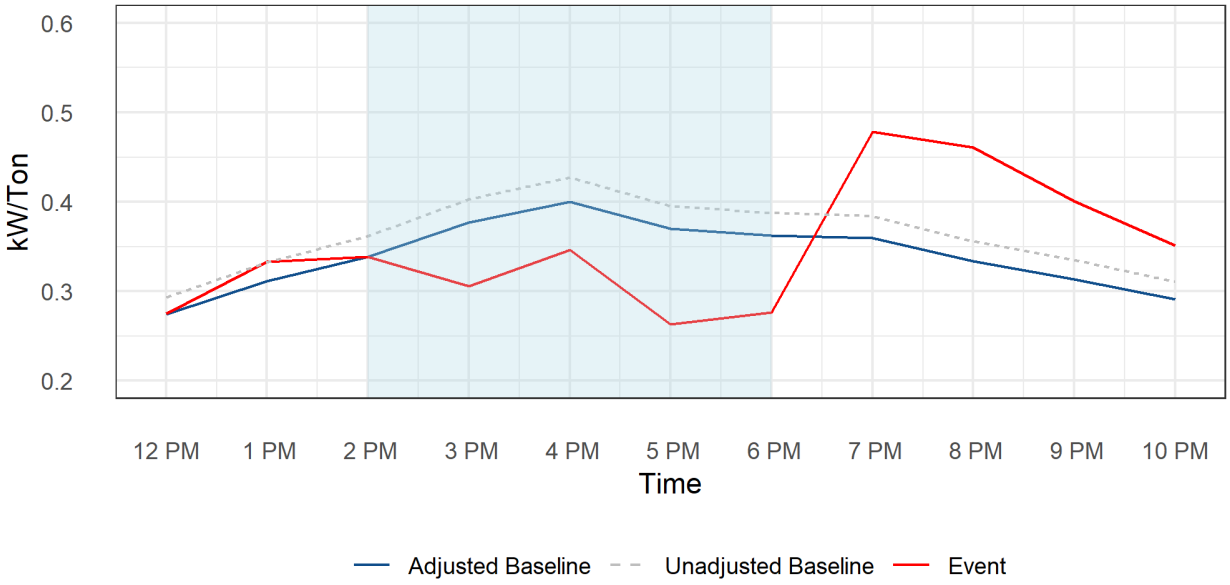
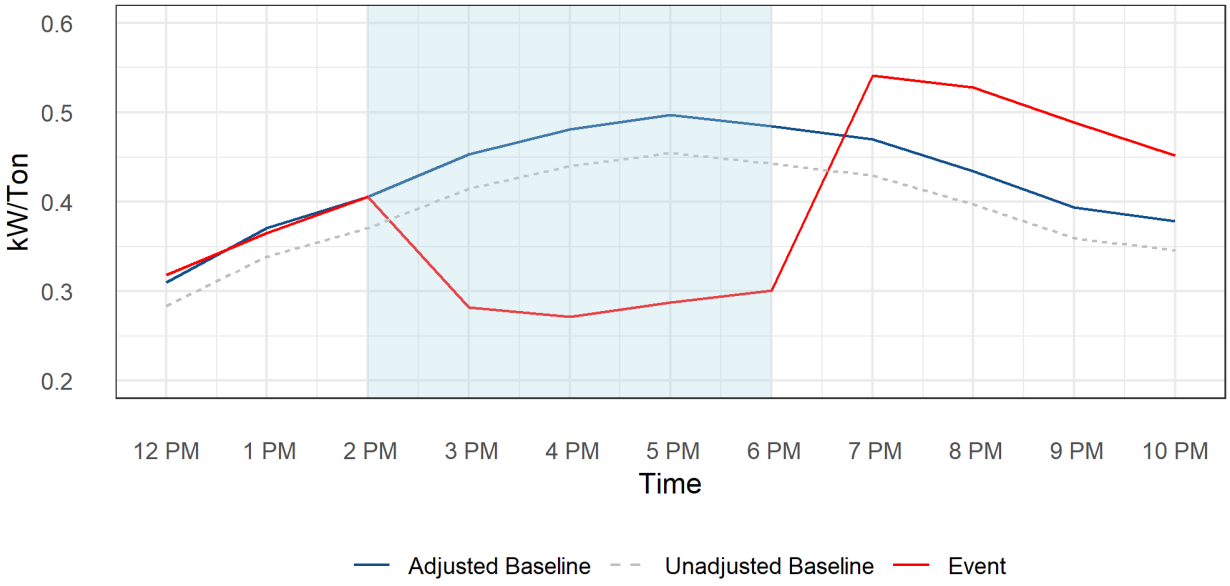


Figure 10-6 Event 5 Load Profile

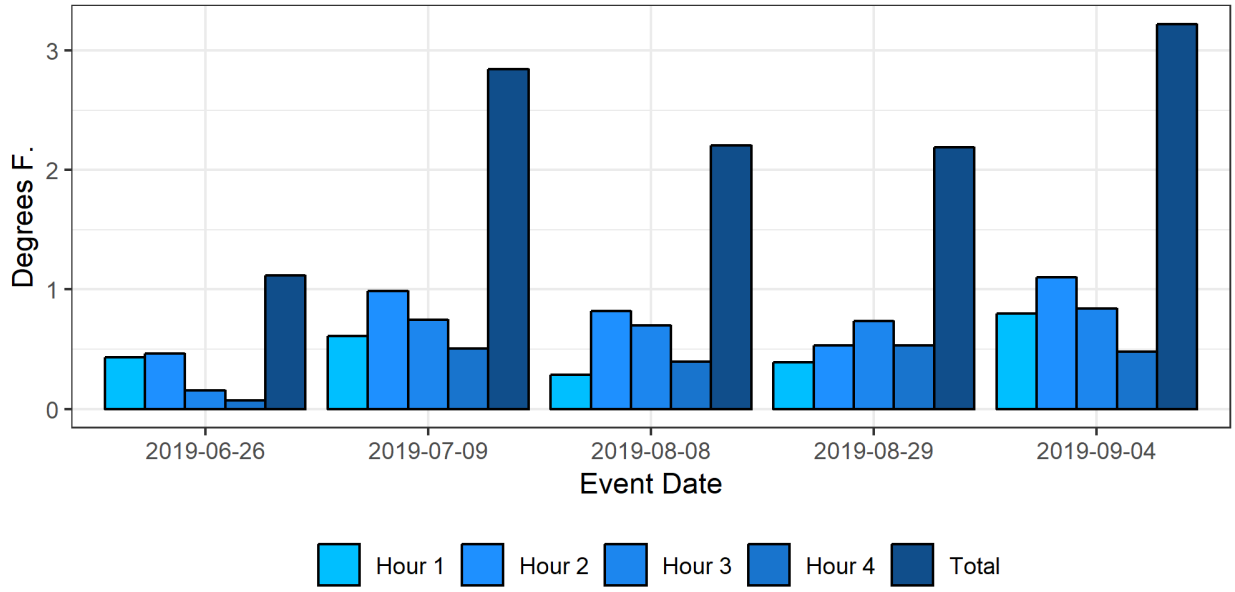


10.5 Indoor Temperature

The Evaluators monitored indoor temperature in the sampled residences in order to assess the effects of the program on home comfort. The temperature increases are presented in Figure 10-7. The average temperature increase in a residence over the course of a system event was 2.32 degrees Fahrenheit. Overall, the temperature increase

over the events is lower than usual. Typically, programs that use a thermostat setback method display a 4-6 degrees Fahrenheit increase in temperature.

Figure 10-7 Temperature Increase During DLC Events



10.6 PY10 Savings Summary

The Evaluators applied the 3-of-5 baseline in assessing final kW demand reductions from the DLC pilot. The average unit capacity is 3.36 tons cooling. Table 10-8 presents the average savings per ton, per event and the extrapolation to program-level savings.

Table 10-8 Final Results

Average Savings per Event per Ton (kW)	***Average Tonnage***	***Total Program Participation (Units)***	***Total Program Savings (kW)***
0.153694	3.359	1,973	4074.30

The average event kW/Ton savings was 0.15 kW/ton or 0.516 kW/unit), the average program kW/Ton savings was 0.61 kW/ton or 2.06 kW/unit) and the average savings per unit per event was 0.4130 kW.

10.7 PY10 Verified kW Reduction

The Evaluators calculated the PY10 kW reduction using results of PY9 evaluation shown below in Table 10-9.

Table 10-9 Final Results

Average Savings per Event per Ton (kW)	Average Tonnage	Total Program Participation (Units)	Total Program Savings (kW)
0.153694	3.359	1,973	4074.30

Table 10-10 shows verified PY10 results.

Table 10-10 Verified Reductions by Territory

Average Savings per Event per Ton (kW)	Average Tonnage	Total Program Participation (Units)	Total Program Savings (kW)
0.153694	3.359	1,899	980.37

The overall verified kW reduction is 980.37.

10.8 Key Findings and Conclusions

The key findings and conclusions of the evaluation of the program are as follows:

- **The PY10 program exceeded its kW reduction target.** DLC did not have a savings goal, and only had peak kW reduction target of 764.10 kW. The program exceeded the target by 216.27 kW, achieving a 980.37 verified kW reduction.
- **The DLC offering is being transitioned to the new Bring Your Own Thermostat offering.** Further, the Evaluators conducted thorough event monitoring and process evaluations during PY6 through PY9. For these reasons, the PY10 program did not receive a process evaluation and the impact evaluation was based on PY9 average kW reductions per AC/HP capacity connected to a switch.

10.9 Recommendations

- The Evaluators recommend that we accelerate the closing out of the DLC switch offering and expansion of the BYOT offering.

11 EasyCool Bring Your Own Thermostat (Residential)

11.1 Program Description

The EasyCool - Bring Your Own Thermostat (BYOT) offering uses a Distributed Energy Resource Management System (DERMS) to enroll, monitor, and to schedule load control events to reduce electricity consumption during periods of high demand. The DERMS system increases the temperature setting by a small amount on customer thermostats. These events may occur between June 1st and September 30th and are limited to a maximum of 15 adjustments per year. These events typically last no more than four hours and occur between noon and 8 p.m. To manage customer comfort, the system will pre-cool the home in advance of the event.

The offering works with a wide range of thermostats including those manufactured by ecobee, Honeywell, Nest, and Emerson. A complete list of qualifying thermostats is published on the program website.

Customers enroll in the offering by visiting a web-based portal. To qualify customers must be a residential Entergy New Orleans customer, have an internet connected thermostat that controls central air conditioning, and agree to the terms and conditions. Customers may receive a $25 incentive for enrolling and $40 for each year they participate in the offering. Customers may unenroll by sending an email communication or they may opt-out of events using the web portal.

BYOT Residential was first introduced in PY10.

11.1.1 Program Activity

Customers could enroll in the program during the period April 1, 2020 - December 31, 2020. As of December 31, 2020, a total of 2,067 customers enrolled in the BYOT offering.

No events were called in 2020 and no savings or demand reductions are expected.

11.1.2 Goal Achievement

Total verified savings and percentage of goals for the BYOT Residential offering are summarized in Table 11-1.

Table 11-1 BYOT Residential Summary of Goal Achievement

kW Target	Verified kW	Difference from Target
764.10	0.00	-764.10

In PY10 the offering did not have a savings goal but did have a kW reduction target of 764.10 kW. Since no event were called, there was no opportunity for savings and the program fell 764.10 kW short of the target.

Customers could enroll in the offering during the period April 1, 2020 – December 31, 2020.

11.2 EM&V Methodology

The Evaluators completed a process evaluation consisting of a review of program documentation and interviews with program staff was completed. Because no events were called during PY10, a participant survey was not performed. The process evaluation focused on both customer segments, residential and small business, targeted by the BYOT offering.

11.3 Process Evaluation Findings

11.3.1 Program Operations

The following sections summarize the findings on the BYOT Residential and Business offerings which have similar operations. The material presented below summarizes findings on program operations for both customer segments to prevent repetition. The material presented in this is based on a review of documentation (i.e., planning documents and the program website) and interviews with program staff.

11.3.1.1 Marketing and Outreach

The BYOT offering is marketed by device partners and uses in-app notifications and email communications. Device partner marketing collateral features both the device partner and utility branding and directs customers with existing qualifying thermostats to enroll their devices in the offering through the device partner web or mobile application experience. Because the program is intended to replace the DLC, switch-based offering, program staff also recruited customers from among those enrolled in the DLC offering. These customers were sent a letter notifying them of the BYOT offering. The program also marketed the offering through press releases, social media, email marketing, search

advertising and direct outreach. The program also cross-marketed smart thermostats and EasyCool.

The program estimated that at the time of launch there were approximately 14,000 connected thermostats operating in the service territory. Additionally, the program recruits customers through installations of smart thermostats through other offerings such as Home Performance with ENERGY STAR and A/C Solutions.

11.3.1.2 Customer Enrollment

Customers enroll online through enrollment pages for each device manufacturer. Customers provide basic information such as name, address, and email, but do not need to provide account numbers. EnergyHub uses the customer data to match customers to the Companies' account records. This process streamlines enrollment and distinguishes between residential and commercial accounts.

To participate, customers must agree to the terms and conditions of the offering. These conditions are to meet the eligibility requirements (i.e., residential or small business customer, use an internet connected thermostat to control a central cooling system), agree to the incentive payment terms and structure, and agree to the thermostat manufacturer specific terms and conditions.

11.3.1.3 Events

Up to 15 events may be called during the period June 1st and September 30th. Events are estimated to last four hours or less and may occur between noon and 8 p.m. Customers receive a notification from the app when an event occurs.

No BYOT events were called during PY10 as the majority of the cycling season was used to complete necessary technological and data security requirements.

11.3.1.4 Quality Control and Assurance

Enrollment and dispatchment procedures were put through a careful quality assurance and control process prior to launch. Staff indicated when there are updates with their thermostat partners, they put those changes through a QA/QC review before they are rolled out to participant thermostats.

11.3.1.5 COVID-19

Staff indicated that COVID-19 did not affect program enrollment. The BYOT offering does not require in-person contact, aside from thermostats directly installed through other residential offerings such as Home Performance with ENERGY STAR and A/C Solutions.

11.4 Key Findings and Conclusions

The key findings and conclusions of the evaluation are as follows:

- **The offering did not reach its savings target.** In PY10 the offering did not have a savings goal but did have a kW reduction target of 764.10 kW. Since no events were called, there was no opportunity for savings and the program fell 764.10 kW short of the target.
- **There was strong enrollment in PY10.** For PY10, the offering budgeted for 2,066 enrolled thermostats and exceeded this budget target with 2,067 devices enrolled. No events were called during the year as the majority of the cycling season was used to complete necessary technological and data security requirements.
- **Quality assurance and control procedures include enrollment and dispatchment.** Enrollment and dispatchment procedures were put through a careful quality assurance and control process prior to launch. Staff indicated when there are updates with the thermostat partners, they put those changes through QA/QC before they are rolled out to participant thermostats. By the end of PY10, the team completed an autoenrollment verification tool to streamline the enrollment review processes. The tool matches applications with an Entergy New Orleans customer data file to verify eligibility.
- **COVID-19 did not significantly impact BYOT.** Program staff did not believe that the pandemic had a major impact on this offering because of how this offering was designed. Staff suggested that with more people home it could potentially boost enrollment into this type of program, thus growing consumer interest in smart home devices to save energy and money. Staff did indicate they anticipated that customers who are at home more often may opt-out of demand response events more frequently compared to previous years.

11.5 Recommendations

The Evaluators' recommendations are as follows:

- **Call demand events in PY11 regardless of status of Nest security assessment.** One of the factors that led program staff to decide not to call events in the latter part of the cycle season was the required completion of a security assessment related to Nest thermostats. While Nest thermostats account for significant share of enrolled devices, the program should strongly consider calling events in PY11 even if certain devices need to be excluded for any reason. Calling an event can also provide an opportunity to test system functioning prior to full rollout.
- **Continue to refine the educational strategies to help customers better understand the EasyCool Bring Your Own Thermostat offering.** BYOT is

intended to replace the DLC offering and additional tactics may help customers to switch the program. One approach may be to include a page on the website on the benefits of switching to BYOT (including the benefits of smart thermostats). Additionally, at some point it may be cost effective to offer a bonus incentive to encourage DLC customers to switch to BYOT to enable shutting down of the DLC program and minimizing the loss of available load to curtail.

- **Recommend the closure of the DLC switch offering to encourage additional participation in the BYOT offering.**

12 EasyCool for Business

12.1 Program Description

EasyCool for Business uses a Distributed Energy Resource Management System (DERMS) to enroll, monitor, and to schedule load control events to reduce electricity consumption during periods of high demand. The DERMS system increases the temperature setting by a small amount on customer thermostats. These events may occur between June 1st and September 30th and are limited to a maximum of 15 adjustments per year. These events typically last no more than four hours and occur between noon and 8 p.m. To manage customer comfort, the system will pre-cool the business in advance of the event.

The offering works with a wide range of thermostats including those manufactured by ecobee, Honeywell, Nest, and Emerson. A complete list of qualifying thermostats is published on the program website.

Customers enroll in the offering by visiting a web-based portal. To qualify customers must be a small business Entergy New Orleans electric customer, have an internet connected thermostat that controls central air conditioning, and agree to the terms and conditions. Customers may receive a $25 incentive for enrolling and $40 for each year they participate. Customers may unenroll by sending an email communication or they may opt-out of events using the web portal.

12.1.1 Program Activity

Customers could enroll in the offering during the period April 1, 2020 - December 31, 2020. As of December 31, 2020, a total of 41 businesses were participating in the commercial BYOT program.

No events were called in 2020 and no savings or demand reductions are expected.

12.1.2 Goal Achievement

Total verified savings and percentage of goals for the EasyCool for Business offering are summarized in Table 12-1.

Table 12-1 EasyCool for Business Summary of Goal Achievement

kW Target	Verified kW	Difference from Target
130.50	0.00	-130.50

In PY10 the offering did not have a savings goal but did have a kW reduction target of 130.50 kW. Since no event were called, there was no opportunity for savings and the offering fell 130.50 kW short of the target.

12.2 EM&V Methodology

The Evaluators completed a process evaluation consisting of a review of program documentation and interviews with program staff was completed. Because no events were called during PY10, a participant survey was not performed. The process evaluation focused on both customer segments, residential and small business, targeted by the BYOT offering and is summarized in Chapter 1.

12.3 Process Evaluation Findings

EasyCool for Business operated conjointly with the residential offering. Section 11.3 summarizes the findings of the process evaluation for the offering.

12.4 Key Findings and Conclusions

- **Relatively few devices were installed in small businesses.** Tracking data indicated that 32 of the devices registered with the program were installed in small businesses.
- **The offering did not reach its savings target.** In PY10 the offering did not have a savings goal but did have a kW reduction target of 130.50 kW. Since no event were called, there was no opportunity for savings and the offering fell 130.50 kW short of the target.

12.5 Recommendations

- **Consider developing marketing materials that specifically address barriers to enrollment faced by small businesses.** Many small businesses may have concerns about participating in a demand response offering because adjustments may impact customer comfort. Directly addressing this barrier in marketing materials such as on the program website may help minimize customer concerns. Addressing the barrier can be accomplished by emphasizing minimal comfort impacts such as through case studies (once events have occurred) and the ability of customers to opt-out if they find that that events have too great of an impact (i.e., noting that they are in control and no risk of participating).

13 Small Commercial & Industrial Solutions

13.1 Program Description

Small Commercial & Industrial Solutions (Small C&I) provides higher incentives to small business owners to help overcome the first-cost barrier that small businesses face in adopting energy efficiency improvements. By offering enhanced financial incentives, the program generates significant cost-effective energy savings for small businesses using added market-segmented strategies that encourage the adoption of diverse efficiency measures in target sub-sectors.

The incentives provided are summarized below in Table 13-1.

Table 13-1 Small C&I Summary of Offering Incentives

Measure	***Incentive***
Prescriptive	$ per unit
Custom Lighting	$0.12 per kWh Saved
Custom Non-Lighting	$0.12 per kWh Saved

13.1.1 Offering Activity and Expected Savings

The Small C&I offering is designed to provide small business owners with energy efficiency information and develop awareness of energy and non-energy benefits of energy efficiency. The information helps small business customers invest in energy efficient technologies and help overcome high “first costs.” It is intended to increase the awareness of the latest energy efficient technologies available to small business customers. Through the Small C&I offering, a network of trade ally contractors was developed that work specifically with small business customers. The offerings provides the tools and training for trade allies to quantify the energy savings and incentives for small business customers.

13.1.2 Program Changes

A 25% bonus incentive for prescriptive measures installed by trade allies was provided during PY10. In PY10, many measures that were previously offered as custom were transitioned to the prescriptive application process. Theo bonus was offered directly to trade allies to support this transition during PY10.

To help customers, implement projects that may have been put on hold due to the COVID-19 pandemic, a customer incentive bonus was created which increased custom and prescriptive rates by 25%. Projects with applications received on or after August 24, 2020 and installed by December 31, 2020 were eligible for the bonus incentives.

13.1.3 Program Activity

Data provided by staff showed that during PY10, there were traditional business retrofit projects, 359 Small Business Energy Efficiency Kits distributed, and 474 items purchased on the Energy Smart Online Store by 73 local businesses. These projects were expected to provide a combined savings of 3,590,542 kWh and 641.24 kW. Count of projects and expected kWh and kW savings for the Small C&I offering are summarized in Table 13-2 and the count of project components broken out by delivery channel are summarized in Table 13-2.

Table 13-2 Savings Expectations by Delivery Channel

Delivery Channel	***Count of Projects***	***Expected kWh Savings***	***Expected kW Savings***
Traditional	122	3,014,843	487.74
Kits	359	490,867	125.57
Online Store	23	84,832	27.93
Total	**504**	**3,590,542**	**641.24**

Table 13-3 Savings Expectations by Project Component

Participation Path	***Project Component***	***Count of Project Components[42]***	***Expected kWh Savings***	***Expected kW Savings***
Traditional	Prescriptive	288	2,276,896	398.45
	Custom	57	737,947	89.29
Office Kit	Prescriptive	134	196,821	53.38
Restaurant Kit	Prescriptive	98	111,851	21.12
Retail Kit	Prescriptive	127	182,195	51.06
Online Store	Prescriptive	430	84,832	27.93
Total		**1,134**	**3,590,542**	**641.24**

In the PY10 offering savings were comprised mostly all lighting measures, with 16% (traditional projects) of expected savings coming from non-lighting measures.

[42] Individual project components, not overall projects.

Table 13-4 Savings Expectations by Measure Category

Project Component	Count of Project Components	Expected kWh Savings	Expected kW Savings	Percentage of Savings Contribution
Lighting	304	2,542,695	366.52	70.82%
HVAC	40	317,881	121.22	8.85%
Controls	1	154,267	0.00	4.30%
Kits	359	490,867	125.57	13.67%
Online	430	84,832	27.93	2.36%
Total	**1,134**	**3,590,542**	**641.24**	**100.00%**

Table 13-5 Savings Expectations by Measure Type

Project Component	Project Component	Count of Measures	Expected kWh Savings	Expected kW Savings
Lighting	Non-Linear LED Fixture	61	606,689	71.53
	Linear LED Fixture	86	715,397	131.24
	LED A-Type	135	999,119	111.77
	LED Exit Sign	7	10,067	1.50
	New Construction Lighting	2	201,890	43.51
	On/Off Daylight Sensor	13	9,534	6.96
HVAC	Duct Sealing	1	6,860	5.60
	AC Tune-Up	16	311,021	115.62
	Smart Thermostat	23	43,433	0.00
Controls	New Building Automation System	1	110,833	0.00
Miscellaneous	Online Store	430	84,832	27.93
	Kit	359	490,867	125.57
Total		**1,134**	**3,590,542**	**641.24**

For comparison: In PY9, 97 projects summing to 6,577,262 kWh were completed during the first twelve months of the program year. The PY10 program ran for 9 months. Normalizing PY10 for a more accurate comparison yields approximately 156 traditional projects summing to 4,768,495. This is a 61% increase in projects, but a 28% decrease in expected savings. Comparisons are shown below in Table 13-6 below.

Table 13-6 Small C&I Participation Summary Comparison

Project Year	*# Projects*	*Expected kWh*	*kWh per Project*
PY5	191	4,011,430	21,002
PY6	156	3,152,283	20,207
PY7 (nominal)	46	2,264,029	49,218
PY7 (normalized)	61	3,018,705	49,487
PY8	130	7,374,272	56,725
PY9 (nominal)	144	8,258,263	57,349
PY9 (normalized)	97	6,577,262	67,807
PY10 (nominal)[43]	117	3,590,542	30,567
PY10 (normalized)	156	4,768,495	30,567

13.1.4 Goal Achievement

Total verified savings and percentage of goals for the Small C&I offering are summarized in Table 13-7.

Table 13-7 Small C&I Summary of Goal Achievement

kWh Goal	*Verified kWh*	*% of Goal Attained*	*kW Target*	*Verified kW*	*Difference from Target*
6,971,994	3,355,719	48.13%	1,397.02	644.44	-752.58

In PY10 the offering had a savings goal of 6,971,994 kWh and a 1,397.02 target kW reduction. The offering achieved 3,355,719 kWh in verified kWh, 48.13% of goal, and was 752.58 kW below the kW reduction target.

13.2 M&V Methodology

13.2.1 M&V Methodology for Traditional Projects

Evaluation of the Small C&I offering requires the following:

- Stratified Random Sampling (as detailed in section 2.2.1.3 Stratified Sampling and by selecting large saving sites with certainty).
- The Evaluators originally planned to conduct on-site visits to verify the installation and operation of rebated equipment, and to collect other project-related building characteristics. However, due to public health concerns related to COVID-19, the Evaluators opted to conduct desk reviews to verify equipment: reviews of project pre/post photos were conducted, and equipment counts verified against invoices.

[43] Counts of both 'calendar' and 'normalized' and their respective kWh savings refer to traditional projects and do not include kits or online purchases.

- Where custom project hours were used, publicly-available facility hours or phone calls were made to project contacts in order to verify schedules.
- Gross savings were estimated using proven techniques, including engineering calculations using industry standards and verification of computer simulations developed by program trade allies to determine energy savings.
- Interviewing of program participants and trade allies.

To approach the impact evaluation, data was collected through review of program materials and on-site inspections were performed to inform savings calculations. Based on data provided by staff, sample designs were developed for the impact evaluation.

The on-site inspections were used to help verify installations and to determine any changes to the operating parameters since the measures were first installed. The Evaluators verified that TRM lighting hours of operation had been correctly assigned by space type. Projects were deemed analyzed using the methods described in the New Orleans TRM 3.0, section D.6.2 and 3, Lighting Efficiency and Lighting Controls. Specific algorithms for lighting savings and an explanation of deemed inputs are below.

13.2.1.1 Lighting Savings Calculations

$$kWh_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times AOH \times IEF_E$$

$$kW_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times CF \times IEF_D$$

Where:

Nfixt(i),pre = Pre-retrofit number of fixtures of type i

Nfixt(i),post = Post-retrofit number of fixtures of type i

Wfixt(i),pre = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table, Appendix E pages C-323 to C-475)

Wfixt(i),post = Rated wattage of post-retrofit fixtures of type i (Appendix E)

CF = Peak demand coincidence factor (TRM Table 227, pages C-294 to C-295)

AOH = Annual operating hours for specified space type (TRM Table 227, pages C-294 to C-295)

IEFD = Interactive effects factor for demand savings (TRM Table 228, page C-296)

IEFE = Interactive effects factor for energy savings (TRM Table 228, page C-296)

13.2.1.2 Small C&I Offering Sample Design

Sampling for evaluation of the Small C&I offering was developed using the Stratified Random Sampling procedure detailed in section 2.2.1.3 Stratified Sampling. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than simple random sampling would require by selecting the highest saving

facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results.

The participant population for the Small C&I offering was divided into five strata. Table 13-8 summarizes the strata boundaries and sample frames for the offering and Table 13-9 summarizes expected savings for of both the sample and population.

Table 13-8 Small C&I Offering Sample Design (Pooled)

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Stratum 5***	***Totals***
Strata boundaries (kWh)	< 10,000	10,001 - 30,000	30,001 - 50,000	50,001 - 120,000	> 120,001	
Number of projects	36	47	20	11	3	**117**
Total kWh savings	179,794	755,114	801,969	799,791	478,175	**3,014,843**
Average kWh Savings	4,994	16,066	40,098	72,708	159,392	**25,768**
Standard deviation of kWh savings	3,013	4,853	5,512	28,512	39,619	**31,060**
Coefficient of variation	0.603	0.302	0.137	0.305	0.249	**1.205**
Final design sample	7	5	4	4	3	**23**

Table 13-9 Expected Savings for Sampled and Non-Sampled Projects by Stratum

Stratum	***Sample Expected Savings***	***Total Expected Savings***
1	33,952	179,794
2	75,109	755,114
3	174,106	801,969
4	314,185	799,791
5	478,175	478,175
Total	**1,075,527**	**3,014,843**

The achieved sampling precision was ±8.19% at 90% confidence.

13.2.2 M&V Methodology for Energy Efficiency Kits

Savings for lighting and water heating measures in the kits was assessed using the New Orleans TRM 3.0. Table 13-10 lists which sections of the TRM were used to evaluate each measure.

Table 13-10 Applicable TRM Sections

Measure	***TRM Section***
LED A-Lamps	D.6
Low-Flow Faucet Aerators 1.0 GPM	D.2.2
Low-Flow Faucet Aerators 1.5 GPM	D.2.3
Advanced Power Strips	D.7.6
LED 'Exit' sign	D.6

To determine in-service rates (ISRs) the Evaluators surveyed kit recipients. Table 13-11 through Table 13-13 below shows responses and ISRs.

Table 13-11 ISRs for 'Office' Kit Measures

Measure	ISR	Responses
LEDs	77.8%	9
Aerator 1.0	93.8%	8
Aerator 1.5	87.5%	8
APS	62.5%	8
LED 'Exit' signs	0.0%	5

Table 13-12 ISRs for 'Retail' Kit Measures

Measure	ISR	Responses
LEDs	43.8%	9
Aerator 1.0	50.0%	4
LED 'Exit' signs	0.0%	5

Table 13-13 ISRs for 'Restaurant' Kit Measures

Measure	ISR	Responses
LEDs	20.0%	5
Aerator 1.0	30.0%	5
Aerator 1.5	40.0%	5
LED 'Exit' signs	0.0%	5

So that savings for businesses with gas water heating was not claimed for hot water measures, staff tracked the water heating type for each kit delivered and included this data in tracking provided to the Evaluators. In addition to asking questions related to in-service rates, the Evaluators also confirmed each businesses' water heating type during surveys. No discrepancies were found.

13.3 Gross Impact Findings

13.3.1 Traditional Project Realization

The Evaluators reviewed all project documentation, including invoices, spec sheets and site photos to verify the installation of the equipment. Energy and demand reduction calculations were reviewed to verify that they were consistent with the TRM and that all inputs were appropriate. Changes and corrections between ex ante and ex post savings estimates were documented and realization rates based on verified savings were developed for each site. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 13-15 presents realization at the stratum level, with Table 13-14 presenting results at the site level.

Table 13-14 Summary of kWh Savings for Small C&I Offering by Sample Stratum

Stratum	Sample Expected kWh Savings	Sample Verified kWh Savings	Stratum Realization Rate
1	33,952	34,641	102.0%
2	75,109	74,155	98.7%
3	174,106	154,458	88.7%
4	314,185	300,661	95.7%
5	478,175	478,174	100.0%

Table 13-15 shows the expected and verified energy savings for the program by project.

Table 13-15 Expected and Verified Savings by Sampled Project

Project ID(s)	Facility Type	Expected kWh Savings	Verified kWh Savings	Realization Rate
CIP_083	Recreational	1,414	1,442	101.98%
CIP_008	Retail	2,616	4,351	166.32%
SN9-092	Restaurant	3,022	4,932	163.20%
SN9-088	Small Office	3,085	3,085	100.00%
SA9-015	Manufacturing	5,399	6,462	119.69%
CIP_055	Recreational	8,769	8,941	101.96%
SA9-017	K-12 School	9,647	5,428	56.27%
SA9-016	Grocery	11,704	11,705	100.01%
SN9-128	Retail	13,078	13,078	100.00%
CIP_046	Recreational	13,136	115,472	879.05%
SN9-095	Manufacturing	15,097	17,640	116.84%
CIP_090	Retail	22,094	18,334	82.98%
CIP_009	Religious	39,273	29,430	74.94%
SA9-018	Retail	41,354	38,047	92.00%
SN9-107	Religious	45,265	44,011	97.23%
CIP_151	Retail	48,214	42,970	89.12%
SN9-138	Manufacturing	58,531	58,531	100.00%
CIP_079	Manufacturing	67,649	68,894	101.84%
CIP_120	Small Office	87,795	88,646	100.97%
CIP_099	Warehouse	100,211	84,590	84.41%
Total		**1,075,527**	**1,144,163**	**106.38%**

13.3.1.1 Causes of Sub-100% Realization

Some sampled projects used annual hours of lighting operation and peak CFs that were not correct for the space type. Verified savings calculations reflect hours of use and peak CFs specific to the type of space the lamps were installed in, resulting in slightly different verified savings estimates.

13.3.1.2 Overall Realization of Traditional Projects

Using the realization rates presented in Table 13-15, the Evaluators extrapolated results from sampled sites to non-sampled sites in developing offering-level savings estimates. Table 13-16 presents results by stratum.

Table 13-16 Overall Realization by Stratum

Stratum	# Sites	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
1	36	179,794	183,445	102.03%	26.13	25.72	98.43%
2	47	755,114	745,520	98.73%	154.44	155.06	100.40%
3	20	801,969	711,466	88.71%	141.14	124.69	88.34%
4	11	799,791	765,364	95.70%	82.48	87.40	105.97%
5	3	478,175	478,174	100.00%	83.55	119.11	142.56%
Total	**117**	**3,014,843**	**2,883,969**	**95.66%**	**487.74**	**511.99**	**104.97%**

13.3.1.3 Small C&I Realization by Contractor

Twenty-five percent of expected savings from 23 projects came from a single trade ally, and 11.5% from a second trade ally who completed 18 projects. Two other lighting-specific trade allies contributed 8.6% and 7.0% percent to expected savings, respectively. Remaining 57 projects (40.8% savings) were completed by a combination of 24 additional trade allies, each contributing between 4.3% and <.01% to the overall expected savings. The results are presented below in Table 13-17.

Table 13-17 Savings by Contractor

Contractor	Count of Projects	Percent of kWh Savings	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate
Lighting Contractor #1	23	25.4%	765,583	739,253	96.6%
HVAC Contractor #2	18	11.5%	348,086	327,716	94.1%
Lighting Contractor #3	13	8.6%	259,022	244,035	94.2%
Lighting Contractor #4	5	7.0%	210,595	196,409	93.3%
Other Contractors (24):	57	47.5%	1,432,050	1,432,050	100.0%

13.3.2 Energy Efficiency Kit Realization

Savings for kits were analyzed separately from the stratified sample of traditional projects. Results are as follows:

Table 13-18 'Office' Kit Realization by Component

Office Measures	Expected kWh	Verified kWh	Realization	Expected kW	Verified kW	Realization
LEDs	284	335	117.8%	0.06	0.07	117.8%
Aerator 1.0	1,338	1,901	142.0%	0.43	0.61	142.0%
Aerator 1.5	390	517	132.6%	0.12	0.17	132.6%
APS	40	38	94.7%	0.00	0.00	N/A
LED 'Exit' signs	159	0	0.0%	0.02	0.00	0.0%
Totals:	**2,212**	**2,792**	**126.2%**	**0.63**	**0.84**	**134.1%**

Table 13-19 'Retail' Kit Realization by Component

Retail Measures	Expected kWh	Verified kWh	Realization	Expected kW	Verified kW	Verified kWh
LEDs	333	221	66.3%	0.09	0.06	66.3%
Aerator 1.0	1,338	1,014	75.8%	0.43	0.32	75.8%
LED 'Exit' signs	216	0	0.0%	0.03	0.00	0.0%
Totals:	**1,888**	**1,235**	**65.4%**	**0.55**	**0.38**	**70.0%**

Table 13-20 'Restaurant' Kit Realization by Component

Restaurant Measures	Expected kWh	Verified kWh	Realization	Expected kW	Verified kW	Verified kWh
LEDs	337	102	30.3%	0.06	0.02	30.3%
Aerator 1.0	743	338	45.5%	0.16	0.07	45.5%
Aerator 1.5	217	132	60.6%	0.05	0.03	60.6%
LED 'Exit' signs	216	0	0.0%	0.03	0.00	0.0%
Totals:	**1,514**	**572**	**37.8%**	**0.30**	**0.12**	**40.1%**

Table 13-21 Overall Kit Realization by Business Type and Water Heating Fuel Mix

Kit Type	Count Distributed	Expected kWh	Verified kWh	kWh RR	Expected kW	Verified kW	kW RR
Office - ER	81	179,172	226,134	126.2%	50.79	68.09	134.1%
Office - gas	53	17,649	19,790	112.1%	2.60	3.54	136.2%
Retail - ER	84	158,575	103,715	65.4%	45.95	32.21	70.1%
Retail - gas	43	23,620	9,490	40.2%	5.12	2.54	49.6%
Restaurant - ER	60	90,822	34,291	37.8%	17.70	7.10	40.1%
Restaurant - gas	38	21,029	3,880	18.5%	3.42	0.69	20.2%
Totals:	**359**	**490,867**	**397,300**	**80.9%**	**125.58**	**114.17**	**90.9%**

Verified savings differs from expected estimates because verified ISRs (Table 13-11 through Table 13-13 above) are lower than those used in ex ante estimations (66% for all measures). Additionally, in expected savings calculations staff used an incorrect change in connected load in 'Office' 'Exit' sign calculations. The Evaluators corrected this, increasing realization slightly.

13.3.3 Online Store Realization

Savings from the Online Store were analyzed separately from the stratified sample of traditional projects and kits. Results are as follows:

Table 13-22 Online Store Purchases Savings by Measure

Measure	Expected kWh	Verified kWh	Realization	Expected kW	Verified kW	Realization
Advanced Power Strips	61	61	100.00%	0.00	0.00	N/A
Low-Flow Sink Aerators - 1.5 GPM or Less	3,380	5,046	149.29%	0.72	1.07	148.61%
Low-Flow Shower Heads	389	146	37.53%	17.29	6.48	37.48%
1-6 Watt LED	13,943	12,237	87.76%	2.48	3.52	141.94%
7-12 Watt LED	13,771	14,568	105.79%	2.46	3.22	130.89%
13-17 Watt LED	16,744	19,670	117.47%	3.02	3.90	129.14%
LED Exit Signs	656	732	111.59%	0.09	0.11	122.22%
Smart Thermostats	21,717	21,990	101.26%	0.00	0.00	N/A
Totals:	**70,661**	**74,450**	**105.36%**	**26.06**	**18.30**	**70.22%**

Table 13-23 Overall Verified Savings

Project Component	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
Traditional Projects	3,014,843	2,883,969	95.66%	487.74	511.98	104.97%
Energy Savings Kits	490,867	397,300	80.94%	125.57	114.16	90.91%
Online Store	70,661	74,450	105.36%	26.06	18.30	70.22%
Total	**3,576,371**	**3,355,719**	**93.83%**	**639.37**	**644.44**	**100.79%**

The overall verified kWh is 3,355,719 and the verified kW reduction is 644.44 kW, 93.83% and 100.79% of their respective expected savings.

13.4 Net Impact Findings

Participant survey responses were used to estimate the net energy impacts for the Small C&I offering. The methodology used is described in detail in Section 2.2.3.

13.4.1 Net Savings Results

Table 13-24 summarizes the verified net kWh savings and peak kW demand reduction.

Table 13-24 Summary of Verified Net kWh Savings and Net Peak kW Reductions

Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
3,355,719	0	3,355,719	100.00%	644.44	0	644.44	100.00%

Overall net kWh savings is 3,355,719 and kW 644.44, 100% of gross savings.

13.5 Process Evaluation Findings

13.5.1 Summary of Offering Participation

Table 13-25 summarizes offering participation by measure type for Small C&I. The offering provides both prescriptive and custom measures, with prescriptive measures incentivized on a per unit basis and custom measures incentivized based on energy savings. As shown below, custom incentive projects accounted for the greatest share of expected savings.

Table 13-25 Offering Activity by Measure Type

Measure Incentive Type	*Measure Type*	*Expected Savings (kWh)*	*Number of Participants*	*$ per kWh in Expected Savings*
Prescriptive	Controls	65,773	41	$0.47
	HVAC	317,881	16	$0.08
	Lighting	1,910,040	96	$0.17
	Lighting and Water Heating	490,867	359	$0.01
	Miscellaneous	61	80	$1,181.25
	Water Heating	3,769	5	$0.02
Custom	Controls	5,549,891	9	$0.15
	Lighting	2,461,455	10	$0.15
	Miscellaneous	7,266,276	40	--

Table 13-26 shows the number of participants and the number of measure types installed at each participant location. As shown, the majority of customers received a single measure type.

Table 13-26 Number of Measure Types Installed at Location

*Number of Measures Installed at Location**	*Number of Participants*
1	368
2	39
3	27
4	14
5	18
6	3
7	7
8	8
10 or more	4
*Locations defined by account numbers	

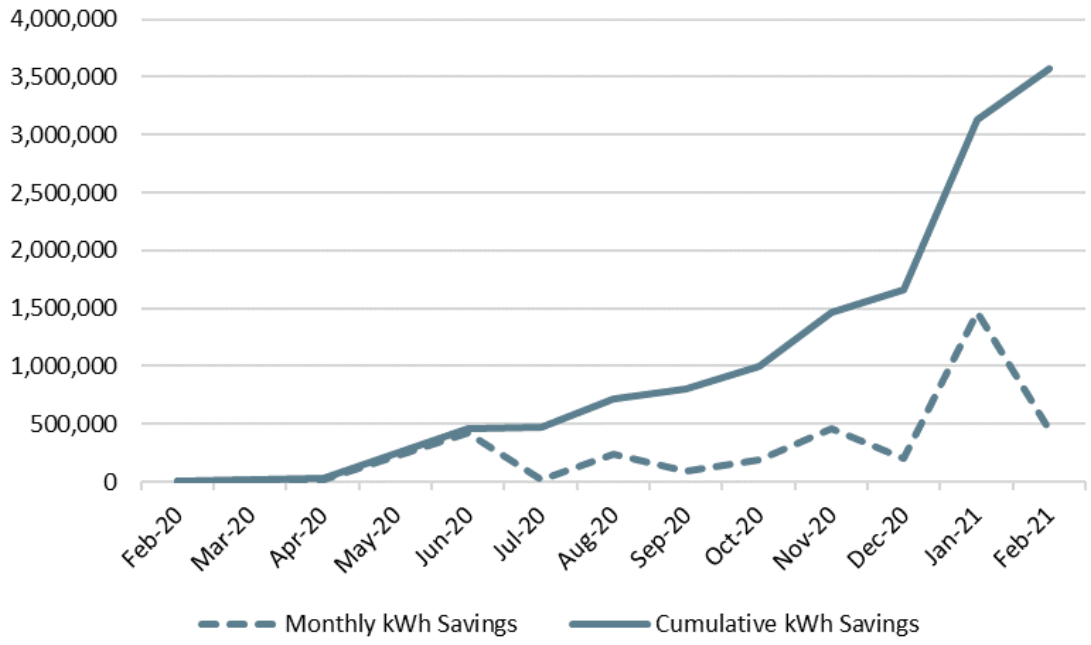
As shown in Table 13-27, thirty-two trade allies completed projects during the program year, although five trade allies accounted for more than half (54%) of expected offering savings.

Table 13-27 Summary of Trade Ally Participation

Trade Ally	Expected Savings (kWh)	Percent of Expected Savings	Number of Participants	Average Project Size (kWh)
Trade ally 1	765,583	21%	23	8,506
Trade ally 2	490,867	14%	360	1,360
Trade ally 3	259,022	7%	13	3,809
Trade ally 4	210,595	6%	5	9,156
Trade ally 5	204,304	6%	12	6,385
Trade ally 6	201,890	6%	1	100,945
Trade ally 7	143,781	4%	6	8,458
Trade ally 8	131,063	4%	6	4,519
Trade ally 9	130,635	4%	3	9,331
Trade ally 10	126,911	4%	5	8,461
All 22 other trade allies	925,890	24%	206	4,495

Figure 13-1 summarizes the monthly and cumulative kWh savings for the Small C&I offering in PY10. As seen, January 2021 accounts for the largest monthly kWh savings for PY10.

Figure 13-1 Monthly and Cumulative kWh Savings



13.5.2 Program Operations – Small Business Energy Efficiency Kits

Small Business Energy Efficiency Kits and the Online Store were new solutions added for small businesses in PY10. For the Online Store, customers can purchase equipment online and incentives are applied as instant discounts. Small business customers can request a kit by filling out an online form to receive the kit. Customers have the option of

selecting a kit that best fits their business type: office, retail, or restaurant. Staff also distributed kits directly to customers through door-to-door canvassing. Table 13-28 summarizes the measures included in each kit option.

Table 13-28 Measure Included in each Kit

Measure	Number in Retail Kit	Number in Office Kit	Number in Restaurant Kit
LED A Lamps	2	2	3
LED exit light retrofits	2	2	2
LED BR30 bulbs	2	N/A	N/A
Bathroom faucet aerator	1	2	2
Kitchen faucet aerator	N/A	1	1
Advanced power strip	N/A	1	N/A

13.5.3 Trade Ally Participant Feedback

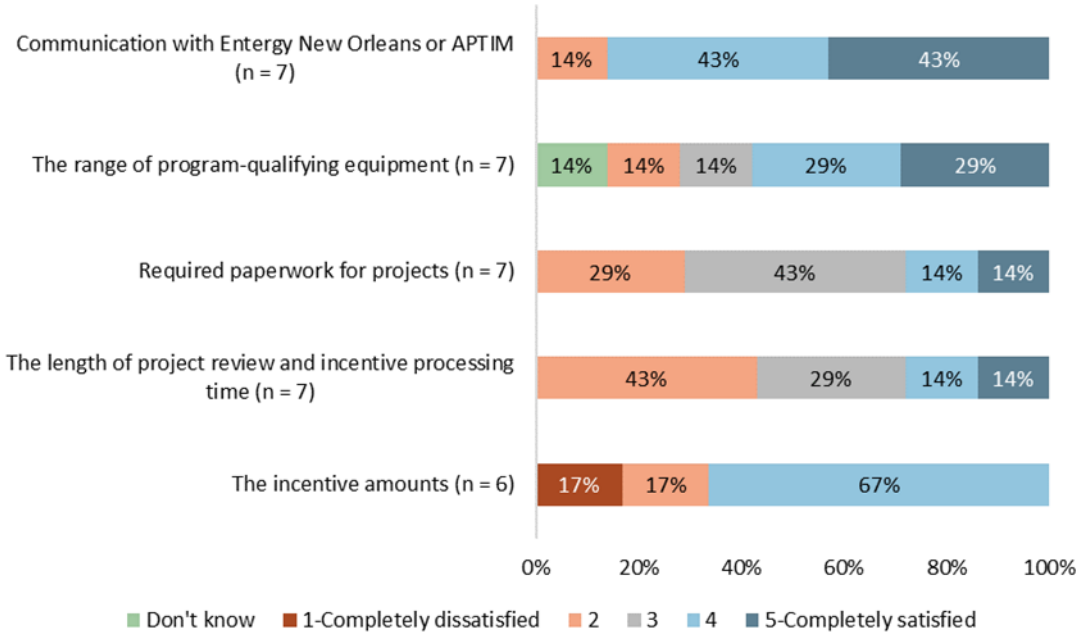
The Evaluators administered an online survey using email invitations to participating commercial trade allies that serve business customers. These trade allies provide services to customers through all of the Energy Smart Program offerings (i.e., Small Commercial Solutions, Commercial New Construction, Large Commercial and Industrial, and Publicly Funded Institutions). The findings presented in this section are broadly applicable to the C&I portfolio. The Evaluators sent a total of 109 survey invitations, of which four were undeliverable, and seven resulted in a completed survey (see Table 13-29).

Table 13-29 Email Campaign and Response Rate

Metric	Number
Initially contacted	109
Undeliverable	4
Completed	7
Total emails sent (including reminders)	302
Response rate	<1%

Trade allies were satisfied with the Energy Smart Commercial Program overall. Six of the seven survey respondents stated they were either somewhat or completely satisfied with the program. Many expressed their satisfaction with communications between program staff (86%), incentive amounts (67%), and the range of program-qualifying equipment. One respondent stated they were not satisfied because they had "very little contact with Entergy." In other words, the lack of consistent communication with program staff contributed to their dissatisfaction.

Figure 13-2 Satisfaction with Aspects of the Program



The trade allies reported that COVID-19 affected them in some way during PY10. Table 13-30 summarizes the extent of the impact. Fifty percent were somewhat or greatly impacted by COVID-19.

Table 13-30 Impact of COVID-19 on Trade Allies

Categories	***Percentage (n = 7)***
1-Not at all impacted	0%
2	17%
3	33%
4	33%
5-Greatly impacted	17%
Don't know	0%

One trade ally shared the problem of labor shortage (e.g., many employees being out because they contracted the virus).

Four of the seven trade allies stated their organization was provided training on operating during the pandemic by program staff. Another trade ally shared:

> *"Mostly[,] I've received emails on [COVID-19] safety procedures. [APTIM] has proceeded with [pre-inspections] being [performed] digitally now with pictures or video chat of what is currently installed. I haven't participated in any ENO Small or Large projects yet. The two projects I've had since [March] were SBDI."*

All the trade allies who completed the survey stated they have participated in Entergy New Orleans's energy efficiency programs in the past. The years of participation range from two to eight among the respondents. Most of the trade allies specialize in a combination of lighting controls (71%), building automation systems (57%), general lighting (57%), or HVAC (43%). The table summarizes the different Energy Smart Program programs the trade allies have participated in this year.

Table 13-31 Offerings that Trade Allies have had Experience With

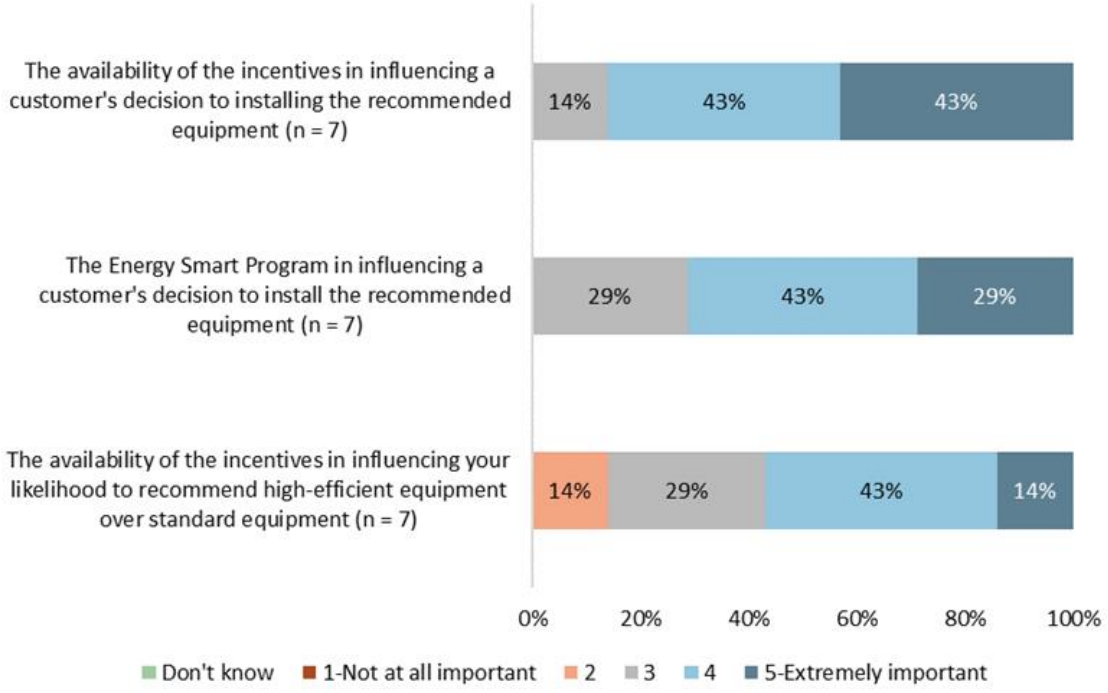
Response	*Percent (n = 7)*
Large Commercial or Industrial	71%
Publicly Funded Institutions (PFI)	43%
Retro-Commissioning	43%
Small Business Solutions	43%
Commercial Real Estate	29%
New Construction	14%

Since April of this year, most trade allies have been able to complete one to two projects. Many of the trade allies expressed that with more projects postponed by their clients, they cannot participate in the Energy Smart Program. At the time of the survey, four of the seven trade allies stated they had at least one pending project.

Most of the trade allies found the training conducted by the program to be useful. Furthermore, the respondents expressed they would like to participate in more virtual trainings (e.g., telephonically or webinars). One trade ally listed specific training topics of interest. Some of these include duct blaster/commercial blower door test, solar, energy efficiency for large buildings, or more on-site "hands-on" training. They also expressed a need to be trained on how to approach and market the program to owners of small businesses. Additionally, one trade ally expressed their interest in participating in a training on how to effectively communicate with marginalized groups and ethnic or minority business owners.

The trade allies are continually promoting incentives to their customers. The seven survey respondents stated they either recommend high-efficiency equipment to customers most of the time (43%) or always (57%) during their sales. The trade allies said they emphasize the return on investments customers will receive if they choose energy efficient over standard equipment. They promote the energy efficiency offerings to their customers by providing program educational material or information on the incentive and how it might help with upfront costs. Additionally, some indicated they tend to stock their inventory with more energy efficient equipment. Most respondents said that the incentive also influenced the promotional process (see Figure 13-3).

Figure 13-3 Factors that Influence Energy Efficient Equipment Purchases



As a result, customers tend to purchase these items often (86%). The trade allies expressed that they were satisfied (57%) with the longer prescriptive list of eligible measures offered in PY10.

The trade allies identified some barriers or obstacles to participation. Although most trade allies are pleased with the offering, they did mention issues regarding the application process. For example, two trade allies stated they had installed qualifying equipment without applying for incentives because the amount of paperwork and process often felt overwhelming. They also stated that by not applying for the incentive, the project's turnaround time is shorter, and they do not have to wait so long for the incentive reimbursement. In these cases, the customers may have been free riders since they apparently did not need the incentives to complete the project. One respondent suggested Entergy New Orleans create an online application process to streamline the process, keep a better track of the status of the project, and improve communication with the trade allies.

13.5.4 Survey Participant Feedback – Small C&I

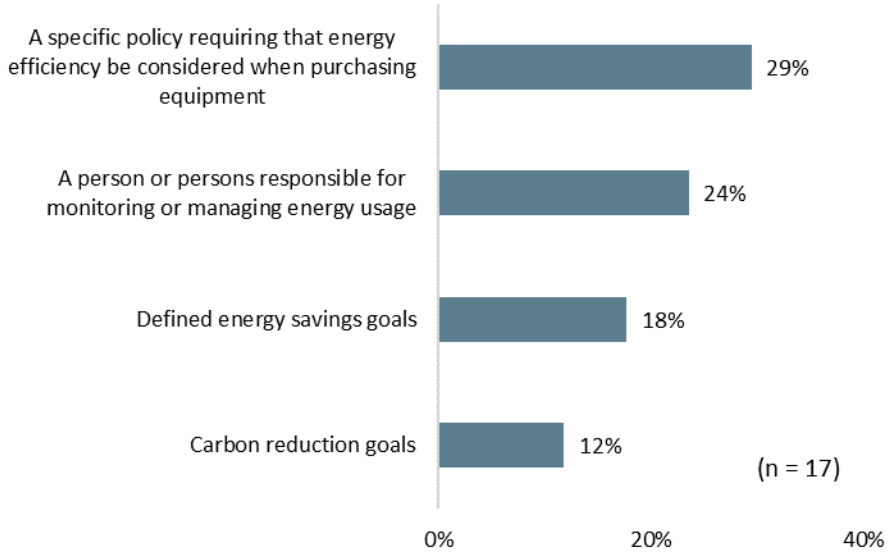
Seventeen small business customers completed a survey for the Small C&I offering. As shown in Table 13-32, the majority of respondents were either the owner or manager of the business, representing 35% and 29% respectively. Among the respondents, 88% reported not completing any other significant energy efficiency projects in the last three years and 65% did not have plans to install the equipment prior to deciding to participate.

Table 13-32 Respondent Position/Role in Company

Response	Percent of Respondents (n = 17)
Proprietor/Owner	35%
Manager	29%
Volunteer	12%
Brewmaster	6%
Partner	6%
Vice president	6%

Figure 13-4 summarizes participants' company policies to support energy efficiency. Less than a third of the respondents reported having each of the policies. Consideration of energy efficiency when purchasing equipment and having a person responsible for managing energy use were the most frequently mentioned policies.

Figure 13-4 Percentage of Companies with Energy Efficiency Policies



13.5.4.1 *How Customers Learned of the Offering*

The most common source of awareness was from a contractor, trade ally, vendor, or energy consultant (36%). Other common sources of awareness included friends or colleagues (14%) or prior program participation (14%) (see Figure 13-5).

Figure 13-5 Source of Program Awareness

13.5.4.2 *Motivations for Participating*

Reducing energy costs was the most common motivation for participating in the offering (71%). Other common responses included replacing old or outdated equipment (29%), reducing energy usage or power outages (29%), and improving the product quality (21%). Table 13-33 below summarizes the responses.

Table 13-33 Reasons for Completing the Project

Response	Percent of Respondents* (n = 14)
To reduce energy costs	71%
To replace old or outdated equipment	29%
To reduce energy use/power outages	29%
To improve the product quality	21%
To get a rebate from the program	14%
To update to the latest technology	14%
To improve equipment performance	7%
To protect the environment	7%

**Responses add to greater than 100% because respondents could select multiple responses.*

13.5.4.3 *Technical Services and Trade Allies*

Program trade allies and representatives are providing varying forms of support to participants. Forty-one percent of respondents indicated they received application assistance. In addition, 35% of respondents received a facility assessment, 29% received calculation assistance, and 18% received some other type of technical assistance from an Energy Smart representative. Among those who received a facility assessment, 73% indicated a commercial project upgrade was recommended.

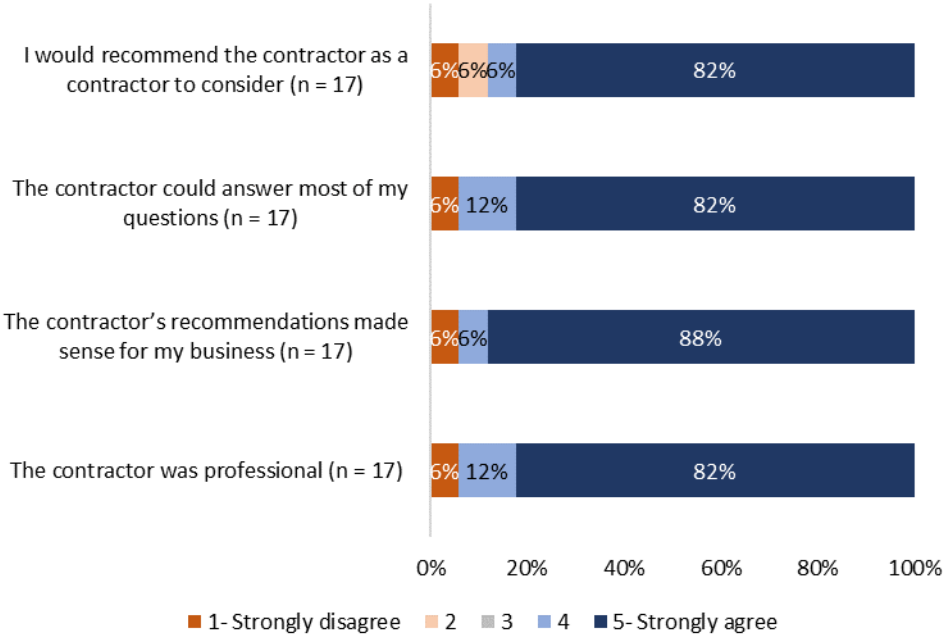
Most SCS customers (88%) reported working with a trade ally through the entire project (e.g., design through installation). As shown in Table 13-34, 35% of respondents reported that a contractor who they had worked with before installed the equipment for their project.

Table 13-34 Who Installed the Qualifying Equipment

Response	Percent of Respondents (n = 17)
A contractor who we have worked with before	35%
A contractor registered with the Energy Smart program	29%
My own staff	24%
A new contractor that someone else recommended	6%
Other	6%

A large majority of respondents (94%) stated it was an easy decision to participate in the Small C&I offering. As shown in Figure 13-6, at least 80% of respondents agreed that the contractor they worked with could answer most questions, made recommendations that made sense for their business, and was professional. Eighty-two percent of respondents indicated they would recommend the contractor to others.

Figure 13-6 Participant Feedback on Trade Allies



All the surveyed Small C&I customers agreed that the overall application process was smooth. Additionally, all survey respondents agreed that the time it took to approve the application was acceptable, the information on how to complete the application was clear, and that providing the required invoices or other supporting documentation was effortless. About half of respondents (53%) agreed that finding forms on the website was easy (47% were unsure), while 53% agreed that using the electronic application worksheets was easy (47% were unsure).

As shown in Table 13-35, more than half of respondents (53%) indicated that project costs were about what they expected, while 24% reported the costs were greater than expected.

Table 13-35 Project Cost Expectations

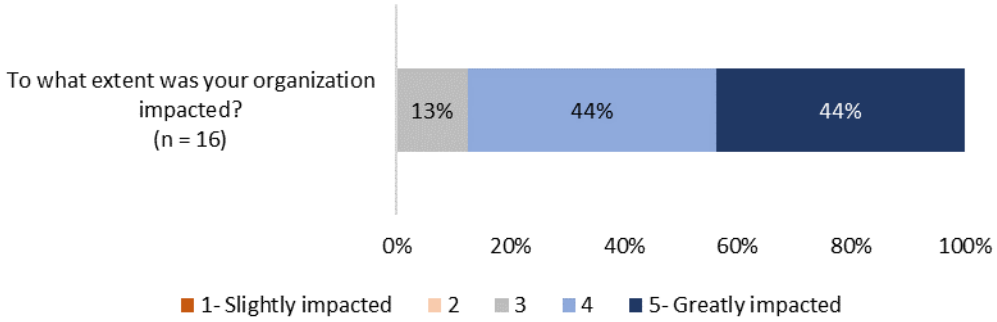
Response	***Percent of Respondents (n = 17)***
It was much less	18%
It was somewhat less	6%
It was what was expected	53%
It was somewhat more	18%
It was much more	6%

13.5.4.4 *COVID-19 Impacts*

A significant proportion (94%) of Small C&I respondents reported being impacted by the COVID-19 pandemic. Among those who reported being affected, 88% were somewhat or greatly impacted (Figure 13-7). Most respondents (71%) stated that the

pandemic has not at all affected their ability to participate in the Energy Smart program. Among those whose ability was impacted, four respondents stated they had projects that were put on hold.

Figure 13-7 Impact of COVID-19 on Small Business Customers



Forty-one percent of respondents indicated that Entergy New Orleans has helped them remain energy efficient during the pandemic and 18% were unsure. Respondents were given an opportunity to share how the pandemic impacted their businesses. All of the comments discussed lower building attendance and negative impacts on sales.

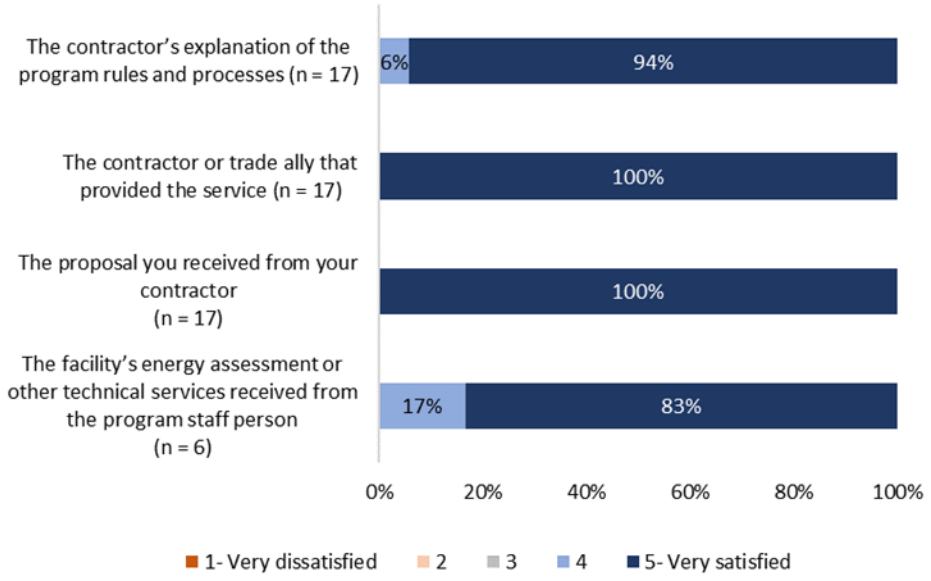
- *Lost congregation attendance.*
- *Negatively, loss of business and loss of employees.*
- *Loss of sales, shutdowns, pivot to different production parameters in the workplace.*
- *Haven't used as much energy due to church being shut down, lack of participation income has dropped [sic].*
- *Employees don't come in and work has been low.*
- *Church had to be closed down, financial ability declined.*
- *Had to close down.*
- *We are a mall so [we] shut down for three months. Lost a chunk of traffic. Lot of stores left.*
- *Shut down and restricted on capacity. Lost business we haven't gain back [sic].*
- *Shut down for 8 weeks. People weren't bringing children. People ordering online.*
- *Sales were impacted.*
- *Less business traffic.*
- *Reduced number of customers. Closures due to quarantine.*

13.5.4.5 *Participant Satisfaction*

All survey respondents were satisfied with the virtual and in-person inspections. Eighty-eight percent of respondents reported that after their project was completed a program representative conducted either a virtual or in-person inspection. Among those respondents, all agreed that the inspector was courteous and efficient.

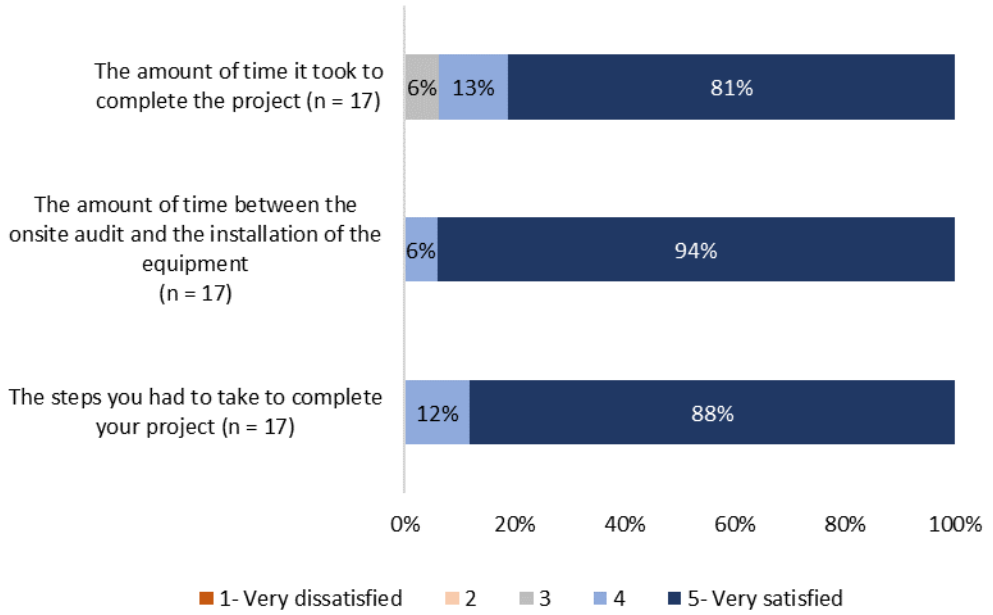
Participants reported positive experiences with the program trade allies. All respondents were satisfied with the contractors' explanation of the program rules and processes, the contractor they worked with, the proposal they received, and the technical assistance they received (Figure 13-8).

Figure 13-8 Participant Satisfaction with Contractors and Technical Assistance



Respondents were satisfied with the project completion process. All survey respondents were very satisfied with the range of equipment that qualified for the program, the equipment that was installed, and the energy efficiency improvements they made at their facility. Additionally, small business customers who participated in the program were satisfied with the amount of time it took to complete the project, the time between the audit and installation, and the steps to complete the project (Figure 13-9).

Figure 13-9 Participant Satisfaction with Completion of the Program Project



All respondents were satisfied with ENO as their electric service provider. Ninety-four percent of those surveyed stated that they were very satisfied with ENO as their electric service provider (Table 13-36).

Table 13-36 Satisfaction with Entergy New Orleans

Response	***Percent of Respondents (n =16)***
5 (Very satisfied)	94%
4	6%
3	0%
2	0%
1 (Very dissatisfied)	0%

The majority of respondents reported that they would recommend the Small C&I offering to others, while one respondent was unsure if they would make a recommendation. Additionally, 47% of respondents agreed that they intend to initiate another energy efficiency improvement in the next 12 months, followed by 41% who were not planning another project in the coming year. Forty-one percent of respondents indicated they are willing to participate in program marketing (e.g., providing quotes about their experiences).

13.5.4.6 *Firmographics*

Participants were asked a series of questions regarding the facility where project work was completed.

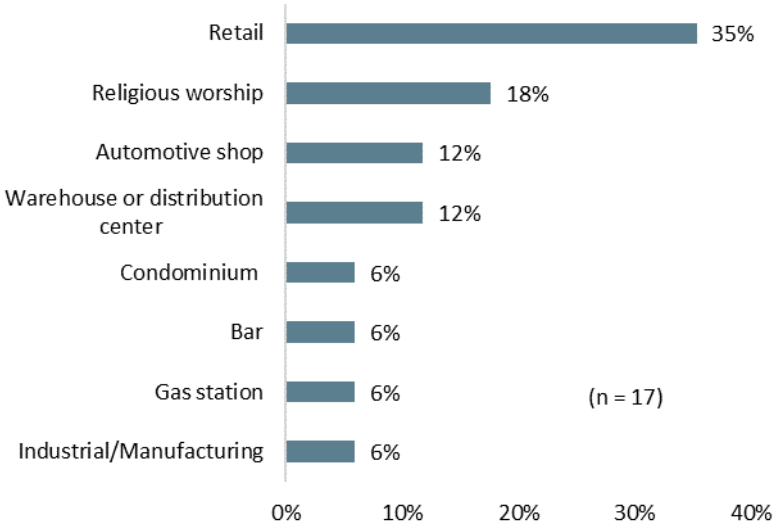
The majority of participants stated that the work that was completed was at the company's only location, and most of them owned the property where work was completed. Sixty-five percent of those surveyed stated that the facility was the company's only location, followed by 35% who indicated the facility was one of several locations owned by their company. Most respondents (76%) stated that they own and occupy the property (Table 13-37).

Table 13-37 Property Ownership

Response	*Percent of Respondents (n = 17)*
Own and occupy	76%
Rent	6%
Own and rent to someone else	6%
Don't know	12%

The majority of businesses were billed directly for electricity use by ENO**.** Eighty-eight percent of those who responded stated that they were billed directly for electricity used at this location and two customers were unsure. As shown in Figure 13-10, retail establishments were the most common facility type, followed by religious worship, automotive shops, and warehouses.

Figure 13-10 Business/Facility Type



13.5.5 Participant Feedback – Small Business Energy Efficiency Kits

The Evaluators conducted a survey to gain insight into customer satisfaction with the Small Business Energy Efficiency Kits offered through the Small C&I offering. Table 13-38 summarizes the number of kits.

Table 13-38 Number of Completed Surveys by Business Kit Type

Metric	Measures in Office Kit	Measures in Retail Kit	Measures in Restaurant Kit
Customers contacted	46	18	37
Survey completions	9	5	5

The following is a summary of participant experience with the kit offering during PY10.

13.5.5.1 *Experience with Energy Smart*

As shown in Table 13-39, most of the respondents had not participated in other Energy Smart offerings before receiving the kits. The small business participants who have engaged in other offerings stated they last participated within the last three years.

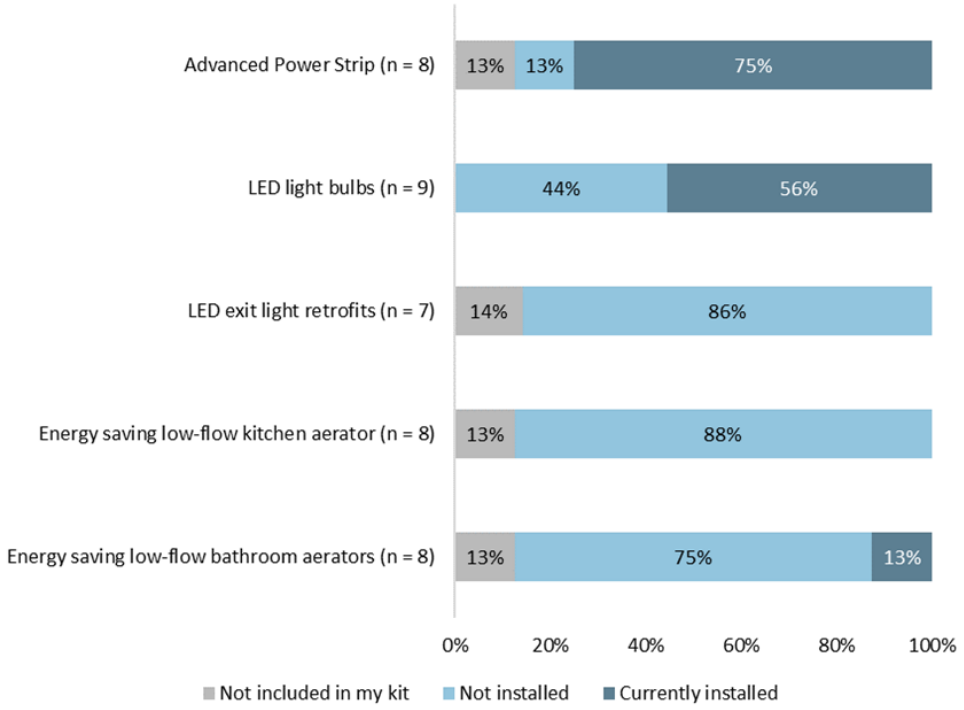
Table 13-39 Prior Participation in Energy Smart Offerings

Response	Percentage of Respondents with Offices (n = 8)	Percentage of Respondents with Retail Stores (n = 5)	Percentage of Respondents with Restaurants (n = 4)
Yes	25%	20%	0%
No	75%	80%	100%

13.5.5.2 Office Kits

The installation rate was highest for advanced power strips and no respondents installed LED faucet aerators or LED exit lamps (Figure 13-11). The top three items currently installed are the advanced power strip (75%), the LED light bulbs (56%), and the energy saving low-flow bathroom aerator (13%).

Figure 13-11 Measure Installation Rates for Office Kits



Most of the respondents who explained why they had not installed the items yet expressed they had not had time to install them (Table 13-40).

Table 13-40 Reasons for Not Installing Items- Office Kit

Responses	***LED light bulbs (n = 4)***	***LED exit light retrofits (n = 5)***	***Energy saving low-flow bathroom aerators (n = 6)***	***Energy saving low-flow kitchen aerators (n = 7)***
Have not had time to install it	25%	60%	50%	43%
Don't know how to install it	0%	20%	0%	0%
Not the right size, model, or style	0%	0%	33%	43%
Using them as a spare	**N/A**	0%	20%	14%
Don't have an exit light	**N/A**	20%	**N/A**	**N/A**
Waiting for bulbs to burn out	75%	**N/A**	**N/A**	**N/A**

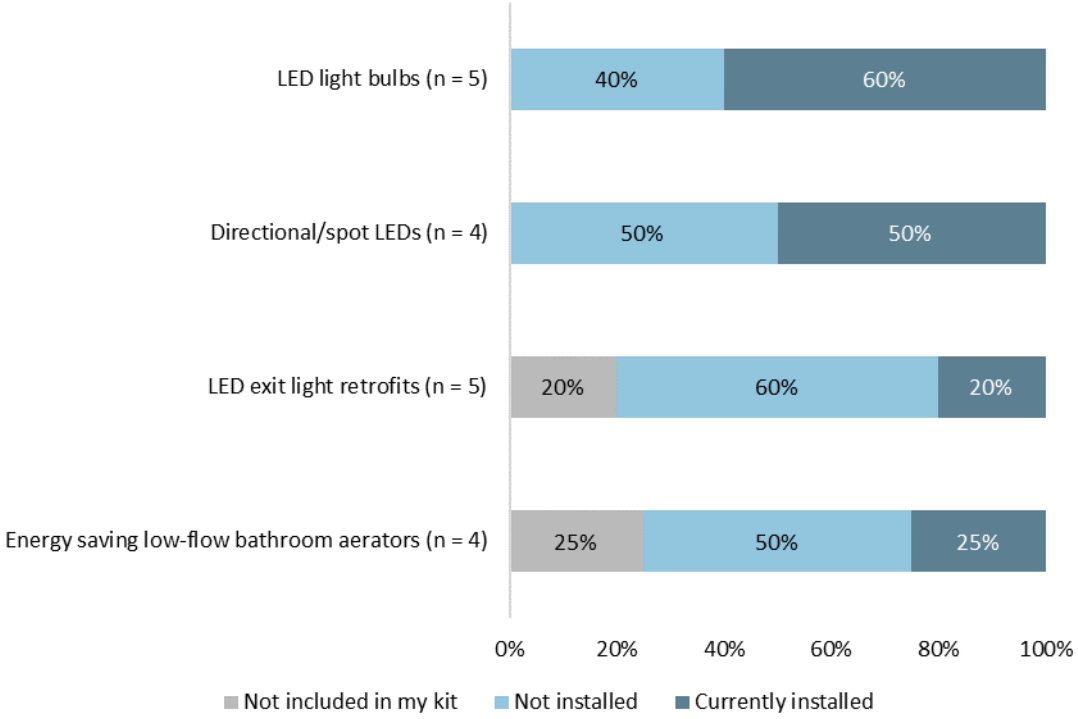
Of the five participants who stated they had installed the LED light bulbs, everyone said they had used both bulbs. The one respondent who installed the low-flow bathroom aerator stated they only installed one of two provided in the kit.

Of the five who installed the advanced power strip, three stated they have a computer plugged into the power strip, and two stated they had other office equipment plugged into the "controlled" outlet. Additionally, three reported they have a computer plugged into the primary outlet, one had other office equipment, and another did not specify the item plugged into the primary outlet.

13.5.5.3 Retail Kits

Most of the retail kit recipients stated they installed at least one of the measures and LED light bulbs had the highest installation rate. Sixty percent of respondents installed LED light bulbs, 50% installed directional/spot LEDs, 25% installed low-flow bathroom aerator, and 20% installed the LED exit light retrofit.

Figure 13-12 Measure Installation Rates for Retail Kits



All the respondents who stated they had not installed the items explained that they had not had time to install them.

13.5.5.4 Restaurant Kits

LED light bulbs and low flow bathroom faucet aerators had the highest installation rates. Customers who received the restaurant kit also varied in the types of measures they installed in their restaurants (Figure 13-13).

Figure 13-13 Measure Installation Rates for Restaurant Kits

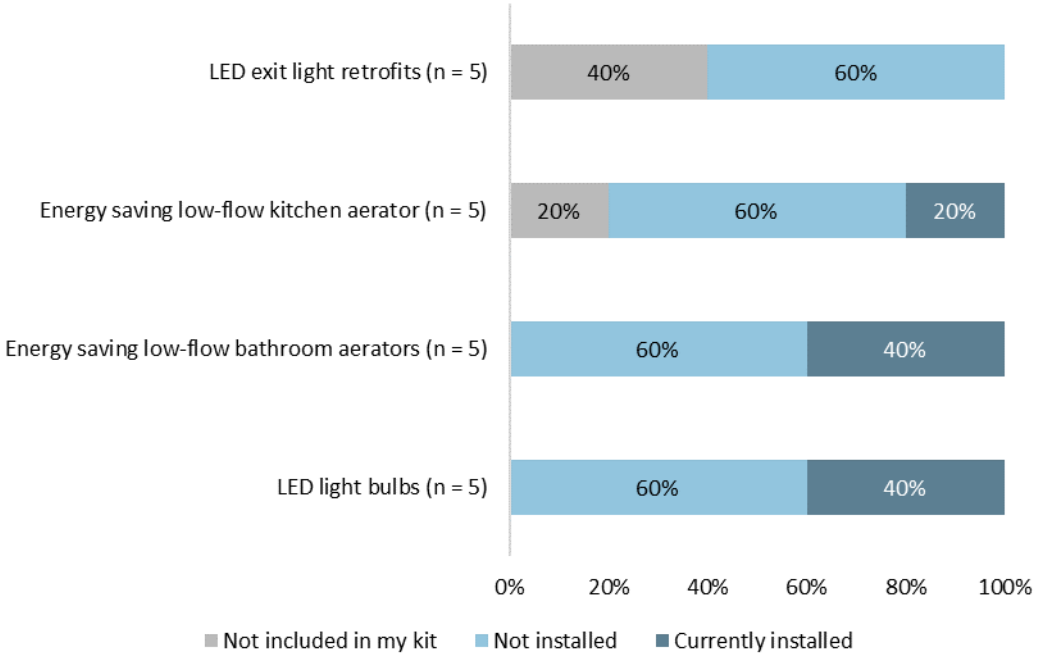


Table 13-41 summarizes the main reasons participants gave for not installing the measures.

Table 13-41 Reasons for Not Installing Items- Restaurant Kits

Responses	***LED light bulbs (n = 3)***	***LED exit light retrofits (n = 3)***	***Energy saving low-flow bathroom aerators (n = 3)***	***Energy saving low-flow kitchen aerators (n = 3)***
Have not had time to install it	33%	33%	0%	0%
Waiting for bulbs to burn out	33%	0%	**NA**	**NA**
Did not find a purpose for measure	33%	67%	33%	33%
Measure did not fit	0%	0%	67%	67%

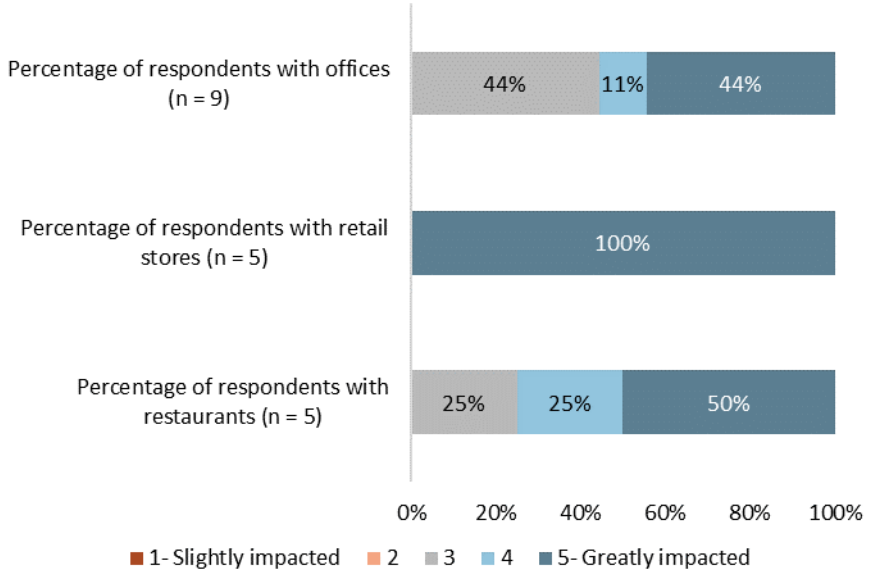
Finally, some of the small businesses offered recommendations on how to improve the kits. Examples of respondent suggestions are provided below:

- *[Delivery] was weird. Someone just threw it over the fence. Could have left a note or notified it was delivered.*
- *We have various size bulbs: back up emergency lights, valance lights, etc. Are there energy efficient bulbs in all sizes?" Is it possible to have our facility assessed by one of your experts to see if we are or if [we] could run this shelter more economically and energy efficiently?*
- *[The] low flow faucets [didn't] fit so maybe just make it more universal.*

13.5.5.5 COVID-19 Impact on Business

The majority of respondents indicated they had been affected by the COVID-19 pandemic. One restaurant owner preferred not to divulge this information, but every respondent with an office, retail store, or restaurant stated they had been affected by the pandemic. Figure 13-14 summarizes the extent of the impact among the respondents.

Figure 13-14 Extent of Impact from the Coronavirus Pandemic



Furthermore, participants shared how the pandemic impacted them. Below are some of their statements:

- *[Office] we are in is the main office. Main Office was [affected.] [One] of contractors died from [COVID-19]. LLC has suffered from [COVID-19]. [Affected] everything.* – Office kit recipient
- *Clients are reluctant to come to my business.* - Office kit recipient
- *[Lost] employees, shut down building, all employees working from home. [Two] employees [are] working in the office. [Lost] contracts and lost money, Lost half of business.* – Retail kit recipient
- *[Business] closure and capacity restrictions.* – Retail kit recipient
- *[Had] to close during quarantine, change menu, take extra precautions, [can't] operate at more than 50% capacity and make several changes.* – Restaurant kit recipient
- *[Weren't] able to have [dine-in] events.* – Restaurant kit recipient

13.5.5.6 Future Participation

As shown in Table 13-42, more than half of respondents stated they do not want to be contacted about future energy efficiency opportunities by the Energy Smart program. In addition, two out of five participants from retail stores indicated they participated in other programs after receiving the kits. One of these retailers participated in a light bulb replacement program while the other participated in a smart thermostat program.

Table 13-42 Interest in Future Energy Efficiency Opportunities

Response	*Percentage of Respondents with Offices (n = 7)*	*Percentage of Respondents with Retail Stores (n = 4)*	*Percentage of Respondents with Restaurants (n = 2)*
Yes	29%	50%	50%
No	71%	50%	50%

13.5.5.7 Firmographics

Electric heating was the most commonly reported fuel type used for heating.

Table 13-43 Main Fuel Type for Heating Building

Response	Percentage of Respondents with Offices (n = 7)	Percentage of Respondents with Retail Stores (n = 4)	Percentage of Respondents with Restaurants (n = 2)
Electric	43%	50%	100%
Gas	29%	25%	0%
I don't know	14%	25%	0%
Prefer not to answer	14%	0%	0%

13.6 Key Findings and Conclusions

The key findings and conclusions of the evaluation of the offering are as follows:

- **The offering did not meet it's goal.** In PY10 the offering had a savings goal of 6,971,994 kWh and a 1,397.02target kW reduction. The program achieved 3,355,719 kWh in verified kWh, 48.13% of goal, and was 752.58 kW below the kW reduction target.
- **Contractors/trade allies were important drivers of program awareness.** Thirty-six percent of respondents reported learning of the program from program contractors or trade allies.
- **Program trade allies and representatives are providing multiple forms of support to participants to help them complete projects.** Forty-one percent of respondents indicated they received application assistance. In addition, 35% of respondents received a facility assessment, 29% received calculation assistance, and 18% received some other type of technical assistance from an Energy Smart representative.

- **Reducing energy costs was the main motivation for participating in the offering**. Seventy-one percent of respondents stated that they participated in the offering to reduce their energy cost, and 29% of respondents stated that they participated to replace old or outdated equipment. Other common motivators were to improve equipment to reduce energy use/power outages, to improve the product quality, and to get a rebate.
- **Most small business customers surveyed said COVID-19 impacted their business, but only a minority said it impacted their program participation.** Ninety-four percent of respondents said their business was impacted by COVID-19. Most respondents also stated that the pandemic did not affect their ability to participate in the Energy Smart program, but we note that this is the perspective of customers who did participate in the program. There may large numbers of customers who did not participate because of COVID-19. Among those who said their participation was impacted by COVID-19, two respondents stated they had to put the project on hold for a month and one other stated time constraints resulting from COVID-19.
- **All survey respondents were very satisfied with the Energy Smart Small C&I offering.** All survey respondents were satisfied with the contractors' explanation of the offering rules and processes, the contractor they worked with, the proposal they received, and the technical assistance they received. Most respondents agreed that they would recommend the Energy Smart Program to others and one respondent was unsure.
- **Less than half of kit measures have been installed**. The top three items currently installed by recipients who received office kits were the advanced power strip, the LED light bulbs, and the energy saving low-flow bathroom aerator. The top measures installed from the retail kit were LED light bulbs, directional/spot LEDs, low-flow bathroom aerator, and the LED exit light retrofit. Customers who received the restaurant kit stated they installed the bathroom or kitchen aerators and the LED light bulbs. The most common reason respondents gave for not installing the measures was they had not had enough time to install them.
- **Most of the kit recipient respondents had not participated in other Energy Smart offerings before receiving the kits.** The kits may be a useful tool for engaging customers in the Energy Smart program, but participation in the program by kit recipients should be monitored to see if there is evidence that the kits are driving program participation.

The following summarizes the main findings from the survey of trade allies. Because these respondents participated in multiple Energy Smart offerings, the findings are applicable to Small C&I, Large C&I, C&I NC, and PFI.

- **Trade allies were satisfied with the Energy Smart C&I Portfolio overall.** Six of the seven survey respondents stated they were either somewhat or completely satisfied with the program. Many expressed their satisfaction with communication with program staff, incentive amounts, and the range of program-qualifying equipment.
- **The trade allies identified some barriers or obstacles to program participation**. Although most trade allies are pleased with the program, they did mention issues regarding the application process. For example, two trade allies stated they had installed qualifying equipment without applying for program incentives because the amount of paperwork and the process can be overwhelming. They also stated that by not applying for the incentive, the project's turnaround time is shorter, and they do not have to wait so long for the reimbursement from Entergy New Orleans. One respondent suggested Entergy New Orleans create an online application process to streamline the process, keep a better track of the status of the project, and improve communication with the trade allies.
- **Most of the trade allies found the training conducted by the program to be useful.** Furthermore, the respondents expressed they would like to participate in more virtual trainings (e.g., telephonically or webinars). One trade ally listed specific training topics of interest. Some of these include duct blaster/commercial blower door test, solar, energy efficiency for large buildings, or more on-site "hands-on" training. They also expressed a need to train on how to approach and market the offerings to owners of small businesses. Additionally, one trade ally expressed their interest in participating in a training on how to effectively communicate with marginalized groups and ethnic or minority business owners.
- **The trade allies are continually promoting incentives to their customers.** The seven survey respondents stated they either recommend high-efficiency equipment to customers most of the time or always during their sales. The trade allies indicated they emphasize the return on investments customers will receive if they choose energy efficient over standard equipment. They promote the energy efficiency offerings to their customers by program educational material or providing them with information on the incentive and how it might help with upfront costs. Most respondents said that the incentive also influenced the promotional process.
- **The trade allies reported that COVID-19 affected them in varying ways during PY10**. Seventeen percent indicated they were greatly impacted by COVID-19 and 33% indicating they were somewhat impacted. The public health restrictions

implemented in the region affected the trade allies' operations and many projects were postponed to 2021 or delayed. One trade ally shared the problem of labor shortage (e.g., many employees being out because they contracted the virus). Many of the trade allies expressed that with more projects postponed by their clients, they cannot participate in the Energy Smart Program. At the time of the survey, four of the seven trade allies stated they had at least one pending project.

13.7 Recommendations

The Evaluators' recommendations are as follows:

- **Monitor kit measure in-service rates.** In-service rates were low for certain measures (e.g., 1 of 13 respondents installed the LED exit signs). Not having enough time to install the measures was the most common reason customers gave for not having installed the measures. However, other reasons given included not understanding how to install the measure and not having a purpose for the measure. These responses suggest there may be barriers other than time to installing some measures. If low install rates persist for certain measures, the program should consider removing them from the kit or consider allowing customers to customize the kit measures to their needs (beyond the market segment-based customization).
- **Monitor program participation among kit recipients.** Future program participation among kit recipients should be monitored as a performance metric.
- **Continue to offer Small Business Energy Saving Kits .** In addition to providing the energy savings resulting from the measures, the kits also provide information about other offerings and survey results suggest that the kits largely reached businesses that had not participated in the program in the past three years. This benefit adds value beyond the energy savings resulting from the kits.
- **Explore more virtual, online training opportunities for trade allies.** A trade ally suggestion was to offer more online trainings and webinars. Although the ENO service territory is relatively small in terms of geographic size, online options may offer convenience that increases attendance and provides a way to further engage contractors. Furthermore, online trainings could present the opportunity to develop an online knowledge bank with information on program processes, as well as energy efficiency education. Trade allies also suggested technical topics like blower door testing, efficiency in large buildings, as well as topics related to reaching diverse business owners (such as ethnic minorities) in the region.

14 Commercial & Industrial Construction Solutions

14.1 Program Description

Commercial & Industrial Construction Solutions (C&I NC) is a new offering that is intended to encourage customers to design and construct higher efficiency facilities than required by building codes or planned designs. This offering is available to ground-up construction, additions or expansions, building repurposing and commercial building restorations. The C&I NC offering provides incentives for design assistance, prescriptive measures, interior and exterior lighting and custom upgrades tailored to the customer's building operations.

The incentives provided are summarized below in Table 14-1.

Table 14-1 C&I NC Summary of Offering Incentives

Type	***Incentive***
Prescriptive	Predefined amounts based on units installed.
Lighting	$0.35 per watt below approved baseline wattage.
Custom	$0.08 per kWh reduced for qualifying measures.
Whole building incentives	Tier 1: <20% energy savings: $0.02/kWh Tier 2: 20-30% energy savings: $0.03/kWh Tier 3: >30% energy savings: $0.04/kWh

14.1.1 Program Activity

Data provided by staff showed that during PY10, there were two projects completed. These projects were expected to provide a combined savings of 281,137 kWh and 64.58 kW. Count of projects and expected kWh and kW savings for the C&I NC offering are summarized in Table 14-2.

Table 14-2 Summary of Expected Savings

Count of Projects[44]	***Expected kWh Savings***	***Expected kW Savings***
2	281,137	64.58

[44] Independent projects, which contain all project components associate with said project.

Table 14-3 Savings Expectations by Project Component

Project Component	Count of Project Components[45]	Expected kWh Savings	Expected kW Savings
Prescriptive	2	281,137	64.58
Custom	0	0	0.00
Total	**2**	**281,137**	**64.58**

The offering is designed to encourage long-term market transformation within the commercial new construction sector. These projects have long timelines and require early intervention if the program is to influence decision-making. As such, it was not expected in the first year of program launch that the C&I NC offering would have high participation levels. Early activities within the offering have been focused on outreach to the commercial building sector to scope projects for future program years.

Table 14-4 Savings Expectations by Measure Category

Project Component	Count of Project Components	Expected kWh Savings	Expected kW Savings	Percent Savings (kWh)
Lighting	4	258,517	56.18	92.0%
HVAC	1	22,620	8.40	8.1%
Total	**5**	**281,137**	**64.58**	**100.0%**

14.1.2 Goal Achievement

Table 14-5 C&I NC Savings Goals

kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Target	Verified kW Reduction	Difference in kW
230,403	279,621	121.36%	44.53	64.58	20.05

C&I NC met 121.36% of the PY10 kWh savings goal and was 20.05 kW above the kW target.

14.2 M&V Methodology

Evaluation of the C&I NC offering entailed the following: desk reviews of a census of projects.

Energy savings was estimated using proven techniques, including engineering calculations using industry standards to determine energy savings. Methods for

[45] Many projects contain multiple components within the same project number. These numbers represent the total number of components.

evaluating lighting measures are described in the Small Commercial & Industrial Solutions Chapter, section 12.2 M&V Methodology.

14.2.1 C&I NC Offering Sample Design

Though traditionally an offering such as the C&I NC offering would require stratified random sampling (as seen with the Large C&I Solutions offering), due to the small number of participants, a census of projects was evaluated in the 2020 program year.

14.3 Gross Impact Findings

14.3.1 Site- and Program-Level Realization

Desk reviews of documentation for all sites chosen within each stratum were performed: All project documentation, calculations, invoices, photos, were carefully examined to verify the installation and operation of equipment. Where there was uncertainty regarding the project or measures, the Evaluators contacted the implementation staff or site contacts for clarification. This information was then used to verify savings or make adjustments to ex ante estimates based on findings. Table 14-6 presents realization at the stratum level.

Table 14-6 Summary of kWh Savings for C&I NC Offering

Project	*Expected kWh Savings*	*Verified kWh Savings*	*Realization Rate*
1	194,979	193,987	99.5%
2	86,158	85,634	99.4%
Total	281,137	279,621	99.5%

14.4 Net Impact Findings

Due to the offering being new in PY10 and having smaller participation in the first year, net savings analysis was not completed in 2020. This will be completed when the program has sufficient participants to support a survey effort. The program was assigned a 100% NTG ration for PY10 and verified gross impacts equal net impacts.

14.5 Process Evaluation Findings

14.5.1 Summary of Offering Participation

Table 14-7 summarizes offering savings by measure type for the C&I NC offering. Both projects for the C&I NC offering were limited to prescriptive measures (see Table 14-7).

Table 14-7 Program Activity by Measure Type (New Construction)

Measure Incentive Type	*Measure Type*	*Expected Savings (kWh)*	*Number of Participants*	*$ per kWh in Expected Savings*
Prescriptive	HVAC	22,620	1	$0.12
	Lighting	258,517	2	$0.08

14.5.2 Program Operations

This section describes the C&I Construction Solutions offering operations and design. The information presented was informed by a review of program documents and an interview with staff's senior energy engineer who is responsible for general oversight of C&I NC projects. Some of the oversight includes reviewing the scope of work, building designs, and the project approval process. The C&I NC offering was an addition to the Commercial and Industrial Portfolio in PY10.

14.5.2.1 *Offering Design and Process*

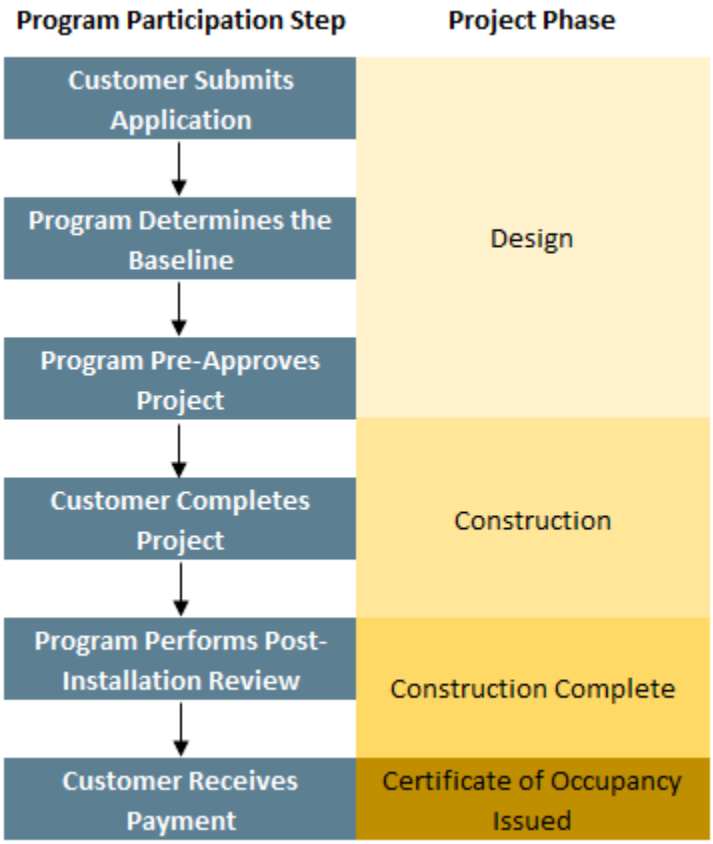
The offering provides a variety of incentive structures to meet the specific needs of the customer and project, as all new construction projects are unique. C&I NC offers prescriptive (incentives based on per unit of equipment installed), interior and exterior lighting (incentives based on lighting power density), custom (incentives calculated based on measure savings), and whole-building performance incentive (incentives based on whole-building energy savings) options. The prescriptive option gives customers several pre-selected measures (e.g., HVAC, refrigeration and commercial kitchen equipment) for more typical building designs. Interior and exterior lighting incentives provide incentives for reducing the building's lighting power density relative to the maximum wattage allowed by code. Customers can also pursue incentives for custom equipment upgrades (e.g. HVAC controls and building envelope). The whole-building performance option is for more complex new construction projects that have particular and unique needs that would be served well by building energy modeling. The whole-building option has a bonus incentive structure that tiers the incentive rate based on the overall energy savings achieved in the building as a whole relative to the design baseline.

Project baselines are based on one of the following:

- Local energy or building code at the time the project is initiated;
- For state-owned buildings, the baseline is 30% lower consumption than required by Louisiana building code at the time the project is initiated; and
- Current design if building design is complete at the time of project initiation.

The basic project process is summarized in Figure 14-1.

Figure 14-1 Participation Process and Project Phase



An issue raised by staff is the challenge of balancing a quality review of projects with completing the review quickly to not delay the project. Staff focuses on building relationships with the customers and contractors to increase participation while meeting all the building's needs.

14.5.2.2 *Outreach and Marketing*

Participation is mainly driven by direct outreach. The staff's experience is that direct contact with architectural firms, engineering firms, developers and general contractors has been the best method of recruitment. Staff has also trained the Entergy New Orleans Customers Service Managers and VP of Customer Service to share information about the offering. Other direct contacts included speaking with architects, speaking at the AIA 2030 Symposium, and generating leads through word-of-mouth.

The program has used a variety of marketing strategies to increase awareness of the offering. Staff developed a landing page for the C&I New Construction Solutions offering for the Energy Smart website. The website has links to a guidelines document and an energy savings calculator that are specific to the offering.

A press release was published on the Entergy New Orleans Newsroom Run. Staff also ran digital and print advertisements in the City Business Journal in June. Leads were also generated from an article written about a renovation on an old Holiday Inn in New Orleans East published in the New Orleans Business Journal.

Staff expects to continue to engage with more customers and contractors to build the pipeline of projects year over year. Staff noted that they are willing to adapt to their contractors' specific needs, especially those with larger, more complex building designs. They also hope to create effective relationships with trade allies who will be essential in streamlining participation processes.

14.5.2.3 *First Year Performance and COVID-19 Impacts*

The offering exceeded its savings goals for PY10. Staff stated the offering completed two projects and paid $23,762 in incentives during PY10. The offering exceeded its first-year energy savings goal (230,403 kWh). Overall, the offering had a short first year, as PY10 was only a nine-month long program year, and new construction projects take time to develop and then complete. However, staff reported that there was a great deal of interest in the offering and they expect to see increased participation in PY11 and beyond.

The pandemic had an impact on the offering, primarily on the quality assurance and control processes. Staff reported that they could not perform in-person post-completion audits to verify that the installations matched the submitted plans. Instead, the program collected photographs and other details to check the details of the installation.

14.5.2.4 *Program Database*

New construction projects are tracked in the existing program tracking system. The system was modified to improve the identification of new construction projects through the reporting system. Staff said all other data gathered for C&I NC projects was similar to the information collected for all other C&I offerings.

14.6 Key Findings and Conclusions

- **Participation was limited to two prescriptive and lighting projects.** New construction projects take time to develop and complete and the projects completed met the programs first year target, despite a short program year and potential challenges from the COVID-19 pandemic. Both projects contained prescriptive and lighting measures.
- **The individual outreach approach is appropriate for a new construction program.** Staff reported that outreach is focused on direct engagement with general contractors, engineers, developers and architects. Interfacing with these types of market actors is valuable for increasing awareness of the offering during the building design phase.

14.7 Recommendations

The Evaluator's recommendations are summarized below:

- **Continue maintaining a presence in the building design community.** Keeping contact with design professionals will help maintain awareness of the offering as new projects arise.
- **Future evaluations should consider interviews with design professionals, general contractors, and program participants to explore potential barriers to whole-building incentive projects.** Whole-building incentive projects have the potential to encourage deeper energy savings. Future evaluations should explore completion of interviews with these market actors to identify any barriers to whole-building incentives that the program may be able to address.

15 Large Commercial and Industrial Solutions

15.1 Program Description

Large Commercial & Industrial Solutions (Large C&I) provides financial incentives and technical services to encourage non-residential customers with greater than 100 kW average monthly peak demand to implement energy-saving measures. The Large C&I offering is designed to help this customer segment overcome barriers to energy improvement, such as higher first-cost of efficiency equipment and a lack of technical knowledge or resources.

The incentives provided are summarized below in Table 15-1.

Table 15-1 Large C&I Summary of Offering Incentives

Measure	***Incentive***
Prescriptive	Various based on $ per unit
Custom Lighting	$0.10 per kWh Saved
Custom Non-Lighting	$0.12 per kWh Saved
Retro-commissioning	$0.04-$0.07/kWh Saved

15.1.1 Program Changes

A 25% bonus incentive for prescriptive measures installed by trade allies was provided during PY10. In PY10, many measures that were previously offered as custom were transitioned to the prescriptive application process. The bonus was offered directly to trade allies to support this transition during PY10.

To help customers, implement projects that may have been put on hold due to the COVID-19 pandemic, a customer incentive bonus was created which increased custom and prescriptive rates by 25%. Projects with applications received on or after August 24, 2020 and installed by December 31, 2020 were eligible for the bonus incentives.

15.1.2 Program Activity

Data provided by staff showed that during PY10, there were 91 projects. These projects were expected to provide a combined savings of 19,571,940 kWh and 1,842.50 kW. Count of projects and expected kWh and kW savings for the Large C&I offering are summarized in Figure 15-2.

Table 15-2 Expected Savings Summary

Count of Projects[1]	***Expected kWh Savings***	***Expected kW Savings***
91	19,571,940	1,842.50

Table 15-3 Savings Expectations by Project Component

Project Component	Count of Project Components[1]	Expected kWh Savings	Expected kW Savings
Prescriptive	143	3,888,371	615.18
Custom	228	15,683,569	1,227.32
Total	**371**	**19,571,940**	**1,842.50**

Table 15-4 summarizes expected savings by measure category. Lighting and lighting controls combined to account for 78% of PY10 expected kWh savings.

Table 15-4 Expected Savings by Measure Category

Project Component	Count of Project Components	Expected kWh Savings	Expected kW Savings	Percent Savings (kWh)
Lighting	302	10,795,437	1,441.32	55.16%
Refrigeration	2	75,576	8.65	0.39%
HVAC	16	2,655,007	315.21	13.57%
Controls - Lighting	16	4,412,311	20.86	22.54%
Controls – Non-Lighting	2	1,225,803	3.54	6.26%
Motors	1	107,366	4.03	0.55%
Miscellaneous	31	66,748	44.68	0.34%
Cooking	1	1,858	0.36	0.01%
Process	2	231,833	3.86	1.18%
Total	**371**	**19,571,940**	**1,842.50**	**100.00%**

Table 15-5 Savings Expectations by Measure Type

Project Component	Project Component	Count of Projects	Expected kWh Savings	Expected kW Savings	Percent Savings (kWh)
Lighting	Non-Linear LED Fixture	102	4,292,460	602.68	21.93%
	Linear LED Fixture	161	6,800,842	772.92	34.75%
	LED A-Type	61	4,328,544	249.56	22.12%
	LED Exit Sign	4	151,446	37.49	0.77%
HVAC	Chiller	6	181,222	22.20	0.93%
	Cooling Tower	4	131,876	19.27	0.67%
	Packaged / Rooftop Unit	2	2,898	0.41	0.01%
	Optimization	7	1,272,139	9.45	6.50%
Controls	Occupancy Sensors	14	4,412,311	20.86	22.54%
	HVAC Optimization	2	1,225,803	3.54	6.26%
Motors	Pumps and Fan Motors	2	40,657	4.93	0.21%
Miscellaneous	Combined EEMs	1	23,995	4.13	0.12%
Refrigeration	ECMs	3	51,979	7.90	0.27%
Total		**371**	**19,571,940**	**1,842.50**	**100%**

Figure 15-6 summarizes performance of the Large C&I offering by program year. PY9 ran for 15 months so for this comparison, it has been normalized to a 12-month program year.

Table 15-6 Large C&I Offering Participation Summary Comparison

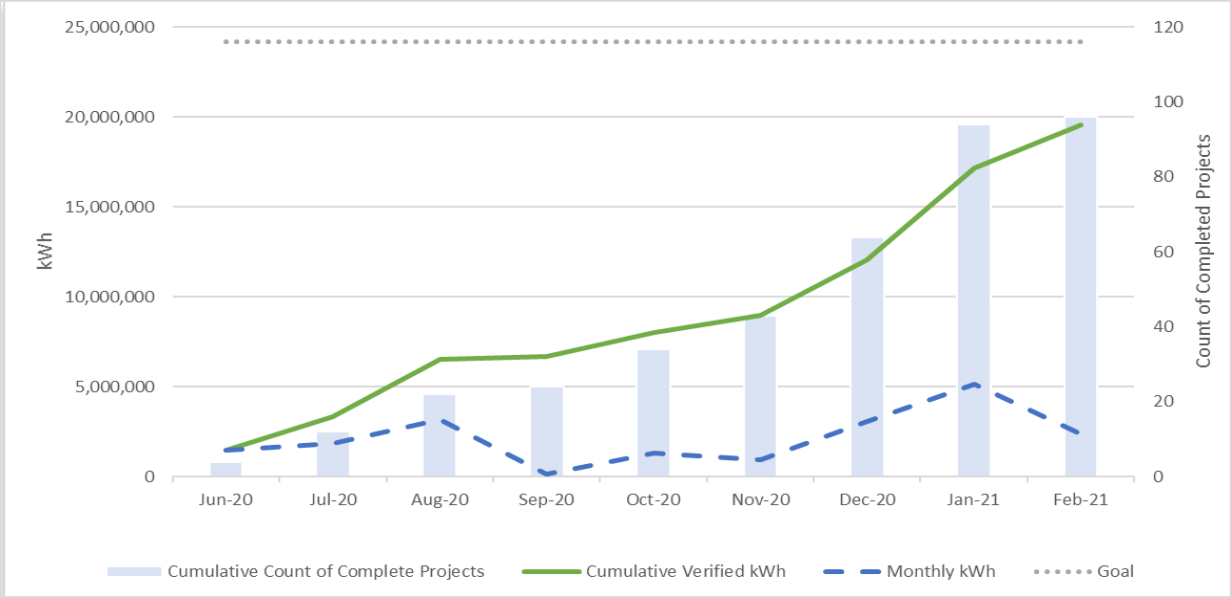
Project Year	# Projects	Expected kWh	kWh per Project	% kWh Non-Lighting
PY5	46	9,807,855	213,214	35.60%
PY6	41[1]	12,282,310	299,569	16.80%
PY7 (nominal)	42	9,829,550	234,037	34.00%
PY7 (normalized)	56	13,106,067	234,037	34.00%
PY8	135	19,377,054	143,534	31.74%
PY9 (total)	128	27,247,005	212,867	29.88%
PY9 (calendar)	83	17,078,303	205,763	47.67%
PY10	91	19,571,940	215,076	19.16%

In a direct comparison of PY9 and PY10:

When compared to a calendar-year normalized PY9, PY10's comparative performance is as follows:

- Expected kWh savings have increased by 14.6%;
- Expected kW program reductions[46] have increased by 1.2%; and
- Per-project savings has increased from an average of 205,763 to 215,076 kWh and 16.29 to 20.25 kW, representing 4.3% and 19.6% percentage changes, respectively.

Table 15-7 Overall Offering Performance by Month



15.1.3 Goal Achievement

Table 15-8 Large C&I PY10 Savings Goals

kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Target	Verified kW Reductions	Difference in kW
24,180,632	18,903,086	78.17%	3,245.61	1,842.50	-1,403.11

Large C&I did not reach its kWh savings goal in for PY10. The program met 78.17% of its kWh goal and is 1,403.11 kW below the kW target.

[46] Not shown.

15.2 M&V Methodology

Evaluation of the Large C&I offering requires the following:

- Stratified Random Sampling (as detailed in section (as detailed in section 2.2.1.3 Stratified Sampling) and by selecting large saving sites with certainty.
- On-site verification for two projects, desk reviews of all 16 sampled; and
- Interviewing of program participants and trade allies.

The on-site inspections were used to verify installations and to determine any changes to the operating parameters since the measures were first installed. Energy savings was estimated using proven techniques, including engineering calculations using industry standards to determine energy savings. Methods for evaluating lighting measures are described in the Small Commercial & Industrial Solutions Chapter, section 12.2 M&V Methodology.

15.2.1 Large C&I Offering Sample Design

Sampling for evaluation of ENO Large C&I offering was developed using the Stratified Random Sampling procedure detailed in section 12.2.1.3 Stratified Sampling. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than simple random sampling would require by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results.

The participant population was divided into five strata. Table 15-9 summarizes the strata boundaries and sample frames for the program and Table 15-10 summarizes expected savings of both the sample and population. The achieved sampling precision was ±8.51% at 90% confidence.

Table 15-9 Large C&I Offering Sample Design (Pooled)

	Stratum 1	***Stratum 2***	***Stratum 3***	***Stratum 4***	***Stratum 5***	***Totals***
Strata boundaries (kWh)	< 120,000	120,001 - 250,000	250,001 - 350,000	350,001 - 600,000	> 600,001	
Number of projects	42	24	10	10	5	91
Total kWh savings	2,363,991	4,370,811	3,052,260	4,072,181	5,712,697	19,571,940
Average	56,286	182,117	305,226	407,218	1,142,539	215,076
Standard deviation	32,701	39,591	30,220	28,512	601,383	286,611
Coefficient of variation	0.581	0.217	0.099	0.121	0.53	1.333
Final design sample	3	3	2	3	5	14

Table 15-10 Expected Savings for Sampled and Non-Sampled Projects by Stratum

Stratum	Sample Expected Savings	Total Expected Savings	% Savings in M&V Sample
1	121,824	2,363,991	5.15%
2	447,837	4,370,811	10.25%
3	655,103	3,052,260	21.46%
4	1,275,409	4,072,181	31.32%
5	5,712,697	5,712,697	100.00%
Total	**8,212,869**	**19,571,940**	**41.96%**

15.3 Gross Impact Findings

15.3.1 Large C&I Site-Level Realization

Desk reviews of documentation for all sites chosen within each stratum were performed: All project documentation, calculations, invoices, photos, were carefully examined to verify the installation and operation of equipment. In addition, the Evaluators visited two sites to verify installation and operation of measures and collect data. Where there was uncertainly, the Evaluators contacted staff or site contacts for clarification. This information was then used to verify savings or adjust ex ante estimates based on findings. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 15-11 presents realization at the stratum level.

Table 15-11 Summary of kWh Savings for Large C&I Offering by Sample Stratum

Stratum	Sample Expected kWh Savings	Sample Verified kWh Savings	Realization Rate
1	121,824	127,195	104.41%
2	447,837	367,562	82.07%
3	655,103	651,097	99.39%
4	1,275,409	1,285,409	100.78%
5	**5,712,697**	**5,709,812**	**99.95%**

Table 15-12 shows the expected and verified energy savings for the offering by project.

Table 15-12 Expected and Verified Savings by Sampled Project

Project ID(s)	Facility Type	Expected kWh Savings	Verified kWh Savings	Realization Rate
CIP_104	Large Office	16,514	13,946	84.45%
LN9-131	Restaurant	30,858	30,858	100.00%
CIP_015	Large Office	74,451	82,391	110.66%
LN9-142	Large Office	140,561	140,561	100.00%
CIP_102	Parking Structure	141,238	141,237	100.00%
CIP_003	Retail	166,038	85,764	51.65%
CIP_007	Hotel	314,748	310,742	98.73%
LN9-141	Retail	340,355	340,355	100.00%
LN9-137	Large Office	359,523	360,832	100.36%
CIP_059	Large Office	393,331	400,426	101.80%
CIP_038	Arts	522,555	524,151	100.31%
CIP_042	Parking Structure	644,269	644,288	100.00%
CIP_112	Restaurant	848,436	848,436	100.00%
LN9-136	Large Office	933,806	930,902	99.69%
LN9-110	Retail	1,110,553	1,110,553	100.00%
CIP_070	University	2,175,633	2,175,633	100.00%
Totals		**8,212,869**	**8,141,075**	**99.13%**

15.3.2 Large C&I Offering-Level Realization

Using the realization rates presented in Table 15-12 the Evaluators extrapolated results from sampled sites to non-sampled sites in developing offering-level savings estimates. Table 15-13 presents results by stratum.

Table 15-13 Large C&I Offering-Level Realization by Stratum

Stratum	# Sites	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
1	42	2,363,991	2,468,222	104.41%	360.89	379.06	105.03%
2	24	4,370,811	3,587,345	82.08%	547.80	477.73	87.21%
3	10	3,052,260	3,033,597	99.39%	465.88	463.61	99.51%
4	10	4,072,181	4,104,110	100.78%	353.32	386.44	109.37%
5	3	2,426,511	2,423,626	99.88%	114.61	117.58	102.59%
6	2	3,286,186	3,286,186	100.00%	0.00	0.00	-
Total	**91**	**19,571,940**	**18,903,086**	**96.58%**	**1843.50**	**1824.42**	**99.02%**

Table 15-14 presents offering-level gross kWh and kW savings results.

Table 15-14 Large C&I Offering-Level Realization

Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
19,571,940	18,903,086	96.58%	1,842.50	1,824.42	99.02%

15.3.3 Large C&I – Causes of Savings Deviations

For illustrative purposes, the Evaluators have summarized these adjustments to kWh savings in Table 15-15.

Table 15-15 Large C&I – Causes of Variance in Savings

Project ID	Expected kWh	Verified kWh	Realization Rate	Causes of Variance in Savings
CIP-104	16,514	13,946	84.5%	Medical research center. In in expected savings calculations the implementors assumed average hours of operation and CFs for all facility types (4,352 and 62.2%, respectively). In verified savings calculations the Evaluators used facility and space type-specific hours of operation and CFs: 'Education: College/University' (3577 and 69%).
CIP-003	166,038	85,764	51.6%	Grocery facility. Expected savings estimates assumed averaged hours of operation and CFs for all facility types (4,352 and 74%, respectively). In verified savings calculations the Evaluators used facility and space type-specific hours of operation and CFs: 'Food Sales: Non-24 hour supermarket' (2058 and 95%).

Key issues identified in site-level analyses include:

- **Hours of use assumptions.** Some projects had an assumed hours of use that averaged all facility types. This was corrected to use hours of use associated with the specific facility in the TRM.

15.4 Net Impact Findings

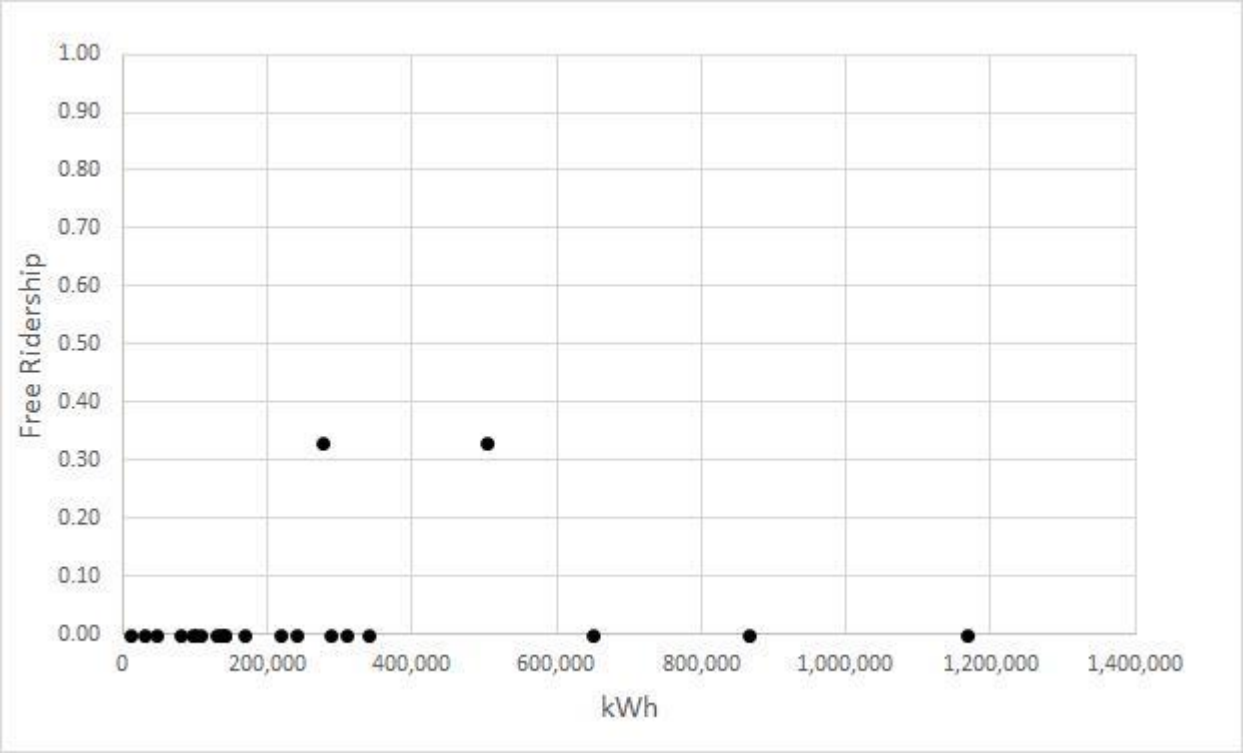
Participant survey responses were used to estimate the net energy impacts for the Large C&I Program. The methodology used is described in detail in Section 2.2.2.3.

15.4.1 Surveys and Benchmarking

Responses from 20 participant decision makers who installed efficiency projects were used to assess the net impacts of the Large C&I offering.

Figure 15-1 is a plot of project energy savings against free ridership score. As shown, there was not a strong relationship between energy savings and free ridership. However, the two projects identified as full free riders had low to moderate total savings.

Figure 15-1 Plot of Project Energy Savings and Free Ridership Score



No respondents reported quantifiable spillover measures. The Evaluators identified NTGRs of:

- kWh: 96%
- kW: 90%

15.4.2 Net Savings Results

Table 15-16 summarizes the verified net kWh savings and peak kW demand reductions of the offering.

Table 15-16 Summary of Verified Net kWh Savings and Net Peak kW Reductions

Verified Gross kWh Savings	*kWh FR*	*Verified Net kWh Savings*	*kWh NTGR*	*Verified kW Reductions*	*kW FR*	*Verified Net kW Reductions*	*kW Net NTGR*
18,903,086	756,123	18,146,963	96.00%	1,824.42	182.44	1,641.98	90.00%

Net savings totaled to 18,146,963 kWh and 1,641.98 kW.

15.5 Process Evaluation Findings

15.5.1 Summary of Program Participation

Table 15-17 summarizes savings by measure type for the Large C&I offering. Similar to the SCS offering, custom measures generate the majority of Large C&I offering savings.

Table 15-17 Offering Activity by Measure Type (Large C&I)

Measure Incentive Type	Measure Type	Expected Savings (kWh)	Number of Participants	$ per kWh in Expected Savings
Prescriptive	Controls	88,223	6	$0.13
	Cooking	1,858	1	$0.15
	HVAC	193,552	6	$0.10
	Lighting	3,529,161	72	$0.10
	Refrigeration	75,576	2	$0.12
Custom	Controls	5,549,891	9	$0.09
	HVAC	2,461,455	10	$0.12
	Lighting	7,266,276	70	$0.11
	Miscellaneous	66,748	47	$0.12
	Process	231,833	2	$0.12
	Motors	107,366	1	$0.15

As shown in Table 15-18, 30% of the projects were multi-measure projects.

Table 15-18 Number of Measure Types Installed at Location

Number of Measures Installed at Location*	Number of Participants (Large C&I)	Number of Participants (New Construction)
1	22	0
2	10	1
3	8	1
4	4	0
5	5	0
6	6	0
7	3	0
9	1	0
10 or more	15	0

*Locations defined by account numbers

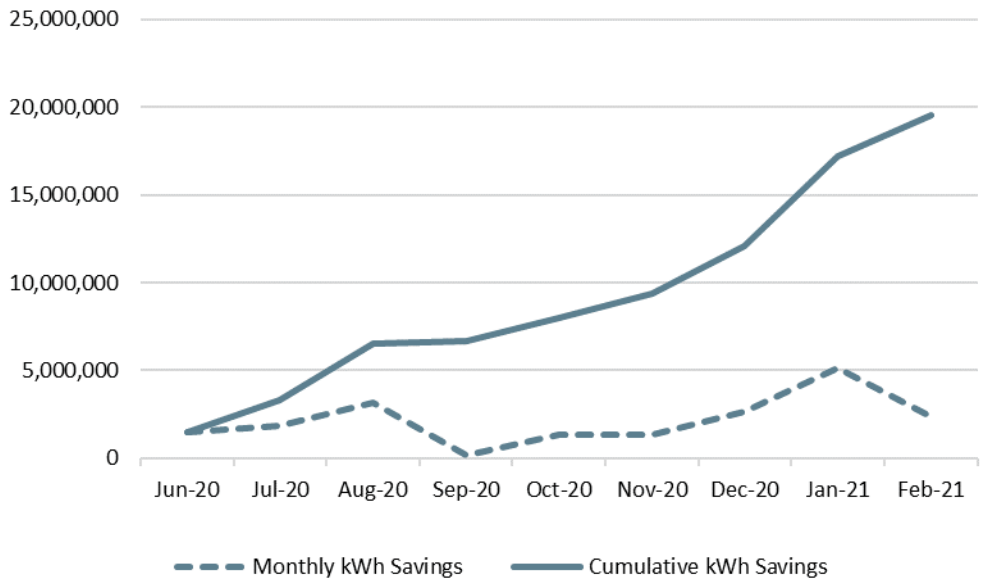
A large number of trade allies, 39, completed projects through the program in PY10 (Table 15-19). Moreover, the savings and number of projects completed were distributed across a large number of trade allies, although the four most active trade allies accounted for about 65% of offering savings.

Table 15-19 Summary of Trade Ally Participation

Trade Ally	*Expected Savings (kWh)*	*Percent of Expected Savings*	*Number of Participants*	*Average Project Size*
Trade ally 1	7,835,329	40%	19	412,386
Trade ally 2	2,458,699	13%	8	307,337
Trade ally 3	1,435,219	7%	2	717,610
Trade ally 4	938,491	5%	2	469,245
Trade ally 5	935,890	5%	3	311,963
Trade ally 6	730,423	4%	7	104,346
Trade ally 7	644,654	3%	7	92,093
Trade ally 8	616,808	3%	2	308,404
Trade ally 9	551,412	3%	1	551,412
Trade ally 10	482,864	2%	3	160,955
All 29 other trade allies	2,942,152	15%	37	79,518

Figure 15-2 summarizes the monthly and cumulative kWh savings for the Large C&I offering in PY10. As seen, January 2021 accounts for the largest monthly kWh savings for PY10.

Figure 15-2 Monthly and Cumulative kWh Savings (Large C&I)

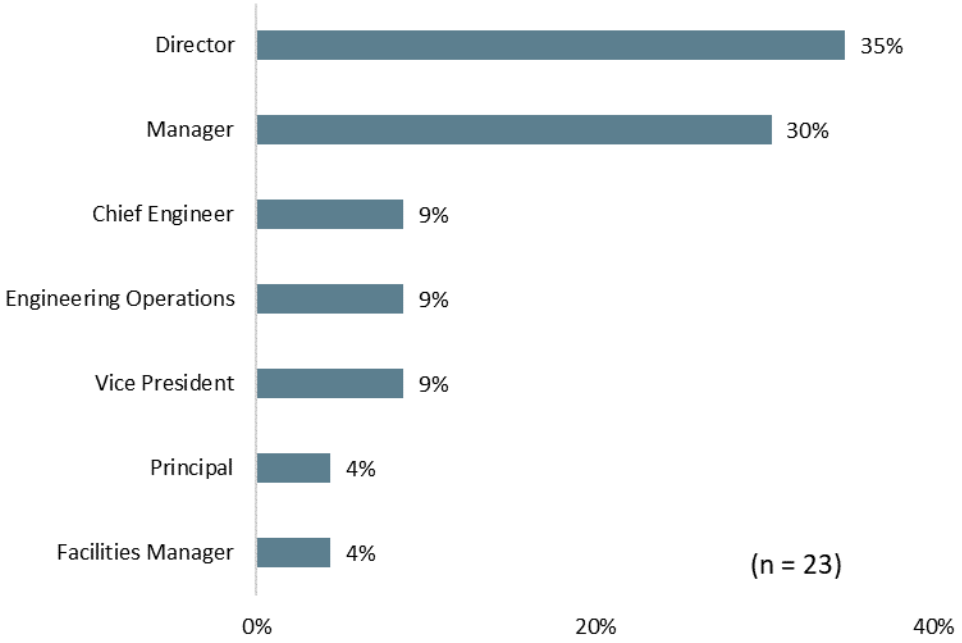


15.5.2 Survey Participant Feedback

Twenty-three customers completed responses to a survey about the Large C&I offering. As shown in Figure 15-3, the majority of respondents were either the director or manager of the business, representing 35% and 30% respectively. Other positions included chief engineer, engineering operations, or vice president (9% each). Among respondents, 71% reported completing an energy efficiency project within the last three

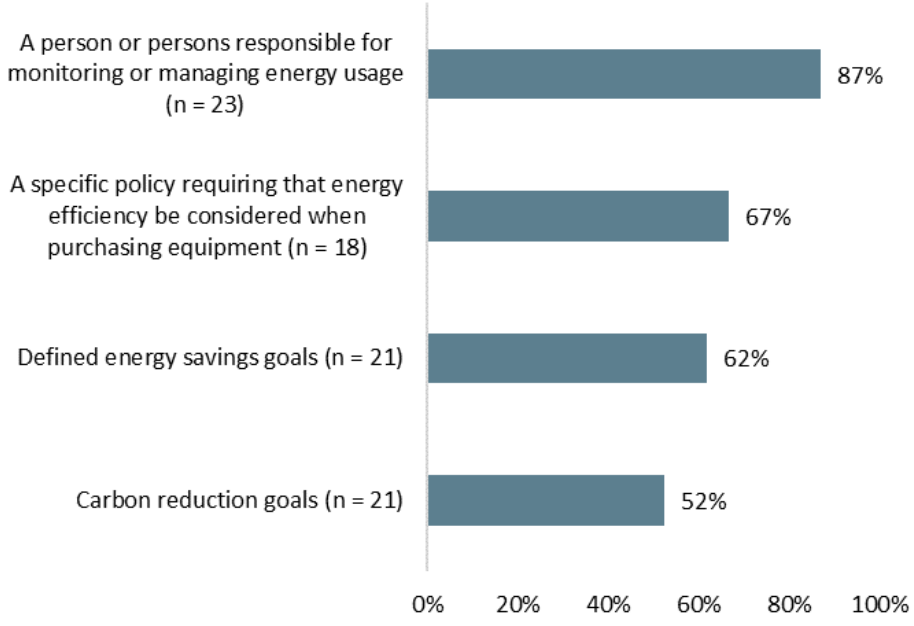
years, and 56% of those who completed the project indicated they did not receive a rebate or discount.

Figure 15-3 Respondent Position/Role in Company



As shown in Figure 15-4, the majority of respondents reported the business had specific policies supporting energy efficiency.

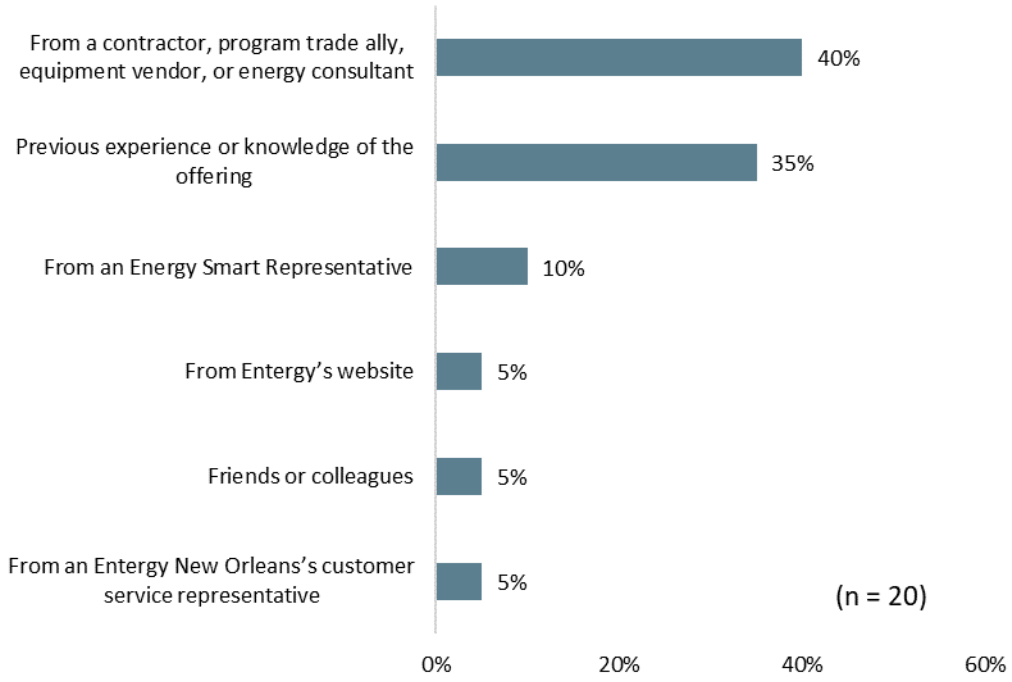
Figure 15-4 Percentages of Companies with Energy Efficiency Policies



15.5.2.1 How Customers Learned of the Program

The most common source of awareness was from a contractor, program trade ally, equipment vendor, or energy consultant (40%). Figure 15-5 summarizes the common ways that customers learned of the Large C&I program. Other common sources of awareness included having previous experience or knowledge of the program (35%) or from an Energy Smart representative (10%).

Figure 15-5 Source of Program Awareness



Program representatives provided a variety of forms of assistance with customer projects. Forty-one percent of respondents indicated they received application assistance from an Energy Smart Commercial & Industrial program representative. In addition, 43% of respondents received calculation assistance, 28% received a facility assessment, and 5% received some other type of technical assistance from an Energy Smart representative. Among those who received a facility assessment, 60% indicated a commercial project upgrade was recommended.

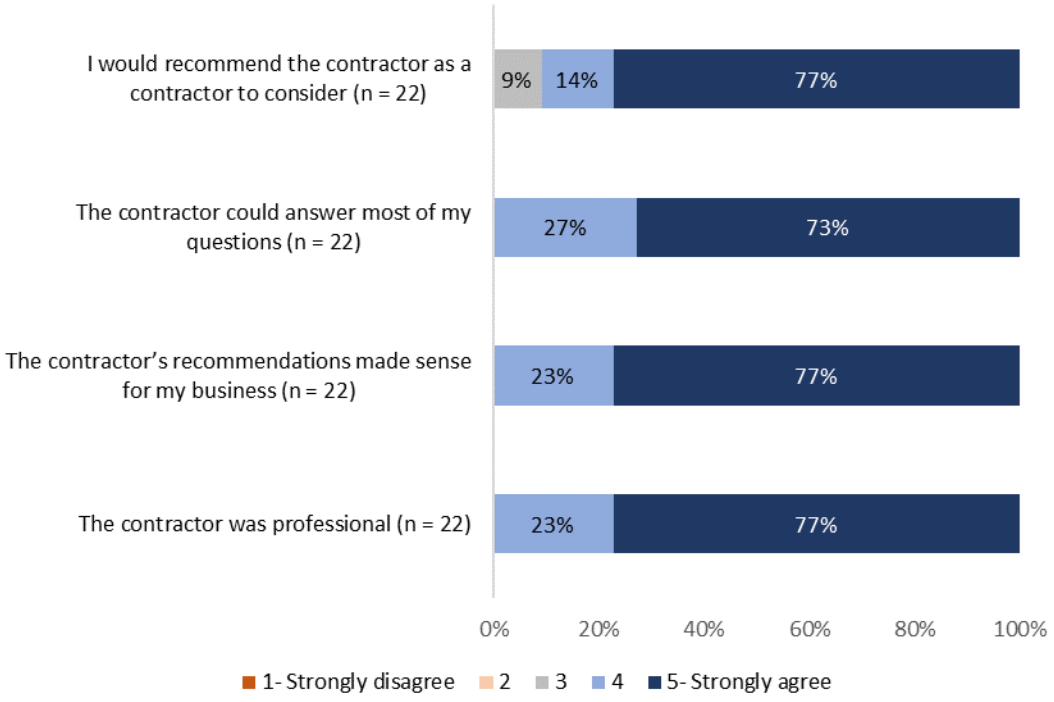
The majority of respondents (70%) reported working with a trade ally through the entire project (e.g., design through installation). As shown in Table 15-20, 43% of respondents reported that a contractor who they had worked with before installed the equipment for their project.

Table 15-20 Who Installed the Qualifying Equipment

Response	Percent of Respondents (n = 23)
A contractor who we have worked with before	43%
A contractor registered with the Energy Smart program	26%
My own staff	22%
A new contractor that someone else recommended	4%
Other	4%

Participants reported positive experiences with their contractor. As shown in Figure 15-6, most respondents agreed that the contractor they worked with could answer most questions, made recommendations that made sense for their business, and was professional (see). Many respondents indicated they would recommend the contractor they worked with to others (91%).

Figure 15-6 Participant Feedback on Trade Allies



As shown in Table 15-21, 65% of respondents reported completing the application process on their own. In addition, 61% of respondents received assistance from a contractor when completing their project application while 17% of respondents reported receiving help from a program representative.

Table 15-21 Application Process Support

Response	Percent of Respondents* (n = 23)
Myself	65%
A contractor	61%
A program representative	17%
An equipment vendor	13%
Another member of your company	9%
A designer or architect	4%

**Responses add to greater than 100% because respondents could select multiple responses.*

The majority of respondents (86%) agreed that the overall application process was smooth. Additionally, most respondents agreed that the time it took to approve the application was acceptable (86%), the information on how to complete the application was clear (81%) and providing the required invoices or other supporting documentation was effortless (76%). Eighty-nine percent of participants agreed that finding forms on the website was easy. In addition, 79% of respondents agreed that using the electronic application worksheets was easy.

As shown in Table 15-22, the majority of respondents (61%) indicated the project cost about what they expected, while 18% reported it was more than what they had expected.

Table 15-22 Project Cost Expectations

Response	Percent of Respondents (n = 23)
It was much less	13%
It was somewhat less	9%
It was what was expected	61%
It was somewhat more	9%
It was much more	9%

15.5.2.2 *Motivations for Participating*

Reducing energy costs was the most common motivation for participating in the offering (35%). Other common responses included obtaining a rebate for the equipment (22%), reducing energy usage and power outages (13%), and replacing old or outdated equipment (9%). Table 15-23 below summarizes the responses.

Table 15-23 Reasons for Completing the Project

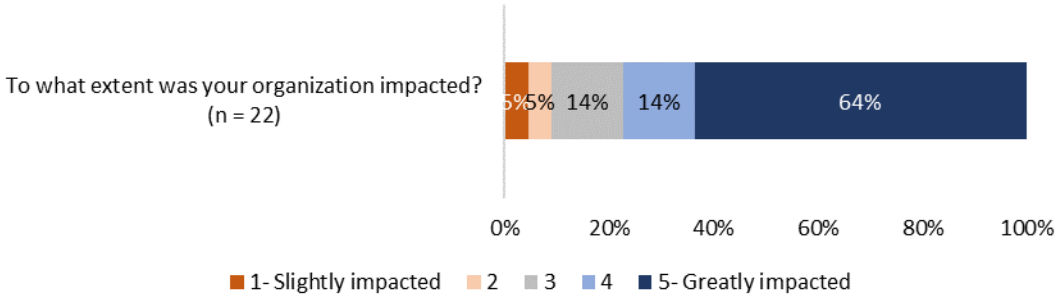
Response	Percent of Respondents* (n = 23)
To reduce energy costs	35%
To get a rebate from the program	22%
To reduce energy use/power outages	13%
To replace old or outdated equipment	9%
To reduce maintenance costs on downtime and associated expenses for the old equipment	9%
To improve equipment performance	9%
To improve the product quality	4%
To update to the latest technology	4%
As part of a planned remodeling, build-out, or expansion	4%
Improve health and safety	4%

**Responses add to greater than 100% because respondents could select multiple responses.*

15.5.2.3 COVID-19 Impacts

A significant proportion (96%) of Large C&I respondents reported being impacted by the COVID-19 pandemic. Among those who reported being affected, 78% were somewhat or greatly impacted (Figure 15-7). However, most respondents (81%) stated that the pandemic has not at all affected their ability to participate in the Energy Smart program.

Figure 15-7 Impact of COVID-19 on Large C&I Customers



In addition, 50% of respondents indicated that ENO has helped them remain energy efficient during the pandemic.

Customers were given an opportunity to share how the pandemic impacted their businesses. Below are some of their verbatim responses.

- *"How we conduct teaching and learning has changed."*
- *"Closed business during quarantine. Loss of customer."*
- *"Had to close due to the pandemic; 80% drop off in clients and events."*
- *"Tenants not able to operate their business putting financial strain on all."*
- *"Running 30% of building. 2-3 people in the building. Everyone is working from home."*
- *"Less occupy [SIC]."*
- *"Lost some tenants."*

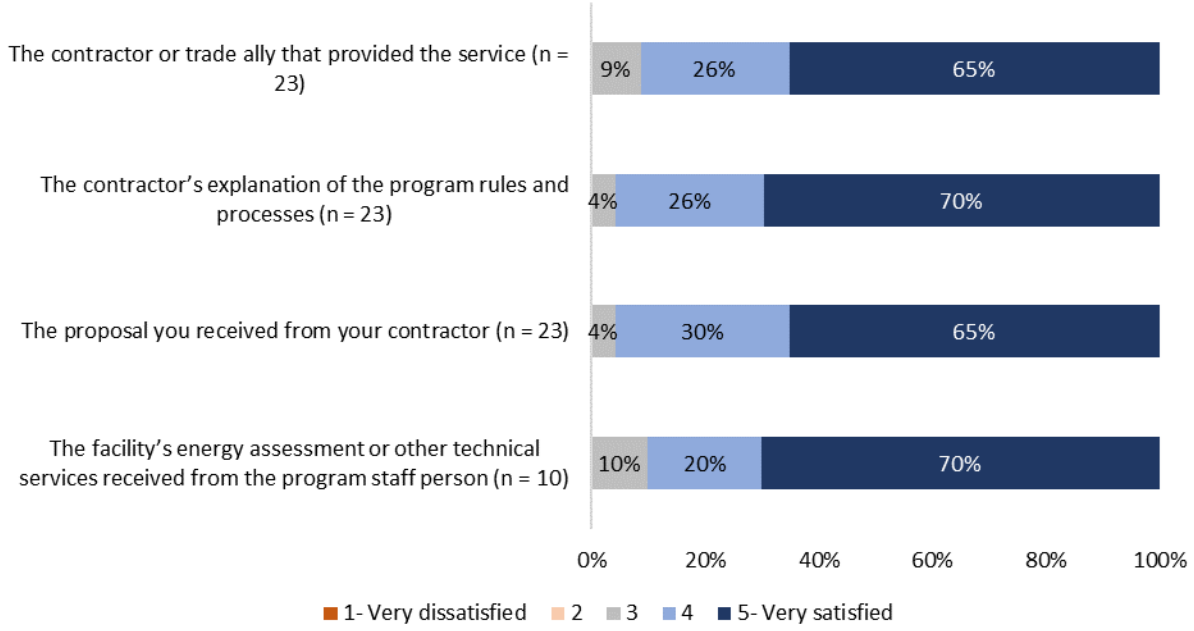
- *"Staff has gotten virus and been out. Clients gotten virus [sic]. Volunteers can't come."*
- *"No classes and revenues went down. Do lot of testing and vaccination now."*
- *"Reduced funds, income reduced."*

15.5.2.4 Participant Satisfaction

Ninety-one percent of respondents were satisfied with the virtual and in-person inspections. Ninety-one percent of respondents reported that after their project was completed a program representative conducted either a virtual or in-person inspection. Among those respondents, 90% agreed the inspector was courteous and efficient.

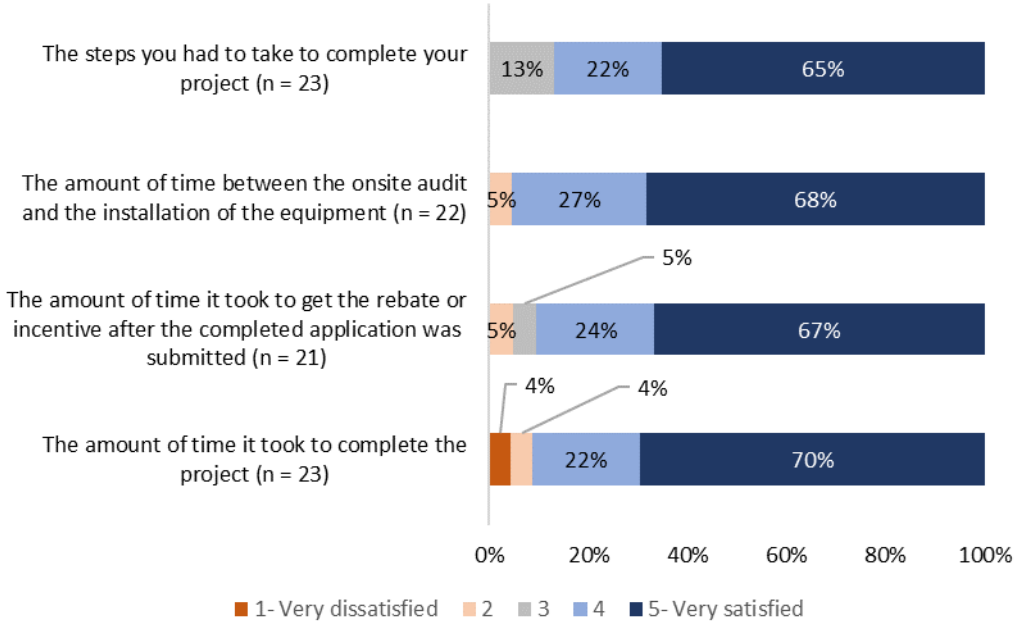
Participants reported positive experiences with the program trade allies. Most respondents were satisfied with the contractors' explanation of the program rules and processes, the contractor they worked with, the proposal they received, and the technical assistance they received (Figure 15-8).

Figure 15-8 Participant Satisfaction with Contractors and Technical Assistance



Ninety-five percent of survey respondents were very satisfied with the range of equipment that qualified for the offering and 100% of respondents were satisfied with the equipment that was installed. Additionally, respondents were generally satisfied with the amount of time it took to complete the project, the time between the audit and installation, and the steps to complete the project (Figure 15-9).

Figure 15-9 Participant Satisfaction with Aspects of the Project



All respondents were satisfied with ENO as their electric service provider. Ninety-three percent of those surveyed stated that they were very satisfied with ENO as their electric service provider (Table 15-24).

Table 15-24 Satisfaction with ENO

Response	***Percent of Respondents (n = 23)***
5 (Very satisfied)	57%
4	26%
3	17%
2	0%
1 (Very dissatisfied)	0%

All respondents agreed that they would recommend the Large C&I offering to others. In addition, 36% of respondents indicated they are willing to participate in program marketing (e.g., providing quotes about their experiences).

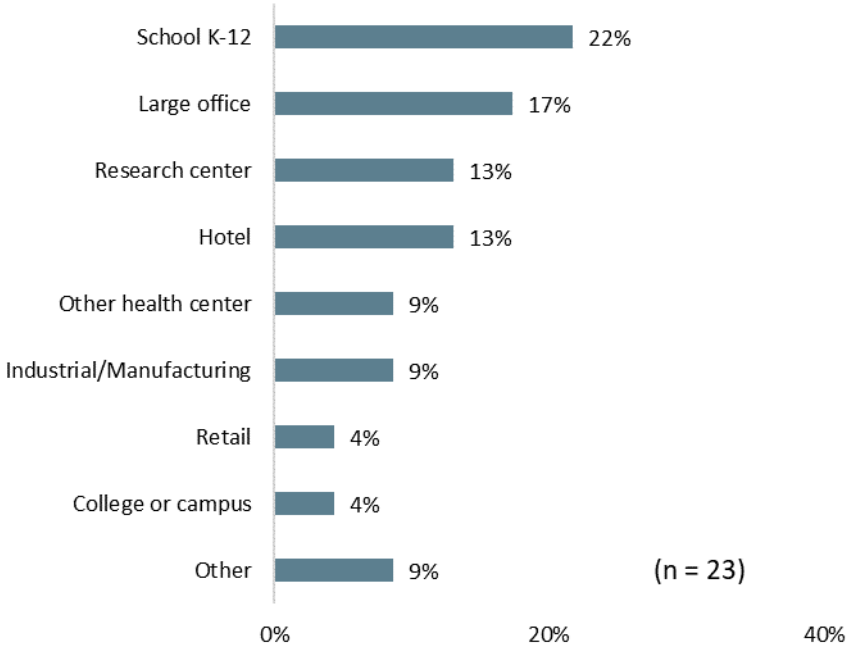
15.5.2.5 Firmographic

Sixty-one percent of respondents stated that the facility where the work was performed was one of several locations owned by the company. In addition, 30% of respondents

said it was the company's sole location, and 9% said it was the headquarters of a company with several locations. All 21 respondents stated they own and occupy the property.

All of the businesses were billed directly for electricity use by ENO. Schools K-12 were the most common facility type, followed by large office, research centers, and hotels (Figure 15-10).

Figure 15-10 Firmographics



15.6 Key Findings and Conclusions

The key findings and conclusions of the evaluation of the program are as follows:

- **Contractors and trade allies are driving program participation.** The most common source of awareness was from a contractor or program trade ally. Most large business customers reported working with a trade ally through the entire project (e.g., design through installation). Many respondents reported that a contractor who they had worked with before installed the equipment for their project.
- **Most Large C&I customers agreed that the overall application process was smooth.** Most survey respondents agreed that the time it took to approve the application was acceptable, that the information on how to complete the application was clear and providing the required invoices or other supporting documentation was effortless.

- **Most survey respondents were very satisfied with the Energy Smart Large C&I offering.** Most respondents who had a post-installation inspection agreed that the inspector was courteous and efficient. Additionally, many were satisfied with the contractors' explanation of the program rules and processes, the contractor they worked with, the proposal they received, and the technical assistance they received. Large business customers who participated in the offering were satisfied with the amount of time it took to complete the project, the time between the audit and installation, and the steps to complete the project. Furthermore, all respondents agreed that they would recommend the Energy Smart Program to others.
- **A significant proportion of large business customers surveyed reported impacts from the COVID-19 pandemic on their business.** Among those who reported effects, many were somewhat or greatly impacted. However, most respondents stated that the pandemic has not at all affected their ability to participate in the Energy Smart program. It should be noted that the pandemic may have affected others who did not participate in the offering.

15.7 Recommendations

The Evaluators' do not have recommendations for the Large C&I offering for PY10.

16 Publicly Funded Institutions

16.1 Program Description

The Publicly Funded Institutions offering (PFI) provides financial incentives and technical services to encourage the participation of publicly funded customers. The PFI offering is designed to help this customer segment overcome barriers to energy improvement, such as higher first-cost of efficiency equipment and a lack of technical knowledge or resources.

The incentives are based on the total demand (kW) of the facility; above or below 100 kW. Rates for both facility demand groups are provided are summarized below in Table 16-1.

Table 16-1 Publicly Funded Institutions Summary of Program Incentives

Measure	***Incentive***	
Facility Demand	**Small (<100 kW)**	**Large (>100 kW)**
Prescriptive	$ per unit	$ per unit
Custom Lighting	$0.12 per kWh Saved	$0.10 per kWh Saved
Custom Non-Lighting	$0.12 per kWh Saved	$0.12 per kWh Saved

16.1.1 Program Changes

A 25% bonus incentive for prescriptive measures installed by trade allies was provided during PY10. In PY10, many measures that were previously offered as custom were transitioned to the prescriptive application process. The bonus was offered directly to trade allies to support this transition during PY10.

To help customers, implement projects that may have been put on hold due to the COVID-19 pandemic, a customer incentive bonus was created which increased custom and prescriptive rates by 25%. Projects with applications received on or after August 24, 2020 and installed by December 31, 2020 were eligible for the bonus incentives.

16.1.2 Program Activity

The PY10 program was open and available to customers between April 1, 2020 and December 31, 2020.

Data provided by staff showed that during PY10, there were 13 project components among 12 sites. These projects were expected to provide a combined savings of 1,924,976 kWh and 126.84 kW.

Count of projects and expected kWh and kW savings for the PFI offering are summarized in Table 16-2.

Table 16-2 Savings Expectations by Utility

Count of Projects[47]	Expected kWh Savings	Expected kW Savings
13	1,924,976	126.84

Table 16-3 Savings Expectations by Measure Type

Program Component	Program Component	Count of Project Components	Expected kWh Savings	Expected kW Savings	Percent Savings (kWh)
Custom	Controls	5	1,036,851	0	53.86%
	HVAC	1	110,910	8.847	5.76%
	Lighting	13	358,649	67.9072	18.63%
Prescriptive	Lighting	13	418,567	50.089	21.74%
Total		**32**	**1,924,976**	**126.84**	

In PY9, 16 projects summing to 3,449,536 kWh were completed during the 15-month program year. Normalizing these figures to a 12-month program year for an 'apples-to-apples' comparison yields an expected 13 projects summing to 2,759,629 kWh. During PY10 the program ran for only nine months, completing 13 projects summing to 1,924,976 kWh in expected savings. A similar normalization process yields 17 projects and 2,566,635 kWh in a 12-month period. Comparisons are shown below in Table 16-4.

Table 16-4 Publicly Funded Institutions Participation Summary Comparison

Project Year	# Projects	Expected kWh	kWh per Project
PY7 (nominal)	3	814,317	271,439
PY7 (normalized)	4	1,085,756	271,439
PY8	20	2,898,984	144,949
PY9 (nominal)	16	3,449,536	215,596
PY9 (normalized)	13	2,759,629	212,279
PY10 (nominal)	13	1,924,976	148,075
PY10 (normalized)	17	2,566,635	150,979

16.1.3 Goal Achievement

Total verified savings and percentage of goals for the PFI offering are summarized in Table 16-5.

[47] Independent projects, which contain all project components associate with said project.

Table 16-5 PFI Summary of Goal Achievement

kWh Goal	Verified kWh	% of Goal Attained	kW Target	Verified kW	Difference from Target
1,672,804	1,876,035	112.15%	219.73	132.24	-87.49

In PY10 the offering had a savings goal of 1,672,804 kWh and a 219.73 target kW reduction. The offering achieved 1,876,035 kWh in verified kWh, 112.15% of goal, and was 87.49 kW below the target kW reduction.

16.2 M&V Methodology

Evaluation of the PFI offering requires the following:

- Stratified Random Sampling (as detailed in section 2.2.1.3 Stratified Sampling.) and by selecting large saving sites with certainty.
- On-site verification for two projects, desk reviews of all nine sampled; and
- Interviewing of program participants and trade allies.

Energy savings was estimated using proven techniques, including engineering calculations using industry standards to determine energy savings. Methods for evaluating lighting measures are described in the Small Commercial & Industrial Solutions Chapter, section 1.2.1 M&V Methodology.

16.2.1 PFI Offering Sample Design

Sampling for evaluation of ENOs' PFI offering was developed using the Stratified Random Sampling procedure detailed in 2.2.1.3 Stratified Sampling. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than simple random sampling would require by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results. Table 16-6 summarizes the total participation in the PY10 PFI offering.

Table 16-6 PY10 PFI Offering Participation and Sampling Summary

# Projects	Expected kWh	Expected Peak kW	Site Visit Sample Size
13	1,924,976	126.84	7

The participant population was divided into four strata. Table 16-7 summarizes the strata boundaries and sample frames for the program **Error! Reference source not found.** s ummarizes expected savings for of both the sample and population. The achieved sampling precision was ±9.79% at 90% confidence.

Table 16-7 PFI Offering Sample Design

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Totals***
Strata boundaries (kWh)	< 100,000	100,001 - 200,000	200,001 - 300,000	300,001 - 485,670	
Number of projects	6	4	1	2	**13**
Total kWh savings	272,523	542,637	265,499	844,318	**1,924,976**
Average kWh Savings	45,421	135,659	265,499	422,159	**148,075**
Standard deviation of kWh savings	36,911	20,306	N/A	28,512	**142,593**
Coefficient of variation	0.813	0.150	0.000	0.213	**0.963**
Final design sample	3	1	1	2	**7**

Table 16-8 Expected Savings for Sampled and Non-Sampled Projects by Stratum

Stratum	***Total Expected Savings***	***Sampled Expected Savings***
1	272,523	100,260
2	542,637	110,910
3	265,499	265,499
4	844,318	844,318
Total	**1,924,976**	**1,320,987**

16.3 Gross Impact Findings

16.3.1 PFI Site-Level Realization

Sites chosen within each stratum were visited in order to verify installation of rebated measures and to collect data needed for calculation of ex post verified savings. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 16-9 presents realization at the stratum level.

Table 16-9 Summary of kWh Savings for PFI Offering by Sample Stratum

Stratum	***Sample Expected kWh Savings***	***Sample Verified kWh Savings***	***Realization Rate***
1	100,260	82,255	82.0%
2	110,910	110,910	100.0%
3	265,499	265,499	100.0%
4	844,318	844,317	100.0%

Table 16-10 shows the expected and verified energy savings for the offering by project.

Table 16-10 Expected and Verified Savings by Sampled Project

Project ID(s)	Facility Type	Expected kWh Savings	Verified kWh Savings	Realization Rate
CIP_054	Outdoor Park	9,562	9,750	101.97%
CIP_053	Outdoor Park	9,923	10,118	101.97%
PN9-018	Office	80,776	62,387	77.23%
PN9-008	School	110,910	110,910	100.00%
PN9-021	School	265,499	265,499	100.00%
LN9-113	Parking Structure	358,649	358,648	100.00%
CIP_106	Government Offices	485,669	485,669	100.00%
Total		**1,320,987**	**1,302,981**	**98.64%**

16.3.2 PFI Offering-Level Realization

Using the realization rates presented in Table 16-10, the Evaluators extrapolated results from sampled sites to non-sampled sites in developing offering-level savings estimates. Table 16-11 presents results by stratum.

Table 16-11 PFI Offering-Level Realization by Stratum

Stratum	# Sites	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
1	6	272,523	223,582	82.04%	0.00	5.39	N/A
2	4	542,637	542,637	100.00%	58.94	58.94	100.00%
3	1	265,499	265,499	100.00%	0.00	0.00	N/A
4	2	844,318	844,317	100.00%	67.91	67.91	N/A
Total	**13**	**1,924,976**	**1,876,035**	**97.46%**	**126.85**	**132.24**	**104.25%**

The overall verified kWh savings is 1,876,035 kWh and 132.24 kW, 97.46% and 104.25% of expectations.

16.3.3 PFI – Causes of Savings Deviations

For illustrative purposes, the Evaluators have summarized these adjustments and others in Table 16-12.

Table 16-12 PFI – Causes of Variance in kWh Savings

Project ID	Expected kWh	Verified kWh	Realization Rate	Causes of Variance in Savings
CIP-054	9,562	9,750	102.0%	Outdoor Park. In expected savings calculations the implementors assumed average hours of operation and CFs for all facility types (4,235.6 and 62.2%, respectively). In verified savings calculations the Evaluators used facility and space type-specific hours of operation and CFs 'Exterior' (4319 and 0.0%), resulting in the slightly high realization rate.3 pm Saturday through Sunday for most of the equipment and noon to 2 pm Saturday through Sunday for remaining equipment. The Evaluator used the revised schedule provided to calculate savings which reduced the overall annual operating schedule and increased the estimated savings.
CIP-053	9,932	10,118	102.0%	Outdoor Park. In expected savings calculations the implementors assumed average hours of operation and CFs for all facility types (4,235.6 and 62.2%, respectively). In verified savings calculations the Evaluators used facility and space type-specific hours of operation and CFs 'Exterior' (4319 and 0.0%), resulting in the slightly high realization rate.3 pm Saturday through Sunday for most of the equipment and noon to 2 pm Saturday through Sunday for remaining equipment. The Evaluator used the revised schedule provided to calculate savings which reduced the overall annual operating schedule and increased the estimated savings.
PN9-018	80,776	62,387	77.2%	Office. The kWh realization rate is low for two reasons. First, the provided energy model equipment schedule did not match the provided BAS screenshots and were adjusted to the schedule stated above. Secondly, the provided energy model did not match the results given. The only way to recreate the provided energy usages with the provided energy model and provided information was to set the HVAC fan type forward curve inlet guide vanes in the baseline and variable speed controls in the proposed model. This simulation estimates the savings for installing a VFD which was not claimed in the application report. The peak kW reduction realization rate is undefined because the application stated an increase in energy demand and therefore put zero instead of a negative number. The ex-ante calculations calculated the peak kW reduction as the difference between the maximum energy demand between the two energy simulations. The ex-post calculation calculated the peak kW reduction as the average energy demand during the peak hours of 3 pm to 6 pm Weekdays during the months of April through September.

16.4 Net Impact Findings

Because none of the respondents who completed a PFI project contacted to complete the survey responded to questions involving net-to-gross questions, the Evaluator applied the net-to-gross ratio developed by participants in the Large C&I Program. The methodology used is described in detail in section 2.2.3.

16.4.1 Net Savings Results

Table 16-13 summarizes the verified net kWh savings and peak kW demand reductions of the offering.

Table 16-13 Summary of Verified Net kWh Savings and Peak kW Reductions

Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW NTGR
1,876,035	102,431	1,773,603	94.54%	132.24	8.04	124.20	93.92%

Total verified net savings are 1,773,603 kWh and 124.2 kW, 94.5% and 93.9% of respective gross savings.

16.5 Process Evaluation Findings

16.5.1 Summary of Offering Participation

Table 16-14 summarizes the expected savings and number of participants by measure type. Custom control measures generated over 50% of expected offering savings.

Table 16-14 Offering Activity by Measure Type

Measure Incentive Type	Measure Type	Expected Savings (kWh)	Number of Participants	$ per kWh in Expected Savings
Prescriptive	Lighting	418,567	6	$0.24
Custom	Controls	1,036,851	5	$0.11
	HVAC	110,910	1	$0.12
	Lighting	358,649	1	--

Table 16-15 shows the count of project components per project.

Table 16-15 Number of Measure Types Installed at Location

Number of Measure Components Installed at Location*	Number of Participants
1	4
2	4
3	2
7	1
13	1

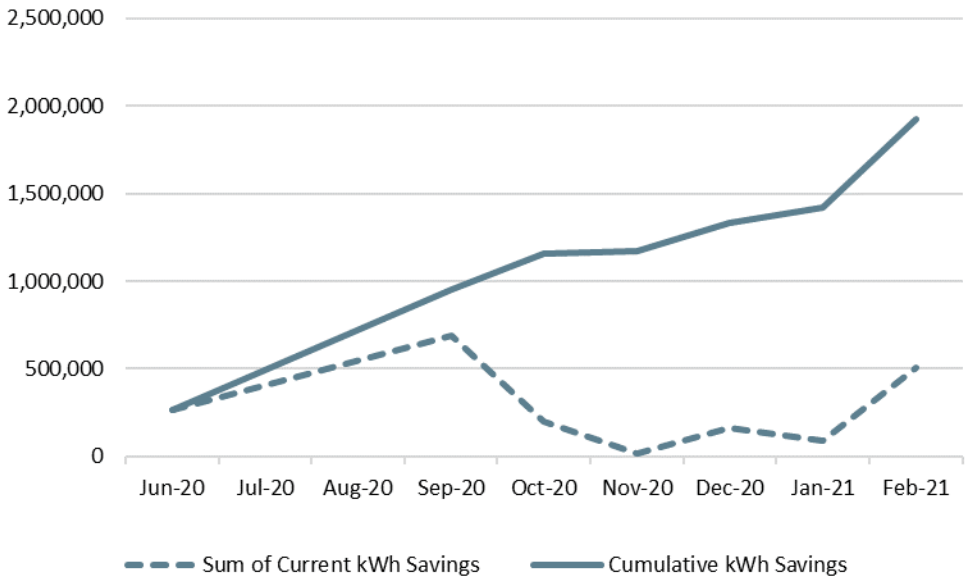
*Locations defined by account numbers

Table 16-16 summarizes trade ally activity for the offering. Activity was distributed across multiple trade allies, with one trade ally accounting for 47% of the offering savings.

Table 16-16 Summary of Trade Ally Participation

Trade Ally	Expected Savings (kWh)	Percent of Expected Savings	Number of Projects	Average Project Size
Trade ally 1	904,239	47%	5	82,204
Trade ally 2	358,649	19%	1	27,588
Trade ally 3	265,499	14%	1	265,499
Trade ally 4	160,330	8%	1	53,443
Trade ally 5	125,350	7%	4	13,928
Trade ally 6	110,910	6%	1	110,910

Figure 16-1 Monthly and Cumulative kWh Savings



16.5.2 Program Operations

This section summarizes changes to the PY10 offering design and processes. The information presented is based on interviews with program staff and a review of program documents. Based on that information, the design changes made to the PY10 offering are summarized below, followed by changes to offering operations.

Overall, there were not any specific changes made to the PFI offering. However, other cross cutting changes made to the Commercial and Industrial Portfolio in general also applied to PFI. These changes were the expanded list of prescriptive measures, a trade ally bonus for prescriptive measure projects, a provision to allow for incentive payments to be split across multiple parties, and the implementation of virtual verification procedures. These changes are summarized in additional detail in section 17.5.2.

16.5.3 Participant Feedback

ENO customers who participated in the PFI offering were sent an email invitation to participate in an online survey. Additionally, these customers were contacted by telephone to complete the survey. One ENO customer who completed a PFI project completed the survey. Below is their feedback.

- **The survey participant indicated they first learned of the PFI offering through the General Service Administration.** This person indicated their company received a facility assessment, calculation, and application assistance from an Energy Smart Commercial & Industrial program representative. The project upgrades were not recommended during their facility assessment but when they were first approached about the program, it was an easy decision to participate. The respondent indicated they worked with an Energy Smart trade ally throughout the project to install the qualifying equipment. that a contractor. The PFI respondent strongly agreed that the contractor was professional and that their recommendations made sense for their business. Additionally, the respondent strongly agreed that the trade ally could answer most questions and that they would recommend the trade ally to others to consider.
- **The PFI respondent stated the execution of the application process was satisfactory.** The survey respondent strongly agreed that finding forms on the Energy Smart website was easy, the time it took to approve the application was acceptable, the information on how to complete the application was clear, providing the required invoices or other supporting documentation was effortless, and the overall application process was smooth. This person indicated they were neutral on using the electronic application worksheets. The PFI participant had a clear sense of who to go to for assistance with the application process. The project cost was about what the survey participant expected.
- **The PFI participant stated the execution of the assessment and equipment installation was satisfactory.** A program representative inspected the project post completion, according to the survey respondent. They strongly agreed that the inspector was courteous and efficient. Additionally, the PFI survey respondent was strongly satisfied with the facility's energy assessment they received from a program staff person, the amount of time between the onsite audit and installation of equipment, the equipment that was installed, the contractor's explanation of the offering rules and processes, the amount of time it took to get the rebate after the completed application was submitted, the trade ally that provided the service, the energy efficiency improvement that was completed, the amount of time to complete the project, and the Energy Smart Program overall. The respondent was neither satisfied or dissatisfied with the proposal they received from their contractor and the steps they had to take to complete the project.

16.6 Key Findings and Conclusions

The key findings and conclusions of the evaluation of the program are as follows:

- **The program exceeded the kWh savings goal but did not reach the kW reduction target.** In PY10 the offering had a savings goal of 1,672,804 kWh and a 219.73target kW reduction. The offering achieved 1,876,035 kWh in verified kWh, 112.15% of goal, and was 87.49 kW below the target kW reduction.
- **The survey respondent was satisfied with the offering participation process and the technical services provided through the program.** One customer that completed a PFI project responded to the survey. The respondent was satisfied with their program experience.

16.7 Recommendations

The Evaluators' do not have recommendations for the Publicly Funded Institutions offering for PY10.

17 Appendix A: Commercial Site Reports

17.1 Small Business Program

Project Number CIP-083

Program Small Commercial Solutions

Project Background

The participant is a miniature golf course that received incentives from Entergy New Orleans for retrofitting energy efficient lighting outdoors. The Evaluators verified that the following had been installed:

- (32) LED fixtures replacing 175W-250W HID fixtures

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	*Expected Per-Unit kWh Savings*	*Expected Per-Unit kW Reduction*
LED replacing 175 W to 250 W HID	44.2	0.00

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
LED replacing 175 W to 250 W HID (lamp wattage)	32	44.2	1,414	1,442	102.0%
		Totals:	**1,414**	**1,442**	**102.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
LED replacing 175 W to 250 W HID (lamp wattage)	32	0.000	0.00	0.00	N/A
		Totals:	**0.00**	**0.00**	**N/A**

Results

The kWh realization rate for project CIP_083 is 102.0% (no kW reduction was claimed or verified).

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a reduction in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
LED replacing 175 W to 250 W HID (lamp wattage)	1,442	0.00	102.0%	N/A
Total	**1,442**	**0.00**	**102.0%**	**N/A**

Project Number CIP-008

Program Small Commercial Solutions

Project Background

The participant is a frozen custard shop that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (4) LED Exit Sign
- (8) T8/T12 Upgrade to LED Linear - 4ft
- (10) 13-17W LED Screw-in replacing incandescent/CFL

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	*Expected Per-Unit kWh Savings*	*Expected Per-Unit kW Reduction*
LED Exit Sign	164.0	0.023
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
13-17W LED Screw-in replacing incandescent/CFL	149.4	0.027

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
LED Exit Sign	4	164	656	1,357	206.8%
T8/T12 Upgrade to LED Linear - 4ft	8	58	465	711	152.8%

13-17W LED Screw-in replacing incandescent/CFL	10	149	1,495	2,284	152.8%
		Totals:	**2,616**	**4,351**	**166.3%**

Table C. Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kW Reduction***	***Expected kW Reduction***	***Verified kW Reduction***	***kW Realization Rate***
LED Exit Sign	4	0.023	0.09	0.15	164.2%
T8/T12 Upgrade to LED Linear - 4ft	8	0.010	0.08	0.11	136.1%
13-17W LED Screw-in replacing incandescent/CFL	10	0.027	0.27	0.35	129.6%
		Totals:	**0.44**	**0.61**	**137.9%**

Results

The kWh and kW realization rates for project CIP_008 are 166.3% and 137.9%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
LED Exit Sign	1,357	0.15	206.8%	164.2%
T8/T12 Upgrade to LED Linear - 4ft	711	0.11	152.8%	136.1%
13-17W LED Screw-in replacing incandescent/CFL	2,284	0.35	152.8%	129.6%
Total	4,351	0.61	166.3%	137.9%

Project Number SN9-092

Program Small Commercial Solutions

Project Background

The participant is a sit-down restaurant that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (76) T8/T12 Upgrade to LED Linear – 4ft

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	*Expected Per-Unit kWh Savings*	*Expected Per-Unit kW Reduction*
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	76	58	3,022	4,932	163.2%
		Total:	**3,022**	**4,932**	**163.2%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	76	0.010	0.98	0.99	101.0%
		Total:	**0.98**	**0.99**	**101.0%**

Results

The kWh and kW realization rates for project SN9-092 are 163.2% and 101.0%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a reduction in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	4,932	0.99	163.2%	101.0%
Total:	**4,932**	**0.99**	**163.2%**	**101.0%**

Project Number SN9-088

Program Small Commercial Solutions

Project Background

The participant is an office that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (44) 28w led - non-int. ballasts replaced (44) 4' 2-lamp t8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Prescriptive Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Office (custom)	ER	2,600	0.87	1.20	0.77

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Verified kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED28W	44	44	59	28	2,600	3,085	3,085	0.87	100.0%
					Total	**3,085**	**3,085**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Verified kW Savings	IEFD	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED28W	44	44	59	28	0.77	1.26	1.26	1.20	100.0%
					Total	**1.26**	**1.26**		**100.0%**

Results

The kWh realization rate for project SN9-088 is 100.0% and the kW realization rate is 100.0%.

Table D. Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LED28W	3,085	1.26	100.0%	100.0%
Total	**3,085**	**1.26**	**100.0%**	**100.0%**

Project Number SA9-015

Program Small Commercial Solutions

Project Background

The participant is an art studio that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (24) 48w led - non-int. ballasts replaced (24) 4' 4-lamp t8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Prescriptive Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Non-Warehouse Storage (Generic)	None	4,207	1.00	1.00	0.77

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Verified kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED48W	24	24	112	48	4,207	5,399	6,462	1.00	119.7%
					Total:	**5,399**	**6,462**		**119.7%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Verified kW Savings	IEFD	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED48W	24	24	112	48	0.77	1.38	1.18	1.00	85.5%
					Total	**1.38**	**1.18**		**85.5%**

Results

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LED48W	6,462	1.18	119.7%	85.5%
Total:	**6,462**	**1.18**	**119.7%**	**85.5%**

Project Number CIP-055

Program Small Commercial Solutions

Project Background

The participant is a recreational park that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (38) Exterior Lighting: LED replacing 401 W to 1000 W HID

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	*Expected Per-Unit kWh Savings*	*Expected Per-Unit kW Reduction*
Exterior Lighting: LED replacing 401 W to 1000 W HID	230.8	0.000

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
Exterior Lighting: LED replacing 401 W to 1000 W HID	38	230.8	8,769	8,941	102.0%
		Total:	**8,769**	**8,941**	**102.0%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
Exterior Lighting: LED replacing 401 W to 1000 W HID (lamp wattage)	38	0.000	0.00	0.00	-
		Total:	**0.00**	**0.00**	**-**

Results

The kWh and kW realization rates for project CIP_055 are 206.8% and NA, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
Exterior Lighting: LED replacing 401 W to 1000 W HID	8,941	0.00	102.0%	N/A
Total:	**8,941**	**0.00**	**102.0%**	**N/A**

Project Number SA9-017

Program Small Commercial Solutions

Project Background

The participant is a religious organization that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (46) LED A-lamp replacing CFL/Incandescent Screw-In Lamp
- (23) LED Directional lamp replacing CFL/Halogen Direction Lamp
- (5) LED Downlight kit replacing CFL/Incandescent Downlight
- (12) T8/T12 Upgrade to LED Linear - 4ft
- (1) LED replacing <175 W HID

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	111.7	0.036
LED Directional lamp replacing CFL/Halogen Direction Lamp	108.5	0.035
LED Downlight kit replacing CFL/Incandescent Downlight	108.5	0.035
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
LED replacing <175 W HID (lamp wattage)	228.3	0.041

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	46	112	5,137	2,830	55.1%
LED Directional lamp replacing CFL/Halogen Direction Lamp	23	109	2,496	1,375	55.1%
LED Downlight kit replacing CFL/Incandescent Downlight	5	109	543	299	55.0%
T8/T12 Upgrade to LED Linear - 4ft	12	58	477	692	145.2%
LED replacing <175 W HID	1	228	994	233	23.4%
		Total:	**9,647**	**5,428**	**56.3%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	46	0.036	1.67	1.26	75.6%
LED Directional lamp replacing CFL/Halogen Direction Lamp	23	0.035	0.81	0.61	75.6%
LED Downlight kit replacing CFL/Incandescent Downlight	5	0.035	0.18	0.13	75.6%
T8/T12 Upgrade to LED Linear - 4ft	12	0.010	0.16	0.15	95.8%
LED replacing <175 W HID	1	0.041	0.11	0.00	0.0%
		Total:	**2.93**	**2.16**	**73.6%**

Results

The kWh and kW realization rates for project SA9-017 are 56.3% and 73.6%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	2,830	1.26	55.1%	75.6%
LED Directional lamp replacing CFL/Halogen Direction Lamp	1,375	0.61	55.1%	75.6%
LED Downlight kit replacing CFL/Incandescent Downlight	299	0.13	55.0%	75.6%
T8/T12 Upgrade to LED Linear - 4ft	692	0.15	145.2%	95.8%
LED replacing <175 W HID (lamp wattage)	233	0.00	23.4%	0.0%
Total:	**5,428**	**2.16**	**56.3%**	**73.6%**

Project Number SA9-016

Program Small Commercial Solutions

Project Background

The participant is a non-24-hour supermarket that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (11) 32w led - non-int. ballasts replaced (11) 80w 1-lamp halogens
- (18) 72w led - non-int. ballasts replaced (18) 4' 3-lamp t12ess
- (7) 36w led - non-int. ballasts replaced (7) 4' 3-lamp t12ess
- (3) 80w led - non-int. ballasts replaced (3) 320w metal halides

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Food Sales: Non-24-Hour Supermarket (custom)	ER	4,472	0.87	1.25	0.95
Food Sales: Non-24-Hour Supermarket (custom)	ER	4,472	0.87	1.20	0.95
Exterior	ER	4,319	0.87	1.00	0.00

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Verified kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
H80 to LED32W	11	11	80	32	4,472	2,952	2,952	1.25	100.0%
F40T12/ES to LED72W	18	18	144	72	4,472	2,801	2,801	0.87	100.0%
F40T12/ES to LED36W	7	7	144	36	4,319	2,298	2,298	1.00	100.0%
MH320 to LED80W	3	3	362	80	4,319	3,654	3,654	1.00	100.0%
					Total:	**11,705**	**11,705**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Verified kW Savings	IEFD	Realization Rate
	Base	Post	Base	Post					
H80 to LED32W	11	11	80	32	0.95	0.63	0.63	1.25	100.0%
F40T12/ES to LED72W	18	18	144	72	0.95	0.82	0.82	1.20	100.0%
F40T12/ES to LED36W	7	7	144	36	0.00	0.00	0.00	1.00	N/A
MH320 to LED80W	3	3	362	80	0.00	0.00	0.00	1.00	N/A
					Total	**1.45**	**1.45**		**100.0%**

Results

The kWh realization rate for project SA9-016 is 100.0% and the kW realization rate is 100.0%.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
H80 to LED32W	2,952	0.63	100.0%	100.0%
F40T12/ES to LED72W	2,801	0.82	100.0%	100.0%
F40T12/ES to LED36W	2,298	0.00	100.0%	N/A
MH320 to LED80W	3,654	0.00	100.0%	N/A
Total	**11,705**	**1.45**	**100.0%**	**100.0%**

Project Number SN9-128

Program Small Commercial Solutions

Project Background

The participant is an automotive service facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting outdoors. The Evaluators verified that the following had been installed:

- (4) 321w led - non-int. ballasts replaced (4) 1000w metal halides

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A, Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	IEF_E	IEF_D	*CF*
Exterior	(none)	4,319	1.00	1.00	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Verified kWh Savings*	IEF_E	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1000 to LED321W	4	4	1,078	321	4,319	13,078	13,078	1.00	100.0%
					Total	**13,078**	**13,078**		**100.0%**

Table C, Lighting Retrofit kW Reduction Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*Expected kW Savings*	*Verified kW Savings*	*IEFD*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1000 to LED321W	4	4	1,078	321	0.00	0.00	0.00	1.00	N/A
					Total	**0.00**	**0.00**		**100.0%**

Results

The kWh realization rate for project SN9-128 is 100.0% and the kW realization rate is not applicable.

Table D, Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
MH1000 to LED321W	13,078	0.00	100.0%	N/A
Total	**13,078**	**0.00**	**100.0%**	**N/A**

Project Number CIP-046

Program Small Commercial Solutions

Project Background

The participant is a recreational park that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (2) Exterior Lighting: LED replacing 175 W to 250 W HID
- (15) Exterior Lighting: LED replacing 251 W to 400 W HID
- (50) Exterior Lighting: LED replacing 401 W to 1000 W HID

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	*Expected Per-Unit kWh Savings*	*Expected Per-Unit kW Reduction*
Exterior Lighting: LED replacing 175 W to 250 W HID	44.2	0.000
Exterior Lighting: LED replacing 251 W to 400 W HID	100.7	0.000
Exterior Lighting: LED replacing 401 W to 1000 W HID	230.8	0.000

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
Exterior Lighting: LED replacing 175 W to 250 W HID (lamp wattage)	2	44	88	90	102.0%
Exterior Lighting: LED replacing 251 W to 400 W HID (lamp wattage)	15	101	1,510	1,540	102.0%
Exterior Lighting: LED replacing 401 W to 1000 W HID (lamp wattage)	50	231	11,538	11,767	102.0%
		Total:	**13,136**	**13,398**	**102.0%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
Exterior Lighting: LED replacing 175 W to 250 W HID (lamp wattage)	2	0.000	0.00	0.00	N/A
Exterior Lighting: LED replacing 251 W to 400 W HID (lamp wattage)	15	0.000	0.00	0.00	N/A
Exterior Lighting: LED replacing 401 W to 1000 W HID (lamp wattage)	50	0.000	0.00	0.00	N/A
		Total:	**0.00**	**0.00**	**N/A**

Results

The kWh and kW realization rates for project CIP_046 are 102.0% and N/A, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
Exterior Lighting: LED replacing 175 W to 250 W HID	90	0.00	102.0%	N/A
Exterior Lighting: LED replacing 251 W to 400 W HID	1,540	0.00	102.0%	N/A
Exterior Lighting: LED replacing 401 W to 1000 W HID	11,767	0.00	102.0%	N/A
Total:	**13,398**	**0.00**	**102.0%**	**N/A**

Project Number SN9_095

Program Small Commercial Solutions

Project Background

The participant is a commercial and residential roofing business that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (13) LED A-lamp replacing CFL/Incandescent Screw-In Lamp
- (27) LED Directional lamp replacing CFL/Halogen Direction Lamp
- (48) T8/T12 Upgrade to LED Linear - 4ft
- (44) Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8 (HO)
- (8) LED U-tube replacing U-tube Fluorescent T12/T8
- (2) LED replacing <175 W HID
- (1) LED replacing 175 W to 250 W HID

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	111.7	0.036
LED Directional lamp replacing CFL/Halogen Direction Lamp	108.5	0.035
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8 (HO)	163.4	0.053
LED U-tube replacing U-tube Fluorescent T12/T8	54.6	0.018
LED replacing <175 W HID	228.3	0.041
LED replacing 175 W to 250 W HID	373.6	0.067

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	13	112	1,452	1,621	111.6%
LED Directional lamp replacing CFL/Halogen Direction Lamp	27	109	2,930	3,270	111.6%
T8/T12 Upgrade to LED Linear - 4ft	48	58	1,909	3,113	163.1%
Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8 (HO)	44	163	7,189	8,024	111.6%
LED U-tube replacing U-tube Fluorescent T12/T8	8	55	437	487	111.6%
LED replacing <175 W HID	2	228	662	619	93.4%
LED replacing 175 W to 250 W HID	1	374	516	506	98.1%
		Total:	**15,093**	**17,640**	**116.8%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	13	0.036	0.47	0.58	123.8%
LED Directional lamp replacing CFL/Halogen Direction Lamp	27	0.035	0.95	1.18	123.8%
T8/T12 Upgrade to LED Linear - 4ft	48	0.010	0.62	0.59	95.8%
Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8 (HO)	44	0.053	2.34	2.89	123.6%
LED U-tube replacing U-tube Fluorescent T12/T8	8	0.018	0.14	0.18	123.8%
LED replacing <175 W HID	2	0.041	0.22	0.10	44.7%
LED replacing 175 W to 250 W HID	1	0.067	0.17	0.08	46.9%
		Total:	**4.90**	**5.59**	**113.9%**

Results

The kWh and kW realization rates for project SN9_095 are 116.8% and 113.9%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	1,621	0.58	111.6%	123.8%
LED Directional lamp replacing CFL/Halogen Direction Lamp	3,270	1.18	111.6%	123.8%
T8/T12 Upgrade to LED Linear - 4ft	3,113	0.59	163.1%	95.8%
Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8 (HO)	8,024	2.89	111.6%	123.6%
LED U-tube replacing U-tube Fluorescent T12/T8	487	0.18	111.6%	123.8%
LED replacing <175 W HID	619	0.10	93.4%	44.7%
LED replacing 175 W to 250 W HID	506	0.08	98.1%	46.9%
Total:	**17,640**	**5.59**	**116.8%**	**113.9%**

Project Number CIP_090

Program Small Commercial Solutions

Project Background

The participant is a pharmacy that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- 7-12W LED Screw-in replacing incandescent/CFL
- T8/T12 Upgrade to LED Linear - 2ft
- T8/T12 Upgrade to LED Linear - 4ft
- T8/T12 Upgrade to LED Linear - 8ft

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	*Expected Per-Unit kWh Savings*	*Expected Per-Unit kW Reduction*
7-12W LED Screw-in replacing incandescent/CFL	128.7	0.023
T8/T12 Upgrade to LED Linear - 2ft	29.1	0.005
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
T8/T12 Upgrade to LED Linear - 8ft	126.2	0.023

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	5	129	643	534	83.0%
T8/T12 Upgrade to LED Linear - 2ft	1	29	116	97	83.1%
T8/T12 Upgrade to LED Linear - 4ft	100	58	5,812	4,822	83.0%
T8/T12 Upgrade to LED Linear - 8ft	123	126	15,523	12,882	83.0%
		Total:	**22,094**	**18,334**	**83.0%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	15	0.023	0.12	0.17	143.7%
T8/T12 Upgrade to LED Linear - 2ft	456	0.010	0.02	0.03	138.4%
T8/T12 Upgrade to LED Linear - 4ft	6	0.023	1.05	1.45	138.4%
T8/T12 Upgrade to LED Linear - 8ft	44	0.014	2.79	4.09	146.6%
		Total:	**3.98**	**5.74**	**144.1%**

Results

The kWh and kW realization rates for project CIP_090 are 83.0% and 144.1%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
7-12W LED Screw-in replacing incandescent/CFL	534	0.17	83.0%	143.7%
T8/T12 Upgrade to LED Linear - 2ft	97	0.03	83.1%	138.4%
T8/T12 Upgrade to LED Linear - 4ft	4,822	1.45	83.0%	138.4%
T8/T12 Upgrade to LED Linear - 8ft	12,882	4.09	83.0%	146.6%
Total:	**18,334**	**5.74**	**83.0%**	**144.1%**

Project Number CIP-009

Program Small Commercial Solutions

Project Background

The participant is a church that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (20) T8/T12 Upgrade to LED Linear - 4ft
- (36) LED replacing 251 W to 400 W HID
- (50) 13-17W LED Screw-in replacing incandescent/CFL

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
LED replacing 251 W to 400 W HID	851.0	0.153
13-17W LED Screw-in replacing incandescent/CFL	149.5	0.027

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	20	58	1,162	871	74.9%
LED replacing 251 W to 400 W HID	36	851	30,636	22,957	74.9%
13-17W LED Screw-in replacing incandescent/CFL	50	150	7,475	5,601	74.9%
		Total:	**39,273**	**29,430**	**74.9%**

Table C. Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	20	0.010	0.20	0.17	85.2%
LED replacing 251 W to 400 W HID	36	0.153	5.51	4.69	85.2%
13-17W LED Screw-in replacing incandescent/CFL	50	0.027	1.35	1.15	85.2%
		Total:	**7.06**	**6.01**	**85.2%**

Results

The kWh and kW realization rates for project CIP_009 are 74.9% and 85.2%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
T8/T12 Upgrade to LED Linear - 4ft	871	0.17	74.9%	85.2%
LED replacing 251 W to 400 W HID (lamp wattage)	22,957	4.69	74.9%	85.2%
13-17W LED Screw-in replacing incandescent/CFL	5,601	1.15	74.9%	85.2%
Total:	**29,430**	**6.01**	**74.9%**	**85.2%**

Project Number SA9-018

Program Small Commercial Solutions

Project Background

The participant is a church that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (32) LED A-lamp replacing CFL/Incandescent Screw-In Lamp
- (37) LED Directional lamp replacing CFL/Halogen Direction Lamp
- (20) LED Downlight kit replacing CFL/Incandescent Downlight
- (56) T8/T12 Upgrade to LED Linear - 2ft
- (419) T8/T12 Upgrade to LED Linear - 4ft
- (3) LED Lamp/Fixture replacing <175 W HID
- (3) LED replacing 251 W to 400 W HID
- (21) LED Exit Sign

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	111.7	0.036
LED Directional lamp replacing CFL/Halogen Direction Lamp	108.5	0.035
LED Downlight kit replacing CFL/Incandescent Downlight	108.5	0.035
T8/T12 Upgrade to LED Linear - 2ft	29.1	0.005
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
LED Lamp/Fixture replacing <175 W HID (lamp wattage)	994.3	0.000
LED replacing 251 W to 400 W HID (lamp wattage)	851.0	0.153
LED Exit Sign	164.0	0.023

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	32	112	3,574	2,678	74.9%
LED Directional lamp replacing CFL/Halogen Direction Lamp	37	109	4,015	3,008	74.9%
LED Downlight kit replacing CFL/Incandescent Downlight	20	109	2,170	1,626	74.9%
T8/T12 Upgrade to LED Linear - 2ft	56	29	1,107	1,221	110.3%
T8/T12 Upgrade to LED Linear - 4ft	419	58	16,660	18,242	109.5%
LED Lamp/Fixture replacing <175 W HID (lamp wattage)	3	994	2,983	2,235	74.9%
LED replacing 251 W to 400 W HID (lamp wattage)	3	851	7,240	1,913	26.4%
LED Exit Sign	21	164	3,606	7,123	197.5%
		Total:	**41,354**	**38,047**	**92.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	32	0.036	1.16	0.99	85.2%
LED Directional lamp replacing CFL/Halogen Direction Lamp	37	0.035	1.30	1.11	85.2%
LED Downlight kit replacing CFL/Incandescent Downlight	20	0.035	0.71	0.60	85.2%
T8/T12 Upgrade to LED Linear - 2ft	56	0.005	0.36	0.24	66.3%
T8/T12 Upgrade to LED Linear - 4ft	419	0.010	5.41	3.57	66.0%
LED Lamp/Fixture replacing <175 W HID (lamp wattage)	3	0.000	0.34	0.00	0.0%
LED replacing 251 W to 400 W HID (lamp wattage)	3	0.153	0.83	0.39	47.3%
LED Exit Sign	21	0.023	0.50	0.78	154.1%
		Total:	**10.62**	**7.68**	**72.3%**

Results

The kWh and kW realization rates for project SA9-018 are 92.0% and 72.3%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	2,678	0.99	74.9%	85.2%
LED Directional lamp replacing CFL/Halogen Direction Lamp	3,008	1.11	74.9%	85.2%
LED Downlight kit replacing CFL/Incandescent Downlight	1,626	0.60	74.9%	85.2%
T8/T12 Upgrade to LED Linear - 2ft	1,221	0.24	110.3%	66.3%
T8/T12 Upgrade to LED Linear - 4ft	18,242	3.57	109.5%	66.0%
LED Lamp/Fixture replacing <175 W HID (lamp wattage)	2,235	0.00	74.9%	0.0%
LED replacing 251 W to 400 W HID (lamp wattage)	1,913	0.39	26.4%	47.3%
LED Exit Sign	7,123	0.78	197.5%	154.1%
Total:	**38,047**	**7.68**	**92.0%**	**72.3%**

Project Number SN9-107

Program Small Commercial Solutions

Project Background

The participant is a leisure dining and lounge facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (30) 28w led - non-int. ballasts replaced (30) 4' 3-lamp t8s
- (8) 25w led - non-int. ballasts replaced (9) 2-lamp t8 hlo u-tubes
- (1) 25w led - non-int. ballasts replaced (1) 4' 2-lamp t8s
- (6) 14w led - non-int. ballasts replaced (6) 4' 1-lamp t8s
- (16) 42w led - non-int. ballasts replaced (16) 4' 3-lamp t8s
- (18) 28w led - non-int. ballasts replaced (18) 4' 2-lamp t8s
- (46) 28w led - non-int. ballasts replaced (46) 4' 3-lamp t8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Calculation Inputs

Building Type	*Heating Type*	*Annual Hours*	IEF_E	IEF_D	*CF*
Non-Warehouse Storage (generic)	Gas	4207	1.09	1.2	0.77
Custom[48]	Gas	8760	1.09	1.2	1.0
Restroom (Generic)	Gas	3516	1.09	1.2	0.9
Office (attached to other facility)	Gas	4728	1.09	1.2	0.77

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

[48] Based upon verified actual hours of operation in the space.

Table B. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Verified kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED28W	2	2	89	28	4,207	573	559	1.09	97.6%
F32T8 to LED28W	3	3	89	28	4,207	860	839	1.09	97.6%
F32T8 to LED28W	1	1	89	28	4,207	287	280	1.09	97.6%
F32T8 to LED28W	1	1	89	28	4,207	287	280	1.09	97.6%
F32T8 to LED28W	1	1	89	28	4,207	287	280	1.09	97.6%
F32T8 to LED28W	1	1	89	28	4,207	287	280	1.09	97.6%
F32T8 to LED28W	3	3	89	28	4,207	860	839	1.09	97.6%
F32T8 to LED28W	10	10	89	28	8,760	5,825	5,825	1.09	100.0%
F32T8 to LED28W	5	5	89	28	8,760	2,912	2,912	1.09	100.0%
F32T8 to LED28W	1	1	89	28	3,516	234	234	1.09	100.0%
F32T8 to LED28W	2	2	89	28	8,760	1,165	1,165	1.09	100.0%
FU31T8/6 to LED25W	1	1	65	25	8,760	382	382	1.09	100.0%
F32T8 to LED25W	1	1	62	25	8,760	353	353	1.09	100.0%
FU31T8/6 to LED25W	4	4	65	25	8,760	1,528	1,528	1.09	100.0%
FU31T8/6 to LED25W	2	3	65	25	8,760	525	525	1.09	100.0%
F32T8 to LED14W	1	1	31	14	8,760	162	162	1.09	100.0%
F32T8 to LED42W	7	7	89	42	8,760	3,141	3,141	1.09	100.0%
F32T8 to LED28W	2	2	62	28	8,760	649	649	1.09	100.0%
F32T8 to LED28W	2	2	62	28	8,760	649	649	1.09	100.0%
F32T8 to LED42W	3	3	89	42	8,760	1,346	1,346	1.09	100.0%
F32T8 to LED42W	3	3	89	42	3,516	233	233	1.09	100.0%

F32T8 to LED42W	3	3	89	42	3,516	233	233	1.09	100.0%
FU31T8/6 to LED25W	1	1	65	25	3,516	79	79	1.09	100.0%
F32T8 to LED28W	2	2	89	28	8,760	1,165	1,165	1.09	100.0%
F32T8 to LED28W	1	1	89	28	8,760	583	582	1.09	99.8%
F32T8 to LED28W	1	1	89	28	8,760	583	582	1.09	99.8%
F32T8 to LED28W	2	2	89	28	8,760	1,165	1,165	1.09	100.0%
F32T8 to LED28W	2	2	89	28	8,760	1,165	1,165	1.09	100.0%
F32T8 to LED28W	1	1	89	28	8,760	583	582	1.09	99.8%
F32T8 to LED28W	1	1	89	28	8,760	583	582	1.09	99.8%
F32T8 to LED28W	1	1	62	28	8,760	325	325	1.09	100.0%
F32T8 to LED28W	1	1	62	28	8,760	325	325	1.09	100.0%
F32T8 to LED14W	4	4	32	14	8,760	688	687	1.09	99.9%
F32T8 to LED28W	2	2	62	28	8,760	649	649	1.09	100.0%
F32T8 to LED14W	1	1	32	14	8,760	172	172	1.09	100.0%
F32T8 to LED28W	11	11	89	28	4,728	3,773	3,458	1.09	91.7%
F32T8 to LED28W	2	2	62	28	4,728	382	350	1.09	91.6%
F32T8 to LED28W	2	2	89	28	4,728	686	629	1.09	91.7%
F32T8 to LED28W	4	4	89	28	4,728	1,372	1,257	1.09	91.6%
F32T8 to LED28W	4	4	89	28	4,728	1,372	1,257	1.09	91.6%
F32T8 to LED28W	2	2	89	28	4,728	686	629	1.09	91.7%
F32T8 to LED28W	4	4	89	28	4,728	1,372	1,257	1.09	91.6%
F32T8 to LED28W	4	4	89	28	4,728	1,372	1,257	1.09	91.6%
F32T8 to LED28W	3	3	89	28	4,728	1,029	943	1.09	91.6%
F32T8 to LED28W	2	2	62	28	4,728	382	350	1.09	91.6%
F32T8 to LED28W	5	5	62	28	4,728	956	876	1.09	91.6%

F32T8 to LED28W	3	3	62	28	4,728	574	526	1.09	91.6%
F32T8 to LED28W	1	1	89	28	3,516	234	234	1.09	100.0%
F32T8 to LED28W	1	1	89	28	3,516	234	234	1.09	100.0%
					Total	**45,267**	**44,011**		**97.2%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Verified kW Savings***	***IEFD***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED28W	2	2	89	28	0.77	0.13	0.11	1.20	84.6%
F32T8 to LED28W	3	3	89	28	0.77	0.20	0.17	1.20	85.0%
F32T8 to LED28W	1	1	89	28	0.77	0.07	0.06	1.20	85.7%
F32T8 to LED28W	1	1	89	28	0.77	0.07	0.06	1.20	85.7%
F32T8 to LED28W	1	1	89	28	0.77	0.07	0.06	1.20	85.7%
F32T8 to LED28W	1	1	89	28	0.77	0.07	0.06	1.20	85.7%
F32T8 to LED28W	3	3	89	28	0.77	0.20	0.17	1.20	85.0%
F32T8 to LED28W	10	10	89	28	1.00	0.73	0.73	1.20	100.0%
F32T8 to LED28W	5	5	89	28	1.00	0.37	0.37	1.20	100.0%
F32T8 to LED28W	1	1	89	28	0.90	0.07	0.07	1.20	100.0%
F32T8 to LED28W	2	2	89	28	1.00	0.15	0.15	1.20	100.0%
FU31T8/6 to LED25W	1	1	65	25	1.00	0.05	0.05	1.20	100.0%
F32T8 to LED25W	1	1	62	25	1.00	0.04	0.04	1.20	100.0%
FU31T8/6 to LED25W	4	4	65	25	1.00	0.19	0.19	1.20	100.0%
FU31T8/6 to LED25W	2	3	65	25	1.00	0.07	0.07	1.20	100.0%
F32T8 to LED14W	1	1	31	14	1.00	0.02	0.02	1.20	100.0%
F32T8 to LED42W	7	7	89	42	1.00	0.39	0.39	1.20	100.0%

F32T8 to LED28W	2	2	62	28	1.00	0.08	0.08	1.20	100.0%
F32T8 to LED28W	2	2	62	28	1.00	0.08	0.08	1.20	100.0%
F32T8 to LED42W	3	3	89	42	1.00	0.17	0.17	1.20	100.0%
F32T8 to LED42W	3	3	89	42	0.90	0.04	0.10	1.20	250.0%
F32T8 to LED42W	3	3	89	42	0.90	0.04	0.10	1.20	250.0%
FU31T8/6 to LED25W	1	1	65	25	0.90	0.01	0.03	1.20	300.0%
F32T8 to LED28W	2	2	89	28	1.00	0.15	0.15	1.20	100.0%
F32T8 to LED28W	1	1	89	28	1.00	0.07	0.07	1.20	100.0%
F32T8 to LED28W	1	1	89	28	1.00	0.07	0.07	1.20	100.0%
F32T8 to LED28W	2	2	89	28	1.00	0.15	0.15	1.20	100.0%
F32T8 to LED28W	2	2	89	28	1.00	0.15	0.15	1.20	100.0%
F32T8 to LED28W	1	1	89	28	1.00	0.07	0.07	1.20	100.0%
F32T8 to LED28W	1	1	89	28	1.00	0.07	0.07	1.20	100.0%
F32T8 to LED28W	1	1	62	28	1.00	0.04	0.04	1.20	100.0%
F32T8 to LED28W	1	1	62	28	1.00	0.04	0.04	1.20	100.0%
F32T8 to LED14W	4	4	32	14	1.00	0.09	0.09	1.20	100.0%
F32T8 to LED28W	2	2	62	28	1.00	0.08	0.08	1.20	100.0%
F32T8 to LED14W	1	1	32	14	1.00	0.02	0.02	1.20	100.0%
F32T8 to LED28W	11	11	89	28	0.77	0.62	0.62	1.20	100.0%
F32T8 to LED28W	2	2	62	28	0.77	0.06	0.06	1.20	100.0%
F32T8 to LED28W	2	2	89	28	0.77	0.11	0.11	1.20	100.0%
F32T8 to LED28W	4	4	89	28	0.77	0.23	0.23	1.20	100.0%
F32T8 to LED28W	4	4	89	28	0.77	0.23	0.23	1.20	100.0%
F32T8 to LED28W	2	2	89	28	0.77	0.11	0.11	1.20	100.0%
F32T8 to LED28W	4	4	89	28	0.77	0.23	0.23	1.20	100.0%
F32T8 to LED28W	4	4	89	28	0.77	0.23	0.23	1.20	100.0%

F32T8 to LED28W	3	3	89	28	0.77	0.17	0.17	1.20	100.0%
F32T8 to LED28W	2	2	62	28	0.77	0.06	0.06	1.20	100.0%
F32T8 to LED28W	5	5	62	28	0.77	0.16	0.16	1.20	100.0%
F32T8 to LED28W	3	3	62	28	0.77	0.09	0.09	1.20	100.0%
F32T8 to LED28W	1	1	89	28	0.90	0.07	0.07	1.20	100.0%
F32T8 to LED28W	1	1	89	28	0.90	0.07	0.07	1.20	100.0%
					Total	**6.75**	**6.77**		**100.3%**

Results

The kWh and kW realization rates for project SN9-107 are 97.2% and 100.3%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED28W	559	0.11	97.6%	84.6%
F32T8 to LED28W	839	0.17	97.6%	85.0%
F32T8 to LED28W	280	0.06	97.6%	85.7%
F32T8 to LED28W	280	0.06	97.6%	85.7%
F32T8 to LED28W	280	0.06	97.6%	85.7%
F32T8 to LED28W	280	0.06	97.6%	85.7%
F32T8 to LED28W	839	0.17	97.6%	85.0%
F32T8 to LED28W	5,825	0.73	100.0%	100.0%
F32T8 to LED28W	2,912	0.37	100.0%	100.0%

F32T8 to LED28W	234	0.07	100.0%	100.0%
F32T8 to LED28W	1,165	0.15	100.0%	100.0%
FU31T8/6 to LED25W	382	0.05	100.0%	100.0%
F32T8 to LED25W	353	0.04	100.0%	100.0%
FU31T8/6 to LED25W	1,528	0.19	100.0%	100.0%
FU31T8/6 to LED25W	525	0.07	100.0%	100.0%
F32T8 to LED14W	162	0.02	100.0%	100.0%
F32T8 to LED42W	3,141	0.39	100.0%	100.0%
F32T8 to LED28W	649	0.08	100.0%	100.0%
F32T8 to LED28W	649	0.08	100.0%	100.0%
F32T8 to LED42W	1,346	0.17	100.0%	100.0%
F32T8 to LED42W	233	0.10	100.0%	250.0%
F32T8 to LED42W	233	0.10	100.0%	250.0%
FU31T8/6 to LED25W	79	0.03	100.0%	300.0%
F32T8 to LED28W	1,165	0.15	100.0%	100.0%
F32T8 to LED28W	582	0.07	99.8%	100.0%
F32T8 to LED28W	582	0.07	99.8%	100.0%
F32T8 to LED28W	1,165	0.15	100.0%	100.0%
F32T8 to LED28W	1,165	0.15	100.0%	100.0%
F32T8 to LED28W	582	0.07	99.8%	100.0%
F32T8 to LED28W	582	0.07	99.8%	100.0%
F32T8 to LED28W	325	0.04	100.0%	100.0%
F32T8 to LED28W	325	0.04	100.0%	100.0%
F32T8 to LED14W	687	0.09	99.9%	100.0%
F32T8 to LED28W	649	0.08	100.0%	100.0%
F32T8 to LED14W	172	0.02	100.0%	100.0%

F32T8 to LED28W	3,458	0.62	91.7%	100.0%
F32T8 to LED28W	350	0.06	91.6%	100.0%
F32T8 to LED28W	629	0.11	91.7%	100.0%
F32T8 to LED28W	1,257	0.23	91.6%	100.0%
F32T8 to LED28W	1,257	0.23	91.6%	100.0%
F32T8 to LED28W	629	0.11	91.7%	100.0%
F32T8 to LED28W	1,257	0.23	91.6%	100.0%
F32T8 to LED28W	1,257	0.23	91.6%	100.0%
F32T8 to LED28W	943	0.17	91.6%	100.0%
F32T8 to LED28W	350	0.06	91.6%	100.0%
F32T8 to LED28W	876	0.16	91.6%	100.0%
F32T8 to LED28W	526	0.09	91.6%	100.0%
F32T8 to LED28W	234	0.07	100.0%	100.0%
F32T8 to LED28W	234	0.07	100.0%	100.0%
Total	**44,011**	**6.77**	**97.2%**	**100.6%**

Project Number CIP_151

Program Small Commercial Solutions

Project Background

The participant is a retail boating supply store that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (5) 7-12W LED Screw-in replacing incandescent/CFL
- (272) T8/T12 Upgrade to LED Linear - 4ft
- (128) T8/T12 Upgrade to LED Linear - 8ft
- (8) LED replacing 401 W to 1000 W HID

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	*Expected Per-Unit kWh Savings*	*Expected Per-Unit kW Reduction*
7-12W LED Screw-in replacing incandescent/CFL	128.7	0.023
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
T8/T12 Upgrade to LED Linear - 8ft	126.2	0.023
LED replacing 401 W to 1000 W HID	1,951.1	0.351

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	5	129	644	534	82.9%
T8/T12 Upgrade to LED Linear - 4ft	272	58	15,808	13,115	83.0%
T8/T12 Upgrade to LED Linear - 8ft	128	126	16,153	13,405	83.0%
LED replacing 401 W to 1000 W HID	8	1,951	15,609	15,916	102.0%
		Total:	**48,214**	**42,970**	**89.1%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	5	0.023	0.12	0.17	143.7%
T8/T12 Upgrade to LED Linear - 4ft	272	0.010	2.84	3.94	138.4%
T8/T12 Upgrade to LED Linear - 8ft	128	0.023	2.91	4.26	146.6%
LED replacing 401 W to 1000 W HID	8	0.351	2.81	0.00	0.0%
		Total:	**8.67**	**8.36**	**96.4%**

Results

The kWh and kW realization rates for project CIP_151 are 89.1% and 96.4%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
7-12W LED Screw-in replacing incandescent/CFL	534	0.17	82.9%	143.7%
T8/T12 Upgrade to LED Linear - 4ft	13,115	3.94	83.0%	138.4%
T8/T12 Upgrade to LED Linear - 8ft	13,405	4.26	83.0%	146.6%
LED replacing 401 W to 1000 W HID (lamp wattage)	15,916	0.00	102.0%	0.0%
Total:	**42,970**	**8.36**	**89.1%**	**96.4%**

Project Number SN9-138

Program Small Commercial Solutions

Project Background

The participant is a mall that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (256) 29w led - non-int. ballasts replaced (256) 4' 2-lamp t8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Retail: Enclosed Mall	ER	8,760	0.87	1.20	1.00

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Verified kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED29W	256	256	59	29	8,760	58,531	58,531	0.87	100.0%
					Total	**58,531**	**58,531**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*Expected kW Savings*	*Verified kW Savings*	*IEFD*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED29W	256	256	59	29	1.00	9.22	9.22	1.20	100.0%
					Total	**9.22**	**9.22**		**100.0%**

Results

The kWh realization rate for project SN9-138 is 100.0% and the kW realization rate is 100.0%.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
F32T8 to LED29W	58,531	9.22	100.0%	100.0%
Total	**58,531**	**9.22**	**100.0%**	**100.0%**

Project Number CIP-079

Program Small Commercial Solutions

Project Background

The participant is a retail facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (15) 7-12W LED Screw-in replacing incandescent/CFL
- (456) T8/T12 Upgrade to LED Linear - 4ft
- (6) T8/T12 Upgrade to LED Linear - 8ft
- (44) T8/T12 Upgrade to LED Linear - U-Tube
- (12) LED replacing 251 W to 400 W HID
- (2) Exterior Lighting: LED replacing 175 W to 250 W HID
- (1) Exterior Lighting: LED replacing 251 W to 400 W HID
- (10) Exterior Lighting: LED replacing 401 W to 1000 W HID

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0 and was calculated using average connected loads for lamps and fixtures and facility type-specific hours of operation. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***
7-12W LED Screw-in replacing incandescent/CFL	128.7	0.023
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
T8/T12 Upgrade to LED Linear - 8ft	126.2	0.023
T8/T12 Upgrade to LED Linear - U-Tube	78.9	0.014
LED replacing 251 W to 400 W HID	851.0	0.153
Exterior Lighting: LED replacing 175 W to 250 W HID	380.9	0.000
Exterior Lighting: LED replacing 401 W to 1000 W HID	1,989.3	0.000

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	15	129	2,059	2,096	101.8%
T8/T12 Upgrade to LED Linear - 4ft	456	58	30,338	30,875	101.8%
T8/T12 Upgrade to LED Linear - 8ft	6	126	757	771	101.8%
T8/T12 Upgrade to LED Linear - U-Tube	44	79	3,628	3,695	101.8%
LED replacing 251 W to 400 W HID	12	851	10,212	10,396	101.8%
Exterior Lighting: LED replacing 251 W to 400 W HID	1	868	762	776	101.8%
Exterior Lighting: LED replacing 401 W to 1000 W HID	10	1,989	19,893	20,285	102.0%
		Total:	**67,649**	**68,894**	**101.8%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	15	0.023	0.37	0.53	143.7%
T8/T12 Upgrade to LED Linear - 4ft	456	0.010	5.46	7.55	138.4%
T8/T12 Upgrade to LED Linear - 8ft	6	0.023	0.14	0.20	146.6%
T8/T12 Upgrade to LED Linear - U-Tube	44	0.014	0.65	0.93	142.7%
LED replacing 251 W to 400 W HID	12	0.153	1.84	2.66	144.7%

Exterior Lighting: LED replacing 251 W to 400 W HID	1	0.000	0.00	0.00	N/A
Exterior Lighting: LED replacing 401 W to 1000 W HID	10	0.000	0.00	0.00	N/A
Total:			**8.45**	**11.87**	**140.5%**

Results

The kWh and kW realization rates for project CIP_079 are 101.8% and 140.3%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
7-12W LED Screw-in replacing incandescent/CFL	2,096	0.53	101.8%	143.7%
T8/T12 Upgrade to LED Linear - 4ft	30,875	7.55	101.8%	138.4%
T8/T12 Upgrade to LED Linear - 8ft	771	0.20	101.8%	146.6%
T8/T12 Upgrade to LED Linear - U-Tube	3,695	0.93	101.8%	142.7%
LED replacing 251 W to 400 W HID	10,396	2.66	101.8%	144.7%
Exterior Lighting: LED replacing 251 W to 400 W HID	776	0.00	101.8%	N/A
Exterior Lighting: LED replacing 401 W to 1000 W HID	20,285	0.00	102.0%	N/A
Total:	**68,894**	**11.87**	**101.8%**	**140.5%**

Project Number CIP_120

Program Small Commercial & Industrial Solutions

Project Background

The participant is a manufacturing facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (126) T8/T12 Upgrade to LED Linear - 4ft
- (63) 194w led - non-int. ballasts replaced (7) 8' 4-lamp t12ess
- (21) 194w led - non-int. ballasts replaced (21) 400w metal halides

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture and Table B below inputs used in savings calculations:

Table A. Prescriptive kWh Savings and kW Reductions

Prescriptive Measure	***Per-Unit kWh Savings***	***Per-Unit kW Reduction***
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010

Savings for the prescriptive portions of the project are calculated using the following inputs:

Table B. Custom Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Manufacturing (Custom)	Gas	8,760	1.09	1.20	1.00

Savings Calculations – Prescriptive

Using values from Table A above, the Evaluators calculated lighting savings as follows:

Table C. Per-Unit kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	126	58	7,321	8,172	111.6%
		Total	**7,321**	**8,172**	**111.6%**

Table D. Per-Unit kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	126	0.010	1.26	1.56	123.8%
		Total	**1.26**	**1.56**	**123.8%**

Savings Calculations – Prescriptive

Using the values from Table B above, the Evaluators calculated lighting savings as follows:

Table E. Custom Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Verified kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F96T12/ES to LED194W	63	7	69	194	8,760	28,540	28,540	1.09	100.0%
MH400 to LED194W	21	21	453	194	8,760	51,934	51,934	1.09	100.0%
				Total		**80,474**	**80,474**		**100.0%**

Table F. Custom Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Verified kW Savings	IEFD	Realization Rate
	Base	Post	Base	Post					
F96T12/ES to LED194W	63	7	69	194	1.00	3.59	3.59	1.20	100.0%
MH400 to LED194W	21	21	453	194	1.00	6.53	6.53	1.20	100.0%
					Total	**10.12**	**10.12**		**100.0%**

Results

The kWh and kW realization rates for project CIP-120 are 101.0% and 102.7%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table G. Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
Per-Unit				
T8/T12 Upgrade to LED Linear - 4ft	8,172	1.56	112%	124%
Custom				
F96T12/ES to LED194W	28,540	3.59	100%	100%
MH400 to LED194W	51,934	6.53	100%	100%
Total	**88,646**	**11.68**	**101.0%**	**102.7%**

Project Number CIP_099

Program Small Commercial Solutions

Project Background

The participant is an industrial supply rental company that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (2) 7-12W LED Screw-in replacing incandescent/CFL
- (2) 13-17W LED Screw-in replacing incandescent/CFL
- (363) T8/T12 Upgrade to LED Linear - 4ft
- (56) T8/T12 Upgrade to LED Linear - 8ft
- (45) LED replacing 251 W to 400 W HID (lamp wattage)
- (3) LED replacing 401 W to 1000 W HID (lamp wattage)
- (2) LED replacing 175 W to 250 W HID (lamp wattage)
- (10) LED replacing 251 W to 400 W HID (lamp wattage)
- (9) LED replacing 401 W to 1000 W HID (lamp wattage)

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***
7-12W LED Screw-in replacing incandescent/CFL	128.7	0.023
13-17W LED Screw-in replacing incandescent/CFL	149.5	0.027
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
T8/T12 Upgrade to LED Linear - 8ft	126.2	0.023
LED replacing 251 W to 400 W HID (lamp wattage)	851.0	0.153
LED replacing 401 W to 1000 W HID (lamp wattage)	1,951.1	0.351
LED replacing 175 W to 250 W HID (lamp wattage)	373.6	0.067
LED replacing 251 W to 400 W HID (lamp wattage)	851.0	0.153

LED replacing 401 W to 1000 W HID (lamp wattage)	1,951.1	0.351

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	2	129	257	287	111.6%
13-17W LED Screw-in replacing incandescent/CFL	2	150	299	334	111.7%
T8/T12 Upgrade to LED Linear - 4ft	363	58	21,097	23,542	111.6%
T8/T12 Upgrade to LED Linear - 8ft	56	126	7,067	7,889	111.6%
LED replacing 251 W to 400 W HID (lamp wattage)	45	851	38,295	21,853	57.1%
LED replacing 401 W to 1000 W HID (lamp wattage)	3	1,951	5,853	3,340	57.1%
LED replacing 175 W to 250 W HID (lamp wattage)	2	374	762	762	100.0%
LED replacing 251 W to 400 W HID (lamp wattage)	10	851	8,677	8,678	100.0%
LED replacing 401 W to 1000 W HID (lamp wattage)	9	1,951	17,904	17,906	100.0%
		Total:	**100,211**	**84,590**	**84.4%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Verified kW Reduction*	*kW Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	2	0.023	0.05	0.06	123.0%
13-17W LED Screw-in replacing incandescent/CFL	2	0.027	0.05	0.07	124.3%
T8/T12 Upgrade to LED Linear - 4ft	363	0.010	3.81	4.49	118.4%
T8/T12 Upgrade to LED Linear - 8ft	56	0.023	1.27	1.59	125.4%

LED replacing 251 W to 400 W HID (lamp wattage)	45	0.153	6.89	8.52	123.8%
LED replacing 401 W to 1000 W HID (lamp wattage)	3	0.351	1.05	1.30	123.8%
LED replacing 175 W to 250 W HID (lamp wattage)	2	0.067	0.00	0.00	N/A
LED replacing 251 W to 400 W HID (lamp wattage)	10	0.153	0.00	0.00	N/A
LED replacing 401 W to 1000 W HID (lamp wattage)	9	0.351	0.00	0.00	N/A
		Total:	**13.11**	**16.04**	**122.3%**

Results

The kWh and kW realization rates for project CIP_099 are 84.4% and 122.3%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
7-12W LED Screw-in replacing incandescent/CFL	287	0.06	111.6%	123.0%
13-17W LED Screw-in replacing incandescent/CFL	334	0.07	111.7%	124.3%
T8/T12 Upgrade to LED Linear - 4ft	23,542	4.49	111.6%	118.4%
T8/T12 Upgrade to LED Linear - 8ft	7,889	1.59	111.6%	125.4%
LED replacing 251 W to 400 W HID	21,853	8.52	57.1%	123.8%
LED replacing 401 W to 1000 W HID	3,340	1.30	57.1%	123.8%
LED replacing 175 W to 250 W HID	762	N/A	100.0%	N/A
LED replacing 251 W to 400 W HID	8,678	N/A	100.0%	N/A
LED replacing 401 W to 1000 W HID	17,906	N/A	100.0%	N/A
Total:	**84,590**	**16.04**	**84.4%**	**122.3%**

Project Number SN9-136

Program Small Commercial Solutions

Project Background

The participant is a non-warehouse storage facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (26) 100w led - non-int. ballasts replaced (26) 400w metal halides
- (2) 100w led - non-int. ballasts replaced (2) 1000w metal halides
- (42) 27w led - non-int. ballasts replaced (30) 400w metal halides

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Non-Warehouse Storage (Generic)	(none)	4,207	1.00	1.00	0.77

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Verified kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH400 to LED100W	26	26	453	100	4,207	38,611	38,611	1.00	100.0%
MH1000 to LED100W	2	2	1,078	100	4,207	8,229	8,229	1.00	100.0%
MH400 to LED27W	42	30	453	27	4,207	76,635	76,635	1.00	100.0%
					Total:	**123,475**	**123,475**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Verified kW Savings	IEFD	Realization Rate
	Base	Post	Base	Post					
MH400 to LED100W	26	26	453	100	0.77	7.07	7.07	1.00	100.0%
MH1000 to LED100W	2	2	1,078	100	0.77	1.51	1.51	1.00	100.0%
MH400 to LED27W	42	30	453	27	0.77	14.03	14.03	1.00	100.0%
					Total:	**22.61**	**22.61**		**100.0%**

Results

The kWh realization rate for project SN9-136 is 100.0% and the kW realization rate is 100.0%.

Table D. Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH400 to LED100W	38,611	7.07	100.0%	100.0%
MH1000 to LED100W	8,229	1.51	100.0%	100.0%
MH400 to LED27W	76,635	14.03	100.0%	100.0%
Total	**123,475**	**22.61**	**100.0%**	**100.0%**

Project Number CIP_128

Program Small Commercial Solutions

Project Background

The participant is an apartment complex that received incentives from Entergy New Orleans for retrofitting energy efficient lighting outdoors. The Evaluators verified that the following had been installed:

- (98) 30w led - non-int. ballasts replaced (98) 175w metal halides

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Exterior	None	8,760	1.00	1.00	1.00

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Verified kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH175 to LED30W	98	98	208	30	8,760	152,809	152,809	1.00	100.0%
					Total:	**152,809**	**152,809**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*Expected kW Savings*	*Verified kW Savings*	*IEFD*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH175 to LED30W	98	98	208	30	1.00	17.44	17.44	1.00	100%
					Total	**17.44**	**17.44**		**100%**

Results

The kWh realization rate for project CIP_128 is 100.0% and the kW realization rate is 100.0%.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
MH175 to LED30W	152,809	17.44	100.0%	100.0%
Total	**152,809**	**17.44**	**100.0%**	**100.0%**

Project Number CIP-022

Program Small Commercial Solutions

Project Background

The participant is a warehouse (used as a Mardi Gras den) that received incentives from Entergy New Orleans for installing reduced lighting density (LPD) indoors. The Evaluators verified that the following had been installed:

- (35) 202W high-bay LED fixtures
- (23) 60W LED wall packs

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A, Savings Parameters, New Construction

Building Type	*Heating Type*	*Allowable LPD*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Warehouse: Non-Refrigerated	none	1.4	3,120[49]	1.00	1.00	1.00
Exterior	none	0.2	4,319	1.00	1.00	0.0

New Construction:

$$kW_{savings} = \left(\left(SF \times \frac{LPD}{1000}\right) - \sum\left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000}\right]_{post}\right)\right) \times CF \times IEF_D$$

$$kWh_{savings} = \left(\left(SF \times \frac{LPD}{1000}\right) - \sum\left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000}\right]_{post}\right)\right) \times AOH \times IEF_E$$

[49] Calculated based on verified annual hours of lighting operation.

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations, New Construction

Measure	*Quantity (Fixtures)*	*Wattage*	*Annual Hours*	*IEF_E*	*SF*	*LPD*	*Expected kWh Savings*	*Verified kWh Savings*	*Realization Rate*
LED 202W	35	202	3,120	1	45,412	1.4	176,301	176,301	100.0%
LED 60W	23	60	4,319	1	34,784	0.2	25,589	25,589	100.0%
Total							**201,890**	**201,890**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations, New Construction

Measure	*Quantity (Fixtures)*	*Wattage*	*CF*	*IEF_D*	*SF*	*LPD*	*Expected kW Savings*	*Verified kW Savings*	*Realization Rate*
LED 202W	35	202	1	1	45,412	1.4	56.51	79.06	139.9%
LED 60W	23	60	0	1	34,784	0.2	0.00	0.00	N/A
Total							**56.51**	**79.06**	**139.9%**

Results

The kWh realization rate for project CIP-022 is 100.0%, and the kW realization rate is 139.9%. Expected kW reduction calculations for the 'interior' portion of the project assumed a 77% CF, though the verified CF based upon the custom hours of operation is 100%. Verified kW reduction calculations used the 100% CF, resulting in a larger peak kW reduction than was originally estimated.

Table D, Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
LED 202W	176,301	79.06	100.0%	139.9%
LED 60W	25,589	0	100.0%	N/A
Total	**201,890**	**79.06**	**100.0%**	**139.9%**

17.2 Large Commercial and Industrial

Project Number CIP-104

Program Large Commercial & Industrial Solutions

Project Background

The participant is a cancer research center at a university that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (254) T8/T12 Upgrade to LED Linear - 4ft
- (18) T5 High Output (HO) Upgrade to LED Linear - 4ft

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***	***Measure Quantity***
T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010	254
T5 High Output (HO) Upgrade to LED Linear - 4ft	97.6	0.018	18

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kWh Savings***	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***
T8/T12 Upgrade to LED Linear - 4ft	254	58	14,757	12,463	84.5%
T5 High Output (HO) Upgrade to LED Linear - 4ft	18	98	1,757	1,484	84.5%
		Total:	**16,514**	**13,946**	**84.5%**

Table C. Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Realized kW Reduction*	*kW Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	254	0.010	2.54	2.82	110.9%
T5 High Output (HO) Upgrade to LED Linear - 4ft	18	0.018	0.32	0.36	110.9%
		Total:	**2.86**	**3.18**	**111.1%**

Results

The kWh and kW realization rates for project CIP-104 are 84.5% and 111.1%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
T8/T12 Upgrade to LED Linear - 4ft	12,463	2.82	84.5%	110.9%
T5 High Output (HO) Upgrade to LED Linear - 4ft	1,484	0.36	84.5%	110.9%
Total:	**13,946**	**3.18**	**84.5%**	**111.1%**

Project Number LN9-131

Program Large Commercial & Industrial Solutions

Project Background

The participant is a large manufacturing facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (42) 130w led - non-int. ballasts replaced (42) 8' 4-lamp t12ess

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Manufacturing	(none)	5,740	1.00	1.00	0.73

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours $_{pre,\ post}$*	*Expected kWh Savings*	*Realized kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F96T12/ES to LED130W	42	42	220	130	5,740, 4,018	30,858	30,858	1.00	100.0%
					Total	**30,858**	**30,858**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		$CF_{pre, post}$	Expected kW Savings	Realized kW Savings	IEF_D	Realization Rate
	Base	Post	Base	Post					
F96T12/ES to LED130W	42	42	220	130	0.73, 0.26	4.15	4.15	1.00	100.0%
					Total	**4.15**	**4.15**		**100.0%**

Results

The kWh and kW realization rates for project LN9-131 are 100.0%.

Table D. Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F96T12/ES to LED130W	30,858	4.15	100.0%	100.0%
Total	**30,858**	**4.15**	**100.0%**	**100.0%**

Project Number CIP-015

Program Large Commercial & Industrial Solutions

Project Background

The participant is a public convention center that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (1,170) 4' linear led replacing 4' fluorescent t12/t8
- (4) led u-tube replacing u-tube fluorescent t12/t8
- (4) 50w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (17) 36w led - non-int. ballasts replaced (17) 4' 2-lamp t8s
- (1) 36w led - non-int. ballasts replaced (1) 1-lamp t8 u-tubes

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture and Table B shows inputs used in savings calculations:

Table A. Per-Unit kWh Savings and kW Reductions

Prescriptive Measure	***Per-Unit kWh Savings***	***Per-Unit kW Reduction***
4' Linear LED replacing 4' Fluorescent T12/T8	58.1	0.010
LED U-tube replacing U-tube Fluorescent T12/T8	78.9	0.014

Table B. Prescriptive Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Corridor/Hallway/Stairwell	Gas	8,760[50]	1.09	1.20	1.00

[50] Calculated based on verified hours of operation (continuous).

Savings Calculations – Prescriptive

Using values from Table A above, the Evaluators calculated lighting savings as follows:

Table C. kWh Savings Calculations

Prescriptive Measure	Measure Quantity	Per-Unit kWh Savings	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate
SBDI: T8/T12 Upgrade to LED Linear - 4ft	1,170	58	67,977	75,880	111.6%
SBDI: T8/T12 Upgrade to LED Linear - U-Tube	4	79	316	352	111.6%
		Total	**68,293**	**76,232**	**102.4%**

Table D. kW Reduction Calculations

Prescriptive Measure	Measure Quantity	Per-Unit kW Reduction	Expected kW Reduction	Realized kW Reduction	kW Realization Rate
SBDI: T8/T12 Upgrade to LED Linear - 4ft	1,170	0.010	11.70	14.48	123.8%
SBDI: T8/T12 Upgrade to LED Linear - U-Tube	4	0.014	0.06	0.07	123.8%
		Total	**11.76**	**14.55**	**116.1%**

Savings Calculations – Custom

Using the values from Table B above, the Evaluators calculated lighting savings as follows:

Table E. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED50W	4	4	112	50	8,760	2,368	2,368	1.09	100.0%

F32T8 to LED36W	17	17	58	36	8,760	3,571	3,571	1.09	100.0%
FU31T8/6 to LED36W	1	1	59	36	8,760	220	220	1.09	100.0%
					Total	**6,159**	**6,159**		**100.0%**

Table F. Lighting Retrofit kW Reduction Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Realized kW Savings***	***IEF$_D$***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED50W	4	4	112	50	1.00	0.30	0.30	1.20	100.0%
F32T8 to LED36W	17	17	58	36	1.00	0.45	0.45	1.20	100.0%
FU31T8/6 to LED36W	1	1	59	36	1.00	0.03	0.03	1.20	100.0%
					Total	**0.78**	**0.78**		**100.0%**

Results

The kWh and kW realization rates for project CIP-015 are 110.7% and 122.4%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table G. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Prescriptive				
T8/T12 Upgrade to LED Linear - 4ft	75,880	14.48	111.6%	123.8%

T8/T12 Upgrade to LED Linear - U-Tube	352	0.07	111.6%	123.8%
Custom				
F32T8 to LED50W	2,368	0.30	100.0%	100.0%
F32T8 to LED36W	3,571	0.45	100.0%	100.0%
FU31T8/6 to LED36W	220	0.03	100.0%	100.0%
Total	**82,391**	**15.33**	**110.7%**	**122.4%**

Project Number LN9-142

Program Large C&I Solutions

Project Background

The participant is a large office building that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (135) 39w led - non-int. ballasts replaced (135) 4' 3-lamp t8s
- (18) 26w led - non-int. ballasts replaced (18) 4' 2-lamp t8s
- (1) 32w led - non-int. ballasts replaced (1) 1-lamp t8 u-tubes
- (68) 39w led - non-int. ballasts replaced (68) 4' 3-lamp t8s
- (74) 26w led - non-int. ballasts replaced (74) 4' 2-lamp t8s
- (99) 39w led - non-int. ballasts replaced (99) 4' 3-lamp t8s
- (33) 21w led - non-int. ballasts replaced (33) 2' 2-lamp t8s
- (6) 13w led - non-int. ballasts replaced (6) 4' 1-lamp t8s
- (44) 32w led - non-int. ballasts replaced (44) 1-lamp t8 u-tubes
- (34) 39w led - non-int. ballasts replaced (34) 4' 3-lamp t8s
- (8) 26w led - non-int. ballasts replaced (8) 4' 2-lamp t8s
- (13) 32w led - non-int. ballasts replaced (13) 1-lamp t8 u-tubes
- (195) 39w led - non-int. ballasts replaced (195) 4' 3-lamp t8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Office	ER	5,159	0.87	1.20	0.77

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED39W	135	135	88	39	5,159	29,690	29,690	0.87	100.0%
F32T8 to LED26W	18	18	59	26	5,159	2,666	2,666	0.87	100.0%
FU31T8/6 to LED32W	1	1	59	32	5,159	121	121	0.87	100.0%
F32T8 to LED39W	68	68	88	39	5,159	14,955	14,955	0.87	100.0%
F32T8 to LED26W	74	74	59	26	5,159	10,961	10,961	0.87	100.0%
F32T8 to LED39W	99	99	88	39	5,159	21,773	21,773	0.87	100.0%
F17T8 to LED21W	33	33	31	21	5,159	1,481	1,481	0.87	100.0%
F32T8 to LED13W	6	6	30	13	5,159	458	458	0.87	100.0%
FU31T8/6 to LED32W	44	44	59	32	5,159	5,332	5,332	0.87	100.0%
F32T8 to LED39W	34	34	88	39	5,159	7,478	7,478	0.87	100.0%
F32T8 to LED26W	8	8	59	26	5,159	1,185	1,185	0.87	100.0%
FU31T8/6 to LED32W	13	13	59	32	5,159	1,575	1,575	0.87	100.0%
F32T8 to LED39W	195	195	88	39	5,159	42,886	42,886	0.87	100.0%
					Total	**140,561**	**140,561**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF_D	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED39W	135	135	88	39	0.77	6.11	6.11	1.20	100.0%
F32T8 to LED26W	18	18	59	26	0.77	0.55	0.55	1.20	100.0%

FU31T8/6 to LED32W	1	1	59	32	0.77	0.02	0.02	1.20	100.0%
F32T8 to LED39W	68	68	88	39	0.77	3.08	3.08	1.20	100.0%
F32T8 to LED26W	74	74	59	26	0.77	2.26	2.26	1.20	100.0%
F32T8 to LED39W	99	99	88	39	0.77	4.48	4.48	1.20	100.0%
F17T8 to LED21W	33	33	31	21	0.77	0.30	0.30	1.20	100.0%
F32T8 to LED13W	6	6	30	13	0.77	0.09	0.09	1.20	100.0%
FU31T8/6 to LED32W	44	44	59	32	0.77	1.10	1.10	1.20	100.0%
F32T8 to LED39W	34	34	88	39	0.77	1.54	1.54	1.20	100.0%
F32T8 to LED26W	8	8	59	26	0.77	0.24	0.24	1.20	100.0%
FU31T8/6 to LED32W	13	13	59	32	0.77	0.32	0.32	1.20	100.0%
F32T8 to LED39W	195	195	88	39	0.77	8.83	8.83	1.20	100.0%
					Total	**28.92**	**28.92**		**100.0%**

Results

The kWh realization rate for project LN9-142 is 100.0% and the kW realization rate is 100.0%.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED39W	29,690	6.11	100.0%	100.0%
F32T8 to LED26W	2,666	0.55	100.0%	100.0%
FU31T8/6 to LED32W	121	0.02	100.0%	100.0%
F32T8 to LED39W	14,955	3.08	100.0%	100.0%
F32T8 to LED26W	10,961	2.26	100.0%	100.0%
F32T8 to LED39W	21,773	4.48	100.0%	100.0%

F17T8 to LED21W	1,481	0.30	100.0%	100.0%
F32T8 to LED13W	458	0.09	100.0%	100.0%
FU31T8/6 to LED32W	5,332	1.10	100.0%	100.0%
F32T8 to LED39W	7,478	1.54	100.0%	100.0%
F32T8 to LED26W	1,185	0.24	100.0%	100.0%
FU31T8/6 to LED32W	1,575	0.32	100.0%	100.0%
F32T8 to LED39W	42,886	8.83	100.0%	100.0%
Total	**140,561**	**28.92**	**100.0%**	**100.0%**

Project Number CIP_102

Program Large Commercial & Industrial Solutions

Project Background

The participant is a parking structure that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (81) 30w led - non-int. ballasts replaced (81) 150w hpss
- (11) 1w led - non-int. ballasts replaced (1) 150w hpss
- (37) 24w led - non-int. ballasts replaced (37) 4' 2-lamp t8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Expected kWh Savings and kW Reductions

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Exterior (custom)	(none)	8,760[51]	1.00	1.00	1.00

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Realized kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
HPS150 to LED30W	81	81	188	30	8,760	112,111	112,110	1.00	100.0%
HPS150 to LED1W	11	1	188	1	8,760	18,107	18,107	1.00	100.0%

[51] Calculated based on verified hours of operation (continuous).

F32T8 to LED24W	37	37	58	24	8,760	11,020	11,020	1.00	100.0%
					Total:	**141,238**	**141,237**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Realized kW Savings***	***IEF_D***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
HPS150 to LED30W	81	81	188	30	1.00	12.80	12.80	1.00	100.0%
HPS150 to LED1W	11	1	188	1	1.00	2.07	2.07	1.00	100.0%
F32T8 to LED24W	37	37	58	24	1.00	1.26	1.26	1.00	100.0%
					Total	**16.13**	**16.13**		**100.0%**

Results

The kWh and kW realization rates for project CIP_102 are 100.0% and 100.0%, respectively.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
HPS150 to LED30W	112,110	12.80	100.0%	100.0%
HPS150 to LED1W	18,107	2.07	100.0%	100.0%
F32T8 to LED24W	11,020	1.26	100.0%	100.0%
Total:	**141,237**	**16.13**	**100.0%**	**100.0%**

Project Number CIP_003

Program Large Commercial & Industrial Solutions

Project Background

The participant is a non-24-hour grocery store that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (2,738) T8/T12 Upgrade to LED Linear - 4ft
- (8) 7-12W LED Screw-in replacing incandescent/CFL
- (1) LED replacing 175 W to 250 W HID (lamp wattage)
- (12) LED Exit Sign
- (6) 37W LED - non-int. ballasts replaced (6) 8' 1-lamp T8s
- (8) 46W LED - non-int. ballasts replaced (8) 8' 2-lamp T12hos
- (1) 52W LED - non-int. ballasts replaced (1) 8' 2-lamp T8s
- (1) 38W LED - non-int. ballasts replaced (1) 8' 1-lamp T12hos
- (3) 46W LED - non-int. ballasts replaced (3) 8' 2-lamp T8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture and Table B shows inputs used in savings calculations.

Table A. Prescriptive kWh Savings and kW Reductions

Prescriptive Measure	***Per-Unit kWh Savings***	***Per-Unit kW Reduction***
SBDI: T8/T12 Upgrade to LED Linear - 4ft	58.1	0.010
SBDI: 7-12W LED Screw-in replacing incandescent/CFL	128.7	0.023
SBDI: LED replacing 175 W to 250 W HID (lamp wattage)	373.6	0.067
SBDI: LED Exit Sign	164.0	0.023

Table B. Custom Savings Parameters

Building Type	Heating Type	Annual Hours	IEF_E	IEF_D	CF
Food Sales: Non-24-Hour Supermarket	(none)	2,058	1.25	1.25	0.95
Food Sales: Non-24-Hour Supermarket	(none)	2,058	1.30	1.30	0.95
Food Sales: Non-24-Hour Supermarket	ER	2,058	0.87	1.20	0.95

Savings Calculations – Prescriptive

Using values from Table A above, the Evaluators calculated lighting savings as follows:

Table C. kWh Savings Calculations

Prescriptive Measure	Measure Quantity	Per-Unit kWh Savings	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate
SBDI: T8/T12 Upgrade to LED Linear - 4ft	2,738	58	159,078	77,293	48.6%
SBDI: 7-12W LED Screw-in replacing incandescent/CFL	8	129	1,030	500	48.6%
SBDI: LED replacing 175 W to 250 W HID (lamp wattage)	1	374	374	182	48.6%
SBDI: LED Exit Sign	12	164	1,968	4,070	206.8%
		Total	**162,449**	**82,045**	**49.4%**

Table D. kW Reduction Calculations

Prescriptive Measure	Measure Quantity	Per-Unit kW Reduction	Expected kW Reduction	Realized kW Reduction	kW Realization Rate
SBDI: T8/T12 Upgrade to LED Linear - 4ft	2,738	0.010	27.38	41.82	152.7%
SBDI: 7-12W LED Screw-in replacing incandescent/CFL	8	0.023	0.18	0.28	152.7%

SBDI: LED replacing 175 W to 250 W HID (lamp wattage)	1	0.067	0.07	0.10	152.7%
SBDI: LED Exit Sign	12	0.023	0.28	0.44	160.8%
		Total	**27.91**	**42.65**	**144.0%**

Savings Calculations – Custom

Using the values from Table B above, the Evaluators calculated lighting savings as follows:

Table E. Custom Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*Expected kWh Savings*	*Realized kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F96T8 to LED37W	6	6	69	37	2,058	494	494	1.25	100.0%
F96T12/HO to LED46W	8	8	160	46	2,058	2,440	2,440	1.30	100.0%
F96T8 to LED52W	1	1	110	52	2,058	149	149	1.25	100.0%
F96T12/HO/ES to LED38W	1	1	101	38	2,058	162	162	1.25	100.0%
F96T8 to LED46W	3	3	110	46	2,058	344	474	1.20	137.8%
					Total	**3,589**	**3,719**		**103.6%**

Table F. Custom Lighting Retrofit kW Reduction Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*Expected kW Savings*	*Realized kW Savings*	*IEF_D*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F96T8 to LED37W	6	6	69	37	0.95	0.23	0.23	1.25	100.0%
F96T12/HO to LED46W	8	8	160	46	0.95	1.13	1.13	1.30	100.0%
F96T8 to LED52W	1	1	110	52	0.95	0.07	0.07	1.25	100.0%
F96T12/HO/ES to LED38W	1	1	101	38	0.95	0.07	0.07	1.25	100.0%

F96T8 to LED46W	3	3	110	46	0.95	0.22	0.22	1.20	100.0%
					Total	**1.72**	**1.72**		**100.0%**

Results

The kWh and kW realization rates for project CIP-015 are 51.65% and 149.76%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table G. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Prescriptive				
T8/T12 Upgrade to LED Linear - 4ft	77,293	41.82	48.6%	152.7%
7-12W LED Screw-in replacing incandescent/CFL	500	0.28	48.6%	152.7%
LED replacing 175 W to 250 W HID (lamp wattage)	182	0.10	48.6%	152.7%
LED Exit Sign	4,070	0.44	206.8%	160.8%
Custom				
F96T8 to LED37W	494	0.23	100.0%	100.0%
F96T12/HO to LED46W	2,440	1.13	100.0%	100.0%
F96T8 to LED52W	149	0.07	100.0%	100.0%
F96T12/HO/ES to LED38W	162	0.07	100.0%	100.0%
F96T8 to LED46W	474	0.22	137.8%	100.0%
Total	**85,764**	**44.37**	**51.65%**	**149.76%**

Project Number CIP-007

Program Large Commercial & Industrial Solutions

Project Background

The participant is a hotel building that received incentives from Entergy New Orleans for installing VFDs and pump controls system on four chilled water pump motors. The Evaluators verified that the following had been installed:

- (4) Chilled Water Pump Motor with BAS controls

Calculation Parameters

Savings calculations were performed using motor nameplate data and the following algorithms:

$$kW_{pre} = \frac{HP \times 0.746 \times LF}{\eta}$$

$$kWh_{pre} = kW_{pre} \times Hours$$

$$kW_{post} = \frac{HP \times 0.746 \times LF}{\eta} \times Speed^{2.2}$$

$$kWh_{pre} = \sum Q \times kW_{post} \times Hours$$

$$kWh_{Savings} = kWh_{pre} - kWh_{post}$$

Savings parameters applicable to this site are shown below:

Table A, Pre Savings Parameters

Unit Name	*HP*	*Eff*	*LF*	*Hours*
CHWP-1	20	93.0%	0.75	8,760
CHWP-2	20	91.0%	0.75	8,760
CHWP-3	20	91.0%	0.75	8,760
CHWP-4	20	91.0%	0.75	8,760

Table B, Post Savings Parameters

Temperature Range	HP	Speed	kW	Quantity	Hours
97 - 93	40	100.0%	12.2	2	6
93 - 89	40	96.2%	11.2	2	290
89 - 85	40	92.3%	10.3	2	600
85 - 81	40	88.5%	9.3	2	949
81 - 77	40	84.6%	8.5	2	1219
77 - 73	40	80.8%	7.6	2	871
73 - 69	40	76.9%	6.9	2	955
69 - 65	40	73.1%	6.1	2	693
65 - 61	40	69.2%	5.4	2	783
61 - 57	40	65.4%	4.8	2	550
57 - 53	40	61.5%	4.2	2	725
53 - 49	40	57.7%	3.6	2	356
49 - 45	40	53.8%	3.1	2	264
45 - 41	40	50.0%	2.7	2	263

Savings Calculations

Table C, Pre kWh Usage Calculations

Unit Name	HP	Motor Efficiency	Annual Operating Hour Reduction	Expected kWh Savings	Realized kWh Savings	Realization Rate
CHWP-1	20	93.0%	8,760	105,403	107,130	98.4%
CHWP-2	20	91.0%	8,760	107,719	107,130	100.5%
CHWP-3	20	91.0%	8,760	107,719	107,130	100.5%

CHWP-4	20	91.0%	8,760	107,719	107,130	100.5%
Total				**428,560**	**428,522**	**100.0%**

Table D, Post kWh Usage Calculations

Temp Range	***Fan kW***	***Hours***	***Expected kWh Usage***	***Realized kWh Usage***	***Realization Rate***
97 - 93	12.2	6	183	73	40.0%
93 - 89	11.2	290	314	3,253	1035.7%
89 - 85	10.3	600	2,902	6,153	212.0%
85 - 81	9.3	949	7,583	8,862	116.9%
81 - 77	8.5	1219	11,390	10,323	90.6%
77 - 73	7.6	871	10,030	6,658	66.4%
73 - 69	6.9	955	5,569	6,557	117.8%
69 - 65	6.1	693	5,330	4,251	79.7%
65 - 61	5.4	783	4,384	4,264	97.3%
61 - 57	4.8	550	4,898	2,641	53.9%
57 - 53	4.2	725	1,820	3,047	167.4%
53 - 49	3.6	356	1,222	1,298	106.3%
49 - 45	3.1	264	749	827	110.5%
45 - 41	2.7	263	514	700	136.3%
Totals			**58,909**	**56,887**	**103.6%**

Table E, kWh Saving Calculations

Measure	*Pre kWh Usage*	*Post kWh Usage*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
Pump VFD	428,560	117,818	314,748	310,742	98.7%

Results

The kWh and kW realization rates for project CIP-007 are 98.73% and 100.00% respectively. Slight differences between expected and realized kWh come from the provided weather data did not match the TMY3 weather station stated and the ex-post analysis used the TMY3 weather data that matched the stated weather station.

Table F, Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
Pump VFD	310,742	24.46	98.73%	100.00%
Total	**310,742**	**24.46**	**98.73%**	**100.00%**

Project Number LN9-141

Program Large Commercial & Industrial Solutions

Project Background

The participant is a rental cat office that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (1505) 39w led - non-int. ballasts replaced (1505) 4' 3-lamp t8s
- (25) 32w led - non-int. ballasts replaced (25) 2-lamp t8 u-tubes
- (42) 26w led - non-int. ballasts replaced (42) 4' 2-lamp t8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Expected kWh Savings and kW Reductions

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Office	ER	5,159	0.87	1.20	0.77

Savings CalculationS

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***Annual Operating Hours***	***Expected kWh Savings***	***Realized kWh Savings***	***IEF_E***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED39W	1,505	1,505	88	39	5,159	330,992	330,992	0.87	100.0%
FU31T8/6 to LED32W	25	25	60	32	5,159	3,142	3,142	0.87	100.0%
F32T8 to LED26W	42	42	59	26	5,159	6,221	6,221	0.87	100.0%

Total:	**340,355**	**340,355**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Realized kW Savings***	***IEF$_D$***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED39W	1,505	1,505	88	39	0.77	68.14	68.14	1.20	100.0%
FU31T8/6 to LED32W	25	25	60	32	0.77	0.65	0.65	1.20	100.0%
F32T8 to LED26W	42	42	59	26	0.77	1.28	1.28	1.20	100.0%
					Total	**70.07**	**70.07**		**100.0%**

Results

The kWh and kW realization rates for project LN9-141 are 100.0% and 100.0%, respectively.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED39W	330,992	68.14	100.0%	100.0%
FU31T8/6 to LED32W	3,142	0.65	100.0%	100.0%
F32T8 to LED26W	6,221	1.28	100.0%	100.0%
Total:	**340,355**	**70.07**	**100.0%**	**100.0%**

Project Number LN9-137

Program Large C&I Solutions

Project Background

The participant is a zoo that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (8) 250w led - non-int. ballasts replaced (8) 1000w metal halides
- (75) 20w led - non-int. ballasts replaced (75) 100w metal halides
- (22) 9w led - non-int. ballasts replaced (22) 2-lamp 26w cfl multi 4-pins
- (4) 9w led - non-int. ballasts replaced (4) 2-lamp 26w cfl multi 4-pins
- (124) 37w led - non-int. ballasts replaced (124) 175w metal halides
- (55) 20w led - non-int. ballasts replaced (55) 100w metal halides
- (18) 20w led - non-int. ballasts replaced (18) 100w metal halides
- (8) 30w led - non-int. ballasts replaced (8) 150w metal halides
- (8) 40w led - non-int. ballasts replaced (8) 2' 4-lamp t8s
- (8) 39w led - non-int. ballasts replaced (8) 4' 4-lamp t8s
- (4) 29w led - non-int. ballasts replaced (4) 2' 4-lamp t8s
- (12) 39w led - non-int. ballasts replaced (12) 4' 4-lamp t8s
- (2) 39w led - non-int. ballasts replaced (2) 4' 4-lamp t8s
- (4) 39w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (4) 39w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (3) 39w led - non-int. ballasts replaced (3) 4' 4-lamp t8s
- (20) 39w led - non-int. ballasts replaced (20) 4' 4-lamp t8s
- (2) 39w led - non-int. ballasts replaced (2) 4' 4-lamp t8s
- (6) 39w led - non-int. ballasts replaced (6) 4' 4-lamp t8s
- (32) 39w led - non-int. ballasts replaced (32) 4' 4-lamp t8s
- (3) 29w led - non-int. ballasts replaced (3) 2' 4-lamp t8s
- (2) 39w led - non-int. ballasts replaced (2) 4' 4-lamp t8s
- (4) 39w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (4) 39w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (6) 39w led - non-int. ballasts replaced (6) 4' 4-lamp t8s
- (4) 39w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (4) 39w led - non-int. ballasts replaced (4) 4' 2-lamp t8s
- (7) 29w led - non-int. ballasts replaced (7) 1-lamp t8 u-tubes
- (9) 29w led - non-int. ballasts replaced (9) 1-lamp t8 u-tubes
- (31) 16.5w led - non-int. ballasts replaced (31) 100w metal halides
- (5) 9w led - non-int. ballasts replaced (5) 65w 1-lamp halogens
- (8) 20w led - non-int. ballasts replaced (8) 100w 1-lamp halogens
- (5) 39w led - non-int. ballasts replaced (3) 4' 4-lamp t8s

- (6) 39w led - non-int. ballasts replaced (6) 4' 4-lamp t8s
- (3) 39w led - non-int. ballasts replaced (3) 4' 4-lamp t8s
- (6) 29w led - non-int. ballasts replaced (6) 1-lamp t8 u-tubes
- (5) 39w led - non-int. ballasts replaced (5) 4' 4-lamp t8s
- (3) 39w led - non-int. ballasts replaced (3) 4' 4-lamp t8s
- (4) 39w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (1) 29w led - non-int. ballasts replaced (1) 2' 4-lamp t8s
- (13) 39w led - non-int. ballasts replaced (13) 4' 2-lamp t8s
- (1) 29w led - non-int. ballasts replaced (1) 1-lamp t8 u-tubes
- (11) 39w led - non-int. ballasts replaced (11) 4' 4-lamp t8s
- (2) 39w led - non-int. ballasts replaced (2) 4' 2-lamp t8s
- (3) 39w led - non-int. ballasts replaced (3) 4' 4-lamp t8s
- (7) 39w led - non-int. ballasts replaced (7) 4' 4-lamp t8s
- (15) 39w led - non-int. ballasts replaced (15) 4' 4-lamp t8s
- (17) 39w led - non-int. ballasts replaced (17) 4' 4-lamp t8s
- (7) 70w led - non-int. ballasts replaced (7) 250w metal halides
- (49) 37w led - non-int. ballasts replaced (49) 175w metal halides
- (60) 20w led - non-int. ballasts replaced (60) 100w metal halides
- (4) 39w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (1) 39w led - non-int. ballasts replaced (1) 4' 2-lamp t8s
- (2) 39w led - non-int. ballasts replaced (2) 4' 4-lamp t8s
- (2) 39w led - non-int. ballasts replaced (2) 4' 4-lamp t8s
- (1) 29w led - non-int. ballasts replaced (1) 1-lamp t8 u-tubes
- (6) 29w led - non-int. ballasts replaced (6) 1-lamp t8 u-tubes
- (1) 39w led - non-int. ballasts replaced (1) 4' 4-lamp t8s
- (4) 39w led - non-int. ballasts replaced (4) 4' 4-lamp t8s
- (4) 29w led - non-int. ballasts replaced (4) 1-lamp t8 u-tubes

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Corridor/Hallway/Stairwell	ER	5,233	0.87	1.20	0.90
Corridor/Hallway/Stairwell	(none)	5,233	1.00	1.00	0.90
Exterior	(none)	4,319	1.00	1.00	0.00

Non-Warehouse Storage (Generic)	(none)	4,207	1.00	1.00	0.77
Office	ER	5,159	0.87	1.20	0.77
Restroom (Generic)	ER	3,516	0.87	1.20	0.90

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
MH1000 to LED250W	8	8	1,078	250	4,319	28,609	28,609	1.00	100.0%
MH100 to LED20W	75	75	124	20	4,319	33,688	33,688	1.00	100.0%
CFM26W to LED9W	22	22	51	9	4,319	2,946	3,991	1.00	135.5%
CFM26W to LED9W	4	4	51	9	4,319	536	726	1.00	135.4%
MH175 to LED37W	124	124	208	37	4,319	91,580	91,580	1.00	100.0%
MH100 to LED20W	55	55	124	20	4,319	24,705	24,705	1.00	100.0%
MH100 to LED20W	18	18	124	20	4,319	8,085	8,085	1.00	100.0%
MH150 to LED30W	8	8	183	30	4,319	5,286	5,286	1.00	100.0%
F17T8 to LED40W	8	8	59	40	4,319	656	656	1.00	100.0%
F32T8 to LED39W	8	8	112	39	5,159	2,621	2,621	0.87	100.0%
F17T8 to LED29W	4	4	59	29	5,233	546	546	0.87	100.0%
F32T8 to LED39W	12	12	112	39	5,233	3,988	3,988	0.87	100.0%
F32T8 to LED39W	2	2	112	39	5,159	655	655	0.87	100.0%
F32T8 to LED39W	4	4	112	39	5,159	1,311	1,311	0.87	100.0%
F32T8 to LED39W	4	4	112	39	5,159	1,311	1,311	0.87	100.0%
F32T8 to LED39W	3	3	112	39	5,159	983	983	0.87	100.0%

F32T8 to LED39W	20	20	112	39	5,159	6,553	6,553	0.87	100.0%
F32T8 to LED39W	2	2	112	39	5,159	655	655	0.87	100.0%
F32T8 to LED39W	6	6	112	39	5,159	1,966	1,966	0.87	100.0%
F32T8 to LED39W	32	32	112	39	5,159	10,485	10,485	0.87	100.0%
F17T8 to LED29W	3	3	59	29	5,159	404	404	0.87	100.0%
F32T8 to LED39W	2	2	112	39	5,159	655	655	0.87	100.0%
F32T8 to LED39W	4	4	112	39	5,159	1,311	1,311	0.87	100.0%
F32T8 to LED39W	4	4	112	39	5,159	1,311	1,311	0.87	100.0%
F32T8 to LED39W	6	6	112	39	5,159	1,966	1,966	0.87	100.0%
F32T8 to LED39W	4	4	112	39	5,159	1,311	1,311	0.87	100.0%
F32T8 to LED39W	4	4	58	39	5,233	346	346	0.87	100.0%
FU31T8/6 to LED29W	7	7	59	29	5,159	943	943	0.87	100.0%
FU31T8/6 to LED29W	9	9	59	29	5,233	1,229	1,229	0.87	100.0%
MH100 to LED16.5W	31	31	124	17	5,159	14,888	14,957	0.87	100.5%
H65 to LED9W	5	5	65	9	5,159	1,257	1,257	0.87	100.0%
H100 to LED20W	8	8	100	20	5,159	2,873	2,873	0.87	100.0%
F32T8 to LED39W	5	3	112	39	5,159	1,988	1,988	0.87	100.0%
F32T8 to LED39W	6	6	112	39	5,159	1,966	1,966	0.87	100.0%
F32T8 to LED39W	3	3	112	39	5,159	983	983	0.87	100.0%
FU31T8/6 to LED29W	6	6	59	29	5,159	808	808	0.87	100.0%
F32T8 to LED39W	5	5	112	39	5,159	1,638	1,638	0.87	100.0%
F32T8 to LED39W	3	3	112	39	5,233	997	997	0.87	100.0%
F32T8 to LED39W	4	4	112	39	5,159	1,311	1,311	0.87	100.0%
F17T8 to LED29W	1	1	59	29	5,159	135	135	0.87	100.0%
F32T8 to LED39W	13	13	58	39	5,233	1,125	1,125	0.87	100.0%
FU31T8/6 to LED29W	1	1	59	29	5,233	137	137	0.87	100.0%

F32T8 to LED39W	11	11	112	39	5,159	3,604	3,604	0.87	100.0%
F32T8 to LED39W	2	2	58	39	5,159	171	171	0.87	100.0%
F32T8 to LED39W	3	3	112	39	5,159	983	983	0.87	100.0%
F32T8 to LED39W	7	7	112	39	5,159	2,294	2,294	0.87	100.0%
F32T8 to LED39W	15	15	112	39	5,159	4,915	4,915	0.87	100.0%
F32T8 to LED39W	17	17	112	39	5,159	5,570	5,570	0.87	100.0%
MH250 to LED70W	7	7	288	70	4,319	6,591	6,591	1.00	100.0%
MH175 to LED37W	49	49	208	37	4,319	36,189	36,189	1.00	100.0%
MH100 to LED20W	60	60	124	20	4,319	26,951	26,951	1.00	100.0%
F32T8 to LED39W	4	4	112	39	5,159	1,311	1,311	0.87	100.0%
F32T8 to LED39W	1	1	58	39	5,159	85	85	0.87	100.0%
F32T8 to LED39W	2	2	112	39	5,159	655	655	0.87	100.0%
F32T8 to LED39W	2	2	112	39	5,233	764	764	1.00	100.0%
FU31T8/6 to LED29W	1	1	59	29	5,233	157	157	1.00	100.0%
FU31T8/6 to LED29W	6	6	59	29	3,516	551	551	0.87	100.0%
F32T8 to LED39W	1	1	112	39	3,516	223	223	0.87	100.0%
F32T8 to LED39W	4	4	112	39	4,207	1,228	1,228	1.00	100.0%
FU31T8/6 to LED29W	4	4	59	29	5,159	539	539	0.87	100.0%
					Total	**359,528**	**360,832**		**100.4%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Realized kW Savings***	***IEF_D***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
MH1000 to LED250W	8	8	1,078	250	0.26	1.72	1.72	1.00	100.0%

MH100 to LED20W	75	75	124	20	0.26	2.03	2.03	1.00	100.0%
CFM26W to LED9W	22	22	51	9	0.26	0.18	0.24	1.00	133.3%
CFM26W to LED9W	4	4	51	9	0.26	0.03	0.04	1.00	133.3%
MH175 to LED37W	124	124	208	37	0.26	5.51	5.51	1.00	100.0%
MH100 to LED20W	55	55	124	20	0.26	1.49	1.49	1.00	100.0%
MH100 to LED20W	18	18	124	20	0.26	0.49	0.49	1.00	100.0%
MH150 to LED30W	8	8	183	30	0.26	0.32	0.32	1.00	100.0%
F17T8 to LED40W	8	8	59	40	0.26	0.04	0.04	1.00	100.0%
F32T8 to LED39W	8	8	112	39	0.77	0.54	0.54	1.20	100.0%
F17T8 to LED29W	4	4	59	29	0.90	0.13	0.13	1.20	100.0%
F32T8 to LED39W	12	12	112	39	0.90	0.95	0.95	1.20	100.0%
F32T8 to LED39W	2	2	112	39	0.77	0.13	0.13	1.20	100.0%
F32T8 to LED39W	4	4	112	39	0.77	0.27	0.27	1.20	100.0%
F32T8 to LED39W	4	4	112	39	0.77	0.27	0.27	1.20	100.0%
F32T8 to LED39W	3	3	112	39	0.77	0.20	0.20	1.20	100.0%
F32T8 to LED39W	20	20	112	39	0.77	1.35	1.35	1.20	100.0%
F32T8 to LED39W	2	2	112	39	0.77	0.13	0.13	1.20	100.0%
F32T8 to LED39W	6	6	112	39	0.77	0.40	0.40	1.20	100.0%
F32T8 to LED39W	32	32	112	39	0.77	2.16	2.16	1.20	100.0%
F17T8 to LED29W	3	3	59	29	0.77	0.08	0.08	1.20	100.0%
F32T8 to LED39W	2	2	112	39	0.77	0.13	0.13	1.20	100.0%
F32T8 to LED39W	4	4	112	39	0.77	0.27	0.27	1.20	100.0%
F32T8 to LED39W	4	4	112	39	0.77	0.27	0.27	1.20	100.0%
F32T8 to LED39W	6	6	112	39	0.77	0.40	0.40	1.20	100.0%
F32T8 to LED39W	4	4	112	39	0.77	0.27	0.27	1.20	100.0%
F32T8 to LED39W	4	4	58	39	0.90	0.08	0.08	1.20	100.0%

FU31T8/6 to LED29W	7	7	59	29	0.77	0.19	0.19	1.20	100.0%
FU31T8/6 to LED29W	9	9	59	29	0.90	0.29	0.29	1.20	100.0%
MH100 to LED16.5W	31	31	124	17	0.77	3.06	3.08	1.20	100.7%
H65 to LED9W	5	5	65	9	0.77	0.26	0.26	1.20	100.0%
H100 to LED20W	8	8	100	20	0.77	0.59	0.59	1.20	100.0%
F32T8 to LED39W	5	3	112	39	0.77	0.41	0.41	1.20	100.0%
F32T8 to LED39W	6	6	112	39	0.77	0.40	0.40	1.20	100.0%
F32T8 to LED39W	3	3	112	39	0.77	0.20	0.20	1.20	100.0%
FU31T8/6 to LED29W	6	6	59	29	0.77	0.17	0.17	1.20	100.0%
F32T8 to LED39W	5	5	112	39	0.77	0.34	0.34	1.20	100.0%
F32T8 to LED39W	3	3	112	39	0.90	0.24	0.24	1.20	100.0%
F32T8 to LED39W	4	4	112	39	0.77	0.27	0.27	1.20	100.0%
F17T8 to LED29W	1	1	59	29	0.77	0.03	0.03	1.20	100.0%
F32T8 to LED39W	13	13	58	39	0.90	0.27	0.27	1.20	100.0%
FU31T8/6 to LED29W	1	1	59	29	0.90	0.03	0.03	1.20	100.0%
F32T8 to LED39W	11	11	112	39	0.77	0.74	0.74	1.20	100.0%
F32T8 to LED39W	2	2	58	39	0.77	0.04	0.04	1.20	100.0%
F32T8 to LED39W	3	3	112	39	0.77	0.20	0.20	1.20	100.0%
F32T8 to LED39W	7	7	112	39	0.77	0.47	0.47	1.20	100.0%
F32T8 to LED39W	15	15	112	39	0.77	1.01	1.01	1.20	100.0%
F32T8 to LED39W	17	17	112	39	0.77	1.15	1.15	1.20	100.0%
MH250 to LED70W	7	7	288	70	0.26	0.40	0.40	1.00	100.0%
MH175 to LED37W	49	49	208	37	0.26	2.18	2.18	1.00	100.0%

MH100 to LED20W	60	60	124	20	0.26	1.62	1.62	1.00	100.0%
F32T8 to LED39W	4	4	112	39	0.77	0.27	0.27	1.20	100.0%
F32T8 to LED39W	1	1	58	39	0.77	0.02	0.02	1.20	100.0%
F32T8 to LED39W	2	2	112	39	0.77	0.13	0.13	1.20	100.0%
F32T8 to LED39W	2	2	112	39	0.90	0.13	0.13	1.00	100.0%
FU31T8/6 to LED29W	1	1	59	29	0.90	0.03	0.03	1.00	100.0%
FU31T8/6 to LED29W	6	6	59	29	0.90	0.19	0.19	1.20	100.0%
F32T8 to LED39W	1	1	112	39	0.90	0.08	0.08	1.20	100.0%
F32T8 to LED39W	4	4	112	39	0.77	0.22	0.22	1.00	100.0%
FU31T8/6 to LED29W	4	4	59	29	0.77	0.11	0.11	1.20	100.0%
					Total	**28.34**	**28.34**		**100.3%**

Results

The kWh and kW realization rates for project LN9-137 are 100.4% and 100.3%, respectively.

Discrepancies in realization rates are due to three factors:

1) (26) 9W LED fixtures were incorrectly categorized as 20W LED fixtures in the ex ante estimation calculations. Upon project documentation review, the Evaluators determined that there was enough evidence in the invoice and spec sheets to support the change from 20W LEDs to 9W LEDs.
2) (31) 16.5W LED fixtures were incorrectly categorized as 17W LED fixtures. Upon further review of the spec sheets, the Evaluators determined that there was enough evidence to support the change from 17W LEDs to 16.5W LEDs.
3) Minor differences in rounding within the calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH1000 to LED250W	28,609	1.72	100.0%	100.0%
MH100 to LED20W	33,688	2.03	100.0%	100.0%
CFM26W to LED9W	3,991	0.24	135.5%	133.3%
CFM26W to LED9W	726	0.04	135.4%	133.3%
MH175 to LED37W	91,580	5.51	100.0%	100.0%
MH100 to LED20W	24,705	1.49	100.0%	100.0%
MH100 to LED20W	8,085	0.49	100.0%	100.0%
MH150 to LED30W	5,286	0.32	100.0%	100.0%
F17T8 to LED40W	656	0.04	100.0%	100.0%
F32T8 to LED39W	2,621	0.54	100.0%	100.0%
F17T8 to LED29W	546	0.13	100.0%	100.0%
F32T8 to LED39W	3,988	0.95	100.0%	100.0%
F32T8 to LED39W	655	0.13	100.0%	100.0%
F32T8 to LED39W	1,311	0.27	100.0%	100.0%
F32T8 to LED39W	1,311	0.27	100.0%	100.0%
F32T8 to LED39W	983	0.20	100.0%	100.0%
F32T8 to LED39W	6,553	1.35	100.0%	100.0%
F32T8 to LED39W	655	0.13	100.0%	100.0%
F32T8 to LED39W	1,966	0.40	100.0%	100.0%
F32T8 to LED39W	10,485	2.16	100.0%	100.0%
F17T8 to LED29W	404	0.08	100.0%	100.0%
F32T8 to LED39W	655	0.13	100.0%	100.0%

F32T8 to LED39W	1,311	0.27	100.0%	100.0%
F32T8 to LED39W	1,311	0.27	100.0%	100.0%
F32T8 to LED39W	1,966	0.40	100.0%	100.0%
F32T8 to LED39W	1,311	0.27	100.0%	100.0%
F32T8 to LED39W	346	0.08	100.0%	100.0%
FU31T8/6 to LED29W	943	0.19	100.0%	100.0%
FU31T8/6 to LED29W	1,229	0.29	100.0%	100.0%
MH100 to LED16.5W	14,957	3.08	100.5%	100.7%
H65 to LED9W	1,257	0.26	100.0%	100.0%
H100 to LED20W	2,873	0.59	100.0%	100.0%
F32T8 to LED39W	1,988	0.41	100.0%	100.0%
F32T8 to LED39W	1,966	0.40	100.0%	100.0%
F32T8 to LED39W	983	0.20	100.0%	100.0%
FU31T8/6 to LED29W	808	0.17	100.0%	100.0%
F32T8 to LED39W	1,638	0.34	100.0%	100.0%
F32T8 to LED39W	997	0.24	100.0%	100.0%
F32T8 to LED39W	1,311	0.27	100.0%	100.0%
F17T8 to LED29W	135	0.03	100.0%	100.0%
F32T8 to LED39W	1,125	0.27	100.0%	100.0%
FU31T8/6 to LED29W	137	0.03	100.0%	100.0%
F32T8 to LED39W	3,604	0.74	100.0%	100.0%
F32T8 to LED39W	171	0.04	100.0%	100.0%
F32T8 to LED39W	983	0.20	100.0%	100.0%
F32T8 to LED39W	2,294	0.47	100.0%	100.0%
F32T8 to LED39W	4,915	1.01	100.0%	100.0%
F32T8 to LED39W	5,570	1.15	100.0%	100.0%

MH250 to LED70W	6,591	0.40	100.0%	100.0%
MH175 to LED37W	36,189	2.18	100.0%	100.0%
MH100 to LED20W	26,951	1.62	100.0%	100.0%
F32T8 to LED39W	1,311	0.27	100.0%	100.0%
F32T8 to LED39W	85	0.02	100.0%	100.0%
F32T8 to LED39W	655	0.13	100.0%	100.0%
F32T8 to LED39W	764	0.13	100.0%	100.0%
FU31T8/6 to LED29W	157	0.03	100.0%	100.0%
FU31T8/6 to LED29W	551	0.19	100.0%	100.0%
F32T8 to LED39W	223	0.08	100.0%	100.0%
F32T8 to LED39W	1,228	0.22	100.0%	100.0%
FU31T8/6 to LED29W	539	0.11	100.0%	100.0%
Total	**360,832**	**35.67**	**100.4%**	**100.3%**

Project Number LN9_116

Program Large Commercial & Industrial Solutions

Project Background

The participant is a coffee and tea processing facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (20) 40w led - non-int. ballasts replaced (20) 250w metal halides
- (13) 20w led - non-int. ballasts replaced (13) 100w metal halides
- (4) 250w led - non-int. ballasts replaced (4) 1000w metal halides
- (6) 250w led - non-int. ballasts replaced (6) 1000w hpss
- (17) 250w led - non-int. ballasts replaced (17) 1000w hpss
- (8) 100w led - non-int. ballasts replaced (8) 400w metal halides
- (5) 100w led - non-int. ballasts replaced (5) 400w metal halides
- (10) 200w led - non-int. ballasts replaced (10) 1000w hpss
- (107) 40w led - non-int. ballasts replaced (107) 150w metal halides
- (4) 40w led - non-int. ballasts replaced (4) 250w metal halides
- (2) 40w led - non-int. ballasts replaced (2) 175w metal halides
- (2) 1w led - non-int. ballasts replaced (2) 1000w metal halides
- (10) 1w led - non-int. ballasts replaced (10) 400w metal halides
- (3) 40w led - non-int. ballasts replaced (3) 175w metal halides

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Expected kWh Savings and kW Reductions

Building Type	*Heating Type*	*Annual Hours*	IEF_E	IEF_D	*CF*
Exterior	(none)	4,319	1.00	1.00	0.00
Manufacturing	(none)	5,740	1.00	1.00	0.73
Manufacturing (Custom)	(none)	8,760	1.00	1.00	1.00

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
MH250 to LED40W	20	20	288	40	4,319	21,422	21,422	1.00	100.0%
MH100 to LED20W	13	13	124	20	4,319	5,839	5,839	1.00	100.0%
MH1000 to LED250W	4	4	1,078	250	4,319	14,305	14,305	1.00	100.0%
HPS1000 to LED250W	6	6	1,100	250	4,319	22,027	22,027	1.00	100.0%
HPS1000 to LED250W	17	17	1,100	250	4,319	62,410	62,410	1.00	100.0%
MH400 to LED100W	8	8	453	100	4,319	12,197	12,197	1.00	100.0%
MH400 to LED100W	5	5	453	100	4,319	7,623	7,623	1.00	100.0%
HPS1000 to LED200W	10	10	1,100	200	5,740	51,660	51,660	1.00	100.0%
MH150 to LED40W	107	107	183	40	8,760	134,037	134,037	1.00	100.0%
MH250 to LED40W	4	4	288	40	4,319	4,284	4,284	1.00	100.0%
MH175 to LED40W	2	2	208	40	4,319	1,451	1,451	1.00	100.0%
MH1000 to LED1W	2	2	1,078	1	4,319	9,303	9,303	1.00	100.0%
MH400 to LED1W	10	10	453	1	4,319	19,522	19,522	1.00	100.0%
MH175 to LED40W	3	3	208	40	8,760	4,415	4,415	1.00	100.0%
					Total:	**370,495**	**370,495**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF_D	Realization Rate
	Base	Post	Base	Post					
MH250 to LED40W	20	20	288	40	0.00	1.29	0.00	1.00	0.0%

MH100 to LED20W	13	13	124	20	0.00	0.35	0.00	1.00	0.0%
MH1000 to LED250W	4	4	1,078	250	0.00	0.86	0.00	1.00	0.0%
HPS1000 to LED250W	6	6	1,100	250	0.00	1.33	0.00	1.00	0.0%
HPS1000 to LED250W	17	17	1,100	250	0.00	3.76	0.00	1.00	0.0%
MH400 to LED100W	8	8	453	100	0.00	0.73	0.00	1.00	0.0%
MH400 to LED100W	5	5	453	100	0.00	0.46	0.00	1.00	0.0%
HPS1000 to LED200W	10	10	1,100	200	0.73	6.57	6.57	1.00	100.0%
MH150 to LED40W	107	107	183	40	1.00	15.30	15.30	1.00	100.0%
MH250 to LED40W	4	4	288	40	0.00	0.26	0.00	1.00	0.0%
MH175 to LED40W	2	2	208	40	0.00	0.09	0.00	1.00	0.0%
MH1000 to LED1W	2	2	1,078	1	0.00	0.56	0.00	1.00	0.0%
MH400 to LED1W	10	10	453	1	0.00	1.18	0.00	1.00	0.0%
MH175 to LED40W	3	3	208	40	1.00	0.50	0.50	1.00	100.0%
					Total	**33.24**	**22.37**		**67.3%**

Results

The kWh and kW realization rates for project LN9-116 are 100.0% and 67.3%, respectively.

Expected kW reduction calculations used 0.26 as a CF for exterior fixtures on daylight sensors. Since this schedule precludes operation during peak hours, a peak kW reduction cannot be realized for them, which lowered the verified reduction.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH250 to LED40W	21,422	0.00	100.0%	0.0%
MH100 to LED20W	5,839	0.00	100.0%	0.0%

MH1000 to LED250W	14,305	0.00	100.0%	0.0%
HPS1000 to LED250W	22,027	0.00	100.0%	0.0%
HPS1000 to LED250W	62,410	0.00	100.0%	0.0%
MH400 to LED100W	12,197	0.00	100.0%	0.0%
MH400 to LED100W	7,623	0.00	100.0%	0.0%
HPS1000 to LED200W	51,660	6.57	100.0%	100.0%
MH150 to LED40W	134,037	15.30	100.0%	100.0%
MH250 to LED40W	4,284	0.00	100.0%	0.0%
MH175 to LED40W	1,451	0.00	100.0%	0.0%
MH1000 to LED1W	9,303	0.00	100.0%	0.0%
MH400 to LED1W	19,522	0.00	100.0%	0.0%
MH175 to LED40W	4,415	0.50	100.0%	100.0%
Total:	**370,495**	**22.37**	**100.0%**	**67.3%**

Project Number CIP_059

Program Large Commercial & Industrial Solutions

Project Background

The participant is a museum that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (2,419) 7-12W LED Screw-in replacing incandescent/CFL
- (116) 13-17W LED Screw-in replacing incandescent/CFL
- (95) LED replacing <175 W HID (lamp wattage)
- (450) 1-6W LED Screw-in replacing incandescent/CFL

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***
7-12W LED Screw-in replacing incandescent/CFL	128.7	0.023
13-17W LED Screw-in replacing incandescent/CFL	149.5	0.027
LED replacing <175 W HID	228.3	0.041
1-6W LED Screw-in replacing incandescent/CFL	95.5	0.017

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kWh Savings*	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	2,419	129	311,325	316,941	101.8%
13-17W LED Screw-in replacing incandescent/CFL	116	150	17,342	17,655	101.8%
LED replacing <175 W HID	95	228	21,689	22,080	101.8%
1-6W LED Screw-in replacing incandescent/CFL	450	96	42,975	43,750	101.8%
		Total:	**393,331**	**400,426**	**101.8%**

Table C. Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Realized kW Reduction*	*kW Realization Rate*
7-12W LED Screw-in replacing incandescent/CFL	2,419	0.023	55.64	80.50	144.7%
13-17W LED Screw-in replacing incandescent/CFL	116	0.027	3.13	4.53	144.7%
LED replacing <175 W HID	95	0.041	3.90	5.64	144.7%
1-6W LED Screw-in replacing incandescent/CFL	450	0.017	7.65	11.07	144.7%
		Total:	**70.31**	**101.74**	**144.7%**

Results

The kWh and kW realization rates for project CIP_059 are 101.8% and 144.7%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted

the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
7-12W LED Screw-in replacing incandescent/CFL	316,941	80.50	101.8%	144.7%
13-17W LED Screw-in replacing incandescent/CFL	17,655	4.53	101.8%	144.7%
LED replacing <175 W HID	22,080	5.64	101.8%	144.7%
1-6W LED Screw-in replacing incandescent/CFL	43,750	11.07	101.8%	144.7%
Total:	**400,426**	**101.74**	**101.8%**	**144.7%**

Project Number CIP-038

Program Large Commercial & Industrial Solutions

Project Background

The participant is a parking garage that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (15) Exterior: LED Lamp/Fixture (HID (<175W) Baseline)
- (2) Exterior: LED Lamp/Fixture (HID (175 to 250W) Baseline)
- (10) 8' Linear LED (T8/T12 8ft Linear Fluorescent Baseline)
- (36) Exterior: LED Lamp/Fixture (HID (<175W) Baseline)
- (477) 70w led - non-int. ballasts replaced (477) 150w hpss
- (15) 40w led - non-int. ballasts replaced (15) 4' 2-lamp t8s
- (74) 40w led - non-int. ballasts replaced (74) 4' 2-lamp t8s

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture and Table B shows inputs used in savings calculations.

Table A. Prescriptive kWh Savings and kW Reductions

Prescriptive Measure	***Per-Unit kWh Savings***	***Per-Unit kW Reduction***
Exterior: LED Lamp/Fixture (HID (<175W) Baseline)	232.8	0.000
Exterior: LED Lamp/Fixture (HID (175 to 250W) Baseline)	380.9	0.000
8' Linear LED (T8/T12 8ft Linear Fluorescent Baseline)	126.2	0.023

Table B. Prescriptive Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Parking Garage	None	8,760[52]	1.00	1.00	1.00

[52] Calculated based on verified hours of operation (continuous).

Savings Calculations

Using values from Table A above, the Evaluators calculated lighting savings as follows:

Table C. Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kWh Savings***	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***
Exterior: LED Lamp/Fixture (HID (<175W) Baseline)	51	233	11,873	12,107	102.0%
Exterior: LED Lamp/Fixture (HID (175 to 250W) Baseline)	2	381	762	777	102.0%
8' Linear LED (T8/T12 8ft Linear Fluorescent Baseline)	10	126	1,262	2,610	206.8%
		Total	**13,897**	**15,493**	**111.5%**

Table D. Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kW Reduction***	***Expected kW Reduction***	***Realized kW Reduction***	***kW Realization Rate***
Exterior: LED Lamp/Fixture (HID (<175W) Baseline)	51	0.000	0.00	0.00	N/A
Exterior: LED Lamp/Fixture (HID (175 to 250W) Baseline)	2	0.000	0.00	0.00	N/A
8' Linear LED (T8/T12 8ft Linear Fluorescent Baseline)	10	0.023	0.23	0.37	160.8%
		Total	**0.23**	**0.37**	**160.8%**

Savings Calculations

Using the values from Table B above, the Evaluators calculated lighting savings as follows:

Table E. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
HPS150 to LED70W	477	477	188	70	8,760	493,065	493,065	1.00	100.0%
F32T8 to LED40W	15	15	60	40	8,760	2,628	2,628	1.00	100.0%
F32T8 to LED40W	74	74	60	40	8,760	12,965	12,965	1.00	100.0%
					Total	**508,658**	**508,658**		**100.0%**

Table F. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF_D	Realization Rate
	Base	Post	Base	Post					
HPS150 to LED70W	477	477	188	70	1.00	56.29	56.29	1.00	100.0%
F32T8 to LED40W	15	15	60	40	1.00	0.30	0.30	1.00	100.0%
F32T8 to LED40W	74	74	60	40	1.00	1.48	1.48	1.00	100.0%
					Total	**58.07**	**58.07**		**100.0%**

Results

The kWh and kW realization rates for project CIP_038 are 100.6% and 100.0%, respectively.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table G. Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
Per-Unit				

Exterior: LED Lamp/Fixture (HID (<175W) Baseline)	12,107	0	102.0%	N/A
Exterior: LED Lamp/Fixture (HID (175 to 250W) Baseline)	777	0	102.0%	N/A
8' Linear LED (T8/T12 8ft Linear Fluorescent Baseline)	2,610	0.37	206.8%	160.8%
Custom				
HPS150 to LED70W	493,065	56.29	100.0%	100.0%
F32T8 to LED40W	2,628	0.3	100.0%	100.0%
F32T8 to LED40W	12,965	1.48	100.0%	100.0%
Total	**524,151**	**58.44**	**100.3%**	**100.2%**

Project Number CIP-042

Program Large Commercial & Industrial Solutions

Project Background

The participant is a University building that received incentives from Entergy New Orleans for installing a Building Automation System (BAS) to control the air handling unit fan motors. The Evaluators verified that the following had been installed:

- (18) Air Handling Unit Fan Motors with BAS Schedule Operation

Calculation Parameters

Savings calculations were performed using motor nameplate data and the following algorithms:

$$kW = \frac{HP \times 0.7457 \times LF}{\eta}$$

$$kWh_{Savings} = kW \times (Hours_{pre} - Hours_{post})$$

Savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Unit Name	***HP***	***Eff***	***Hours$_{pre}$***	***Hours$_{post}$***
AHU 1-2	10	89.5%	8,760	4,380
AHU 1-7	15	93.0%	8,760	4,380
AHU 1-8	3	89.5%	8,760	4,380
AHU 2-2	15	93.0%	8,760	4,380
AHU 2-3	20	93.0%	8,760	4,380
AHU 2-4	5	89.5%	8,760	4,380
AHU 3-4	25	93.6%	8,760	4,380
AHU 3-6	10	91.7%	8,760	4,380
AHU 1-6	15	93.0%	8,760	4,380

Auditorium	10	91.7%	8,760	4,380
AHU 2-1	15	93.0%	8,760	4,380
AHU 2-5	15	93.0%	8,760	4,380
AHU 3-1	10	91.7%	8,760	4,380
AHU 3-5	15	93.0%	8,760	4,380
AHU 1-3	20	91.0%	8,760	4,380
AHU 3-2	20	93.0%	8,760	4,380
AHU 1-1	5	89.5%	8,760	4,380
AHU 1-5	15	93.0%	8,760	4,380

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Unit Name AHU 1-2	***HP***	***Motor Efficiency***	***Annual Operating Hour Reduction***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
AHU 1-7	10	89.5%	4,380	26,713	27,370	102.5%
AHU 1-8	15	93.0%	4,380	39,767	39,510	99.4%
AHU 2-2	3	89.5%	4,380	8,211	8,211	100.0%
AHU 2-3	15	93.0%	4,380	39,767	39,510	99.4%
AHU 2-4	20	93.0%	4,380	52,680	52,680	100.0%
AHU 3-4	5	89.5%	4,380	13,685	13,685	100.0%
AHU 3-6	25	93.6%	4,380	65,428	65,428	100.0%
AHU 1-6	10	91.7%	4,380	26,713	26,713	100.0%
Auditorium	15	93.0%	4,380	39,767	39,510	99.4%
AHU 2-1	10	91.7%	4,380	26,713	26,713	100.0%
AHU 2-5	15	93.0%	4,380	39,767	39,510	99.4%

AHU 3-1	15	93.0%	4,380	39,767	39,510	99.4%
AHU 3-5	10	91.7%	4,380	26,713	26,713	100.0%
AHU 1-3	15	93.0%	4,380	39,767	39,510	99.4%
AHU 3-2	20	91.0%	4,380	52,680	53,838	102.2%
AHU 1-1	20	93.0%	4,380	52,680	52,680	100.0%
AHU 1-5	5	89.5%	4,380	13,685	13,685	100.0%
Total				**644,270**	**644,288**	**100.0%**

Results

The kWh realization rates for project CIP-042 are 100.0% and no kW savings since energy savings do not occur during designated peak operating hours. Slight differences between expected and realized kWh come from using the nameplate motor efficiency instead of the NEMA premium motor efficiency table.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
BAS Controls	644,288	-	100.0%	-
Total	**644,288**	**-**	**100.0%**	**-**

Project Number CIP-112

Program Large Commercial & Industrial Solutions

Project Background

The participant is a University building that received incentives from Entergy New Orleans for installing a Building Automation System (BAS) to control the air handling unit fan motors, Chilled water pump, Chiller compressor and air handling unit fan motor Variable Speed Drive. The Evaluators verified that the following had been installed:

- (7) Air Handling Unit Fan Motors with BAS Schedule Operation
- (1) Chilled Water Pump Motor with BAS Schedule Operation
- (1) Air Handling Unit Fan Motor with VSD with BAS Schedule Operation
- (1) Chiller Condenser with BAS Schedule Operation

Calculation Parameters

Savings calculations were performed using motor nameplate data and the following algorithms:

Constant volume BAS Schedule:

$$kW = \frac{HP \times 0.7457 \times LF}{\eta}$$

$$Hours_{reduction} = Hours_{pre} - Hours_{post}$$

$$kWh_{Savings} = kW \times Hours_{reduction}$$

Savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Unit Name	***HP***	***Eff***	***LF***	***Hours$_{reduction}$***
AHU-1	7.5	91.7%	0.75	3,120
AHU-2	3	90.2%	0.75	3,120
AHU-3	25	94.1%	0.75	3,120
AHU-4	30	93.6%	0.75	3,120
AHU-5	7.5	85.0%	0.75	3,120

AHU-7	25	93.6%	0.75	3,120
AHU-8	7.5	91.7%	0.75	3,120
CHW Pump	40	94.1%	0.75	3,120

Variable Volume BAS Schedule:

$$kW = \frac{HP \times 0.7457 \times \mathrm{FS}}{\eta}$$

$$kWh_{Savings} = \sum kW \times Hours$$

Savings parameters applicable to this site are shown below:

Table B, Savings Parameters

Temperature Range	***HP***	***FS***	***kW***	***Hours***
97 - 95	40	100.0%	31.7	0
95 - 93	40	95.0%	27.9	2
93 - 91	40	90.0%	24.4	16
91 - 89	40	85.0%	21.1	31
89 - 87	40	80.0%	18.1	57
87 - 85	40	75.0%	15.4	92
85 - 83	40	70.0%	13.0	147
83 - 81	40	65.0%	10.8	202
81 - 79	40	60.0%	8.8	308
79 - 77	40	55.0%	7.1	507
77 - 75	40	50.0%	5.6	532
75 - 73	40	50.0%	5.6	424
73 - 71	40	50.0%	5.6	312

71 - 69	40	50.0%	5.6	260
69 - 67	40	50.0%	5.6	263
67 - 65	40	50.0%	5.6	232
65 - 63	40	50.0%	5.6	244
63 - 61	40	50.0%	5.6	282
61 - 59	40	50.0%	5.6	216
59 - 57	40	50.0%	5.6	180
57 - 55	40	50.0%	5.6	156
55 - 53	40	50.0%	5.6	178
53 - 51	40	50.0%	5.6	129
51 - 49	40	50.0%	5.6	133
49 - 47	40	50.0%	5.6	141
47 - 45	40	50.0%	5.6	125
45 - 43	40	50.0%	5.6	122
43 - 41	40	58.3%	8.2	76
41 - 39	40	66.7%	11.5	51
39 - 37	40	75.0%	15.4	70
37 - 35	40	83.3%	20.1	63
35 - 33	40	91.7%	25.5	32
33 - 31	40	100.0%	31.7	21
31 - 29	40	100.0%	31.7	12
29 - 27	40	100.0%	31.7	17
27 - 25	40	100.0%	31.7	7

Chiller BAS Schedule:

$$kWh_{Savings} = \sum Tons \times \eta \times Hours$$

Where:

Tons Calculated based on OAT

η Efficiency based on the cooling load

Hours Reduction in hours based on outside air temperature and BAS schedule

Savings parameters applicable to this site are shown below:

Table C, Savings Parameters

Temperature Range	***Tons***	***% cooling***	***kW/ton***	***Hours***
97 - 95	153.25	77%	1.072723	0
95 - 93	146.75	73%	1.060477	2
93 - 91	140.25	70%	1.048231	16
91 - 89	133.75	67%	1.035985	31
89 - 87	127.25	64%	1.023739	57
87 - 85	120.75	60%	1.011493	92
85 - 83	114.25	57%	0.999247	147
83 - 81	107.75	54%	0.987001	202
81 - 79	101.25	51%	0.974755	308
79 - 77	94.75	47%	0.962509	507
77 - 75	88.25	44%	0.950263	532
75 - 73	81.75	41%	0.938017	424
73 - 71	75.25	38%	0.925771	312
71 - 69	68.75	34%	0.913525	260
69 - 67	62.25	31%	0.901279	263
67 - 65	55.75	28%	0.889033	232
65 - 63	49.25	25%	0.876787	244
63 - 61	42.75	21%	0.864541	282

61 - 59	36.25	18%	0.852295	216
59 - 57	29.75	15%	0.840049	180
57 - 55	23.25	12%	0.827803	156

Savings Calculations

Table D, Constant Volume kWh Savings Calculations

Unit Name	***HP***	***Motor Efficiency***	***Annual Operating Hour Reduction***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
AHU-1	7.5	91.7%	5,640	134,083	134,083	100.0%
AHU-2	3	90.2%	5,640	25,799	25,799	100.0%
AHU-3	25	94.1%	5,640	10,573	10,491	99.2%
AHU-4	30	93.6%	5,640	84,250	83,802	99.5%
AHU-5	7.5	85.0%	5,640	101,100	101,100	100.0%
AHU-7	25	93.6%	5,640	25,799	27,832	107.9%
AHU-8	7.5	91.7%	5,640	84,250	84,250	100.0%
CHW Pump	40	94.1%	5,640	25,799	25,799	100.0%
Total				**493,155**	**491,652**	**100.3%**

Table E, Variable kW Savings Calculations

Temp Range	***Fan kW***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***	***Chiller kW***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
95 - 93	27.9	52	56	106.3%	155.6	311	311	100.0%
93 - 91	24.4	367	390	106.3%	147.0	2,352	2,352	100.0%
91 - 89	21.1	616	655	106.3%	138.6	4,295	4,295	100.0%
89 - 87	18.1	973	1,034	106.3%	130.3	7,425	7,425	100.0%

87 - 85	15.4	1,337	1,421	106.3%	122.1	11,237	11,237	100.0%
85 - 83	13.0	1,798	1,910	106.3%	114.2	16,782	16,782	100.0%
83 - 81	10.8	2,052	2,181	106.3%	106.3	21,483	21,483	100.0%
81 - 79	8.8	2,562	2,722	106.3%	98.7	30,398	30,398	100.0%
79 - 77	7.1	3,393	3,605	106.3%	91.2	46,237	46,237	100.0%
77 - 75	5.6	2,805	2,981	106.3%	83.9	44,614	44,614	100.0%
75 - 73	5.6	2,236	2,376	106.3%	76.7	32,514	32,514	100.0%
73 - 71	5.6	1,645	1,748	106.3%	69.7	21,735	21,735	100.0%
71 - 69	5.6	1,371	1,457	106.3%	62.8	16,329	16,329	100.0%
69 - 67	5.6	1,387	1,474	106.3%	56.1	14,756	14,756	100.0%
67 - 65	5.6	1,223	1,300	106.3%	49.6	11,499	11,499	100.0%
65 - 63	5.6	1,287	1,367	106.3%	43.2	10,536	10,536	100.0%
63 - 61	5.6	1,487	1,580	106.3%	37.0	10,422	10,422	100.0%
61 - 59	5.6	1,139	1,210	106.3%	30.9	6,673	6,673	100.0%
59 - 57	5.6	949	1,009	106.3%	25.0	4,498	4,498	100.0%
57 - 55	5.6	823	874	106.3%	19.2	3,002	3,002	100.0%
55 - 53	5.6	939	997	106.3%	0	0	0	100.0%
53 - 51	5.6	680	723	106.3%	0	0	0	100.0%
51 - 49	5.6	701	745	106.3%	0	0	0	100.0%
49 - 47	5.6	743	790	106.3%	0	0	0	100.0%
47 - 45	5.6	659	700	106.3%	0	0	0	100.0%
45 - 43	5.6	643	684	106.3%	0	0	0	100.0%
43 - 41	8.2	589	626	106.3%	0	0	0	100.0%
41 - 39	11.5	552	587	106.3%	0	0	0	100.0%
39 - 37	15.4	1,017	1,081	106.3%	0	0	0	100.0%
37 - 35	20.1	1,191	1,266	106.3%	0	0	0	100.0%

35 - 33	25.5	768	816	106.3%	0	0	0	100.0%
33 - 31	31.7	626	666	106.3%	0	0	0	100.0%
31 - 29	31.7	358	380	106.3%	0	0	0	100.0%
29 - 27	31.7	507	539	106.3%	0	0	0	100.0%
27 - 25	31.7	209	222	106.3%	0	0	0	100.0%
Totals		**39,685**	**42,173**	**106.3%**		**317,100**	**317,100**	**100.0%**

Results

The kWh realization rates for project CIP-112 are 100.5% and no kW savings since energy savings do not occur during designated peak operating hours. Slight differences between expected and realized kWh come from using the nameplate motor efficiency instead of the NEMA premium motor efficiency table and including the motor efficiency in the calculation for the variable volume motor savings calculation.

Table F, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Constant Volume Motor	491,652	-	100.3%	-
Variable Volume Motor	39,685	-	106.3%	-
Chiller	317,100	-	100.0%	-
Total	**848,436**	**-**	**100.5%**	**-**

Project Number LN9-136

Program Large Commercial & Industrial Solutions

Project Background

The participant is a big box contractor supply that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (671) 78w led - non-int. ballasts replaced (671) 4' 6-lamp t8 28w
- (57) 30w led - non-int. ballasts replaced (57) 4' 3-lamp t8s
- (3) 31w led - non-int. ballasts replaced (3) 4' 2-lamp t8s
- (7) 34w led - non-int. ballasts replaced (7) 4' 2-lamp t8s
- (32) 94w led - non-int. ballasts replaced (32) 8' 2-lamp t8 86w hos
- (237) 22w led - non-int. ballasts replaced (351) 4' 2-lamp t8s
- (31) 160w led - non-int. ballasts replaced (31) 320w metal halides
- (22) 130w led - non-int. ballasts replaced (22) 320w metal halides
- (11) 85w led - non-int. ballasts replaced (11) 320w metal halides
- (13) 96w led - non-int. ballasts replaced (13) 400w metal halides
- (2) 96w led - non-int. ballasts replaced (2) 400w metal halides
- (16) 36w led - non-int. ballasts replaced (16) 400w metal halides
- (10) 22w led - non-int. ballasts replaced (10) 1-lamp 42w cfl multi 4-pins
- (29) 212w led - non-int. ballasts replaced (29) 1000w metal halides
- (10) 140w led - non-int. ballasts replaced (10) 1000w metal halides
- (6) 140w led - non-int. ballasts replaced (6) 1000w metal halides
- (7) 96w led - non-int. ballasts replaced (7) 400w metal halides
- (5) 146w led - non-int. ballasts replaced (5) 400w metal halides

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	IEF_E	IEF_D	*CF*
Retail: Other	Gas	6,734	1.09	1.20	1.00
Retail: Other	Gas	6,734	1.09	1.20	1.00
Exterior	None	2,184	1.00	1.00	1.00
Exterior	None	4,319	1.00	1.00	0.00

Expected savings for this project were developed using custom-calculated hours of operation. The Evaluators reviewed and verified the lighting hours of operation.

Savings Calculations

Table B. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
F32T8-28W to LED78W	671	671	194	78	6,734	571,321	571,321	1.09	100.0%
F32T8 to LED30W	57	57	85	30	5,772	19,724	19,724	1.09	100.0%
F32T8 to LED31W	3	3	58	31	5,772	510	510	1.09	100.0%
F32T8 to LED34W	7	7	58	34	5,772	1,057	1,057	1.09	100.0%
F96T8/HO to LED94W	32	32	160	94	6,734	15,502	15,502	1.09	100.0%
F32T8 to LED22W	237	351	58	22	6,734	44,217	44,217	1.09	100.0%
MH320 to LED160W	31	31	343	160	2,184	12,390	12,390	1.00	100.0%
MH320 to LED130W	22	22	343	130	2,184	10,234	10,234	1.00	100.0%
MH320 to LED85W	11	11	343	85	4,319	12,396	12,257	1.00	98.9%
MH400 to LED96W	13	13	453	96	4,319	20,272	20,044	1.00	98.9%
MH400 to LED96W	2	2	453	96	4,319	3,119	3,084	1.00	98.9%
MH400 to LED36W	16	16	453	36	4,319	29,143	28,816	1.00	98.9%
CFM42W to LED22W	10	10	46	22	4,319	1,048	1,037	1.00	99.0%
MH1000 to LED212W	29	29	1,078	212	4,319	109,698	108,467	1.00	98.9%
MH1000 to LED140W	10	10	1,078	140	4,319	40,972	40,512	1.00	98.9%
MH1000 to LED140W	6	6	1,078	140	4,319	24,583	24,307	1.00	98.9%
MH400 to LED96W	7	7	453	96	4,319	10,916	10,793	1.00	98.9%
MH400 to LED146W	5	5	453	146	4,319	6,705	6,630	1.00	98.9%
					Total	**933,807**	**930,902**		**99.7%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF_D	Realization Rate
	Base	Post	Base	Post					
F32T8-28W to LED78W	671	671	194	78	1.00	84.06	93.40	1.20	111.1%
F32T8 to LED30W	57	57	85	30	1.00	3.39	3.76	1.20	110.9%
F32T8 to LED31W	3	3	58	31	1.00	0.09	0.10	1.20	111.1%
F32T8 to LED34W	7	7	58	34	1.00	0.18	0.20	1.20	111.1%
F96T8/HO to LED94W	32	32	160	94	1.00	2.28	2.53	1.20	111.0%
F32T8 to LED22W	237	351	58	22	1.00	6.51	7.23	1.20	111.1%
MH320 to LED160W	31	31	343	160	1.00	1.47	5.67	1.00	385.7%
MH320 to LED130W	22	22	343	130	1.00	1.22	4.69	1.00	384.4%
MH320 to LED85W	11	11	343	85	0.00	0.74	0.00	1.00	0.0%
MH400 to LED96W	13	13	453	96	0.00	1.21	0.00	1.00	0.0%
MH400 to LED96W	2	2	453	96	0.00	0.19	0.00	1.00	0.0%
MH400 to LED36W	16	16	453	36	0.00	1.73	0.00	1.00	0.0%
CFM42W to LED22W	10	10	46	22	0.00	0.06	0.00	1.00	0.0%
MH1000 to LED212W	29	29	1,078	212	0.00	6.53	0.00	1.00	0.0%
MH1000 to LED140W	10	10	1,078	140	0.00	2.44	0.00	1.00	0.0%
MH1000 to LED140W	6	6	1,078	140	0.00	1.46	0.00	1.00	0.0%
MH400 to LED96W	7	7	453	96	0.00	0.65	0.00	1.00	0.0%
MH400 to LED146W	5	5	453	146	0.00	0.40	0.00	1.00	0.0%
					Total	**114.61**	**117.58**		**102.6%**

Results

The kWh realization rate for project LN9-107 is 99.7% and the kW realization rate is 102.%. Annual operating hours for 10 of 12 exterior spaces was listed as ‘dusk to dawn’ and used 4,368 hours in savings calculations. The Evaluators changed this to 4,319, New

Orleans dusk-to-dawn annual hours of operation[53]. This slightly reduced the kWh realization rate. Ex ante calculations used deemed coincidence factors despite custom hours of operating. The Evaluators calculated peak coincidence factors and found that all interior spaces and two exterior spaces were on 100% of peak hours. Slightly offsetting this, ex ante calculations 10 of 12 exterior spaces used 0.26, a peak CF appropriate for lighting after occupancy sensors have been installed. However, dusk-to-dawn operation precludes operation during this time, thus ex post calculations use a 0% coincidence factor, resulting in no kW savings for these areas.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8-28W to LED78W	571,321	93.40	100.0%	111.1%
F32T8 to LED30W	19,724	3.76	100.0%	110.9%
F32T8 to LED31W	510	0.10	100.0%	111.1%
F32T8 to LED34W	1,057	0.20	100.0%	111.1%
F96T8/HO to LED94W	15,502	2.53	100.0%	111.0%
F32T8 to LED22W	44,217	7.23	100.0%	111.1%
MH320 to LED160W	12,390	5.67	100.0%	385.7%
MH320 to LED130W	10,234	4.69	100.0%	384.4%
MH320 to LED85W	12,257	0.00	98.9%	0.0%
MH400 to LED96W	20,044	0.00	98.9%	0.0%
MH400 to LED96W	3,084	0.00	98.9%	0.0%
MH400 to LED36W	28,816	0.00	98.9%	0.0%
CFM42W to LED22W	1,037	0.00	99.0%	0.0%
MH1000 to LED212W	108,467	0.00	98.9%	0.0%
MH1000 to LED140W	40,512	0.00	98.9%	0.0%

[53] TRM 3.0 table D-144, p D-176

MH1000 to LED140W	24,307	0.00	98.9%	0.0%
MH400 to LED96W	10,793	0.00	98.9%	0.0%
MH400 to LED146W	6,630	0.00	98.9%	0.0%
Total	**930,902**	**117.58**	**99.7%**	**102.6%**

Project Number LN9-110

Program Large Commercial & Industrial Solutions

Project Background

The participant is a University Central Plant that received incentives from Entergy New Orleans for implementing optimization controls on the chillers and cooling tower cooling system. The optimization controls use continuous monitoring and learning strategies to reduce the energy usage and energy cost. The Evaluators verified that the following had been installed:

- (1) Optimization strategy on the central plant cooling system

Calculation Parameters

Savings calculations were performed using an energy simulation model and

motor nameplate data and the following algorithms:

$$kWh_{Savings} = kWh_{pre} - kWh_{post}$$

A billing regression simulation would be the preferred solution to calculate savings but estimated saving are less than 2% of the total annual energy usage and therefore would not be visible in the energy usage.

Simulation equipment specifications applicable to this site are shown below:

Table A, Chiller Equipment Specifications

Unit Name	*Cooling Capacity (ton)*	*Evap. Flow (GPM)*	*Cond. Flow (GPM)*	*Power (kW)*	*Efficiency (kW/ton)*
CH-1	1,600	3,840	4,800	968.2	0.605
CH-2	1,600	3,840	4,800	968.2	0.605
CH-4	2,000	3,000	6,000	1,151	0.576
CH-5	2,000	3,000	6,000	1,151	0.576
CH-6	4,550	6,825	13,650	2,710	0.596

Savings Calculations

Table B, kWh Usage ***Results***

System	Baseline kWh	Optimal kWh	Savings	Percentage Savings
York Chiller	11,580,992	13,255,536	-1,674,544	-14.5%
Trane Chiller	5,281,091	2,139,813	3,141,278	59.5%
Carrier Chiller	38,456	30,454	8,002	20.8%
PCHWP	909,567	1,010,255	-100,688	-11.1%
SCHWP	1,993,426	1,964,176	29,250	1.5%
CWP	2,268,775	2,316,541	-47,766	-2.1%
Tower	1,027,649	532,261	495,388	48.2%
Total Central Plant	23,099,956	21,249,036	1,850,920	8.0%

Savings from the CPO planning tool uses actual plant readings to estimate savings. The following graph compares the energy usage of the actual billed central plant usage versus the model usage. The cooling central plant usage mimics the usage of the whole central plant as expected. An actual calibration is not possible since the billing data is for the whole central plant and the simulation only accounts for the chiller cooling system.

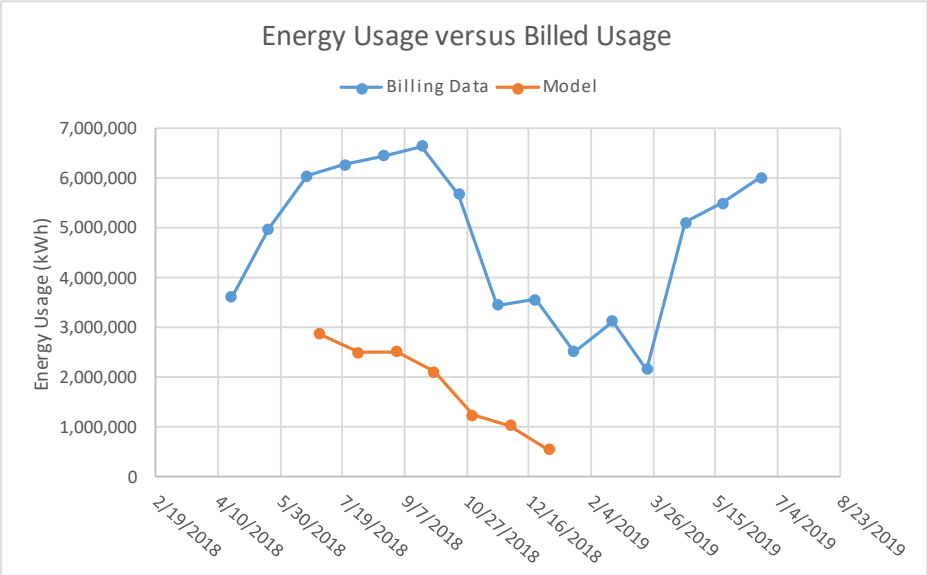


Table C, kWh Saving Calculations

Measure	*Pre kWh Usage*	*Post kWh Usage*	*Model kWh Savings*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
Central Plant Optimization	23,099,956	21,249,036	1,850,922	1,110,553	1,110,553	100.0%

Results

The kWh realization rate for project LN9-110 is 100.00% with no peak demand savings since max usage is expected to be similar even after optimization. The expected and realized kWh savings are less than the provided energy model because the model simulate the theoretical savings however the real world savings will be less based on equipment inefficiencies arising and the inability of the optimization software to perfectly predict future environmental extremes.

Table D, Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
Central Plant Optimization	1,110,553	-	100.00%	-
Total	**1,110,553**	**-**	**100.00%**	**-**

Project Number CIP-070

Program Large Commercial & Industrial Solutions

Project Background

The participant is an office building that received incentives from Entergy New Orleans for installing a BAS to implement an operating schedule. The Evaluators verified following equipment is controlled by the BAS control:

- (24) Air Handling Units Fan Motors
- (1) Large Chiller
- (5) Chilled Water Pump Motors
- (2) Hot Water Pump Motors
- (2) Mixed Usage Pump Motors
- (5) Cooling Tower Fan Motors
- (1) Condenser Water Pump Motor

Calculation Parameters

Savings calculations were performed using motor nameplate data and the following algorithms:

$$kW_{fl} = \frac{HP \times 0.746 \times LF}{\eta}$$

$$kW_{bin} = kW_{fl} \times (\mathrm{A} + \mathrm{B} \times Speed_{\%} + C \times (Speed_{\%})^2)$$

$$kWh = \sum kW_{bin} \times Hours_{bin}$$

$$kWh_{Savings} = kWh_{pre} - kWh_{post}$$

Where:

HP = Motor nameplate horsepower

LF= Motor estimated load factor

η= Motor nameplate efficiency

A,B,C= Motor part load usage coefficients

fl= Motor full load power demand

bin= Motor part load power demand by temperature range

Hours= Annual operating hours in each temperature range based on TMY3 weather data.

This method calculates energy savings by defining the system airflow and motor speed based on the outside air temperature. The annual operating hours for each temperature bin are based on TMY3 weather data. The part load usage coefficients are from the agreed upon BAS Savings Analysis calculator.

Savings parameters applicable to this site are shown below:

Table A, Equipment Parameters

Unit Name	***HP***	***Eff***	***LF***	***kW***
PAU-102 & 103	120	95.0%	75%	70.67
PAU-104	25	93.0%	75%	15.04
7.5hp AHUs	105	91.0%	75%	64.56
5hp AHUs	10	89.5%	75%	6.25
10hp AHUs	20	91.7%	75%	12.20
15hp AHUs	45	93.0%	75%	27.07
PCWP-101	25	92.4%	75%	15.14
P-101	25	92.4%	75%	15.14
P-102	25	92.4%	75%	15.14
P-110	40	93.0%	75%	24.06
P-111	40	93.0%	75%	24.06
BP-104	40	91.0%	75%	24.59
BP-105	40	91.0%	75%	24.59
Mix 1	20	93.0%	75%	12.03
Mix 2	20	93.0%	75%	12.03
CTFM-1	30	93.6%	75%	17.93

CTFM-2	30	93.6%	75%	17.93
CTFM-3	30	93.6%	75%	17.93
CTFM-4	30	93.6%	75%	17.93
CTFM-5	30	93.6%	75%	17.93
P115	100	91.7%	75%	61.01
Chiller	784 (Tons)	0.3654 (kW/ton)	-	286.47

Table B, Temperature Bin Parameters

Temperature Bin	***Speed Percentage***	***Baseline Hours***	***Proposed Hours***
25	86%	35	1
30	84%	80	17
35	82%	212	48
40	80%	296	89
45	78%	450	132
50	76%	94	35
51	74%	98	34
52	72%	96	33
53	70%	142	50
54	68%	113	29
55	66%	119	33
56	64%	117	42
57	62%	138	40
58	60%	126	46
59	59%	151	41
60	60%	154	41
61	61%	191	55

62	62%	218	67
63	63%	171	46
64	64%	177	54
65	65%	172	65
66	66%	193	68
67	67%	177	60
68	68%	199	75
69	69%	161	56
70	70%	229	95
71	71%	209	87
72	72%	248	87
73	73%	277	93
74	74%	310	102
75	75%	310	98
76	76%	398	115
77	77%	386	120
78	78%	331	123
79	79%	293	121
80	80%	239	120
81	81%	234	132
82	82%	184	120
83	83%	180	131
84	84%	165	130
85	85%	132	108
86	86%	143	116
87	87%	111	104

88	88%	102	95
89	89%	67	64
90	90%	62	57
91	91%	32	30
92	92%	15	15
93	93%	11	11
94	94%	6	6
95	95%	5	5
96	96%	1	1

Savings Calculations

Table C, Pre kWh Usage Calculations

System	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
CHWP-1	105,403	107,130	98.4%
CHWP-2	107,719	107,130	100.5%
CHWP-3	107,719	107,130	100.5%
CHWP-4	107,719	107,130	100.5%

Table D, Post kWh Usage Calculations

Temp Range	*Fan kW*	*Hours*	*Expected kWh Usage*	*Realized kWh Usage*	*Realization Rate*
97 - 93	12.2	6	183	73	40.0%
93 - 89	11.2	290	314	3,253	1035.7%
89 - 85	10.3	600	2,902	6,153	212.0%
85 - 81	9.3	949	7,583	8,862	116.9%

81 - 77	8.5	1219	11,390	10,323	90.6%
77 - 73	7.6	871	10,030	6,658	66.4%
73 - 69	6.9	955	5,569	6,557	117.8%
69 - 65	6.1	693	5,330	4,251	79.7%
65 - 61	5.4	783	4,384	4,264	97.3%
61 - 57	4.8	550	4,898	2,641	53.9%
57 - 53	4.2	725	1,820	3,047	167.4%
53 - 49	3.6	356	1,222	1,298	106.3%
49 - 45	3.1	264	749	827	110.5%
45 - 41	2.7	263	514	700	136.3%
Totals			**58,909**	**56,887**	**103.6%**

Table E, kWh Saving Calculations

Measure	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
AHU	696,138	695,722	99.9%
Chiller	725,566	801,410	110.5%
CWP	315,895	348,915	110.5%
HWP	96,600	108,925	112.8%
CTFM	135,389	149,011	110.1%
CoWP	206,045	227,583	110.5%
Total	**2,175,633**	**2,331,566**	**107.2%**

Results

The kWh realization rate for project CIP-070 is 107.2% and no kW savings. Realized kWh savings are higher than expected because of a change in the post operating schedule. The post operating schedule was determined by the BAS screenshots showing the scheduled timing for all the air handling equipment. Additionally, a few equipment efficiency values were adjusted to match the provided nameplate data.

Table F, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
BAS Schedule	2,331,566	-	107.17%	-
Total	**2,331,566**	**-**	**107.17%**	**-**

17.3 Publicly Funded Institutions

Project Number CIP-054

Program Publicly Funded Institutions

Project Background

The participant is a park that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (1) Exterior Lighting: LED replacing 251 W to 400 W HID
- (41) Exterior Lighting: LED replacing 401 W to 1000 W HID

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***	***Measure Quantity***
Exterior Lighting: LED replacing 251 W to 400 W HID	100.7	0.000	1
Exterior Lighting: LED replacing 401 W to 1000 W HID	230.8	0.000	41

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kWh Savings***	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***
Exterior Lighting: LED replacing 251 W to 400 W HID	1	101	101	103	101.9%
Exterior Lighting: LED replacing 401 W to 1000 W HID	41	231	9,461	9,647	102.0%
		Total:	**9,562**	**9,750**	**102.0%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Realized kW Reduction*	*kW Realization Rate*
Exterior Lighting: LED replacing 251 W to 400 W HID	1	0.000	0.00	0.00	N/A
Exterior Lighting: LED replacing 401 W to 1000 W HID	41	0.000	0.00	0.00	N/A
		Total:	**0.00**	**0.00**	**N/A**

Results

The kWh for project CIP_054 is 102.0% and no kW reduction was claimed or realized.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
Exterior Lighting: LED replacing 251 W to 400 W HID	103	0.00	101.9%	N/A
Exterior Lighting: LED replacing 401 W to 1000 W HID	9,647	0.00	102.0%	N/A
Total:	**9,750**	**0.00**	**102.0%**	**N/A**

Project Number CIP-053

Program Publicly Funded Institutions

Project Background

The participant is a park that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (43) Exterior Lighting: LED replacing 401 W to 1000 W HID

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Expected kWh Savings and kW Reductions

Prescriptive Measure	***Expected Per-Unit kWh Savings***	***Expected Per-Unit kW Reduction***	***Measure Quantity***
Exterior Lighting: LED replacing 401 W to 1000 W HID	230.8	0.000	43

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. kWh Savings Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kWh Savings***	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***
Exterior Lighting: LED replacing 401 W to 1000 W HID	43	231	9,923	10,118	102.0%
		Total:	**9,923**	**10,118**	**102.0%**

Table C. kW Reduction Calculations

Prescriptive Measure	*Measure Quantity*	*Per-Unit kW Reduction*	*Expected kW Reduction*	*Realized kW Reduction*	*kW Realization Rate*
Exterior Lighting: LED replacing 401 W to 1000 W HID	43	0.000	0.00	0.00	N/A
		Total:	**0.00**	**0.00**	**N/A**

Results

The kWh for project CIP_053 is 102.0% and no kW reduction was claimed or realized.

Ex ante calculations for the project used annual hours of lighting operation and peak CFs that represented values averaged across multiple building types. The Evaluators adjusted the project to use annual hours of operation and peak CFs specific to the fa This resulted in a difference in verified savings compared to ex ante calculations.

Table D. Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
Exterior Lighting: LED replacing 401 W to 1000 W HID	10,118	0.00	102.0%	N/A
Total:	**10,118**	**0.00**	**102.0%**	**N/A**

Project Number PN9-018

Program Publicly Funded Institutions

Project Background

The participant is an office building that received incentives from Entergy New Orleans for installing a Building Automation System (BAS) to implement an operating schedule to match building occupancy. The Evaluators verified that the following had been installed:

- (1) Building Automation System Schedule
- (2) Air Handling Unit with BAS Schedule Operation

Calculation Parameters

Savings calculations were performed using an eQUEST energy model with motor nameplate data and the following algorithms:

The baseline schedule was Always On during the week and 6 am to noon on weekends calculating to 6,870 operating hours per year. The proposed schedule is 6 am to 7 pm weekdays and 6 am to 10 am weekends calculating to 3,800 operating hours per year. The difference in operating hours is 3,070 hours per year.

Constant volume BAS Schedule:

$$kW_{Savings} = kW_{pre,peak} - kW_{post,peak}$$

$$kWh_{Savings} = kWh_{pre} - kWh_{post}$$

Peak usage is defined by the average energy demand during the defined peak hours of 3 pm to 6 pm Weekdays during the months of April through September.

Savings parameters applicable to this site are shown below:

Table A, Energy Model HVAC Parameters

Unit Name	*Capacity*	*EER*	*Heating COP*	*Baseline Schedule*	*Proposed Schedule*
RTU-1	40 ton	10.7	0.8	24/7	7 am – 6 pm Weekday 10 am – 2 pm Weekend

RTU-2	40 ton	10.7	0.8	24/7	6 am – 5 pm Weekday 10 am – 2 pm Weekend

Savings Calculations

Table B, kWh Savings Calculations

Measure	***Baseline Annual kWh***	***Proposed Annual kWh***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
BAS Upgrade	383,587	321,201	80,776	62,387	77.2%

Table C, Peak kW Savings Calculations

Measure	***Baseline Peak kW***	***Proposed Peak kW***	***Expected kW Savings***	***Realized kW Savings***	***Realization Rate***
BAS Upgrade	65.97	60.58	0.00	5.39	NA

Results

The kWh realization rate for project PN9-018 is 77.2% with an undefined peak kW reduction realization rate.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
BAS Upgrade	62,387	5.39	77.2%	-
Total	**62,387**	**5.39**	**77.2%**	**-**

Project Number PN9-008

Program Publicly Funded Institutions

Project Background

The participant is a school building that received incentives from Entergy New Orleans for replacing an air cooled chiller with a more efficient unit. The Evaluators verified that the following had been replaced:

- (1) Air Cooled 180 ton Chiller

Calculation Parameters

Savings calculations were performed using section D.3.3. Air- and Water-Cooled Chillers from the New Orleans TRM version 3 and the manufacturer specifications. Section D.3.3 use the following algorithms:

Constant volume BAS Schedule:

$$kW_{Savings} = CAP \times (\eta_{base} - \eta_{post}) \times CF$$

$$kWh_{savings} = CAP \times EFLH_C \times (\eta_{base} - \eta_{post})$$

Where:

CAP = Rated equipment cooling capacity of the new unit (Tons)

η_{base} = Baseline energy efficiency rating of the baseline cooling equipment (kW/ton or EER converted to kW/ton)

η_{post}= Nameplate energy efficiency rating of the installed cooling equipment (kW/ton)

Note: use full-load efficiency (in units of kW/ton) for kW savings calculations and IPLV (in units of kW/ton) for kWh savings calculations. Cooling efficiencies expressed as an EER will need to be converted to kW/ton using the following equation:

$$\frac{kW}{Ton} = \frac{12}{EER}$$

CF= Coincidence factor

EFLH$_c$= Equivalent full-load hours for cooling

Savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Equipment	Capacity	EER		IPLV		EFLH	CF
		Base	Post	Base	Post		
Chiller	180	1.26	0.7	1.26	1.19	2,329	0.71

Savings Calculations

Table B, kWh Savings Calculations

Equipment	Capacity	EFLH	CF	Expected kWh Savings	Realized kWh Savings	Realization Rate
Chiller	180	2,329	0.71	110,910	110,910	100.00%
Total				**110,910**	**110,910**	**100.00%**

Table C, kWh Savings Calculations

Equipment	Capacity	EFLH	CF	Expected kWh Savings	Realized kWh Savings	Realization Rate
Chiller	180	2,329	0.71	8.85	8.85	100.00%
Total				8.85	8.85	100.00%

Results

The kWh and kW realization rates for project PN9-008 are both 100.0%

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
Chiller	110,910	8.85	100.00%	100.00%
Total	**110,910**	8.85	100.00%	100.00%

Project Number PN9-021

Program Publicly Funded Institutions

Project Background

The participant is a school building that received incentives from Entergy New Orleans for installing a Building Automation System (BAS) to implement an operating schedule to match building occupancy. The Evaluators verified that the following had been installed:

- (1) Building Automation System Schedule
- (1) Chilled Water Pump Motor with BAS Schedule Operation
- (7) Air Handling Unit Fan Motors with BAS Schedule Operation
- (6) Chiller Condenser with BAS Schedule Operation

Calculation Parameters

Savings calculations were performed using motor nameplate data and the following algorithms:

The baseline schedule was Always On during the week and 6 am to noon on weekends calculating to 6,870 operating hours per year. The proposed schedule is 6 am to 7 pm weekdays and 6 am to 10 am weekends calculating to 3,800 operating hours per year. The difference in operating hours is 3,070 hours per year.

Constant volume BAS Schedule:

$$kW = \frac{Q \times HP \times 0.7457 \times LF}{\eta}$$

$$Hours_{reduction} = Hours_{pre} - Hours_{post}$$

$$kWh_{Savings} = kW \times Hours_{reduction}$$

Savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Unit Name	*Q*	*HP*	*Eff*	*LF*	*Hours$_{reduction}$*
CHW Pump w/ VFD	1	15	92.4%	0.75	3,070
Indoor Mod	1	0.062	85.5%	0.75	3,070

Rooftop Package Unit	1	3	89.5%	0.75	3,070
3rd Floor Rooftop	1	3	89.5%	0.75	3,070
Unit 9 AHU indoor	2	1.5	86.5%	0.75	3,070
Unit 11 AHU indoor	2	7.5	91.7%	0.75	3,070

Chiller BAS Schedule:

$$kWh_{Savings} = \sum Tons \times \%\, cooling \times \eta \times Hours$$

Where:

Tons Nameplate unit capacity in tons

% cooling Estimated cooling percentage based on outside air temperature

η Efficiency based on the cooling load

Hours Reduction in hours based on outside air temperature and BAS schedule

Savings parameters applicable to this site are shown below:

Table B, Global Savings Parameters

Temperature Range	***% cooling***	***Hours***
97 - 95	76.6%	0
95 - 93	73.4%	0
93 - 91	70.1%	1
91 - 89	66.9%	13
89 - 87	63.6%	18
87 - 85	60.4%	19
85 - 83	57.1%	31

83 - 81	53.9%	85
81 - 79	50.6%	150
79 - 77	47.4%	271
77 - 75	44.1%	314
75 - 73	40.9%	242
73 - 71	37.6%	164
71 - 69	34.4%	126
69 - 67	31.1%	136
67 - 65	27.9%	134
65 - 63	24.6%	152
63 - 61	21.4%	195
61 - 59	18.1%	134
59 - 57	14.9%	96
57 - 55	11.6%	104

Table C, Chiller Savings Parameters

Temperature Range	Chiller 1 (kW/ton)	Chiller 3 (kW/ton)	Chiller 4 (kW/ton)	Chiller 5 (kW/ton)	Chiller 10 (kW/ton)	Chiller 12 (kW/ton)
97 - 95	1.27	1.10	1.32	1.22	1.08	1.14
95 - 93	1.23	1.09	1.32	1.21	1.07	1.13
93 - 91	1.20	1.08	1.31	1.21	1.06	1.13
91 - 89	1.16	1.06	1.31	1.21	1.05	1.12
89 - 87	1.13	1.05	1.31	1.21	1.04	1.12
87 - 85	1.10	1.04	1.31	1.21	1.03	1.12
85 - 83	1.06	1.02	1.31	1.21	1.01	1.11
83 - 81	1.03	1.01	1.31	1.21	1.00	1.11
81 - 79	1.00	1.00	1.31	1.20	0.99	1.10
79 - 77	0.96	0.98	1.31	1.20	0.98	1.10
77 - 75	0.93	0.97	1.31	1.20	0.97	1.09
75 - 73	0.89	0.96	1.30	1.20	0.96	1.09
73 - 71	0.86	0.94	1.30	1.20	0.95	1.09
71 - 69	0.83	0.93	1.30	1.20	0.93	1.08
69 - 67	0.79	0.92	1.30	1.20	0.92	1.08
67 - 65	0.76	0.90	1.30	1.19	0.91	1.07
65 - 63	0.73	0.89	1.30	1.19	0.90	1.07
63 - 61	0.69	0.88	1.30	1.19	0.89	1.06
61 - 59	0.66	0.86	1.30	1.19	0.88	1.06
59 - 57	0.62	0.85	1.30	1.19	0.87	1.06
57 - 55	0.59	0.84	1.29	1.19	0.85	1.05

Savings Calculations

Table D, Constant Volume kWh Savings Calculations

Unit Name	*HP*	*Motor Efficiency*	*Annual Operating Hour Reduction*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
CHW Pump w/ VFD	15	92.4%	3,070	27,873	27,873	100.0%
Indoor Mod	0.062	85.5%	3,070	124	124	100.0%
Rooftop Package Unit	3	89.5%	3,070	5,755	5,755	100.0%
3rd Floor Rooftop	3	89.5%	3,070	5,755	5,755	100.0%
Unit 9 AHU indoor	1.5	86.5%	3,070	5,955	5,955	100.0%
Unit 11 AHU indoor	7.5	91.7%	3,070	28,086	28,086	100.0%
Total				**73,548**	**73,548**	**100.0%**

Table E, Combined Chiller kWh Savings Calculations

Temp Range	*Fan kW*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
95 - 93	228.03	0.00	0.00	#DIV/0!
93 - 91	213.60	0.00	0.00	#DIV/0!
91 - 89	199.60	200	200	100.0%
89 - 87	186.01	2,418	2,418	100.0%
87 - 85	172.85	3,111	3,111	100.0%
85 - 83	160.11	3,042	3,042	100.0%
83 - 81	147.79	4,581	4,581	100.0%
81 - 79	135.89	11,550	11,550	100.0%
79 - 77	124.41	18,661	18,661	100.0%
77 - 75	113.35	30,718	30,718	100.0%

75 - 73	102.72	32,253	32,253	100.0%
73 - 71	92.50	22,385	22,385	100.0%
71 - 69	82.71	13,564	13,564	100.0%
69 - 67	73.34	9,240	9,240	100.0%
67 - 65	64.38	8,756	8,756	100.0%
65 - 63	55.86	7,485	7,485	100.0%
63 - 61	47.75	7,258	7,258	100.0%
61 - 59	40.06	7,812	7,812	100.0%
59 - 57	32.79	4,394	4,394	100.0%
57 - 55	25.95	2,491	2,491	100.0%
Totals		**191,951**	**191,951**	**100.0%**

Results

The kWh realization rate for project PN9-021 is 100.0% with no peak kW reduction since all the savings happen on nights and weekends which are not during peak hours.

Table F, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Constant Volume Motor	73,548	-	100.0%	-
Chiller	191,951	-	100.0%	-
Total	**265,499**	**-**	**100.0%**	**-**

Project Number LN9_113

Program Publicly Funded Institutions

Project Background

The participant is a parking structure that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (24) 48w led - non-int. ballasts replaced (24) 4' 4-lamp t8s
- (96) 52w led - non-int. ballasts replaced (49) 2-lamp 42w cfl multi 4-pins
- (22) 78w led - non-int. ballasts replaced (11) 2-lamp 42w cfl multi 4-pins
- (21) 52w led - non-int. ballasts replaced (7) 2-lamp 42w cfl multi 4-pins
- (19) 26w led - non-int. ballasts replaced (19) 2-lamp 42w cfl multi 4-pins
- (29) 26w led - non-int. ballasts replaced (29) 2-lamp 42w cfl multi 4-pins
- (12) 13w led - non-int. ballasts replaced (12) 1-lamp 42w cfl multi 4-pins
- (13) 26w led - non-int. ballasts replaced (13) 2-lamp 42w cfl multi 4-pins
- (15) 26w led - non-int. ballasts replaced (15) 2-lamp 42w cfl multi 4-pins
- (14) 26w led - non-int. ballasts replaced (14) 2-lamp 42w cfl multi 4-pins
- (10) 52w led - non-int. ballasts replaced (5) 2-lamp 42w cfl multi 4-pins
- (42) 40w led - non-int. ballasts replaced (21) 150w metal halides
- (21) 52w led - non-int. ballasts replaced (21) 8-lamp 42w cfl multi 4-pins
- (15) 12w led - non-int. ballasts replaced (15) 4' 3-lamp t8s
- (31) 12w led - non-int. ballasts replaced (31) 4' 2-lamp t8 30w rlos
- (130) 15w led - non-int. ballasts replaced (130) 4' 2-lamp t8 28w rlos
- (24) 15w led - non-int. ballasts replaced (24) 4' 1-lamp t8 28ws
- (13) 15w led - non-int. ballasts replaced (13) 4' 1-lamp t8 28ws
- (15) 15w led - non-int. ballasts replaced (15) 4' 2-lamp t8 28w rlos
- (15) 9w led - non-int. ballasts replaced (15) 4' 1-lamp t8 28ws
- (30) 48w led - non-int. ballasts replaced (30) 350w metal halides
- (45) 48w led - non-int. ballasts replaced (45) 350w metal halides
- (4) 25w led - non-int. ballasts replaced (4) 2-lamp 42w cfl multi 4-pins

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Expected kWh Savings and kW Reductions

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Corridor/Hallway/Stairwell	Gas	5,233	1.09	1.20	0.90

Savings Calculations

Using measures from the table above, the Evaluators calculated lighting savings as follows:

Table B. Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
CFM42W to LED52W	96	49	93	52	5,233	36,391	36,391	1.09	100.0%
CFM42W to LED78W	22	11	93	78	5,233	6,776	6,776	1.09	100.0%
CFM42W to LED52W	21	7	93	52	5,233	9,064	9,064	1.09	100.0%
CFM42W to LED26W	19	19	93	26	5,233	7,261	7,261	1.09	100.0%
CFM42W to LED26W	29	29	93	26	5,233	11,083	11,083	1.09	100.0%
CFM42W to LED13W	12	12	46	13	5,233	2,259	2,259	1.09	100.0%
CFM42W to LED26W	13	13	93	26	5,233	4,968	4,968	1.09	100.0%
CFM42W to LED26W	15	15	93	26	5,233	5,732	5,732	1.09	100.0%
CFM42W to LED26W	14	14	93	26	5,233	5,350	5,350	1.09	100.0%
CFM42W to LED52W	10	5	93	52	5,233	3,822	3,822	1.09	100.0%
MH150 to LED40W	42	21	183	40	5,233	39,049	39,049	1.09	100.0%
CFM42W to LED52W	21	21	372	52	5,233	38,331	38,331	1.09	100.0%
F32T8 to LED12W	15	15	81	12	5,233	5,904	5,904	1.09	100.0%
F32T8-30W to LED12W	31	31	49	12	5,233	6,542	6,542	1.09	100.0%
F32T8-28W to LED15W	130	130	52	15	5,233	27,436	27,436	1.09	100.0%
F32T8-28W to LED15W	24	24	27	15	5,233	1,643	1,643	1.09	100.0%
F32T8-28W to LED15W	13	13	27	15	5,233	890	890	1.09	100.0%
F32T8-28W to LED15W	15	15	52	15	5,233	3,166	3,166	1.09	100.0%
F32T8-28W to LED9W	15	15	27	9	5,233	1,540	1,540	1.09	100.0%

MH350 to LED48W	30	30	375	48	5,233	55,956	55,956	1.09	100.0%
MH350 to LED48W	45	45	375	48	5,233	83,934	83,934	1.09	100.0%
CFM42W to LED25W	4	4	93	25	5,233	1,551	1,551	1.09	100.0%
					Total:	**358,648**	**358,648**		**100.0%**

Table C. Lighting Retrofit kW Reduction Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Realized kW Savings***	***IEF$_D$***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
CFM42W to LED52W	96	49	93	52	0.90	6.91	6.91	1.20	100.0%
CFM42W to LED78W	22	11	93	78	0.90	1.28	1.28	1.20	100.0%
CFM42W to LED52W	21	7	93	52	0.90	1.72	1.72	1.20	100.0%
CFM42W to LED26W	19	19	93	26	0.90	1.37	1.37	1.20	100.0%
CFM42W to LED26W	29	29	93	26	0.90	2.10	2.10	1.20	100.0%
CFM42W to LED13W	12	12	46	13	0.90	0.43	0.43	1.20	100.0%
CFM42W to LED26W	13	13	93	26	0.90	0.94	0.94	1.20	100.0%
CFM42W to LED26W	15	15	93	26	0.90	1.09	1.09	1.20	100.0%
CFM42W to LED26W	14	14	93	26	0.90	1.01	1.01	1.20	100.0%
CFM42W to LED52W	10	5	93	52	0.90	0.72	0.72	1.20	100.0%
MH150 to LED40W	42	21	183	40	0.90	7.39	7.39	1.20	100.0%
CFM42W to LED52W	21	21	372	52	0.90	7.26	7.26	1.20	100.0%
F32T8 to LED12W	15	15	81	12	0.90	1.12	1.12	1.20	100.0%
F32T8-30W to LED12W	31	31	49	12	0.90	1.24	1.24	1.20	100.0%
F32T8-28W to LED15W	130	130	52	15	0.90	5.19	5.19	1.20	100.0%
F32T8-28W to LED15W	24	24	27	15	0.90	0.31	0.31	1.20	100.0%
F32T8-28W to LED15W	13	13	27	15	0.90	0.17	0.17	1.20	100.0%

F32T8-28W to LED15W	15	15	52	15	0.90	0.60	0.60	1.20	100.0%
F32T8-28W to LED9W	15	15	27	9	0.90	0.29	0.29	1.20	100.0%
MH350 to LED48W	30	30	375	48	0.90	10.59	10.59	1.20	100.0%
MH350 to LED48W	45	45	375	48	0.90	15.89	15.89	1.20	100.0%
CFM42W to LED25W	4	4	93	25	0.90	0.29	0.29	1.20	100.0%
					Total	**67.91**	**67.91**		**100.0%**

Results

The kWh and kW realization rates for project LN9-113 are 100.0%.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
CFM42W to LED52W	36,391	6.91	100.0%	100.0%
CFM42W to LED78W	6,776	1.28	100.0%	100.0%
CFM42W to LED52W	9,064	1.72	100.0%	100.0%
CFM42W to LED26W	7,261	1.37	100.0%	100.0%
CFM42W to LED26W	11,083	2.10	100.0%	100.0%
CFM42W to LED13W	2,259	0.43	100.0%	100.0%
CFM42W to LED26W	4,968	0.94	100.0%	100.0%
CFM42W to LED26W	5,732	1.09	100.0%	100.0%
CFM42W to LED26W	5,350	1.01	100.0%	100.0%
CFM42W to LED52W	3,822	0.72	100.0%	100.0%
MH150 to LED40W	39,049	7.39	100.0%	100.0%
CFM42W to LED52W	38,331	7.26	100.0%	100.0%
F32T8 to LED12W	5,904	1.12	100.0%	100.0%

F32T8-30W to LED12W	6,542	1.24	100.0%	100.0%
F32T8-28W to LED15W	27,436	5.19	100.0%	100.0%
F32T8-28W to LED15W	1,643	0.31	100.0%	100.0%
F32T8-28W to LED15W	890	0.17	100.0%	100.0%
F32T8-28W to LED15W	3,166	0.60	100.0%	100.0%
F32T8-28W to LED9W	1,540	0.29	100.0%	100.0%
MH350 to LED48W	55,956	10.59	100.0%	100.0%
MH350 to LED48W	83,934	15.89	100.0%	100.0%
CFM42W to LED25W	1,551	0.29	100.0%	100.0%
Total:	**358,648**	**67.91**	**100.0%**	**100.0%**

Project Number CIP-106

Program Publicly Funded Institutions

Project Background

The participant is an office building that received incentives from Entergy New Orleans for installing a Building Automation System (BAS) to implement an operating schedule to match building occupancy. The Evaluators verified that the following had been installed:

- (1) Building Automation System Schedule
- (19) Air Handling Unit with BAS Schedule Operation

Calculation Parameters

Savings calculations were performed using a BAS excel calculator, equipment capacity, equipment efficiency, and the following algorithms:

The baseline schedule was Always On and the proposed schedule is 7 am to 5 pm weekedays and noon to 2 pm weekends. Since these are just air conditioning units they only operate when there is a call for cooling. Cooling is expected when the outside air temperature is less than 59 degrees. This calculates to 6,644 operating hours per year baseline and 2,345 hours per year proposed.

Constant volume BAS Schedule:

$$kW_{Savings} = kW_{pre,peak} - kW_{post,peak}$$

$$kWh_{Savings} = \sum (Tons \times IPLV \times LF) \times \left(Hours_{pre} - Hours_{post}\right)$$

Savings parameters applicable to this site are shown below:

Table A, Energy Model HVAC Parameters

Unit Name	*Tons*	*IPLV*	*LF*	*kW*	*Baseline Hours*	*Proposed Hours*
10-ton units	80	0.916	0.75	54.96	6,644	2,345
15-ton units	45	0.968	0.75	32.67	6,644	2,345
CU-2	3	1.14	0.75	2.57	6,644	2,345

CU-3A	3	1.07	0.75	2.41	6,644	2,345
CU-4	3	1.14	0.75	2.57	6,644	2,345
CU-5	3	1.14	0.75	2.57	6,644	2,345
CU-9	5	1.07	0.75	4.01	6,644	2,345
CU-14	7.5	1.14	0.75	6.41	6,644	2,345
CU-18	3	1.07	0.75	2.41	6,644	2,345
CU-19	3	1.07	0.75	2.41	6,644	2,345

Savings Calculations

Table B, kWh Savings Calculations

Measure	*Baseline Annual kWh*	*Proposed Annual kWh*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
BAS Upgrade	750,589	264,921	485,669	485,669	100.0%

Table C, Peak kW Savings Calculations

Measure	*Baseline Peak kW*	*Proposed Peak kW*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
BAS Upgrade	113	113	0	0	NA

Results

The kWh realization rate for project PN9-018 is 100.0% with an undefined peak kW reduction realization rate.

Table D, Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
BAS Upgrade	485,669	0.00	100.0%	-
Total	**485,669**	**0.00**	**100.0%**	**-**

17.4 Commercial & Industrial Construction Solutions

Project Number CIP-069

Program Large Commercial & Industrial Solutions

Project Background

The participant is a retail facility that received incentives from Entergy New Orleans for installing energy efficient lighting and high efficiency air conditioners in a new construction project. The Evaluators verified that the following had been installed:

- (95) Interior lighting fixtures in 9,927 square feet of interior space
- (36) Exterior lighting fixtures in 485 linear feet of exterior space
- (40) Tons of High Efficiency Air Conditioning Units

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below presents expected kWh savings and peak kW reductions per each lamp/fixture.

Table A. Lighting Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Interior	Gas	5,460	1.09	1.20	0.95
Exterior	None	4,319	1	1	0

Savings calculations for the high efficiency air conditioners were performed using prescriptive savings tables based on the type of unit installed. Savings parameters applicable to this site are shown below:

Table B. Prescriptive HVAC Savings Parameters

Unit Name	*Unit Capacity (tons)*	*Quantity*
10 Ton Package Unit	10	1
12.5 Ton Package Unit	12.5	2
5 Ton Package Unit	5	1

Savings Calculations – Custom

Using the values from Table A and B above, the Evaluators calculated savings as follows:

Table C. New Construction Lighting kWh Savings Calculations

Measure	Area		Fixture		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	SF	LPD	N	W					
Interior	9,927	1.5	95	47	5,460	61,908	61,908	1.09	100.0%
Exterior	485	5	36	60	4,319	1,629	1,106	1.00	67.9%
					Total	**63,538**	**63,014**		**99.2%**

Table D. New Construction Lighting kW Reduction Calculations

Measure	Area		Fixture		CF	Expected kW Savings	Realized kW Savings	IEF_D	Realization Rate
	SF	LPD	N	W					
Interior	9,927	1.5	95	47	0.95	11.86	11.86	1.20	100.0%
Exterior	485	5	36	60	0	0	0	1.00	-
					Total	**11.86**	**11.86**		**100.0%**

Table E. New Construction HVAC Savings Calculations

Measure	Total Capacity	Prescriptive Savings		Expected Savings		Realized Savings		Realization Rate	
		kWh/ ton	kW/ Ton	kWh	kW	kWh	kW	kWh	kW
High Eff AC Unit	*40*	*565.5*	*0.21*	*22,620*	*8.4*	*22,620*	*8.4*	*100.0%*	*100.0%*

Results

The kWh and kW realization rates for project CIP-069 are 99.4% and 100.0%, respectively.

Discrepancies in the kWh realization rate arises from the ex-ante method increasing the exterior allowed wattage by 5% without any explanation.

Table D. Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Interior Lighting	61,908	11.86	100.0%	100.0%
Exterior Lighting	1,106	-	67.9%	-
Prescriptive HVAC	22,620	8.40	100.0%	100.0%
Total	**85,634**	**20.26**	**99.4%**	**100.0%**

Project Number CIP-023

Program Large Commercial & Industrial Solutions

Project Background

The participant is a manufacturing facility that received incentives from Entergy New Orleans for installing energy efficient lighting in a new construction project. The Evaluators verified that the following had been installed:

- (30) 218w led in the interior high bay
- (2) 32w led in the interior restrooms
- (21) 60w led in the building exterior

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures is based on the New Orleans TRM 3.0. Table A below inputs used in savings calculations:

Table A. Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Interior	None	3,120	1	1	0.77
Exterior	None	4,319	1	1	0

Savings Calculations – Custom

Using the values from Table B above, the Evaluators calculated lighting savings as follows:

Table B. New Construction Lighting kWh Savings Calculations

Measure	*Area*		*Fixture*		*Annual Operating Hours*	*Expected kWh Savings*	*Realized kWh Savings*	*IEF_E*	*Realization Rate*
	SF	*LPD*	*N*	*W*					
Interior*	45,829	1.4	30	218	3,120	179,583	179,583	1.00	100.0%
			2	31					
Exterior	919	5	21	60	4,319	15,396	14,404	1.00	93.6%
					Total	**194,979**	**193,987**		**99.5%**

*Interior is combined into one line to match the ex-ante calculation method

Table C. New Construction Lighting kW Reduction Calculations

Measure	Area		Fixture		CF	Expected kW Savings	Realized kW Savings	IEF_D	Realization Rate
	SF	LPD	N	W					
Interior*	45,829	1.4	30	218	0.77	44.32	44.32	1.00	100.0%
			2	31					
Exterior	919	5	21	60	0	0	0	1.00	-
					Total	**44.32**	**44.32**		**100.0%**

*Interior is combined into one line to match the ex-ante calculation method.

Results

The kWh and kW realization rates for project CIP-023 are 99.5% and 100.0%, respectively.

Discrepancies in the kWh realization rate arises from the ex-ante method increasing the exterior allowed wattage by 5% without any explanation.

Table D. Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
Interior	179,583	44.32	100.00%	100.00%
Exterior	14,404	0	93.56%	-
Total	**193,987**	**44.32**	**99.49%**	**100.00%**

18 Appendix B: Survey Instruments & Interview Guides

This appendix contains the survey instruments and interview guides used in this evaluation.

18.1 Energy Smart Residential Participant Survey

1. Program records indicate that your household [PROJECT_DESC] through the [PROGRAM_LONG] program at [ADDRESS]. Do you recall this?

    1. Yes
    2. Yes, but information is incorrect
    3. No

[DISPLAY Q2 IF Q1 =2]

2. What do you think is incorrect about our records?

3. The first few questions about how you heard about the program. The rest of the survey will use the abbreviated name of the [PROGRAM_LONG] which is also known as the [PROGRAM_SHORT] program.

    How did you learn of the [PROGRAM_SHORT] program? (Select all that apply)

    1. Contractor
    2. Home energy consultant
    3. Program representative
    4. Program website
    5. Friend, family member, or colleague
    6. Bill insert or utility mailer
    7. Email from [UTILITY_SHORT]
    8. Social media post (e.g., Facebook, Twitter, Flickr)
    9. Through an internet search (e.g., Google search)
    10. Through an internet advertisement
    11. A radio or television advertisement
    12. A print advertisement
    13. Through a retailer
    15. Other (please explain)
    98. Don't know

[DISPLAY Q4 IF PROGRAM = 1, 2, 4, 5]

4. Why did you decide to participate in the program? (Select all that apply)

    1. Save money on energy bills
    2. Improve the comfort of your home
    3. Conserve energy/Protect the environment
    4. Improve the value of the residence
    5. Become as energy efficient as my friends or neighbors
    6. Find out if there were any structural problems with my home

7. Get the free equipment/discount/rebate
8. Other (Please describe)
98. Don't know

[DISPLAY Q5 IF PROGRAM = 1 OR 2]

5. According to our records you received a home energy assessment through the program. Is that correct?

   1. Yes
   2. No
   98. Don't know

[DISPLAY Q6 IF Q5 = 1]

6. Were you planning on having an energy assessment of your home BEFORE you learned about the program?

   1. Yes
   2. No
   98. Don't know

[DISPLAY Q7 IF Q5 = 1]

7. On a scale of 1 to 5, where 1 is "very difficult" and 5 is "very easy," how would you rate the process of scheduling your home energy assessment?

   1. 1 - Very difficult
   2. 2
   3. 3
   4. 4
   5. 5 - Very easy
   98. Don't know

[DISPLAY Q8 IF Q7 < 3]

8. Why do you say that?

[DISPLAY Q9 IF Q5 = 1]

9. When you had your home energy assessment, did the assessor. . .

   1. Yes
   2. No
   98. Don't know

a) Ask you if there were any specific issues with your home you wanted to address?
b) Provide an energy assessment report with energy efficiency recommendations?
c) Discuss with you the potential energy savings you might achieve by implementing those recommendations in your home?
d) Install energy efficient measures on the day of the assessment?
e) Identify any potential health and safety issues with your home?

f) Explain the next steps for additional measures to be installed by an approved Trade Ally contractor?
g) Leave behind any printed program materials?

[DISPLAY Q10 IF 9B)= 1]

10. You confirmed that you received a home energy assessment report as part of your home energy assessment experience. On a scale of 1 to 5, where 1 is "not at all helpful" and 5 is "very helpful," how helpful was that report to you?

    1. 1 - Not at all helpful
    2. 2
    3. 3
    4. 4
    5. 5 - Very helpful
    98. Don't know

[DISPLAY Q11 IF Q10 < 3]

11. Why do you think the home energy assessment report was not helpful?

[DISPLAY Q12 IF Q5 = 1]

12. Since the assessment, would you say you have completed all of the recommended energy efficiency improvements, completed some of them, or not completed any?

    1. Completed all
    2. Completed some but not all
    3. Have not completed any
    98. Don't know

[DISPLAY Q13 IF Q12 = 2 OR 3]

13. What were the energy efficient improvements recommended to you that you have not implemented?

    [RECORD VERBATIM]

[DISPLAY Q14 IF Q12 = 2 OR 3]

14. What were the primary reasons you have not implemented these improvements? (Select all that apply) **[MULTISELECT]**

    1. Cost
    2. Do not have time
    3. Waiting for equipment to fail
    4. Do not feel they need to be done/will save energy
    5. Do not own the property
    6. Need more information
    7. Still planning to implement in the future
    8. Other (Please describe)
    98. Don't know

[DISPLAY Q15 IF MEASURE_NUM_1 = 1, 2, 3,4, OR 5] (APPLIANCES OR HVAC)

15. Why did you select this model or type of [MEASURE_1_NOEFF]? **[MULTISELECT]**

    1. It was a good price
    2. There was a rebate for it
    3. It costs less to operate it
    4. It's good for the environment
    5. It was all that was available/only choice
    6. The contractor/retailer recommended it
    7. It had features I wanted
    8. It was the right size, color
    9. Wanted that brand
    10. It had an ENERGY STAR label
    11. Other (Please specify)
    98. Don't know

[DISPLAY Q16 IF MEASURE_NUM_1 = 1, 2, 3,4, OR 5] (APPLIANCES OR HVAC)

16. When you were deciding to purchase the [MEASURE_1_NOEFF], from where did you get information about what to buy? **[MULTI-SELECT]**

    1. Retailers
    2. Installation contractors
    3. Friend, neighbor, relative or co-worker
    4. Utility
    5. Internet
    6. Consumer reports or other product magazines
    7. Newspaper
    8. Radio
    9. Television
    10. Other (Please specify)
    11. Did not look for any information about what to buy
    98. Don't know

[DISPLAY Q17 IF MEASURE_NUM_1 = 1, 2, 3, OR 4] (APPLIANCES ONLY)

17. What type of store, or from what sort of contractor did you purchase the [MEASURE_1_NOEFF]?

    1. Appliance store
    2. Home improvement store
    3. Heating/ cooling contractor
    4. Swimming pool contractor
    5. Local hardware store
    6. Internet
    7. Other (Please specify)
    98. Don't know

[DISPLAY Q18 IF MEASURE_NUM_1= 6 OR MEASURE_NUM_2 = 6]

18. Just to confirm, did you receive an Energy Smart Air-Conditioning Tune-Up as part of your program participation?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q19 IF Q18 = 1]

19. Prior to participating in the program, did you have regular tune-ups conducted by a heating and cooling contractor?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q20 IF Q19 = 1]

20. Did you have those tune-ups completed as part of a maintenance agreement or plan?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q21 IF Q19 = 1]

21. Did the same company that completed the Energy Smart tune-up perform the tune-ups you had done before receiving the Energy Smart tune-up?

    1. Yes, same company
    2. No, different company
    98. Don't know

[DISPLAY Q22 IF Q19 = 1]

22. Approximately how often do you get a tune up?

    1. Every year
    2. Once every two years
    3. Three to five years
    4. More than five years
    5. Only as needed for repairs
    6. Other (specify)
    98. Don't know

[DISPLAY Q23 IF Q19 <> 1]

23. When, if ever, was your last tune up?

    1. Less than one year ago
    2. 1-2 years ago
    3. 3-5 years ago
    4. More than 5 years ago
    5. Never had a tune up
    98. Don't know

[DISPLAY PAGE IF MAJMEAS_QUANT > 0 & PROGRAM <> 2 (IQ) AND REPEAT ONCE IF MAJMEAS_QUANT > 1 & PROGRAM <> 2 (IQ)]

[DISPLAY Q24 IF Q5 =1]

24. Was the [EFF_MEASURE_1/2] recommended during the home energy assessment?

    1. Yes
    2. No
    98. Don't know

25. Prior to learning about the [PROGRAM_SHORT] Program, did you have plans to [INSTALL_COMPLETE_1/2] the [EFF_MEASURE_1/2]?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q26 IF Q25= 1 AND [MEAUSURE_NUM_1/2= ONE OF 1, 2, 3, 4, 5, 6]]

26. Just to be clear, did you have plans to specifically [INSTALL_COMPLETE_1/2] an [[EFF_MEASURE_1/2] as opposed to a standard efficiency [MEASURE_NOEFF_1/2]?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q27 IF Q24 = 1]

27. How likely is it that you would have [INSTALLED_COMPLETED_1/2] the same [EFF_MEASURE_1/2] if it was not recommended through the home energy assessment? Would you say...

    1. Very likely
    2. Somewhat likely
    3. Neither likely nor unlikely
    4. Somewhat unlikely
    5. Very unlikely
    98. Don't know

28. Would you have been financially able to [INSTALL_COMPLETE_1/2] the [EFF_MEASURE_1/2] without the financial assistance provided through the program?

    1. Yes
    2. No
    98. Don't know

29. How likely is it that you would have [INSTALLED_COMPLETED_1/2] the same [EFF_MEASURE_1/2] if the financial assistance was not available? Would you say...

    1. Very likely
    2. Somewhat likely
    3. Neither likely nor unlikely
    4. Somewhat unlikely
    5. Very unlikely
    98. Don't know

[DISPLAY Q30 IF MEASURE_NUM_1/2 = 3 OR 6]

30. Did the contractor that you worked with provide you with information, marketing material or a recommendation to purchase or install the [EFF_MEASURE_1/2]?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q31 IF Q30 = 1]

31. On a scale where 0 means "not at all influential" and 10 means "extremely influential," how influential was the information, marketing material, or recommendation provided by this contractor in your decision to purchase the [EFF_MEASURE_1/2]?

    1. (Record 0 -10)
    98. Don't know

32. Did you [INSTALL_COMPLETE_1/2] the [EFF_MEASURE_1/2] sooner than you would have if the information and financial assistance from the program had not been available?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q33 IF Q32 = 1]

33. When might you have purchased or installed the same [EFF_MEASURE_1/2] if you had not participated in the program? Would you say …

    1. Within 6 months of when you [INSTALLED_COMPLETED_1/2 it
    2. Between 6 months and 1 year
    3. In more than 1 year to 2 years
    4. In 2 to 3 years
    5. In more than 3 years
    6. Never
    98. Don't know

[DISPLAY PAGE IF DI_MEASURE_FLAG = 1]

34. Had you purchased and installed any [DIMEASURE] before you received them for free through the program?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q35 IF Q34 = 2]

35. How familiar were you with [DIMEASURE] as a technology to save energy before you participated in the [PROGRAM_SHORT] Program? Would you say…

    1. Very unfamiliar
    2. Somewhat unfamiliar
    3. Neither familiar nor unfamiliar
    4. Somewhat familiar
    5. Very familiar
    98. Don't know

36. Did you have plans to purchase and install any [DIMEASURE] before you learned that you could get them for free through the [PROGRAM_SHORT] Program?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q37 IF , =1 & Q36 = 1]

37. Just to be clear, did you have plans to purchase an energy saving power strip or plans to purchase a standard power strip?

    1. An energy saving power strip
    2. A standard power strip
    98. Don't know

[DISPLAY Q38 IF DIMEASURE_QUANT > 1 & Q36 = 1]

38. How many of the [DIMEASURE_QUANT] [DIMEASURE] that you received for free had you already planned to purchase?

39. If you had not received the free [DIMEASURE], how likely is it that you would have installed them anyway within 12 months of when you received them? Would you say…

    1. Very likely
    2. Somewhat likely
    3. Neither particularly likely nor unlikely
    4. Somewhat unlikely
    5. Very unlikely
    98. Don't know

SPILLOVER [DISPLAY IF PROGRAM <> 2]

40. We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive or rebate for.

    Since participating in the [PROGRAM_SHORT] Program, have you installed any ADDITIONAL energy efficient items in a household in [UTILITY]'s service territory without receiving an incentive or rebate?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q41 IF Q40 = 1]

41. We would like to know what you purchased and installed because of your experience with the program that you did not get a rebate or discount for.

    Since participating in the program in [YEAR] have you done any of the following? **[MULTISELECT]**

    1. Installed CFLs (Compact Fluorescent Light bulbs)
    2. Installed LED Light Bulbs
    3. Purchased an ENERGY STAR appliance such as a refrigerator, freezer, dehumidifier, dishwasher, clothes washer, or clothes dryer
    4. Installed water heater pipe insulation
    5. Installed water Heater jacket, blanket, or insulation
    6. Installed low flow faucet aerators
    7. Installed low flow showerhead
    8. Installed an ENERGY STAR room air conditioner
    9. Installed an energy efficient water heater
    10. Installed an ENERGY STAR central air conditioner or heat pump unit
    11. Installed an ENERGY STAR pool pump
    12. Something else
    98. Don't know

[DISPLAY Q42 IF Q40 = 1]

42. Why did you not get a [UTILITY] incentive rebate or discount for that energy saving equipment?

[DISPLAY Q43 IF Q41 = 1]

43. How many CFLs did you purchase and install?

[DISPLAY Q44 IF Q41 = 2]

44. How many LEDs did you purchase and install?

[DISPLAY Q45 IF Q41 = 3]

45. What kind of appliance did you purchase? **[MULTISELECT]**

1. Refrigerator
2. Freezer
3. Dehumidifier
4. Dishwasher
5. Clothes washer
6. Clothes dryer (Is it electric or gas?)
7. Other (Please describe)
98. Don't know

[DISPLAY Q46 IF Q41 = 3]

46. How do you know it is an energy efficient appliance?

[DISPLAY Q47 IF Q45 = 6]

47. Is the dryer a gas or electric dryer?

1. Gas
2. Electric
98. Don't know

[DISPLAY Q48 IF Q41 = 4]

48. About how many feet of water heater pipe insulation you purchased and installed?

[DISPLAY Q49 IF Q41 = 6]

49. How many low flow faucet aerators did you install in bathroom sinks?

[DISPLAY Q50 IF Q41 = 6]

50. How many low flow faucet aerators did you install in kitchen sinks?

[DISPLAY Q51 IF Q41 = 7]

51. How many low flow shower heads did you install?

[DISPLAY Q52 IF Q41 = 8]

52. How many ENERGY STAR room air conditioners did you install?

[DISPLAY Q53 IF Q41 = 8]

53. How many square feet is the room that the ENERGY STAR air conditioner is installed in? (If multiple units installed, ask how many square feet on average are the rooms you installed the air conditioners in)

[DISPLAY Q54 IF Q41 = 9]

54. How do you know that the water heater you installed is an energy efficient water heater?

[DISPLAY Q55 IF Q41 =9]

55. What type of water heater did you install? Was it a…

1. Natural gas storage tank water heater
2. Electric storage tank water heater
3. Heat pump water heater
4. A natural gas tank less water heater
5. Some other type of water heater (Specify)

98. Don't know

[DISPLAY Q56 IF Q41 =10]

56. Did you install an ENERGY STAR central air conditioner or an ENERGY STAR heat pump?

1. Central air conditioner
2. Heat pump

98. Don't know

[DISPLAY Q57 IF Q41 =10]

57. How many square feet is the house that is cooled by the air conditioner or heat pump?

[DISPLAY Q58 IF Q41 =11]

58. Did you install a variable speed or multispeed pool pump?

1. Variable speed
2. Multispeed

98. Don't know

[DISPLAY Q59 IF Q41 =11]

59. What is the rated horsepower of the pool pump?

[DISPLAY Q60 IF Q41 = 10]

60. What other energy efficient items did you install?

[DISPLAY Q61 IF Q41 = 1 - 10]

61. In approximately what month and year did you install the energy efficient items that you did not receive an incentive for?

[DISPLAY Q62 IF Q41 = 1 - 10]

62. On a scale of 0 to 10, where 0 represents “not at all important” and 10 represents “extremely important”, how important was the experience with the program in your decision to purchase the items you just mentioned?

    1. (Record 0-10)
    98. Don’t know

[DISPLAY Q63 IF Q41 = 1 - 10]

63. On a scale of 0 to 10, where 0 represents “not at all likely” and 10 represents “extremely likely,” how likely would you have been to purchase those additional items if you had not participated in the program?

    1. (Record 0-10)
    98. Don’t know

64. These next few questions ask about your satisfaction with several aspects of the program. Using a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied", how would you rate your satisfaction with the following? [RANDOMIZE A-G]

    [SCALE: 1 = 1 (Very dissatisfied), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Very satisfied = 5), 98 = Don’t know]

    a. [DISPLAY IF PROGRAM = 1, 2, 5] Interactions you had with program staff
    b. [DISPLAY IF PROGRAM = 1, 2, 4, 5] The quality of the installation contractors work
    c. The performance of the equipment installed or the energy efficient improvements that were made
    d. The savings on your monthly utility bills
    e. The effort required for the application process
    f. [DISPLAY IF PROGRAM =1, 2] Scheduling the home energy assessment
    g. [DISPLAY IF PROGRAM =1, 2]] The information provided by the home energy assessment
    h. Overall program experience

[DISPLAY Q65 IF Q64 < 3]

65. Why were you dissatisfied with those aspects of the program you mentioned?

66. Using the same scale, how satisfied are you with [UTILITY] as your electricity service provider?

    [SCALE: 1 = 1 (Very dissatisfied), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Very satisfied = 5), 98 = Don’t know]

67. The next few questions are about this residence. These are anonymous and will be used solely for the purpose of combining different customers' responses. It is okay to not answer any of these questions.

    Which of the following best describes this residence?

    1. Single family detached home
    2. Townhome
    3. Duplex or Triplex
    3. Mobile or manufactured home
    4. Apartment building with 2-4 units
    5. Apartment building with 5-10 units
    6. Apartment building with more than 10 units
    98. Don't know
    99. Prefer not to state

68. When was this residence built?

    1. Before 1970's
    2. 1970's
    3. 1980's
    4. 1990's
    5. 2000-2009
    6. 2010 or newer
    98. Don't know
    99. Prefer not to state

69. What is the approximate square footage of this residence?

    1. Less than 1,000
    2. 1,001-1,500
    3. 1,501-2,000
    4. 2,001-2,500
    5. Greater than 2,500
    98. Don't know
    99. Prefer not to state

70. Do you own, rent, or own and rent to someone else the property located at [LOCATION]?

    1. Own
    2. Rent
    3. Own and rent to someone else
    98. Don't know
    99. Prefer not to state

71. What is the main fuel used for heating your home?

    1. Natural gas
    2. Electricity
    3. Propane
    4. Other (Please describe)
    5. Don't heat the home
    98. Don't know
    99. Prefer not to state

[DISPLAY Q72 IF Q71 <> 5]

72. What is the main type of heating equipment used to provide heat for your home?

    1. Heat pump
    2. Central forced air furnace
    3. Built-in baseboard heater
    4. Building-in wall heater
    5. Something else (Please describe)
    6. Don't heat the home
    98. Don't know
    99. Prefer not to state

[DISPLAY Q73 IF MEASURE_NUM_1/2 <> 3]

73. Do you use a central air conditioning system in your home?

    1. Yes
    2. No
    98. Don't know
    99. Prefer not to state

[DISPLAY Q74 IF Q73 = 1]

74. Is the central air conditioning system a heat pump?

    1. Yes
    2. No
    98. Don't know
    99. Prefer not to state

[DISPLAY Q75 IF Q73 = 1]

75. How old is the central air conditioning system in your home?

1 Less than 2 years old
2 2 to 4 years
3 5 to 9 years
4 10 to 14 years
5 15 to 19 years
6 20 or more years old
98 Don't know
99 Prefer not to state

76. What type of water heater does this residence have?

1. Natural gas water heater
2. Electric water heater
3. Other (Please describe)
98. Don't know
99. Prefer not to state

77. Including yourself, how many people currently live in this residence year-round?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8 or more
98. Don't know
99. Prefer not to state

78. Including all money earned from wages, salaries, tips, commissions, workers' compensation, unemployment insurance, child support, or other sources, about how much was your total annual household income before taxes in 2018?

    1. Less than $10,000
    2. $10,000 to less than $20,000
    3. $20,000 to less than $30,000
    4. $30,000 to less than $40,000
    5. $40,000 to less than $50,000
    6. $50,000 to less than $75,000
    7. $75,000 to less than $100,000
    8. $100,000 to less than $150,000
    9. $150,000 to less than $200,000
    10. $200,000 or more
    98. Don't know
    99. Prefer not to state

79. What's the highest level of education a person living in your household has completed?

    1. Less than high school
    2. High school graduate
    3. Associates degree, vocational/technical school, or some college
    4. Four-year college degree
    5. Graduate or professional degree
    98. Don't know
    99. Prefer not to state

18.2 Energy Smart Kits Survey

1. Our records indicate that your household located at [LOCATION] received a free energy saving kit from [UTILITY]. This kit included a bathroom faucet aerator, a kitchen faucet aerator, an energy savings low-flow showerhead, and four LED light bulbs.

   Do you recall receiving this kit?

   1. Yes
   2. No (TERMINATE SURVEY AFTER Q**2**)

[DISPLAY Q2 IF Q1= 2]

2. Do you recall requesting the kit from Entergy?

   1. Yes
   2. No

3. Thank you for confirming that.

   For each of the following items, please mark if it is currently installed in your home.

   [SCALE: 1 = Currently installed, 2 = Not installed, 98 = Not sure]

   a. The energy saving low-flow bathroom aerator
   b. The energy saving low-flow kitchen aerator
   c. The energy saving low-flow showerhead

[DISPLAY Q4 IF Q3A = 2]

4. Why is the energy saving low-flow bathroom aerator not installed in your home?

   1. Do not like low-flow devices
   2. Have not had time to install it
   3. Need help / don't know how to install it
   4. Gave it to someone else
   5. Doesn't fit on your faucet
   6. For some other reason (Please explain)

[DISPLAY Q5 IF Q3B = 2]

5. Why is the energy saving low-flow kitchen aerator not installed in your home?

   1. Do not like low-flow devices
   2. Have not had time to install it
   3. Need help / don't know how to install it
   4. Gave it to someone else
   5. Doesn't fit on your faucet
   6. For some other reason (Please explain)

[DISPLAY Q5 IF Q3C = 2]

6. Why is the energy saving low-flow showerhead not installed in your home?

   1. Do not like low-flow devices
   2. Have not had time to install it
   3. Need help / don't know how to install it
   4. Gave it to someone else
   5. Doesn't fit your shower
   6. For some other reason (Please explain)

7. Are all, some, or none of the four LED lightbulbs currently installed in your home?

   1. All are currently installed
   2. Some are currently installed
   3. None are currently installed
   98. Not sure

[DISPLAY Q8 IF Q7 = 2]

8. How many of the four LED lightbulbs that you received are currently installed in your home?

   0. None are installed
   1. 1 is installed
   2. 2 are installed
   3. 3 are installed
   4. All 4 are installed

[DISPLAY Q9 IF Q7 = 2 OR 3 AND Q8 <> 4]

9. Why are some of the LED bulbs not currently installed in your home? (Select all that apply) **[MULTISELECT]**

   1. Did not like the light or appearance of the bulbs
   2. They were broken or burnt out
   3. Have not had time to install them
   4. Waiting for bulbs to burn out
   5. Gave to someone else
   6. For some other reason (Please explain)

[DISPLAY PAGE IF Q3A = 1 OR Q3B = 1 OR Q3C = 1 OR Q7 = 1 OR 2]

10. Before you received them for free in the energy saving kit, had you installed any of the following items in your home?

    [SCALE: 1 = Yes, had previously installed, 2 = No, 98 = Not sure]

    a. **[DISPLAY IF Q3A = 1]** Energy saving low-flow bathroom aerators
    b. **[DISPLAY IF Q3B = 1]** Energy saving low-flow kitchen aerators
    c. **[DISPLAY IF Q3C = 1]** Energy saving low-flow showerhead
    d. **[DISPLAY IF Q7 = 1 OR 2]** LED lightbulbs

11. Did you have plans to purchase and install any of the free kit items before you learned that you could get them for free in the energy saving kit?

    [SCALE: 1 = Yes, had planned to purchase, 2 = No, 98 = Not sure]

    a. **DISPLAY IF Q3A = 1]** Energy saving low-flow bathroom aerators
    b. **DISPLAY IF Q3B = 1]** Energy saving low-flow kitchen aerators
    c. **DISPLAY IF Q3C = 1]** Energy saving low-flow showerhead
    d. **[DISPLAY IF Q7 = 1 OR 2]** LED lightbulbs

[DISPLAY Q12 IF Q11 = 1]

12. How many of the four LED lightbulbs that you received for free do you think you would have purchased if they were not provided for free through the program?

    0. None of them
    1. 1
    2. 2
    3. 3
    4. All 4

13. Please rate how likely you would have been to purchase and install each of the following kit items in the next 12 months if they had not been provided for free through the program.

    [SCALE: 1 = Very unlikely, 2 = Somewhat unlikely, 3 = Neither particularly likely nor unlikely, 4 = Somewhat likely, 5 = Very likely, 98 = Don't know]

    a. **DISPLAY IF Q3A = 1]** Energy saving low-flow bathroom aerators
    b. **DISPLAY IF Q3B = 1]** Energy saving low-flow kitchen aerators
    c. **DISPLAY IF Q3C = 1]** Energy saving low-flow showerhead
    d. **[DISPLAY IF Q7 = 1 OR 2]** LED lightbulbs

14. Did you participate in any [UTILITY] energy efficiency programs BEFORE you requested the energy efficiency kit?

    1. Yes
    2. No
    98. Don't recall

[DISPLAY Q15 IF Q14 = 1]

15. When did you last participate in an [UTILITY] energy efficiency program?

    1. 2019
    2. 2018
    3. 2017
    3. 2016
    4. 2015
    5. Before 2015
    98. Do not recall

16. Have you participated in any [UTILITY] energy efficiency programs AFTER you received the energy efficiency kit?

    1. Yes
    2. No
    98. Not sure

[DISPLAY Q17 IF Q16 = 1]

17. Which program(s) did you participate in after you received the kit? (Select all that apply) **[MULTISELECT]**

    1. Home Performance with ENERGY STAR
    2. Multifamily
    3. Income Qualified Weatherization
    4. A/C Tune-Up
    5. Central Air-Conditioner Units
    6. EasyCool
    7. Instore lighting discounts
    8. Appliance rebates
    9. Scorecard
    98. Don’t know

[DISPLAY Q18 IF Q16 = 1]

18. Did you learn about any of the programs that you participated in from the information included in the energy efficiency kit?

    1. Yes
    2. No
    98. Not sure

19. Would you like the Energy Smart Program team to contact you about energy efficiency opportunities for you and your home?

    1. Yes
    2. No

[DISPLAY Q20 IF Q19 = 1]

20. Please provide the name and contact information of the best person to contact about additional energy efficiency opportunities.

    Name:
    Telephone:
    Email:

21. The next few questions about the residence located at [LOCATION]. These are anonymous and will be used solely for the purpose of combining different customers' responses. It is okay to not answer any of these questions.

    Which of the following best describes this residence?

    1. Single family detached home
    2. Townhome
    3. Duplex or Triplex
    3. Mobile or manufactured home
    4. Apartment building with 2-4 units
    5. Apartment building with 5-10 units
    6. Apartment building with more than 10 units
    98. Don't know/prefer not to state

22. When was this residence built?

    1. Before 1970's
    2. 1970's
    3. 1980's
    4. 1990's
    5. 2000-2009
    6. 2010 or newer
    98. Don't know/prefer not to state

23. What is the approximate square footage of this residence?

    1. Less than 1,000
    2. 1,001-1,500
    3. 1,501-2,000
    4. 2,001-2,500
    5. Greater than 2,500
    98. Don't know/prefer not to state

24. Do you own, rent, or own and rent to someone else the property located at [LOCATION]?

    1. Own
    2. Rent
    3. Own and rent to someone else
    98. Don't know/prefer not to state

25. What is the main fuel used for heating your home?

    1. Natural gas
    2. Electricity
    3. Propane
    4. Other (Please describe)
    5. Don't heat the home
    98. Don't know/prefer not to state

26. What type of water heater does this residence have?

    1. Natural gas water heater
    2. Electric water heater
    3. Other (Please describe)
    98. Don't know/prefer not to state

27. Including yourself, how many people currently live in this residence year-round?

    1. 1
    2. 2
    3. 3
    4. 4
    5. 5
    6. 6
    7. 7
    8 8 or more
    98. Don't know/prefer not to state

28. Including all money earned from wages, salaries, tips, commissions, workers' compensation, unemployment insurance, child support, or other sources, about how much was your total annual household income before taxes in 2018?

    1. Less than $10,000
    2. $10,000 to less than $20,000
    3. $20,000 to less than $30,000
    4. $30,000 to less than $40,000
    5. $40,000 to less than $50,000
    6. $50,000 to less than $75,000
    7. $75,000 to less than $100,000
    8. $100,000 to less than $150,000
    9. $150,000 to less than $200,000
    10. $200,000 or more
    98. Don't know/prefer not to state

29. What's the highest level of education a person living in your household has completed?

    1. Less than high school
    2. High school graduate
    3. Associates degree, vocational/technical school, or some college
    4. Four-year college degree
    5. Graduate or professional degree
    98. Don't know/prefer not to state

18.3 Energy Smart Multifamily Owner Survey

1. Program records indicate that your property implemented [MEASURES_ALL] through the [PROGRAM_SHORT] program around [DATE] at the [PROPERTY_NAME] property. Were you involved in the decision to participate in this program?

    1. Yes **[SKIP TO Q5]**
    2. Yes, but information is incorrect
    3. Not involved in the decision(THANK AND TERMINATE)

[DISPLAY Q2 IF Q1 =2]

2. Please tell me what you think is incorrect about our records.

[DISPLAY Q3 IF Q1 = 3]

3. Is there someone else we could speak with who was involved in the decision to participate in the [PROGRAM_SHORT] program?

    1. Yes
    2. No(THANK AND TERMINATE)
    98. DON'T KNOW(THANK AND TERMINATE)
    99. REFUSED(THANK AND TERMINATE)

[DISPLAY Q4 IF Q3 = 1]

4. May I please speak with that person? (ASK FOR CONTACT INFORMATION IF NOT AVAILABLE)

    1. Yes (BEGIN SURVEY WITH NEW RESPONDENT)
    2. No (THANK AND TERMINATE)
    98. DON'T KNOW (THANK AND TERMINATE)
    99. REFUSED(THANK AND TERMINATE)

5. Thank you for providing that information. How did you learn about the energy efficiency improvements available through [UTILITY]'s [PROGRAM_SHORT] Program? **[MULTISELECT]** (DO NOT READ)

    1. Program representative spoke with them
    2. Referred by someone within their company
    3. Program website
    4. Friend, family member, or colleague
    5. Through property management group
    6. Referred by a tenant
    7. Bill insert or utility mailer
    8. Email from [UTILITY_SHORT]
    9. Social media post (e.g., Facebook, Twitter, Flickr)
    10. Through an internet search (e.g., Google search)
    11. Through an internet advertisement
    12. A radio or television advertisement
    13. A print advertisement
    14. Other (please explain)
    98. DON'T KNOW
    99. REFUSED

6. What were the main reason(s) for deciding to complete the efficiency improvements at the property? (Select all that apply) **[MULTISELECT]** (DO NOT READ)

    1. Improve tenant comfort and satisfaction
    2. Reduce tenant utility bills
    3. Reduce property utility bills
    4. To take advantage of rebates/no-cost efficiency improvements
    5. To replace old or non-functioning equipment
    6. To make the units more attractive to prospective tenants
    7. Some other reason – please describe:
    98. DON'T KNOW
    99. REFUSED

[DISPLAY PAGE IF MAJMEAS_QUANT > 0]

Now I have a few questions about the energy efficiency improvements that were made at the [PROPERTY_NAME] property.

7. Prior to learning about the [PROGRAM_SHORT] Program, did you have plans to [INSTALL/COMPLETE1] the [EFF_MEASURE1]?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q8 IF Q7 = 1 AND STAND_OPT = 1]

8. Just to be clear, did you have plans to specifically [INSTALL/COMPLETE1] the [EFF_MEASURE1] as opposed to standard efficiency [STAND_MEASURE1]?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

9. Was the [EFF_MEASURE1] recommended during an energy assessment of the property?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

10. Would you have been financially able to [INSTALL/COMPLETE1] the [EFF_MEASURE1] without the financial assistance provided through the program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q11 IF Q10= 2]

11. To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?

    1. Yes, that is correct.
    2. No, that is not correct.
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q12 IF Q11 = 2]

12. In your own words, can you tell me what your organization would have likely done if the financial incentive was not available from the program?

13. How likely is it that you would have [INSTALLED/COMPLETED1] the same [EFF_MEASURE1] if the financial assistance was not available? Would you say...

    5. Very likely
    4. Somewhat likely
    3. Neither particularly likely nor unlikely
    2. Somewhat unlikely
    1. Very unlikely
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q14 IF Q9 = 1]

14. How likely is it that you would have [INSTALLED/COMPLETED1] the same [EFF_MEASURE1] if it was not recommended through the energy assessment? Would you say...

    1. Very likely
    2. Somewhat likely
    3. Neither particularly likely nor unlikely
    4. Somewhat unlikely
    5. Very unlikely
    98. DON'T KNOW
    99. REFUSED

15. Did you [INSTALL/COMPLETE1] the [EFF_MEASURE1] sooner than you would have if the information and financial assistance from the program had not been available?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q16 IF Q15 = 1]

16. When might you have [INSTALLED/COMPLETED1] the same [EFF_MEASURE1] if you had not participated in the program? Would you say … (READ LIST)

    1. Within 6 months of when you purchased or installed it
    2. Between 6 months and 1 year
    3. In more than 1 year to 2 years
    4. In 2 to 3 years
    5. In more than 3 years
    6. Never (Do not read)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY IF MAJMEAS_QUANT > 1]

17. Our records show that this property also received a rebate or discount from the [UTILITY_SHORT] [PROGRAM_SHORT] for a [EFF_MEASURE2].

    Was the decision making process for that project the same as for the [EFF_MEASURE1] project?

    1. Yes
    2. No **[REPEAT Q7– Q17 FOR SECOND MEASURE]**
    98. DON'T KNOW
    99. REFUSED

[DISPLAY PAGE IF DIMEAS_QUANT > 0] [REPEAT FOR UP TO THREE MEASURES]

Now I have a few questions about the energy efficient equipment installed at no cost in the tenant units at the [PROPERTY_NAME] property.

18. Had you purchased and installed any [DIMEASURE1] in tenant units for this property before you received them for free through the program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

19. Did you have plans to purchase and install any [DIMEASURE1] at the [PROPERTY_NAME] property before you learned about the [PROGRAM_SHORT] Program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q20 IF Q19 = 1]

20. If you had not received them through the program, would you have purchased & installed all of the measures, some of them, or none of them within 12 months of when you received them for free?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q21 IF Q20 = 2]

21. What percent of the [DIMEASURE1] that you received for free would you have purchased and installed?

    (Record Percent)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q22 IF Q19 = 1]

22. When do you think you would have purchased and installed those [DIMEASURE1] if they had not been provided for free through the [PROGRAM_SHORT] Program? (READ LIST)

    1. Within 6 months of when you received them
    2. Between 6 months and 1 year
    3. In more than 1 year to 2 years
    4. In 2 to 3 years
    5. In more than 3 years
    6. (Never)
    98. DON'T KNOW
    99. REFUSED

23. Would you have been financially able to install the [DIMEASURE1] if they had not been provided for free through the program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q24 IF Q23= 2]

24. To confirm, your organization would NOT have allocated the funds to install the [DIMEASURE1] if they were not provide for free through the program. Is that correct?

    1. Yes, that is correct.
    2. No, that is not correct.
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q25 IF Q24 = 2]

25. In your own words, can you tell me what your organization would have likely done if the [DIMEASURE1] were not available for free from the program?

26. If you had not received the [DIMEASURE1] for free, how likely is it that you would have installed them anyway? Would you say… (READ LIST)

    5. Very likely
    4. Somewhat likely
    3. Neither particularly likely nor unlikely
    2. Somewhat unlikely
    1. Very unlikely
    98. DON'T KNOW
    99. REFUSED

27. We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive for.

    Since participating in the [PROGRAM_SHORT] Program has your organization installed any ADDITIONAL energy efficiency measures at this property or at other properties within [UTILITY]'s service territory that did NOT receive incentives through [UTILITY]'s programs?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q28 IF Q27 = 1]

28. What additional equipment did you install without receiving a rebate or incentive?

[DISPLAY Q29 IF Q27 = 1]

29. Why didn't you apply for or receive incentives for those items? **[MULTI SELECT]**

    1. Didn't know whether equipment qualified for financial incentives
    2. Equipment did not qualify for financial incentives
    3. Too much paperwork for the financial incentive application
    4. Financial incentive was insufficient
    5. Didn't have time to complete paperwork for financial incentive application
    6. Didn't know about financial incentives until after equipment was purchased
    7. We did apply for an incentive [**SKIP TO SATISFACTION SECTION**]
    8. Other [OPEN ENDED]
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q30 IF Q27 = 1]

30. Using a scale where 0 means "not at all important" and 10 means "very important", how important was your experience with the [PROGRAM_SHORT] Program in your decision to install this equipment?

    (RECORD 0-10)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q32 IF Q27 = 1]

31. Using a scale where 0 means "definitely would NOT have installed" and 10 means "definitely would have installed", how likely is it that your organization would have installed this equipment if you had NOT participated in the [PROGRAM_SHORT] Program?

    (RECORD 0-10)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q32 IF Q30=0,1,2,3 AND Q31=0,1,2,3 OR IF Q30=8,9,10 AND Q31=8,9,10

32. You scored the importance of your program experience to your decision to implement the additional equipment with [Q30 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing the additional equipment if your organization had not participated in the program with [Q31 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

    [OPEN ENDED]

[DISPLAY Q33 IF Q27 = 1]

33. We may want to follow up with someone to get additional details about the equipment that you installed without an incentive. Can you provide me the name, phone number, and email of the person would be best to speak to about the specific details on the equipment that was installed without an incentive?

34. Using a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied," how would you rate your satisfaction with the following? [RANDOMIZE ORDER OF A-F] (RECORD 97 IF NOT APPLICABLE, 98 IF DON'T KNOW, 99 IF REFUSED)

    a) Interactions you had with [UTILITY] staff
    b) The quality of installation work
    c) The process of having the equipment installed
    d) The performance of the equipment installed
    e) The effort required for the application process
    f) The wait-time to receive the services
    g) Overall program experience

[DISPLAY Q35 IF Q34 A- G < 3]

35. Why were you dissatisfied with those aspects of the program you mentioned?

    [OPEN ENDED]

36. I have just a few more questions about the [PROPERTY_NAME] property? Which of the following is the primary fuel type used for space heating the tenant units?

    1. Electricity
    2. Natural gas
    3. Oil
    4. Something else (please specify)
    98. DON’T KNOW
    99. REFUSED

37. Which of the following is the primary fuel type used for water heating the tenant units?

    1. Electricity
    2. Natural gas
    3. Oil
    4. Something else (please specify)
    98. DON'T KNOW
    99. REFUSED

38. Is air conditioning centrally supplied to the tenant units?

    1 Yes
    2 No
    98. DON'T KNOW
    99. REFUSED

39. I now have a few questions about this residence. These are anonymous and will be used solely for the purpose of combining different customers' responses. If you do not want to answer any of these, let me know. It is okay to not answer any of these questions.

    Which of the following best describes this residence? (READ LIST)

    1. Townhome
    2. Duplex or Triplex
    3. Apartment building with 2-4 units
    4. Apartment building with 5-10 units
    5. Apartment building with more than 10 units
    98. DON'T KNOW
    99. REFUSED

40. When was this property built? (IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE)

    1. Verbatim____
    2. Before 1970's
    3. 1970's
    4. 1980's
    5. 1990's
    7. 2000-2009
    8. 2010 or newer
    98. DON'T KNOW
    99. REFUSED

41. Do the tenants at this property own or rent the residences?

    1. Own
    2. Rent
    3. Some own and some rent
    98. DON'T KNOW
    99. REFUSED

42. Does your company own or manage this property?

1. Own
2. Manage
3. Own and manage
98. DON'T KNOW
99. REFUSED

43. Do tenants pay their own electric bills or are electricity costs included in the rent?

1. Yes, tenant pay their own bills
2. Electricity costs are included as part of the rent
3. There is another type of arrangement (Please describe)
98. DON'T KNOW
99. REFUSED

44. Are any of the units at the [PROPERTY_NAME] property receiving some type of federal, state, or other housing assistance?

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q45 IF Q44 = 1]

45. Approximately what percent of the units are receiving housing assistance?

46. Do you or your company own or manage any other properties in [UTILITY]'s service territory that have not participated in an [UTILITY] efficiency program?

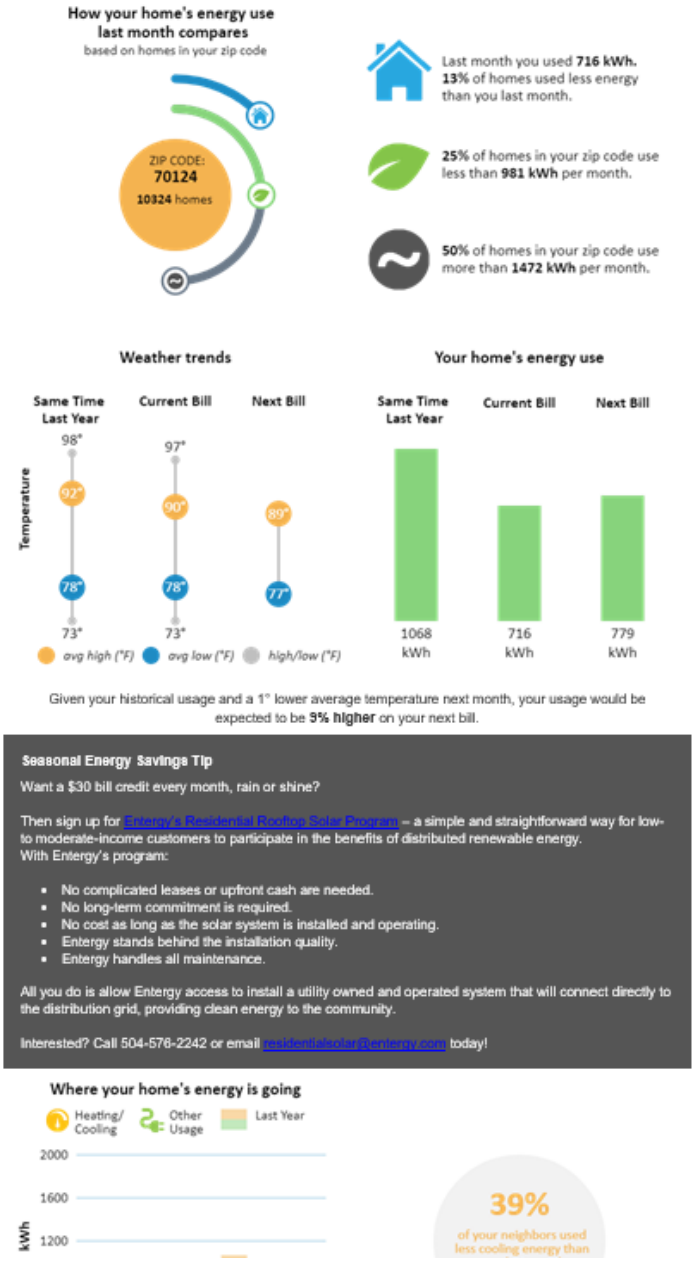
1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q47 IF Q46 = 1]

47. How many properties?

18.4 Energy Smart Scorecard Survey

1. According to our records you received emails with your Energy Smart Scorecard. The Energy Smart Scorecard provides information on your home's energy use and tips on how you can save energy. An example is shown below.



Do you recall receiving these emails in 2019?

1. Yes
2. No **[TERMINATE SURVEY]**

98. Not sure **[TERMINATE SURVEY]**

2. How frequently do you open and view your Energy Smart Scorecard?

    1. Every month
    2. Every other month
    3. Every 2 – 3 months
    4. Every 4 – 6 months
    5. Once or twice per year
    6. I have never viewed my Energy Smart Scorecard [TERMINATE SURVEY]
    98. Don't know

3. When did you first view your Energy Smart Scorecard?

    1. Before January 2019
    2. Between January but not before May (2019)
    3. After May 2019
    98. Don't know

4. Are you the only person in your household who views the Energy Smart Scorecard?

    1. Yes
    2. No
    98. Don't know

5. Thinking back to when you first viewed your Energy Smart Scorecard, what were you interested in learning?

    [OPEN]

6. Thinking about the information provided in the Scorecard, how accurate or inaccurate do you think the comparison of your home's energy to other homes was?

    1. Very inaccurate
    2. Somewhat inaccurate
    3. Somewhat accurate
    4. Very accurate
    98. Don't know

7. Do you recall viewing any energy saving tips or recommendations provided in the Energy Smart Scorecard?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q8 IF Q7 = 1]

8. How useful were the recommendations that were provided?

   1.Very useful
   2.Somewhat useful
   3.Slightly useful
   4.Not at all useful
   98.Don't know

[DISPLAY Q9 IF Q8 = 3 or 4]

9. Why were the recommendations not very useful? (Mark all that apply)

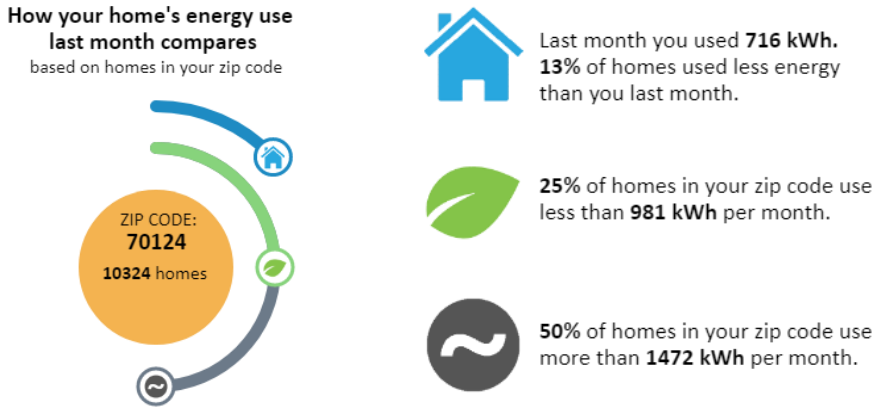
   1.I didn't understand them
   2.They didn't make sense for my home
   3.Condo or rental restricts prevented me from taking the recommended actions
   4.I was already doing the things recommended
   5.Taking the recommended actions would make the home less comfortable
   6.Too generic
   7.Some other reason (Please explain)
   98.Don't know

[DISPLAY Q10 IF Q8 = 1 or 2]

10. What was useful about the recommendations that you received?
    1.They made sense for my home
    2.They were practical
    3.Seemed likely to reduce our energy use
    4.Some other reason (Please explain)
    98.Don't know

11. The next few images are examples of images from a Scorecard report.

    Please answer the following two questions based on your opinions of the image below.



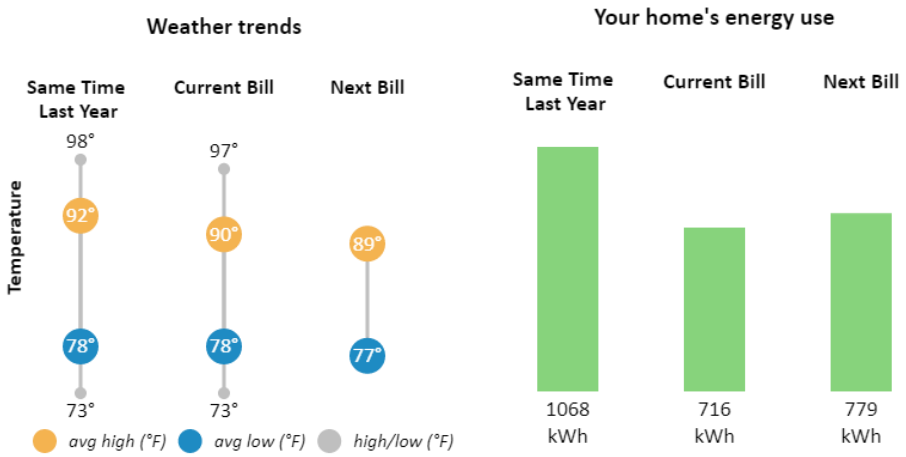
a. How clear is the information on the home's energy use?

[SCALE: 1 = 1 (Not at all clear); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Completely clear); 98 = Don't know]

b. How helpful is the information for understanding the home's energy use?

[SCALE: 1 = 1 (Not at all helpful); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Very helpful); 98 = Don't know]

12. Please answer the following two questions based on your opinions of the image below.



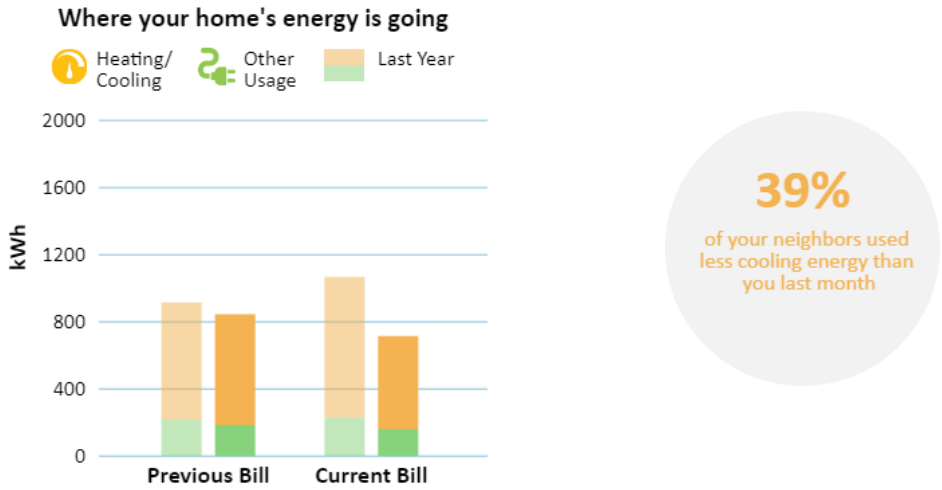
a. How clear is the information on the weather trends and the home's energy use?

[SCALE: 1 = 1 (Not at all clear); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Completely clear); 98 = Don't know]

b. How helpful is the information for understanding weather trends and the home's energy use?

[SCALE: 1 = 1 (Not at all helpful); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Very helpful); 98 = Don't know]

13. Please answer the following two questions based on your opinions of the image below.



a. How clear is the information for understanding how energy is being used in the home?

[SCALE: 1 = 1 (Not at all clear); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Completely clear); 98 = Don't know]

b. How helpful is the information for understanding how energy is being used in the home?

[SCALE: 1 = 1 (Not at all helpful); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Very helpful); 98 = Don't know]

[DISPLAY Q14 IF Q11a-b OR Q12a-b OR Q13a-b = 1 or 2]

14. Do you have any suggestions for how the information presented in the Scorecard could be improved?

    [OPEN]

15. The next few questions are about energy saving actions that you may have taken in your home.

    In the last 12 months, did you take any of the following actions to reduce energy use in your home? (Select all that apply) **[RANDOMIZE 1-12] [MULTISELECT]**

    1. Installed LED light bulbs
    2. Replaced the air filters for your air conditioner or heating system
    3. Changed computer stand-by energy use settings to reduce energy use
    4. Reduced air conditioner use by increasing the temperature setting in the summer
    5. Reduced heater use by decreasing the temperature setting in the winter
    6. Sealed air leaks in the home by installing weather stripping, caulking, and/or spray foam
    7. Turned down the water heater temperature
    8. Installed low-flow faucet aerators
    9. Purchased an ENERGY STAR air conditioner or heat pump
    10. Purchased an ENEGY STAR pool pump
    11. Purchased an ENERGY STAR refrigerator
    12. Make energy saving home improvements like adding insulation or sealing air leaks
    0. Have not taken any of these actions

16. Did you apply for an Entergy rebate for the following energy saving purchases that you mentioned?

    [SCALE: 1 = Yes ; 2 = No; 98 = Don't know]

    1. **[DISPLAY IF Q15 = 9]** Purchased an ENERGY STAR air conditioner or heat pump
    2. **[DISPLAY IF Q15 = 10]** Purchased an ENERGY STAR pool pump
    3. **[DISPLAY IF Q15 = 11]** Purchased an ENERGY STAR refrigerator
    4. **[DISPLAY IF Q15 = 12]** Make energy saving home improvements like adding insulation or sealing air leaks

[DISPLAY Q17 IF Q15 = 1]

17. Did you purchase any of those LED lightbulbs from one of the following retailers? (Select all that apply) [MULTISELECT]

    1.The Home Depot
    2.Costco Warehouse
    3.Dollar Tree
    4.Dollar General
    5.Lowes
    6. Walmart
    7.The Green Project
    8.Rouses Market
    9.Walgreens
    10.No, did not purchase LED light bulbs from these retailers
    98.Don't know

[DISPLAY Q18 IF Q17 = 1- 7]

18. About how many LED light bulbs did you purchase from those retailers in the past 12 months?

    1. [TEXT BOX]
    98. Don't know

19. Using the scale below, please indicate how much more or less often you do the following since you began receiving the Scorecard?

    [SCALE: 1 = 1 (A lot less often), 2 = 2 (Somewhat less often), 3 =3 (No change), 4 = 4 (Somewhat more often), 5 = 5 (A lot more often), 98 = Don't know] [RANDOMIZE LIST]

    a.Turn off lights in a room when it is unoccupied
    b.Use task lighting instead of overhead lighting
    c.Air dry clothes instead of using the dryer
    d.Wash clothes with cold water
    e.Run the clothes washer with a full load
    f.Close window shades or blinds in the daytime during the summer
    g.Close window shades or blinds in the nighttime during the winter
    h.Run the dishwasher with a full load
    i.Unplug electronics when not in use or done charging
    j.Unplug small appliances when not in use

[DISPLAY Q20 IF ANY IN Q19> 3 OR ANY SELECTED IN Q15= 1-15

20. What motivated you to save electricity in your home? (Select all that apply) [MULTISELECT]

    1.Reduce electricity costs / reduce electric bill
    2.Conservation / good for environment
    3.Make my usage more similar to my neighbors
    4.Improve the comfort of my home
    5. The information provided on my Scorecard
    6.Other (Please specify)
    98.Don't know

21. Using the scale below, how much did the Scorecard increase your knowledge of ways to save energy in your home?

    1. 1 (No increase)
    2. 2 (Little increase)
    3. 3 (Moderate increase)
    4. 4 (Large increase)
    98. Not sure

22. Do you think you receive too few, the right number, or too many Scorecards?

    1. Too few
    2. The right number
    3. Too many
    98. Don't know

[DISPLAY Q23 IF Q22 = 1 OR 3]

23. Ideally, how many scorecards would you like to receive each year?

24. How would you rate the overall visual display of the Energy Smart Scorecard?

    [SCALE: 1 = 1(Not at all visually appealing, 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Very visually appealing), 98 = Don't know]

25. Did you learn about other Energy Smart programs from your Scorecard?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q26 IF Q25 = 1]

26. What other Energy Smart programs did you learn about?

27. Using the scale below, how satisfied or dissatisfied are you with the Energy Smart Scorecard service overall?

    [SCALE: 1 = Very dissatisfied, 2 = Somewhat dissatisfied, 3 = Neither satisfied nor dissatisfied, 4 = Somewhat satisfied, 5 = Very satisfied, 98 = Don't know]

[DISPLAY Q28 IF Q26 = 1 OR 2]

28. Why are you dissatisfied?

    [OPEN TEXT]

29. Do you have any suggestions to help Entergy improve their Energy Smart Scorecard?

    [OPEN TEXT]

30. Using the scale below, how satisfied or dissatisfied would you say you are with Entergy as your electrical service provider?

    1. Very dissatisfied
    2. Somewhat dissatisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat satisfied
    5. Very satisfied
    98. Don't know

31. The next few questions are about this residence. These are anonymous and will be used solely for the purpose of combining different customers' responses. It is okay to not answer any of these questions.

    Which of the following best describes this residence?

    1. Single family detached home
    2. Townhome
    3. Duplex or Triplex
    3. Mobile or manufactured home
    4. Apartment building with 2-4 units
    5. Apartment building with 5-10 units
    6. Apartment building with more than 10 units
    98. Don't know/Prefer not to state

32. Do you own, rent, or own and rent your home?

    1. Own
    2. Rent
    3. Own and rent to someone else
    98. Don't know/Prefer not to state

33. Including yourself, how many people currently live in this residence year-round?

    1. 1
    2. 2
    3. 3
    4. 4
    5. 5
    6. 6
    7. 7
    8. 8 or more
    98. Don’t know/Prefer not to state

34. Please indicate which range your total household income falls into. Is the total annual income of your household:

    1. Less than $10,000
    2. $10,000 to less than $20,000
    3. $20,000 to less than $30,000
    4. $30,000 to less than $40,000
    5. $40,000 to less than $50,000
    6. $50,000 to less than $75,000
    7. $75,000 to less than $100,000
    8. $100,000 to less than $150,000
    9. $150,000 to less than $200,000
    10. $200,000 or more
    98. Don’t know/Prefer not to state

35. What’s the highest level of education you’ve completed?

    1. Did not graduate high school
    2. High school graduate
    3. Associates degree, vocational/technical school, or some college
    4. Four-year college degree
    5. Graduate or professional degree
    98. Don’t know/Prefer not to state

36. What type of heating system does this residence have?

    1. Natural gas heating
    2. Heat pump
    3. Electric furnace
    4. Combination of types (Please describe)
    5. Other (Please describe)
    98. Don’t know/Prefer not to state

37. What type of water heater does this residence have?

    1. Natural gas water heater
    2. Electric water heater
    3. Other (Please describe)
    98. Don't know/Prefer not to state

38. We will select one survey respondent at random to win a $100 Amazon gift card. The gift card will be sent by postal mail to the winner.

    Please provide your name and the address where the gift card should be sent to if you are the selected winner.

    Name:
    Street Address:
    City:
    State:
    Zip code:

18.5 Energy Smart Nonresidential Participant Survey

1. Did your organization receive an incentive or discount through [UTILITY_SHORT]'s [PROGRAM_NAME] for [IMPLEMENTING] [MEASURE_Q1] at [LOCATION]?

    1. Yes
    2. No **[TERMINATE]**
    98. DON'T KNOW **[TERMINATE]**

2. Our records indicate you are the main contact for the energy efficiency project(s) completed at [LOCATION] in [YEAR].

    Several of the following questions are about your organization's decision to complete this project and participate in the program. Were you involved in the decision to complete this project?

    1. Yes, I was involved in the decision to complete the project
    2. No, I was involved in the project but not the decision to complete the project.
    3. No, I do not work for [ORGANIZATION] but provided services for the project.

[DISPLAY Q3 IF Q2=2 OR 3]

3. Could you please provide the name and contact information of the person most knowledgeable about the decision to complete this project?

    Contact name:
    Contact phone:
    Contact email:

[TERMINATE SURVEY IF Q2 = 2 OR 3]

4. What is your job title or role?

    1. Facilities Manager
    2. Energy Manager
    3. Other facilities management/maintenance position
    4. Chief Financial Officer
    5. Other financial/administrative position
    6. Proprietor/Owner
    7. President/CEO
    8. Manager
    9. Other (Specify)

5. How did you learn about [UTILITY_SHORT]'s [PROGRAM_NAME] Program incentives for efficient equipment or upgrades? **[RANDOMIZE 1- 10] [MULTISELECT]**

    1. From an [UTILITY_SHORT] Account Representative
    2. From a contractor/ program trade ally
    3. Friends or colleagues
    4. From Entergy's Energy Smart website
    5. Social media post (e.g., Facebook, Twitter, LinkedIn)
    6. From a [UTILITY_SHORT]'s customer service representative
    7. Through an internet search (e.g., online search engine)
    8. Through an internet advertisement
    9. At a trade show/event
    10. Direct mail
    11. Other (please explain)
    98. DON'T KNOW

6. Did you receive any technical services such as a facility assessment or other assistance with identifying and selecting equipment from an [PROGRAM_NAME] Program representative?

    1. Yes
    2. No
    98. DON'T KNOW

7. Not including the [MEASURE] project that you received a rebate or incentive for, has your organization completed any significant energy efficiency projects in the last three years?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q8 IF Q7 = 1]

8. Did you complete any of those projects without receiving a program incentive or rebate?

    1. Yes
    2. No
    98. DON'T KNOW

9. Now I would like to ask you some questions about your decision to [IMPLEMENT] the [MEASURE] at [LOCATION].

   In deciding to do a project of this type, there are usually a number of reasons why it may be undertaken. What were the reasons for doing this project?

   1. To replace old or outdated equipment
   2. As part of a planned remodeling, build-out, or expansion
   3. To gain more control over how the equipment was used
   4. The maintenance downtime and associated expenses for the old equipment were too high
   5. Had process problems and were seeking a solution
   6. To improve equipment performance
   7. To improve the product quality
   8. To comply with codes set by regulatory agencies
   9. To comply with organizational policies regarding regular/normal maintenance/replacement policy
   10. To get a rebate from the program
   11. To protect the environment
   12. To reduce energy costs
   13. To reduce energy use/power outages
   14. To update to the latest technology
   15. Other (Please specify)
   98. DON'T KNOW

10. Which of the following financial methods, if any, did your organization use to evaluate the energy efficiency project(s) that you completed? (Select all that apply) **[MULTI SELECT] [RANDOMIZE 1 – 4]**

    1. Initial Cost
    2. Simple payback
    3. Internal rate of return
    4. Life cycle cost
    5. Do not typically use financial methods to evaluate efficiency projects
    98. DON'T KNOW

[DISPLAY Q11 IF Q10 = 2]

11. What payback time did you target when assessing this project? Please enter the number of years and months.

    1. (#) Years
    2. (#) Months
    98. DON'T KNOW

[DISPLAY Q12 IF Q10 = 3]

12. What rate of return did you target when assessing this project?

    1. (Please specify)
    98. DON'T KNOW

13. Did you complete any energy efficient equipment or project similar to the [MEASURE] at the facility located at [ADDRESS] BEFORE participating in the [PROGRAM_NAME] Program?

    1. Yes
    2. No
    98. DON'T KNOW

14. Did you have plans to [IMPLEMENT] the [MEASURE] that you received an incentive for in [YEAR] before deciding to participate in the [PROGRAM_NAME] Program?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q15 IF Q14 = 1]

15. Would you have gone ahead with this planned project even if you had not received a rebate through [UTILITY_SHORT]'s program?

    1. Yes
    2. No
    98. DON'T KNOW

16. Did you have previous experience with the [PROGRAM_NAME] Program prior to [IMPLEMENTING] the [MEASURE] in [YEAR]?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q17 IF Q16 = 1]

17. How important was your previous experience with the program in making your decision to [IMPLEMENT] the [MEASURE] at your facility? Would you say that it was…

    1. Very important
    2. Somewhat important
    3. Only slightly important
    4. Not at all important
    98. DON'T KNOW

18. Did a [PROGRAM_NAME] representative or other [UTILITY_SHORT] representative recommend that you [IMPLEMENT] the [MEASURE] at your facility?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q19 IF Q6= 1]

19. Was the [MEASURE] project recommended through the technical support or facility assessment that your received?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q20 IF [Q18 = 1 OR Q19=1]

20. How likely is it that you would have [IMPLEMENTED] the [MEASURE] if it had not been recommended? Would you say that you…

    1. Definitely would have
    2. Probably would have
    3. Probably would not have
    4. Definitely would not have
    98. DON'T KNOW

21. Would you have been financially able to [IMPLEMENT] the [MEASURE] at your facility if the rebates from the [PROGRAM_NAME] Program were not available?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q22 IF Q21 = 2]

22. To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?

    1. Yes, that is correct.
    2. No, that is not correct.
    98. DON'T KNOW

[DISPLAY Q23 IF Q22 = 2]

23. What do you think your organization would have done if the financial incentive was not available from the program?

24. If the rebates from the [PROGRAM_NAME] Program had not been available, how likely is it that you would have [IMPLEMENTED] the [MEASURE] at your facility anyway? Would you say that you…

    1 Definitely would have
    2 Probably would have
    3 Probably would not have
    4 Definitely would not have
    98. DON'T KNOW

[DISPLAY Q25 IF MEAS_QUANT >1]

25. We would like to know whether the availability of information and rebates through the [PROGRAM_NAME] Program affected the quantity (or number of units) of [MEASURE] that you [IMPLEMENT] at your facility.

    Did you [IMPLEMENT] more [MEASURE] than you otherwise would have without the program?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q26 IF Q25 = 1]

26. How many more units in percentage terms did you install because of the program? Your best guess is fine.

    1. % more units of equipment
    98. DON'T KNOW

[DISPLAY Q27 IF ENERGY_USING = 1]

27. We would like to know whether the availability of information and rebates through the [PROGRAM_NAME] Program affected the level of energy efficiency you chose for the [MEASURE2] at your facility.

    Did you choose equipment that was more energy efficient than you would have chosen had you not participated in the program?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q28 IF Q27 =1]

28. What type of equipment, if any, would you have installed if you had not participated in the program?

29. We would like to know whether the availability of information and rebates through the [PROGRAM_NAME] Program affected the timing of your [MEASURE] project at your facility.

    Did you [IMPLEMENT] the [MEASURE] earlier than you otherwise would have without the program?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q30 IF Q29 = 1]

30. When would you otherwise have [IMPLEMENTED] the [MEASURE]? Would you have done it …

    1 within 6 months
    2 7 months to 1 year
    3 more than 1 year up to 2 years
    4 more than 2 years up to 3 years
    5 more than 3 years up to 5 years
    6 More than 5 years
    98 DON'T KNOW

31. We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive or rebate for.

    Since participating in the [PROGRAM_NAME] Program has your organization installed any ADDITIONAL energy efficient equipment at this facility or another in the Entergy New Orleans or Entergy Algiers service territory without receiving an incentive or rebate?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q32 if Q31= 1]

32. What additional energy efficient equipment have you installed? **[MULTI SELECT]**

1. Lighting
2. Lighting controls or occupancy sensors
3. Unitary or split air conditioning system or chiller
4. ENERGY STAR Room air conditioners
5. Efficient motors
6. Refrigeration equipment (including LED case lighting)
7. Kitchen equipment
8. Something else [OPEN ENDED]

96. Didn't implement any measures [SKIP TO SATISFACTION]
98. Don't know [SKIP TO SATISFACTION]

[DISPLAY Q33 IF Q32= 1]

33. Why didn't you receive incentives for those items? **[MULTI SELECT RANDOMIZE ORDER, BUT FIX OTHER AND DON'T KNOW]**

1. Didn't know whether equipment qualified for financial incentives
2. Equipment did not qualify for financial incentives
3. Too much paperwork for the financial incentive application
4. Financial incentive was insufficient
5. Didn't have time to complete paperwork for financial incentive application
6. Didn't know about financial incentives until after equipment was purchased
7. We did receive an incentive **[SKIP TO FIRMOGRAPHICS]**
8. Other (Please specify) [OPEN ENDED]

98. Don't know

[DISPLAY Q34 IF Q32= 1]

34. Did you work with a contractor to install that efficient equipment or did your company's staff install the equipment?

1. Worked with a contractor
2. Company self-installed the equipment
3. Both

98. Don't know

[DISPLAY Q35 IF Q32 = 1]

35. What type of lighting did you install? **[MULTI-SELECT]**

1. T8 Fluorescent linear lamps – Single (1) lamps
2. T8 Fluorescent linear lamps – 2 lamp fixtures
3. T8 Fluorescent linear lamps – 4 lamp fixtures
4. T8 Fluorescent linear lamps – 6 lamp fixtures
5. T5 Fluorescent linear lamps – Single (1) lamps
6. T5 Fluorescent linear lamps – 2 lamp fixtures
7. T5 Fluorescent linear lamps – 4 lamp fixtures
8. T5 Fluorescent linear lamps – 6 lamp fixtures
9. LED Screw-in BAR/R/ER bulbs
10. LED Screw-in Interior PAR/MR bulbs
11. LED Screw-in omnidirectional A-line bulbs
12. LED 2-foot linear replacement lamps
13. LED 4-foot linear replacement lamps
14. LED exterior flood or spot luminaires
15. LED 1x4 panel or troffer
16. LED 2x2 panel or troffer
17. LED 2x4 panel or troffer
18. LED high-bay lighting
19. LED exit signs
20. Another type
98. Don’t know

[DISPLAY Q36 IF Q35 = 20]

36. What other type of lighting equipment did you install?

[TEXT BOX]

[REPEAT Q37 - Q40 FOR EACH TYPE SELECTED IN Q35]

37. How many [Q35 RESPONSE] did you install?

[TEXT BOX] Watts

38. What was the average wattage of the [Q35 RESPONSE]?

[TEXT BOX]

39. Were the [Q35 RESPONSE] installed inside a building, outside, or in a parking garage?

1. Inside
2. Outside
3. Parking garage
98. Don’t know

[DISPLAY Q40 IF Q39 = 1]

40. What type of building did you install the [Q35 RESPONSE] in?

1. Assembly
2. College
3. Fast food restaurant
4. Restaurant (not fast food)
5. Grocery
6. Health clinic
7. Large office
8. Lodging
9. Religious worship
10. Retail
11. Other (Please describe)
98. Don't know

[DISPLAY Q41 IF Q39 = 1]

41. Is the inside space heated, cooled, or both?

1. Heated
2. Cooled
3. Both
98. Don't know

42. What type of lighting did the [Q35 RESPONSE] replace?

1. T12s (linear fluorescents)
2. T8s (linear fluorescents)
3. Metal-halide / High-intensity discharge
4. Incandescent
5. **[DISPLAY IF Q35 = 9, 11, OR 12]** Compact fluorescent (CFL)
6. Something else [OPEN]
98. Don't know

43. What was the average wattage of the old lamps or bulbs?

44. How many of the old lamps or bulbs did you remove?

[DISPLAY Q45 IF Q35 = 20]

45. Did you install single-sided, double-sided, or both single and double-sided LED exit signs?

1. Single-sided exit signs
2. Double-sided exit signs
3. Both single and double-sided exit signs
98. Don't know

[DISPLAY Q46 IF Q45 = 1 OR Q45 = 3]

46. How many single-sided LED exit signs did you install?

[DISPLAY Q47 IF Q45 = 1 OR Q45 = 3]

47. How many double-sided LED exit signs did you install?

[DISPLAY Q48 IF Q45 = 98]

48. How many LED exit signs did you install?

[DISPLAY Q49 IF Q32 =1]

49. How important was your experience with the program in your decision to install this lighting equipment?

    [SCALE 0 "Not at all important" - 10 "Very important"]
    98. Don't know

[DISPLAY Q50 IF Q32 =1]

50. If you had NOT participated in the program, how likely is it that your organization would still have installed this lighting equipment?

    [SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"]
    98. Don't know

[DISPLAY Q51 IF [Q49=0,1,2,3 AND Q50=0,1,2,3]

OR IF [Q49=8,9,10 AND Q50=8,9,10]

51. You scored the importance of your program experience to your decision to implement additional lighting measures with [Q49 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing additional lighting measures if your organization had not participated in the program with [Q50 RESPONSE] out of 10 possible points.

Can you please explain the role the program made in your decision to implement this measure?

[DISPLAY Q52 IF Q32 = 2]

52. How many fixtures are being controlled by the lighting controls?

    [TEXT BOX]

[DISPLAY Q53 IF Q32 = 2]

53. On average, how many lamps or bulbs does each fixture contain?

    [TEXT BOX]

[DISPLAY Q54 IF Q32 = 2]

54. What is the average wattage of these lamps?

[TEXT BOX]

[DISPLAY Q55 IF Q32 = 2]

55. Are any of the lighting controls that you installed central time clock controls?

1. Yes
2. No
98. Don't know

[DISPLAY Q56 IF Q55 = 1]

56. How many of the fixtures are controlled by the central time clock?

[TEXT BOX]

[DISPLAY Q57 IF Q32 = 2]

57. What type of building did you install the lighting controls in?

1. Assembly
2. College
3. Fast food restaurant
4. Restaurant (not fast food)
5. Grocery
6. Health clinic
7. Large office
8. Lodging
9. Religious worship
10. Retail
11. Other (Please describe)
98. Don't know

[DISPLAY Q58 IF Q32 = 2]

58. How important was your experience with the program in your decision to install lighting controls?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q59 IF Q32 = 2]

59. If you had NOT participated in the program, how likely is it that your organization would still have installed lighting controls?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q60 IF [Q58=0,1,2,3 AND Q59=0,1,2,3]

OR [Q58=8,9,10 AND Q59=8,9,10]]

60. You scored the importance of your program experience to your decision to implement lighting controls with [Q58 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing lighting controls if your organization had not participated in the program with [Q59 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q61 IF Q32 = 3]

61. What types of energy efficient equipment did you install as part of the HVAC project? [MULTI SELECT]

1. Split air conditioning system (An A/C system that has an evaporator indoors and the compressor and condenser outdoors.)
2. Packaged air conditioning system (A type of central air conditioning that contains both the air handler fan, compressor and condenser in a single unit. These are typically mounted on the roof.)
3. Heat pump (An electric heating and cooling system)
4. Air cooled chiller (A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
5. Water cooled chiller (A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
6. Another type

98. Don't know

[DISPLAY Q62 IF Q61 = 6]

62. What other type of HVAC equipment did you install?

[TEXT BOX]

[REPEAT Q63 – Q64 FOR EACH SELECTED IN Q61]

63. We would like to know more about the rated efficiency and number of units of the [Q61 RESPONSE](s) that you installed.

For each level of efficiency of the equipment you installed, please provide the rated efficiency and the number of units.

64. What type of building did you install the heating/cooling equipment in?

1. Fast Food
2. Grocery
3. Health Clinic
4. Large Office
5. Lodging
6. Full Menu Restaurant
7. Retail
8. School
9. Small Office
10. University
11. Other (Please specify)
98. Don't know

[DISPLAY Q65 IF Q61 = 1-7]

65. How important was your experience with the program in your decision to install the energy efficient HVAC equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q66 IF Q61 = 1-7]

66. If you had NOT participated in the program, how likely is it that your organization would still have installed the energy efficient HVAC equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q67 IF [Q65=0,1,2,3 AND Q66=0,1,2,3] OR [Q65=8,9,10 AND Q66=8,9,10]]

67. You scored the importance of your program experience to your decision to implement energy efficient HVAC equipment with [Q65 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing the energy efficient HVAC equipment if your organization had not participated in the program with [Q66 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q68 IF Q32 = 4]

68. How many ENERGY STAR room air conditioners did you install?

[TEXT BOX]

[DISPLAY Q69 IF Q32 = 4]

69. What type of building did you install the heating/cooling equipment in?

1. Grocery
2. High School
3. Hospital
4. Light Industrial
5. Office - Large
6. Office - Small
7. Primary School
8. Religious Worship
9. Restaurant - Fast Food
10. Restaurant - Full Service
11. Retail - Big Box
12. Retail - Large
13. Retail - Small
14. University
15. Warehouse
16. Other
98. Don't know

[DISPLAY Q70 IF Q32 = 4]

70. How important was your experience with the program in your decision to install the heating/cooling equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q71 IF Q32 = 4]

71. If you had NOT participated in the program, how likely is it that your organization would still have installed the heating/cooling equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q72 IF [Q70=0,1,2,3 AND Q71=0,1,2,3] OR [Q70=8,9,10 AND Q71=8,9,10]]

72. You scored the importance of your program experience to your decision to install the energy efficient air conditioners with [Q70 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of installing the energy efficient air conditioners if your organization had not participated in the program with [Q71 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q73 IF Q32 = 5]

73. How many efficient motors did you install?

    [TEXT BOX]

[DISPLAY Q74 IF Q32 = 5]

74. What is the approximate average horsepower of the new motors? That is, what is the average across all of the motors you installed without an incentive?

    [TEXT BOX]

[DISPLAY Q75 IF Q32 = 5]

75. What is the approximate average efficiency of the new motors? That is, what is the average efficiency across all of the new motors?

    [TEXT BOX] Rated efficiency (%)

[DISPLAY Q76 IF Q32 = 5]

76. On average, how many hours per day do the motors operate? That is, what the average number of hours the motors you installed operate?

    [TEXT BOX] hours per day

[DISPLAY Q77 IF Q32 = 5]

77. How important was your experience with the program in your decision to install efficient motors?

    [SCALE 0 "Not at all important" - 10 "Very important"]
    98. Don't know

[DISPLAY Q78 IF Q32 = 5]

78. If you had NOT participated in the program, how likely is it that your organization would still have installed the efficient motors?

    [SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
    98. Don't know

[DISPLAY Q79 IF [Q77=0,1,2,3 AND Q78=0,1,2,3] OR [Q77=8,9,10 AND Q78=8,9,10]]

79. You scored the importance of your program experience to your decision to implement efficient motors with [Q77 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing the efficient motors if your organization had not participated in the program with [Q78 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

    [TEXT BOX]

[DISPLAY Q80 IF Q32 = 6]

80. What types of energy efficient refrigeration equipment did you install?

1. ENERGY STAR Commercial freezer
2. ENERGY STAR Commercial refrigerator
3. Anti-sweat heater controls
4. LED refrigerated case lighting
5. Refrigerated case covers
6. Some other type of refrigeration equipment

98. Don't know

[DISPLAY Q81 IF Q80 = 6]

81. What other type of energy efficient refrigeration equipment did you install?

[TEXT BOX]

[DISPLAY Q82 IF Q80 = 1]

82. How many ENERGY STAR commercial freezers did you install?

[TEXT BOX]

[DISPLAY Q83 IF Q82 = 1, REPEAT FOR EACH UP TO THREE TIMES]

83. What is the volume in cubic feet of the first freezer?

[TEXT BOX]

[DISPLAY Q84 IF Q82 = 1, REPEAT FOR EACH UP TO THREE TIMES]

84. Does this freezer have a solid door or a glass door?

1. Solid door
2. Glass door

98. Don't know

[DISPLAY Q85 IF Q82 = 1, REPEAT FOR EACH UP TO THREE TIMES]

85. Is this a vertical freezer or a chest type freezer?

1. Vertical
2. Chest

98. Don't know

[DISPLAY Q86 IF Q80 = 2]

86. How many ENERGY STAR commercial refrigerators did you install?

[TEXT BOX] refrigerators

[DISPLAY Q87 IF Q86 = 2, REPEAT FOR EACH UP TO THREE TIMES]

87. What is the volume in cubic feet of the first refrigerator?

[TEXT BOX] cubic feet

[DISPLAY Q88 IF Q86 = 2, REPEAT FOR EACH UP TO THREE TIMES]

88. Does this refrigerator have a solid door or a glass door?

1. Solid door
2. Glass door
98. Don't know

[DISPLAY Q89 IF Q86 = 2, REPEAT FOR EACH UP TO THREE TIMES]

89. Is this a vertical refrigerator or a chest type refrigerator?

1. Vertical
2. Chest
98. Don't know

[DISPLAY Q90 IF Q80 = 3]

90. Did you install humidity-based controls or conductivity-based controls, or both types?

1. Humidity-based controls
2. Conductivity-based controls
3. Both types
98. Don't know

[DISPLAY Q91 IF Q90= 1 OR 3]

91. How many humidity-based controls did you install?

[TEXT BOX]

[DISPLAY Q92 IF Q90= 1 OR 3]

92. What is the total number of freezer or refrigerator doors controlled by the humidity-based controls?

[TEXT BOX]

[DISPLAY Q93 IF Q90= 2 OR 3]

93. How many conductivity-based controls did you install?

[TEXT BOX]

[DISPLAY Q94 IF Q90= 2 OR 3]

94. What is the total number of freezer or refrigerator doors controlled by the conductivity-based controls?

[TEXT BOX]

[DISPLAY Q95 IF Q90 = 98]

95. How many anti-sweat heater controls did you install?

[TEXT BOX]

[DISPLAY Q96 IF Q90 = 98]

96. What is the total number of freezer or refrigerator doors controlled by the anti-sweat heater controls?

[TEXT BOX]

[DISPLAY Q97 IF Q80 = 4]

97. How many linear feet in total of LED case lighting did you install?

[TEXT BOX]

[DISPLAY Q98 IF Q80 = 5]

98. How many linear feet of refrigerated case covers did you install?

[TEXT BOX]

[DISPLAY Q99 IF Q32=6]

99. How important was your experience with the program in your decision to install the energy efficient refrigeration equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q100 IF Q32=6]

100. If you had NOT participated in the program, how likely is it that your organization would still have installed this energy efficient refrigeration equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q101 IF [Q99=0,1,2,3 AND Q100=0,1,2,3] AND [Q99=8,9,10 AND Q100=8,9,10]]

101. You scored the importance of your program experience to your decision to implement energy efficient refrigeration equipment with [Q99 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing energy efficient refrigeration equipment if your organization had not participated in the program with [Q100 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q102 IF Q32 = 7]

102. What type of kitchen equipment did you install?

1. Low flow pre-rinse spray valves
2. ENERGY STAR Commercial fryers
3. ENERGY STAR Commercial steam cookers
4. ENERGY STAR hot food holding cabinets
5. ENERGY STAR commercial griddles
6. ENERGY STAR commercial convection ovens
7. ENERGY STAR commercial combination ovens
8. Some other type of kitchen equipment

98. Don't know

[DISPLAY Q103 IF Q102 = 8]

103. What other type of kitchen equipment did you install?

[TEXT BOX]

[DISPLAY Q104 IF Q102 = 1]

104. Is the flow rate for any of the spray valves you installed equal to or less than 1.6 gallons per minute?

1. Yes
2. No

98. Don't know

[DISPLAY Q105 IF Q102 = 1]

105. How many pre-rinse spray valves with a flow rate equal to or less than 1.6 gallons per minute did you install?

[TEXT BOX]

[DISPLAY Q106 IF Q102 = 1]

106.Did you install the pre-rinse spray valves that the [LOCATION] location?

1. Yes
2. No
98. Don't know

[DISPLAY Q107 IF Q102 = 2]

107.How many ENERGY STAR commercial fryers did you install?

[TEXT BOX]

[DISPLAY Q108 IF Q102 = 3]

108.How many ENERGY STAR commercial steam cookers did you install?

1. Number of 3 pan steam cookers [NUMERIC]
2. Number of 4 pan steam cookers [NUMERIC]
3. Number of 5 pan steam cookers [NUMERIC]
4. Number of 6 pan steam cookers [NUMERIC]
98. Don't know

[DISPLAY Q109 IF Q102 = 4]

109.How many ENERGY STAR hot food holding cabinets did you install?

[TEXT BOX]

[DISPLAY Q110 IF Q102 = 5]

110.How many ENERGY STAR commercial griddles did you install?

[TEXT BOX]

[DISPLAY Q111 IF Q102 = 6]

111.How many ENERGY STAR commercial convection ovens did you install?

[TEXT BOX]

[DISPLAY Q112 IF Q102 = 7]

112.How many ENERGY STAR commercial combination ovens did you install?

[TEXT BOX]

[DISPLAY Q113 IF Q32= 1 AND Q102=1-8]

113. How important was your experience with the program in your decision to install this kitchen equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q114 IF Q32= 1 AND Q102=1-8]

114. If you had NOT participated in the program, how likely is it that your organization would still have installed this kitchen equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q101 IF [Q113=0,1,2,3 AND Q114=0,1,2,3] OR [Q113=8,9,10 AND Q114=8,9,10]]

You scored the importance of your program experience to your decision to implement energy efficient kitchen equipment with [Q113 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing energy efficient kitchen equipment if your organization had not participated in the program with [Q114 RESPONSE] out of 10 possible points.

115. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

116. Did you speak with an [PROGRAM_NAME] program staff person while completing your efficiency project?

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

117. Using a scale of one to five, where one is "very dissatisfied", five is "very satisfied", please rate how satisfied or dissatisfied you are with each of the following …. **[ASK A AND B FIRST, ASK C – F IN RANDOM ORDER], ASK G AND H LAST]**

[RECORD 1 – 5]
98. DON'T KNOW

a. **[DISPLAY IF Q116=1]** …the [PROGRAM_NAME] staff member who assisted you with your project
b. **[DISPLAY IF Q6=1]** …the facility assessment or other technical services received from the [PROGRAM_NAME] staff person
c. …the amount of time it took to get the rebate or incentive after the completed application was submitted
d. …the range of equipment that qualifies for the program
e. …the steps you had to take to get through the program
f. …the contractor or trade ally that provided the service
g. …the energy efficiency improvement(s) you completed
h. …the program overall

[DISPLAY Q118 IF ANY IN Q117 <3]

118. You indicated some dissatisfaction. Why were you dissatisfied?

119. Using a scale of one to five, where one is "very dissatisfied", five is "very satisfied", and a please rate your level of satisfaction with [UTILITY_SHORT] as your electricity service provider?

[RECORD 1 – 5]

98. DON'T KNOW

120. Would you say that your participation in [UTILITY_SHORT]'s [PROGRAM_NAME] Program has:

1. Greatly increased your satisfaction with [UTILITY_SHORT]
2. Somewhat increased your satisfaction with [UTILITY_SHORT]
3. Did not affect your satisfaction with [UTILITY_SHORT]
4. Somewhat decreased your satisfaction with [UTILITY_SHORT]
5. Greatly decreased your satisfaction with [UTILITY_SHORT]

98. DON'T KNOW

121. Using a scale of 1 to 5, where 1 is very unlikely and 5 is very likely, how likely are you to:

a. …initiate another energy efficiency improvement in the next 12 months?
b. …recommend this program to others?

[RECORD 1 – 5]
97. ALREADY HAVE
98. DON'T KNOW

[DISPLAY Q122 IF ANY IN Q121A >3]

122. Would you like the Energy Smart Program team contact you about other energy efficiency opportunities?

1. Yes
2. No
98. DON'T KNOW

123. [UTILITY_SHORT] also offers programs to help its residential customers who live in New Orleans to save energy. Do you live in New Orleans and would you like the Energy Smart Program team to contact you about energy efficiency opportunities for residential customers?

1. Yes, I live in New Orleans and would like Energy Smart to contact me
2. No
98. Don't know

[DISPLAY Q124 IF Q123 = 1]

124. Please provide the contact information of the best person to contact about residential energy efficiency improvements in your home.

Name:
Telephone:
Email:

Thank you for your responses. There are just a few more questions about your facility.

125. Which best describes your facility at [LOCATION]? Would you say the facility is:

1. Your company's only location
2. One of several locations owned by your company
3. The headquarter location of a company with several locations
98. DON'T KNOW

126. Does your company rent or own and occupy, or own and rent the facility to someone else at this location?

1. Rent
2. Own and occupy
3. Own and rent to someone else
98. DON'T KNOW

127. Which of the following best describes how your organization is billed for electricity used at this location?

1. We are billed directly by [UTILITY_SHORT for the electricity we use
2. We are NOT billed directly by [UTILITY_SHORT] for the electricity we use. Our electric bill is handled by another part of our company or a third party service provider
3. We are NOT billed directly by [UTILITY_SHORT] for the electricity we use. The cost for our electricity is included in our rent/lease

98. DON'T KNOW

128. What type of business is at this location?

1. Assembly
2. College
3. Fast food restaurant
4. Restaurant (not fast food)
5. Grocery
6. Health clinic
7. Large office
8. Lodging
9. Religious worship
10. Retail
11. Other (Please describe)
98. Don't know

129. Please tell us more about your experience with the program and any suggestions for improvement.

130. Would your company be willing to participate in program marketing such as providing quotes about your experience to be used on the Energy Smart website or other materials?

1. Yes
2. No

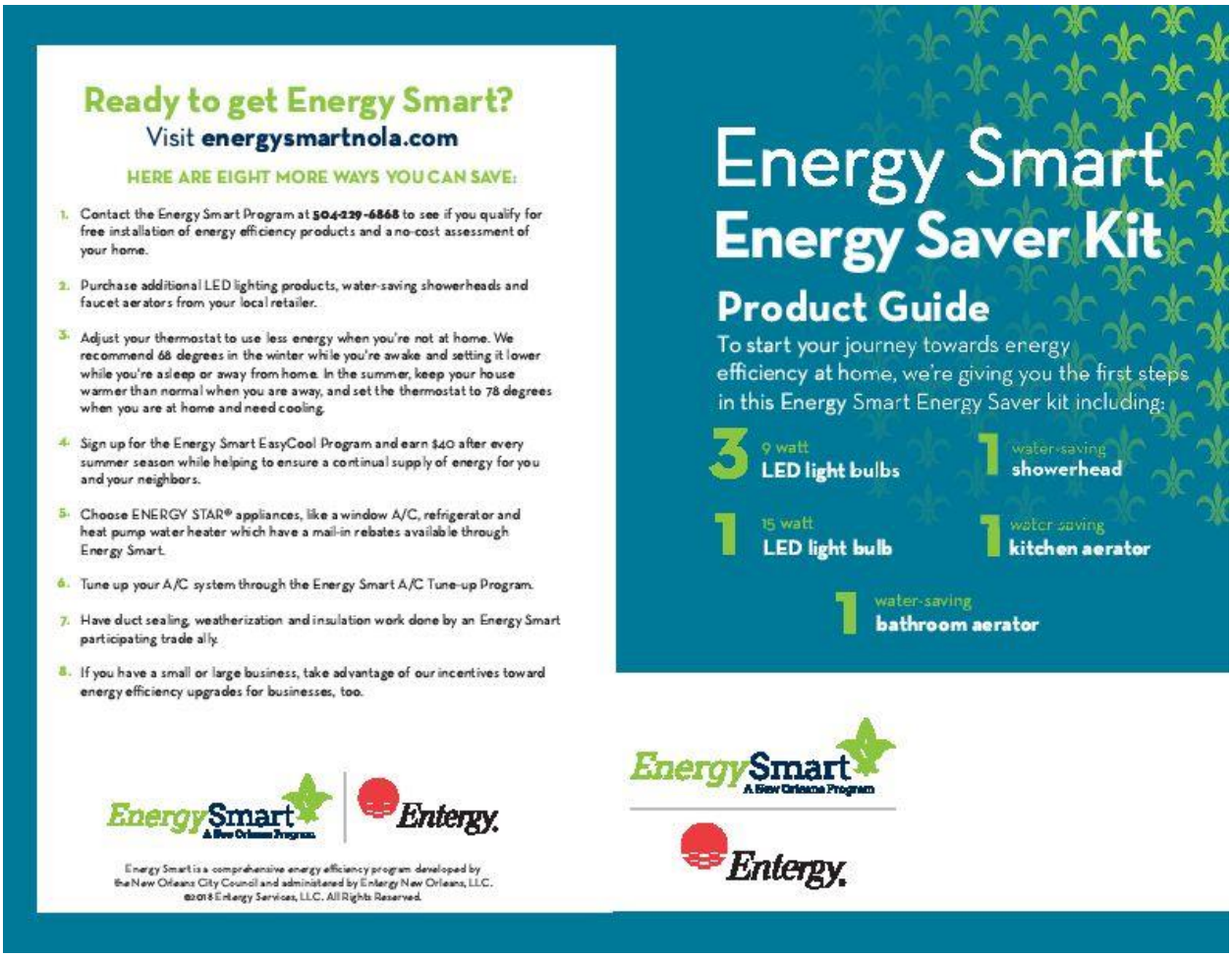
98. DON'T KNOW

[DISPLAY Q131 IF Q130 = 1]

131. Please provide the contact information for the best person to contact about participating in program marketing?

Name:
Phone:
Email:

19 Appendix C: Energy Smart Energy Saver Kit Product Guide



Ready to get Energy Smart?

Visit **energysmartnola.com**

HERE ARE EIGHT MORE WAYS YOU CAN SAVE:

1. Contact the Energy Smart Program at **504-229-6868** to see if you qualify for free installation of energy efficiency products and a no-cost assessment of your home.
2. Purchase additional LED lighting products, water-saving showerheads and faucet aerators from your local retailer.
3. Adjust your thermostat to use less energy when you're not at home. We recommend 68 degrees in the winter while you're awake and setting it lower while you're asleep or away from home. In the summer, keep your house warmer than normal when you are away, and set the thermostat to 78 degrees when you are at home and need cooling.
4. Sign up for the Energy Smart EasyCool Program and earn $40 after every summer season while helping to ensure a continual supply of energy for you and your neighbors.
5. Choose ENERGY STAR® appliances, like a window A/C, refrigerator and heat pump water heater which have a mail-in rebates available through Energy Smart.
6. Tune up your A/C system through the Energy Smart A/C Tune-up Program.
7. Have duct sealing, weatherization and insulation work done by an Energy Smart participating trade ally.
8. If you have a small or large business, take advantage of our incentives toward energy efficiency upgrades for businesses, too.

EnergySmart A New Orleans Program | Entergy.

Energy Smart Energy Saver Kit

Product Guide

To start your journey towards energy efficiency at home, we're giving you the first steps in this Energy Smart Energy Saver kit including:

- **3** 9 watt **LED light bulbs**
- **1** water-saving **showerhead**
- **1** 15 watt **LED light bulb**
- **1** water-saving **kitchen aerator**
- **1** water-saving **bathroom aerator**

EnergySmart A New Orleans Program

Entergy.

WHAT IS ENERGY SMART?

Energy Smart helps conserve the amount of energy (from electricity and water) we use at home and at businesses throughout our communities. The small amounts saved add up quickly, as well as help the environment. You can start saving immediately with these complimentary items in your Energy Smart Energy Saver Kit.

Congratulations

You took the first step on your energy efficiency journey with the Energy Smart Energy Saver Kit Program. You've cut down on your energy use and started lowering your energy costs. So why stop now? Call **504-229-6868** to schedule your assessment.

Questions?

For more information, visit **energysmartnola.com**, call **504-229-6868** or email **info@energysmartnola.com.**

And make sure to tell your friends and family that are Entergy New Orleans customers about these energy-saving options.

EnergySmart A New Orleans Program | Entergy.

LED LIGHT BULBS

Light-emitting diodes, or LEDs, are another great energy saving light source. These bulbs can last for up to 25,000 hours, 15 times longer than incandescents. Standard incandescents use up to 80 percent more energy than energy-efficient LED light bulbs.

WATER-SAVING SHOWERHEAD

A **water-saving showerhead** can save energy by using up to 75 percent less water than most standard showerheads. It provides a powerful, flow rate regardless of water pressure and helps reduce water use in a big way.

WATER-SAVING AERATORS

These **aerators** can be installed on most kitchen and bathroom sink faucets in order to save water and energy. They produce powerful streams of water at a reduced flow rate, regardless of available water pressure. Plus, there's an additional bonus: less energy is required to heat hot water.

20 Appendix D: Cost Benefit Testing

This appendix provides an overview of each programs' participation, verified reduction in peak load, verified kWh savings, annual admin costs, total program costs, as well as a summary of the cost effectiveness analysis.

20.1 Cost Effectiveness Summary

This appendix covers all verified electricity and peak demand savings, and associated program costs incurred in the implementation of the Companies' PY10 portfolio.

The cost-effectiveness of the Companies' PY10 programs was calculated based on reported total spending, verified energy savings, and verified demand reduction for each of the energy efficiency and demand response programs. All spending estimates were provided by the Companies. The methods used to calculate cost-effectiveness are informed by the California Standard Practice Manual.[54]

The demand reduction (kW) and energy savings (kWh) presented throughout this appendix represent savings at the generator by adjusting for line losses.

To calculate the cost-effectiveness of each program, measure lives were assigned on a measure-by-measure basis. Incremental costs were taken directly from the program filing documents.

Avoided energy, capacity, and transmission/distribution costs used to calculate cost-effectiveness were provided by the Companies.

This appendix provides the cost-effectiveness results, as well as a brief overview of the approach taken by the Evaluators.

[54] California Standard Practice Manuel: Economic Analysis of Demand Side Management Programs, October 2001. Available at: http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf

Table 20-1 PY10 Cost-effectiveness Results

Program	*TRC*	*UCT*	*RIM*	*PCT*	*TRC Net Benefits*
HPwES	1.40	1.13	0.36	6.04	$121,926
IQW	1.69	1.51	0.62	N/A	$417,918
Multifamily	1.28	1.28	0.39	5.12	$65,400
RLA	1.54	2.03	0.38	3.59	$1,391,359
A/C Solutions	1.28	1.47	0.46	3.57	$90,604
SK&E	0.52	0.50	0.24	N/A	-$144,184
Behavioral	4.26	4.26	0.43	N/A	$515,442
EasyCool DLC	0.25	0.21	0.21	0.00	-$205,172
EasyCool BYOT	0.00	0.00	0.00	0.00	-$136,662
C&I NC	0.37	0.41	0.23	3.73	-$193,352
Large C&I DR	0.00	0.00	0.00	0.00	-$821,993
EasyCool for Business	0.00	0.00	0.00	0.00	-$76,958
PFI	0.63	0.79	0.26	3.13	-$307,776
Small C&I	0.80	0.95	0.32	3.38	-$296,366
Large C&I	1.03	1.35	0.32	4.14	$176,501
Total	**1.04**	**1.20**	**0.34**	**4.08**	**$596,687**

1.1 Approach

The California Standard Practice Model was used as a guideline for the calculations, along with guidance from the TRM. The cost-effectiveness analysis methods that were used in this analysis are among the set of standard methods used in this industry and include the Utility Cost Test (UCT)[55], Total Resource Cost Test (TRC), Ratepayer Impact Measure Test (RIM), and Participant Cost Test (PCT). All tests weigh monetized benefits against costs. These monetized amounts are presented as Net Present Value (NPV) evaluated over the lifespan of the measure. The benefits and costs differ for each test based on the perspective of the test. The definitions below are taken from the California Standard Practice Manual.

The TRC measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.

The UCT measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits. Costs are defined more narrowly.

[55] The UCT is also referred to as the Program Administrator Cost Test (PACT).

The PCT is the measure of the quantifiable benefits and costs to the customer due to participation in a program. Since many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.

The RIM test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs. Conversely, rates or bills will go up if revenues collected after program implementation is less than the total costs incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.

A common misperception is that there is a single best perspective for evaluation of cost-effectiveness. Each test is useful and accurate, but the results of each test are intended to answer a different set of questions. The questions to be addressed by each cost test are shown in the table below.[56]

Table 20-2 Questions Addressed by the Various Cost Tests

Cost Test	***Questions Addressed***
Participant Cost Test (PCT)	▪ Is it worth it to the customer to install energy efficiency?
	▪ Is it likely that the customer wants to participate in a utility program that promotes energy efficiency?
Ratepayer Impact Measure (RIM)	▪ What is the impact of the energy efficiency project on the utility's operating margin?
	▪ Would the project require an increase in rates to reach the same operating margin?
Utility Cost Test (UCT)	▪ Do total utility costs increase or decrease?
	▪ What is the change in total customer bills required to keep the utility whole?
Total Resource Cost Test (TRC)	▪ What is the regional benefit of the energy efficiency project (including the net costs and benefits to the utility and its customers)?
	▪ Are all of the benefits greater than all of the costs (regardless of who pays the costs and who receives the benefits)?
	▪ Is more or less money required by the region to pay for energy needs?

Overall, the results of all four cost-effectiveness tests provide a more comprehensive picture than the use of any one test alone. The TRC cost test addresses whether energy efficiency is cost-effective overall. The PCT, UCT, and RIM address whether the selection of measures and design of the program are balanced from the perspective of the

[56]https://www.epa.gov/energy/understanding-cost-effectiveness-energy-efficiency-programs

participants, utilities, and non-participants. The scope of the benefit and cost components included in each test are summarized in the table below.[57]

Table 20-3 Benefits and Costs Included in each Cost-Effectiveness Test

Test	***Benefits***	***Costs***
PCT (Benefits and costs from the perspective of the customer installing the measure)	▪ Incentive payments ▪ Bill Savings ▪ Applicable tax credits or incentives	▪ Incremental equipment costs ▪ Incremental installation costs
UCT (Perspective of utility, government agency, or third party implementing the program	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Utility/program administrator incentive costs
TRC (Benefits and costs from the perspective of all utility customers in the utility service territory)	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution ▪ Additional resource savings ▪ Monetized non-energy benefits as outlined by the TRM	▪ Program overhead costs ▪ Program installation costs ▪ Incremental measure costs
RIM (Impact of efficiency measure on non-participating ratepayers overall)	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Lost revenue due to reduced energy bills ▪ Utility/program administrator installation costs

The tables below outline the results for each test, for both the programs and the portfolio as a whole.

[57] *Ibid*.

Table 20-4 PY10 Net Benefits by Cost Test

Program	TRC Net Benefits	UCT Net Benefits	RIM Net Benefits	PCT Net Benefits	SCT Net Benefits
HPwES	$121,926	$48,299	-$739,483	$751,204	$404,100
IQW	$417,918	$341,046	-$609,821	$873,043	$1,085,009
Multifamily	$65,400	$61,871	-$439,723	$419,383	$305,085
RLA	$1,391,359	$1,731,280	-$5,613,995	$5,851,181	$2,969,788
A/C Solutions	$90,604	$131,524	-$481,937	$495,616	$325,932
SK&E	-$144,184	-$155,406	-$483,591	$297,258	$152,590
Behavioral	$515,442	$515,442	-$896,474	$1,411,916	$673,775
EasyCool DLC	-$205,172	-$266,932	-$266,932	$61,760	$69,052
EasyCool BYOT	-$136,662	-$266,057	-$266,057	$129,395	$0
C&I NC	-$193,352	-$160,249	-$371,028	$155,355	$77,015
Large C&I DR	-$821,993	-$821,993	-$821,993	$0	$0
EasyCool for Business	-$76,958	-$78,918	-$78,918	$1,960	$0
PFI	-$307,776	-$136,659	-$1,437,632	$998,084	$147,352
Small C&I	-$296,366	-$58,982	-$2,520,466	$1,974,783	$609,079
Large C&I	$176,501	$1,452,197	-$11,858,948	$10,687,200	$3,216,451
Total	**$596,687**	**$2,336,463**	**-$26,886,999**	**$24,108,138**	**$10,035,229**

Table 20-5 PY10 Costs by Cost Test

Program	TRC Costs	UCT Costs	RIM Costs	PCT Costs	SCT Costs
HPwES	$302,073	$375,700	$1,163,482	$148,990	$302,073
IQW	$605,828	$662,978	$1,613,845	$318,457	$605,828
Multifamily	$231,765	$219,278	$720,873	$101,833	$231,765
RLA	$2,585,980	$1,686,951	$9,032,226	$2,263,354	$2,585,980
A/C Solutions	$323,371	$282,451	$895,913	$192,528	$323,371
SK&E	$298,263	$309,485	$637,670	$41,346	$298,263
Behavioral	$158,333	$158,333	$1,570,249	$0	$158,333
EasyCool DLC	$274,224	$335,984	$335,984	$0	$274,224
EasyCool BYOT	$136,662	$266,057	$266,057	$0	$136,662
C&I NC	$304,691	$271,588	$482,367	$56,865	$304,691
Large C&I DR	$821,993	$821,993	$821,993	$0	$821,993
EasyCool for Business	$76,958	$78,918	$78,918	$0	$76,958
PFI	$825,322	$654,206	$1,955,178	$468,365	$825,322
Small C&I	$1,508,612	$1,271,228	$3,732,712	$830,948	$1,508,612
Large C&I	$5,388,687	$4,112,990	$17,424,136	$3,401,857	$5,388,687
Total	**$13,842,762**	**$11,508,141**	**$40,731,603**	**$7,824,543**	**$13,842,762**

Table 20-6 PY10 Benefits by Cost Test

Program	TRC Benefits	UCT Benefits	RIM Benefits	PCT Benefits	SCT Benefits
HPwES	$423,999	$423,999	$423,999	$900,194	$553,091
IQW	$1,023,746	$1,004,024	$1,004,024	$1,191,500	$1,403,466
Multifamily	$297,165	$281,150	$281,150	$521,216	$406,918
RLA	$3,977,339	$3,418,231	$3,418,231	$8,114,535	$5,233,142
A/C Solutions	$413,976	$413,976	$413,976	$688,144	$518,459
SK&E	$154,079	$154,079	$154,079	$338,604	$193,936
Behavioral	$673,775	$673,775	$673,775	$1,411,916	$673,775
EasyCool DLC	$69,052	$69,052	$69,052	$61,760	$69,052
EasyCool BYOT	$0	$0	$0	$129,395	$0
C&I NC	$111,339	$111,339	$111,339	$212,220	$133,880
Large C&I DR	$0	$0	$0	$0	$0
EasyCool for Business	$0	$0	$0	$1,960	$0
PFI	$517,547	$517,547	$517,547	$1,466,449	$615,717
Small C&I	$1,212,246	$1,212,246	$1,212,246	$2,805,731	$1,440,028
Large C&I	$5,565,188	$5,565,188	$5,565,188	$14,089,057	$6,618,309
Total	**$14,439,449**	**$13,844,604**	**$13,844,604**	**$31,932,681**	**$17,859,773**

Table 20-7 PY10 Cost Test Results by Program

Program	TRC	UCT	RIM	PCT	SCT
HPwES	1.40	1.13	0.36	6.04	1.83
IQW	1.69	1.51	0.62	N/A	2.32
Multifamily	1.28	1.28	0.39	5.12	1.76
RLA	1.54	2.03	0.38	3.59	2.02
A/C Solutions	1.28	1.47	0.46	3.57	1.60
SK&E	0.52	0.50	0.24	N/A	0.65
Behavioral	4.26	4.26	0.43	N/A	4.26
EasyCool DLC	0.25	0.21	0.21	0.00	0.25
EasyCool BYOT	0.00	0.00	0.00	0.00	0.00
C&I NC	0.37	0.41	0.23	3.73	0.44
Large C&I DR	0.00	0.00	0.00	0.00	0.00
EasyCool for Business	0.00	0.00	0.00	0.00	0.00
PFI	0.63	0.79	0.26	3.13	0.75
Small C&I	0.80	0.95	0.32	3.38	0.95
Large C&I	1.03	1.35	0.32	4.14	1.23
Total	**1.04**	**1.20**	**0.34**	**4.08**	**1.29**