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May 30, 2018

Via Hand Delivery

Ms. Lora W. Johnson, CMC, LMMC
Clerk of Council
Council of the City of New Orleans
Room 1E09, City Hall
1300 Perdido Street
New Orleans, LA 70112

Re: ***Filing of Entergy New Orleans, LLC's Energy Smart Program Year 7 Annual Program Report, and Annual Evaluation, Measurement and Verification Report (Resolutions R-11-52, R-17-31, R-17-176, R-17-177, R-17-623; UD-08-02, UD-17-03)***

Dear Ms. Johnson:

On February 3, 2011, the Council of the City of New Orleans ("Council") adopted Resolution R-11-52 requiring periodic reports regarding Energy Smart to be filed with the Council. A series of Council Resolutions, R-17-31, R-17-176, R-17-177, and R-17-623, approved the continuance of the Energy Smart for Program Years 7-9 with APTIM, Environmental and Infrastructure ("APTIM") as the Third Party Administrator.

On behalf of APTIM, Entergy New Orleans, LLC submits the enclosed original and three copies of the Energy Smart Annual Program Report, and Annual Evaluation, Measurement and Verification Report for the period of April 1, 2017 to December 31, 2017. Should you have any questions regarding this filing, please contact my office at (504) 670-3680.

Thank you for your assistance with this matter.

Sincerely,

Gary E. Huntley

RECEIVED
MAY 30 2018
BY:

Enclosures
cc: Official Service List UD-08-02 and UD-17-03 *(via electronic mail)*

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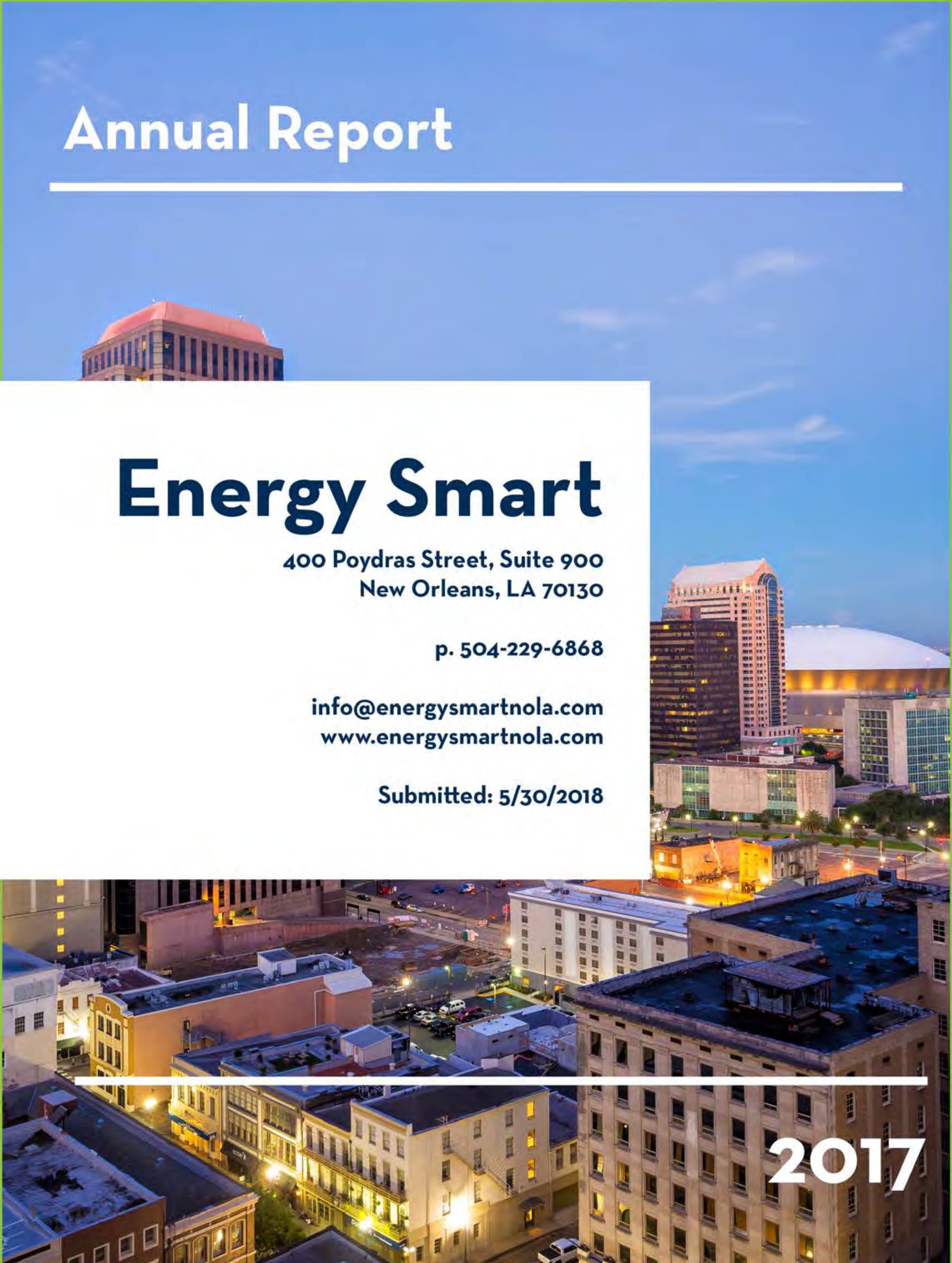
Annual Report



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Submitted: 5/30/2018

2017

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EXECUTIVE SUMMARY

The Energy Smart Program (the "Program") was developed by the New Orleans City Council ("Council"), is administered by Entergy New Orleans, LLC. ("ENO") and is currently implemented by APTIM (formerly CB&I), the Third-Party Administrator ("TPA"). This report contains data on the Program and post-evaluation results from ADM's Evaluation, Measurement and Verification (EM&V) report.

The current Energy Smart portfolio of offerings runs from April 1, 2017 through December 31, 2019. To ensure success in current and future programs, APTIM has engaged a number of subcontractors that have extensive experience in energy efficiency programs and in the New Orleans market to implement the program, including:

- Accelerated Innovations
- Energy Wise Alliance ("EWA")
- Franklin Energy Services
- Green Coast Enterprises
- Green Light New Orleans ("GLNO")
- ILSI Engineering (ILSI)
- KT Consulting
- Resource Innovations
- TSG Services (TSG)
- Urban League of Louisiana

This report contains data on the Energy Smart Commercial & Industrial and Residential offerings which span the east bank of New Orleans and Algiers territory.

- kWh savings and total participation by program
- Summaries of activity by program
- A comprehensive review of each program's data and activity

An emphasis on working collaboratively with ENO, the Council's Advisors, and numerous stakeholders, including local policy advocacy stakeholders, local trade ally stakeholders and local higher education stakeholders, has been important for the implementation of the Energy Smart program in 2017. ENO and APTIM view collaborative teamwork among the large number of stakeholders with diverse interests as a critical component to the overall success of the program.

Staff List

Name	Title	Company	Location
Kristin McKee	Program Director	APTIM	New Orleans, LA
Mike Dessilla	Project Lead	APTIM	New Orleans, LA
Nicky Chokran	Project Lead	APTIM	New Orleans, LA
Robyn Munici	Project Lead	APTIM	New Orleans, LA
Spencer Kurtz	Energy Engineer	APTIM	Charlotte, NC
Jessica Wagner	Program Marketing	APTIM	Madison, WI
Nate Warren	Program Support	APTIM	Madison, WI
Tamzen Jenkins	Marketing Intern	APTIM	New Orleans, LA
Philip Russo	Engineering Intern	APTIM	New Orleans, LA
Tom Quasius	TPA Director	APTIM	Chicago, IL
Michael Slaughter	Finance	APTIM	Baton Rouge, LA
Frank Montagna	VP, Managing Director	Franklin Energy Services	Atlanta, GA
Leanne Boudreaux	Program Manager	Franklin Energy Services	New Orleans, LA
Alan Mitchell	Operations Manager	Franklin Energy Services	New Orleans, LA
Atom Davis	Trade Ally Liaison	Franklin Energy Services	New Orleans, LA
Karen O’Brien	Project Coordinator	Franklin Energy Services	New Orleans, LA
Bernadelle Tilus	CSR	Franklin Energy Services	New Orleans, LA
James Phillips	Energy Auditor/Specialist	Franklin Energy Services	New Orleans, LA
Matthew Siano	Energy Advisor	Franklin Energy Services	New Orleans, LA
Dwayne Haley	Energy Advisor	Franklin Energy Services	New Orleans, LA
Atticus Doman	Program Design Consultant	Resource Innovations	Chicago, IL
George Leonard	Engineer	ILSI Engineering	New Orleans, LA
Michael Sullivan	Demand Response Installer	TSG Services	New Orleans, LA
Keeley Evans	Administrative Support	TSG Services	New Orleans, LA
Jackie Dadakis	QA/QC and Publicly Funded Institutions	Green Coast Enterprises/GCE Services	New Orleans, LA
Joe Ryan	QA/QC	Green Coast Enterprises/GCE Services	New Orleans, LA
Jared Sessum	QA/QC	Green Coast Enterprises/GCE Services	New Orleans, LA
Jamie Wine	School Kits and Community Outreach	EnergyWise Alliance	New Orleans, LA
Kim Thomas	Algiers Outreach	KT Consulting	New Orleans, LA
Greg Ravy	Algiers Outreach	KT Consulting	New Orleans, LA
Andreas Hoffman	Direct Install	Green Light New Orleans	New Orleans, LA
Linda Baynham	QA Subcontract	Baynham Environmental	New Orleans, LA

Programs Overview

Residential

- Home Performance with Energy Star.
- Residential Lighting & Appliances.
- Low Income Audit & Weatherization.
- High Efficiency Tune Up.
- Multi-Family Program.
- Direct Load Control.
- Green Light Direct Install.
- School Kits & Education.

Commercial & Industrial

- Small Commercial Solutions.
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Behavioral

- Scorecard.

PROGRAM PERFORMANCE & ACTIVITY

Program Performance and Activity

	kWh SAVINGS	kWh GOAL*	% TO kWh GOAL	kW SAVINGS	kW TARGET*	% TO kW TARGET	INCENTIVE SPENT	INCENTIVE BUDGET	% OF BUDGET
Algiers – Commercial	393,230	768,799	51.15%	20.79	125.72	16.54%	$38,354	$81,898	46.83%
Algiers - Residential	450,786	607,002	74.26%	114.28	190.32	60.05%	$91,827	$113,633	80.81%
N.O. - Commercial	12,779,549	11,597,577	110.19%	1,642.77	1,781.61	92.21%	$1,144,606	$1,211,414	94.49%
N.O. - Residential	5,437,475	6,975,300	77.95%	1,546.62	2,370.12	65.26%	$1,015,211	$1,282,994	79.13%
TOTAL	**19,061,040**	**19,948,677**	**95.55%**	**3,324.46**	**4,467.77**	**74.41%**	**$2,289,998**	**$2,689,939**	**85.13%**

*Goals are reflective of the Supplemental and Amended Energy Smart Implementation Plan PY 7 – 9, approved 12/14/2017. Savings reflect verified savings as documented in ADM's Evaluation, Measurement and Verification (EM&V) report.

Summary tables show savings and incentive spend from April 1st, 2017 through December 31st, 2017.

	NET PEAK DEMAND REDUCTION (KW)	NET ANNUAL ENERGY SAVINGS (KWH)	TOTAL PROGRAM EXPENDITURES	TRC (B/C RATIO)	UCT (B/C RATIO)
New Orleans	3,189.39	18,217,024	$ 5,244,130	2.18	2.44
Algiers	135.07	844,016	$ 449,480	1.25	1.32

Residential Summary

The Energy Smart Residential Portfolio was successful in PY7, benefiting customers across the programs. There were changes implemented in 2017 from the previous years in the program. Air conditioner improvements were offered across all four field-based programs to include duct sealing and air conditioner tune ups. Duct sealing, air sealing, and attic insulation rebates increased to create further interest and participation in the program. The programs exceeded kWh goals in four programs while another four programs finished greater than 80% of kWh goals. The EasyCool demand load control program conducted four successful events during PY7. Looking forward, the program team will focus on multiple methods of improving the programs to meet customer needs. Marketing efforts, community outreach and trade ally referrals will continue to be sources for enrollments in the portfolio. The Algiers territory will be targeted with all three lead generating tactics. The program will also focus on efforts in Algiers with local stores carrying LED rebates for bulbs sales as part of the Residential Lighting and Appliance program. Community events, the Energy Smart website and cross promotional collateral at retail locations will assist homeowners in identifying the programs they qualify for across the Entergy New Orleans footprint. The program will look to carry the momentum of PY7 into PY8 and present information to Entergy New Orleans customers in a variety of outreach methods.

Commercial & Industrial Summary

The Energy Smart Commercial & Industrial (C&I) portfolio evolved substantially throughout PY7 and saw many successes across the programs. Energy Smart introduced the Publicly Funded Institutions offering which dedicates funds specifically to this sector. Across the three offerings, there was an increase in non-lighting and custom projects which demonstrates the shift away from the program being a historically predominantly lighting program. Energy Smart dedicated significant time and resources to general awareness-building about the program and changes since PY6. To increase commercial customer awareness and participation in Algiers, APTIM hired a local minority-owned subcontractor that is based in Algiers to provide outreach support. APTIM will also be subcontracting outreach support on the East Bank with a local woman-owned firm in PY8. These additional subcontractors are helping create awareness of Energy Smart and drive participation across the three C&I offerings. APTIM will also be looking into program design changes and additional offerings to enhance the portfolio in PY8 and PY9.

RESIDENTIAL PROGRAMS

Residential Program Summary

	KWH SAVINGS	KWH GOAL*	% TO SAVINGS GOAL	KW SAVINGS	KW TARGET*	% TO KW TARGET	INCENTIVE SPENT	INCENTIVE BUDGET	% OF BUDGET
Algiers – Home Performance	90,115	72,604	124.12%	23.56	14.70	160.27%	$25,195	$18,903	133.29%
Algiers – Lighting & Appliance	73,685	242,465	30.39%	15.60	51.00	30.59%	$1,450	$22,238	6.52%
Algiers – Multi-Family	6,064	19,340	31.35%	0.99	3.70	26.76%	$1,815	$5,667	32.03%
Algiers – Low Income	158,874	74,694	212.70%	39.57	16.00	247.31%	$43,043	$25,545	168.50%
Algiers – High Efficiency Tune Ups	72,321	85,830	84.26%	27.64	25.40	108.82%	$12,453	$15,767	78.98%
Algiers – DLC	-	-	-	0.00	62.22	0.00%	$0	$8,400	0.00%
Algiers – School Kits	38,146	39,056	97.67%	4.52	5.30	85.28%	$6,683	$6,800	98.27%
Algiers – Green Light	11,581	73,013	15.86%	2.40	12.00	20.00%	$1,189	$10,313	11.53%
N.O. – Home Performance	872,375	980,222	89.00%	216.25	197.44	109.53%	$212,016	$254,629	83.26%
N.O. – Lighting & Appliance	1,849,985	3,277,546	56.44%	387.78	683.18	56.76%	$212,300	$302,072	0.00%
N.O. – Multi-Family	341,939	259,377	131.83%	62.31	49.03	127.09%	$69,418	$72,053	96.34%
N.O. – Low Income	880,394	985,729	89.31%	225.05	213.51	105.40%	$258,732	$339,110	76.30%
N.O. – High Efficiency Tune Ups	1,192,194	1,092,377	109.14%	443.03	341.75	129.64%	$203,970	$206,519	98.77%
N.O. – DLC	-	-	-	168.80	829.91	20.34%	$12,240	$46,600	26.27%
N.O. – School Kits	212,813	253,937	83.81%	25.22	34.58	72.93%	$37,282	$44,200	84.35%
N.O. – Green Light	87,775	126,112	69.60%	18.18	20.72	87.76%	$9,253	$17,813	51.94%
TOTAL	**5,888,261**	**7,582,301**	**77.66%**	**1,660.90**	**2,560.44**	**64.87%**	**$1,107,038**	**$1,396,627**	**79.27%**

* Goals are reflective of the Supplemental and Amended Energy Smart Implementation Plan PY 7 – 9, approved 12/14/2017. Savings reflect verified savings as documented in ADM's Evaluation, Measurement and Verification (EM&V) report.

Across the residential portfolio, the later program year startup created the need to significantly increase production in order to meet savings goals. As a result, the majority of savings was concentrated in the latter part of the year. The momentum that was generated at the end of PY7 is expected to carry over into PY8 and lead to a more even distribution of savings across the next year and future years.

Home Performance with ENERGY STAR

Program Description

The objective of the Home Performance with ENERGY STAR® (HPwES) offering is to achieve long term, significant cost-effective electricity savings. The program uses local auditors and contractors who help residential customers analyze their energy use and identify opportunities to improve efficiency, install low-cost energy-saving measures, and identify and implement more comprehensive home efficiency projects. HPwES offers three levels of home energy audits. The Level I Assessment includes a "walk-through" inspection and direct installation of low-cost measures, such as LEDs and water measures. To generate additional savings at the time of the audit, smart thermostats are included as a direct install measure. The Level II and III Assessments are comprehensive home inspections with diagnostic testing, performed by a qualified contractor, targeted to achieve deeper savings within the home.

Program Highlights

HPwES New Orleans finished at 89% of the kWh savings goal while Algiers achieved 124% of the kWh goal. Trade allies were a large part of the success in increasing production in the latter part of the year as the follow up measures and customer outreach performed by these contractors drove the program forward.

A total of 348 households participated in HPwES in the program year. The most prevalent measure was LED lighting. In PY7, the program included six measures: AC tune-ups, faucet aerators, LED light bulbs, pipe wrap, advanced power strips and low-flow showerheads.

New Orleans:

- A total of 7,758 measures were installed during the program year.
- The program reached 89% of the kWh goal, achieving 872,375 kWh.
- The program reached 109.53% of the kW target, achieving 216.25 kW.

Algiers:

- A total of 1,023 measures were installed during the program year.
- The program reached 124.12% of the kWh goal, achieving 90,115 kWh.
- The program reached 160.27% of the kW target, achieving 23.56 kW.

Program Budget, Savings and Participants

PROGRAM	COST			ENERGY SAVINGS (kWh)			DEMAND SAVINGS (kW)		
	BUDGET	ACTUAL	%	PRE-EVALUATED	EVALUATED	%	PRE-EVALUATED	EVALUATED	%
Algiers HPwES	$18,903	$25,195	133.29%	87,991	90,115	102.41%	24.52	23.56	96.08%
N.O. HPwES	$254,629	$212,016	83.3%	884,935	872,375	98.58%	218.27	216.25	99.07%

Table reflects savings achievement from ADM's Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Planned or Proposed Changes to Program and Budget

Moving forward, the program will focus on balancing the direct installation savings with the follow-up measures savings, to increase the impact to customers in ENO territory.

Residential Lighting & Appliances

Program Description

The objective of the lighting and appliance offering is to increase awareness and sales of energy efficient lighting and appliances to residential customers. The program is available to ENO retail customers through point of sale and rebate incentives at participating retailers. The program offers customers the opportunity to purchase, largely through retail locations, a variety of discounted products that are ENERGY STAR® qualified.

Program Highlights

The retail lighting measure showed exponential growth during the last quarter of the year as the tri-party agreements with retailers were solidified, and the lighting measures were marketed in the participating retail locations. All possible products were included in the program offerings to reach the program goal. By the end of the quarter, sales were averaging approximately 10% of the goal per week. The retail contracts remain valid until April 2018.

Beginning in PY7, the program ceased offering rebates for CFL light bulbs. The program also stopped offering advanced power strips but introduced ENERGY STAR refrigerators and heat pump water heaters. The most prevalent measure distributed through the program was LED lighting.

New Orleans:

- A total of 134,994 measures were sold during the program year.
- The program reached 56.44% of the kWh goal, achieving 1,849,985 kWh.
- The program reached 56.76% of the kW target, achieving 387.78 kW.

Algiers:

- A total of 5,956 measures were sold during the program year.
- The program reached 30.39% of the kWh goal, achieving 73,685 kWh.
- The program reached 30.59% of the kW target, achieving 15.60 kW.

Program Budget, Savings and Participants

Program	Cost			Energy Savings (kWh)			Demand Savings (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
Algiers Lighting & Appliances	$22,238	$1,450	6.52%	110,536	73,685	66.66%	22.54	15.60	69.21%
N.O. Lighting & Appliances	$302,072	$212,300	70.3%	2,752,151	1,849,985	67.22%	572.21	387.78	67.77%

Table reflects savings achievement from ADM's Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Planned or Proposed Changes to Program and Budget

In PY8, the program will target local vendors to impact areas with less big box stores in the area. The program is working to expand upon its retail partnerships to include both larger stores as well as local community partners. While large retailers are also needed to support goal attainment, the program will continue to partner with local retailers that are easily accessible to Orleans Parish residents, particularly within the Algiers territory. All vendors will have cross promotional information for all the residential programs in the Energy Smart portfolio to maximize opportunities for the ENO customers. Additionally, Energy Smart is considering adjustments to include a higher ratio of specialty bulbs to standard bulbs to adjust for possible market saturation.

Low Income Audit & Weatherization

Program Description

The Low Income Audit & Weatherization offering gives qualified customers the opportunity to receive energy efficiency measures in their homes free of charge. Projects range from direct install measures, such as LED light bulbs and water savings measures, to smart thermostats and comprehensive envelope measures (attic insulation, air sealing and duct sealing).

Program Highlights

The program increased production significantly in the latter part of 2017 due to a few contributing factors. A revised incentive rate was presented to trade allies that helped drive kWh savings for program. The partnership with Energy Wise Alliance (EWA) as well as additional community outreach efforts increased enrollments in the program. The dedication of the trade allies and community outreach efforts enabled this program to meet the overall savings targets set for the program. The New Orleans Low Income Audit & Weatherization program finished at 89% of the yearly goal while Algiers finished above goal at 212%.

A total of 316 households participated in the program in PY7. The program introduced six new measures in PY7: AC tune-ups, faucet aerators, LED light bulbs, pipe wrap, advanced power strips and low-flow showerheads. Program efforts shifted in 2017 to include the use of direct Install measures as part of the program, resulting in an increase in LED lighting measures.

New Orleans:

- A total of 5,195 measures were installed during the program year.
- The program reached 89.31% of the kWh goal, achieving 880,394 kWh.
- The program reached 105.40% of the kW target, achieving 225.05 kW.

Algiers:

- A total of 785 measures were installed during the program year.
- The program reached 212.70% of the kWh goal, achieving 158,874 kWh.
- The program reached 247.31% of the kW target, achieving 39.57 kW.

Program Budget, Savings and Participants

PROGRAM	COST			ENERGY SAVINGS (kWh)			DEMAND SAVINGS (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
Algiers Low Income Audit & Wx	$25,545	$43,043	168.50%	158,973	158,874	99.94%	37.72	39.57	104.90%
N.O. Low Income Audit & Wx	$339,110	$258,732	76.3%	886,110	880,394	99.35%	222.73	225.05	101.04%

Table reflects savings achievement from ADM's Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Planned or Proposed Changes to Program and Budget

The program will be seeking low income multi-family enrollments to better help that sector of customers.

High Efficiency AC Tune-Up

Program Description

This offering is designed to minimize market barriers to efficient cooling in residences. This program provides residential customers with a comprehensive set of options to lower their energy consumption and cost associated with keeping their homes cool and comfortable in the summer. Customers with functioning A/Cs can improve the efficiency of their units with the help of a comprehensive A/C Tune-up.

Program Highlights

The majority of the participation in the program was generated by one trade ally. Additional participants in the trade ally network were added later in the year and are expected to increase participation in PY8. Additionally, the introduction of a more robust reporting system contributed to increased savings achievement towards the latter part of the year. This program met the savings targets for PY7 and will continue to recruit and engage potential trade allies in PY8.

A total of 372 customers participated in the program; which included 410 tune-ups, 396 duct sealing measures, and 2 A/C replacements. Some customers have more than one A/C unit, leading to more measures completed than customers served.

New Orleans:

- A total of 758 measures were installed during the program year.
- The program reached 109.14% of the kWh goal, achieving 1,192,194 kWh.
- The program reached 129.64% of the kW target, achieving 443.03 kW.

Algiers:

- A total of 50 measures were installed during the program year.
- The program reached 84.26% of the kWh goal, achieving 72,321 kWh.
- The program reached 108.82% of the kW target, achieving 27.64 kW.

Program Budget, Savings and Participants

PROGRAM	COST			ENERGY SAVINGS (kWh)			DEMAND SAVINGS (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
Algiers High Efficiency Tune Up	$15,767.00	$12,453.00	78.98%	69,095	72,321	104.67%	24.12	27.64	114.59%
N.O. High Efficiency Tune Up	$206,518.50	$203,970.00	98.8%	1,149,084	1,192,194	103.75%	381.89	443.03	116.01%

Table reflects savings achievement from ADM's Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Planned or Proposed Changes to Program and Budget

There are no planned changes to this program.

Multi-Family Program

Program Description

This offering targets multi-family property owners (landlords) and managers, as well as apartment and condo renters. The program addresses their unique needs, which are often overlooked, through a combination of incentives for both direct install and prescriptive measures, and through property owner and tenant education. The program was expanded to include duplex homes, which provided more opportunities for energy savings within this program.

Program Highlights

A total of 361 households participated in the program in PY7. The Multi-Family program increased momentum in the second half of 2017 to reach the program goals by working with apartment complexes to complete assessments and installing direct measures in duplexes, as well as through the installation of the programmable thermostats. The most prevalent measure installed in PY7 was LED lighting. In PY8, there will be an aggressive effort to engage trade allies to reach out to multi-family customers that received an assessment to offer follow up measures. The program will also work to identify complexes that are eligible for insulation and duct sealing to increase the benefit to the customers of managed complexes. Efforts to increase outreach to occupants of duplexes in the city will include leveraging the partnership with Energy Wise Alliance and other community organizations.

New Orleans:

- A total of 4,815 measures were installed during the program year.
- The program reached 131.83% of the kWh goal, achieving 341,939 kWh.
- The program reached 127.09% of the kW target, achieving 62.31 kW.

Algiers:

- A total of 159 measures were installed during the program year.
- The program reached 31.35% of the kWh goal, achieving 6,064 kWh.
- The program reached 26.76% of the kW target, achieving 0.99 kW.

Program Budget, Savings and Participants

PROGRAM	COST			ENERGY SAVINGS (kWh)			DEMAND SAVINGS (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
Algiers Multi-Family	$5,667	$1,815	32.03%	6,011	6,064	100.88%	0.99	0.99	100.00%
N.O. Multi-Family	$72,053	$69,418	96.3%	337,413	341,939	101.34%	60.22	62.31	103.47%

Table reflects savings achievement from ADM's Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Planned or Proposed Changes to Program and Budget

The program will continue to evaluate the impact of the addition of duplexes to the Multi-Family program, as well as on the Home Performance with ENERGY STAR program. Proposed changes include an increased emphasis on engaging low income multi-family customers and apartment complexes. Franklin Energy Services will also work to improve coordination with APTIM regarding commercial savings opportunities in common areas of apartment complexes.

Direct Load Control (EasyCool)

Program Description

This opt-in load control initiative allows the Energy Smart program to cycle off a participant's home central air conditioner ("CAC") condenser during peak events.

Program Highlights

Although the program faced uncertainties regarding the budget-approval during the cooling season, the direct load control offering was held at the same participation level as in PY6. Energy Smart conducted four events in September 2017.

Direct Load Control Cycling Events				
Date	9/28/2017	9/27/2017	9/21/2017	9/19/2017
Start Time (hours)	1400	1400	1400	1400
End Time	1830	1830	1830	1830
# Devices Controlled	396	396	396	396
Cycle Strategy (ex. 40%)	50% STANDARD (15 min. on/15 min off)	50% STANDARD (15 min. on/15 min off)	50% STANDARD (15 min. on/15 min off)	50% STANDARD (15 min. on/15 min off)

Program Budget, Savings and Participants

The program achieved 168.80 kW savings. More detailed results are provided in the Program Year 7 EM&V report.

Planned or Proposed Changes to Program and Budget

Franklin Energy Services plans to install approximately 1,800 switches during PY8 and has hired a technician to perform the installations. Franklin Energy Services will install switches throughout PY8 while also running cycling events during the AC Cycling season (June – September).

Green Light New Orleans

Program Description

The program partners with Green Light New Orleans (GLNO) to install energy-efficient lighting for residents utilizing volunteers. GLNO installed energy-efficient CFL and LED light bulbs in 341 Energy Smart qualified homes in Orleans Parish in 2017.

Program Highlights

The 341 participating households received 4,770 bulbs from GLNO. Lifetime savings indicate that the lamps installed will produce 526,649 kWh in New Orleans and 69,485 kWh in Algiers.

New Orleans:

- A total of 4,227 measures were installed during the program year.
- The program reached 69.60% of the kWh goal, achieving 87,775 kWh.
- The program reached 87.76% of the kW target, achieving 18.18 kW.

Algiers:

- A total of 543 measures were installed during the program year.
- The program reached 15.86% of the kWh goal, achieving 11,581 kWh.
- The program reached 20.00% of the kW target, achieving 2.40 kW.

Green Light installed 4,770 light bulbs, of which 850 were CFLs and 1,372 were LEDs.

Territory	Homes	Lamps	CFLs	LEDs	Average lamps per home
New Orleans	245	4,227	602	1,092	17.25
Algiers	96	543	248	280	5.66
Total	**341**	**4,770**	**850**	**1,372**	**13.99**
		Average per home	5.61	3.48	

In addition to energy efficiency, GLNO's light bulb program focused on bringing people together within the New Orleans community, with more than 1,000 volunteers helping to install energy-efficient light bulbs.

Program Budget, Savings and Participants

PROGRAM	COST			ENERGY SAVINGS (kWh)			DEMAND SAVINGS (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
Algiers Green Light	$10,313	$1,189	11.53%	13,271	11,581	87.27%	2.74	2.40	87.59%
N.O. Green Light	$17,813	$9,253	51.9%	102,745	87,775	85.43%	21.24	18.18	85.59%

Table reflects savings achievement from ADM's Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Program Events and Training

Volunteers were each trained at GLNO's office, where they were taught the correct way to install energy-efficient bulbs. Because GLNO only replaces incandescent bulbs with energy-efficient ones, volunteers are trained to tell the difference between the two types of bulbs. They are also trained to calculate each installation's impact on the homeowner's bills, carbon footprint and energy consumption and how to safely dispose of energy-efficient bulbs.

Nicole, a Green Light New Orleans volunteer who worked with the organization throughout 2017, said she feels she is making a difference in New Orleans residents' lives by working with GLNO: "We want to continue working with Green Light because greener energy both saves money, and is better for the environment," Nicole said. "We actually give our clients information that describes how many bulbs we installed, how much their carbon footprint will be reduced over the life of the bulb, and what the cost savings will be over time. The more we associate lower costs with reduced environmental impact, the more likely people rally around environmental issues and a better chance of making a positive impact."

Planned or Proposed Changes to Program and Budget

For 2018, GLNO does not have any major changes planned to its program. The CFL light bulbs for the 2018 program year have been donated by Ledvance (formerly Sylvania). GLNO is considering transitioning to more LED lighting. Despite having changed 600,000+ light bulbs since 2007, including 245,000 bulbs through Energy Smart since the program's inception in 2011, GLNO still receives a steady flow of applications from residents seeking help replacing their old incandescent bulbs with energy-efficient ones.

School Kits & Education

Program Description

Energy Smart School Kits and Education is an offering for middle school students that combines in-class education programming provided by Energy Wise Alliance (EWA) staff members and a free Energy Smart Starter Kit for students to bring home and install with their parents. This year, the kit consisted of four 9 watt LED light bulbs, two 15 watt LED light bulbs, one low-flow shower head, one low-flow kitchen sink aerator, one low-flow bathroom sink aerator and one water flow bag for students to compare the difference.

Program Highlights

In the summer of PY7, EWA reached out to 54 schools, including every public and voucher school with a 6th grade class. Methods included phone, email and in-person visits at the campus. This outreach secured enough participating schools and classrooms in the fall to meet the kit goal for 2017 and have scheduled schools for 2018.

In total, EWA served 20 schools and visited 19 sixth grade, 3 fifth grade and one eighth grade class. Some grade levels included multiple classrooms of students, with the average school receiving about 79 kits, totaling 1,500 kits delivered. Each school received 2 visits by EWA instructors, and included content aligned with the Louisiana Student Science Standards that included fun, hands-on activities like a skit with costumes about how electricity reaches our home, why it's important to conserve, the bicycle generator, and the home retrofit game.

Projected lifetime savings indicate that the kits installed will produce 2,035,355 kWh in New Orleans and 364,828 kWh in Algiers.

New Orleans:

- A total of 1,272 kits were distributed during the program year.
- The program reached 83.81% of the kWh goal, achieving 212,813 kWh.
- The program reached 72.93% of the kW target, achieving 25.22 kW.

Algiers:

- A total of 228 kits were distributed during the program year.
- The program reached 97.67% of the kWh goal, achieving 38,146 kWh.
- The program reached 85.28% of the kW target, achieving 4.52 kW.

Program Budget, Savings and Participants

PROGRAM	COST			ENERGY SAVINGS (kWh)			DEMAND SAVINGS (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
Algiers School Kits & Education	$6,800	$6,683	98.27%	48,723	38,146	78.29%	5.85	4.52	77.26%
N.O. School Kits & Education	$44,200	$37,282	84.3%	271,823	212,813	78.29%	32.62	25.22	77.31%

Table reflects savings achievement from ADM's Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Planned or Proposed Changes to Program and Budget

EWA will begin working with high schools in New Orleans targeting primarily 10th and 11th grades, in order to meet the increased kWh savings goals associated with the school kit program. They are working to ensure that they only work with grades that would not have previously participated in the program.

Energy Smart Scorecard

Program Description

The Energy Smart Scorecard program is a behavioral program that provides customers with information regarding potential ways to lower their electric bills. The program launched as a residential energy savings behavioral pilot program in January 2017, to be rolled out into a larger offering in Program Year 8 (starting January 2018).

Program Highlights and Participation

Program Enrollment

Following an initial enrollment of just over 400 users, by the end of Q2 2017 the Energy Smart Scorecard program had 1,317 enrolled customer accounts. On September 21, 2017 an email with a register link went out to 110,000 email addresses and the program saw another increase of just over 400 customers. At the end of the 12 month period since the scorecard program was launched, there were 1,897 customers enrolled in the Energy Smart Scorecard database.

Below are the number of customized scorecards distributed to enrolled customers since program inception:

- April 2017: 908 scorecards distributed
- May 2017: 892 scorecards distributed
- June 2017: 888 scorecards distributed
- July 2017: 892 scorecards distributed
- August 2017: 855 scorecards distributed
- September 2017: 927 scorecards distributed
- October 2017: 1,967 scorecards distributed
- November 2017: 1,252 scorecards distributed
- December 2017: 1,236 scorecards distributed

Throughout 2017, ENO and Accelerated Innovations (AI) worked diligently toward enabling a major component of the program recruitment strategy – one-click enrollment (i.e., single sign-on) via the ENO myAccount Online (MAO) site, which was expected to be implemented around November 2017. This capability was anticipated to provide ENO customers with an easy and visible on ramp to access insights on their home energy performance via the Energy Smart scorecards and portal. Given the high level of adoption of myAccount Online (reported as 57% in 3Q2016, and representing more than 80,000 ENO customers), AI anticipated that participation in the scorecard program would jump significantly within a short timeframe of enabling the single-click registration. However, despite these efforts, single sign-on capability was not able to be attained in 2017.

In early 2017, shortly after the first program scorecards were released to ENO customers, AI was notified that its subcontractor, WeatherBug, had been acquired by a new company named Whisker Labs. As a consequence of this acquisition, the original WeatherBug Home section of the consumer app, which was initially a highly promoted enrollment channel, was disabled. The loss of this easy enrollment posed an additional challenge to achieving the targeted exposure and, thus, participation in the Energy Smart Scorecard program.

Therefore, in order to boost participation and achieve targeted savings, ENO and AI began talks to transition the behavioral program from a participant “opt-in” enrollment format to an “opt-out” enrollment format, one in which third party program evaluator ADM would provide guidance and recommendations for this format amendment. A revised Scope of Work was provided to Stakeholders for review and approval. In April 2018, the Council approved the transition of the Behavioral program to an opt-out format.

Program Events

Events

In collaboration with Energy Wise Alliance, Scorecard program literature and information has been available in-person at weekly outreach tabling events in both Entergy Customer Care Centers (Canal St. and Algiers). Pamphlets and program information is also available to pick-up during business hours (Mon-Fri 8:00 am – 5:00 pm) at the same locations. Energy Wise Alliance has promoted the Scorecard Program as a part of their offering at every event they attend, including Entergy Job Fair, Audubon Fete, and the Algiers Public Library.

Planned or Proposed Changes to Program and Budget

AI’s goal is to maximize the cost effectiveness and evaluability of the energy savings impacts, while also ensuring inclusion or exclusion of appropriate customer segments. Working with ENO and the Energy Smart program’s third-party evaluator, ADM Associates, Inc., the transition to an opt-out program model is now underway. The new approach involves the implementation of a randomized control trial (RCT) participant enrollment and energy-savings evaluation methodology.

The program identified and engages a participant (i.e., Treatment) population while also analyzing the energy use of a non-participant (i.e., Control) population targeted to be of sizes shown in the following table:

Group	PY8	PY9
Treatment	25,000	40,000
Control	10,000	17,000
Total	**35,000**	**57,000**

Given that the Energy Smart Scorecard distribution model is digital, customers with known email address contacts were identified as the most cost-effective strategy to pursue. In addition to the selection of the initial treatment group, AI is targeting higher energy use households to ensure the program is as cost effective as possible. This approach will maximize the ratepayer benefits of the program while establishing the framework upon which the program can be expanded to other lower-use groups in PY9.

COMMERCIAL & INDUSTRIAL PROGRAMS

Commercial & Industrial Program Summary

	KWH SAVINGS	KWH GOAL*	% TO SAVINGS GOAL	KW SAVINGS	KW TARGET*	% TO KW TARGET	ACTUAL INCENTIVE SPENT	INCENTIVE BUDGET	% OF BUDGET
Algiers – Small C&I	277,330	240,297	115.41%	20.79	47.92	43.39%	$31,254	$28,297	110.45%
Algiers - Large C&I	115,900	466,229	24.86%	-	68.31	0.00%	$7,100	$47,428	14.97%
Algiers – PFI	-	62,273	0.00%	-	9.49	0.00%	$0	$6,173	0.00%
N.O. – Small C&I	1,847,496	2,069,113	89.29%	244.91	401.34	61.02%	$230,536	$243,659	94.61%
N.O. - Large C&I	10,248,920	8,934,372	114.71%	1,397.86	1,279.15	109.28%	$863,507	$908,863	95.01%
N.O. – PFI	683,133	594,092	114.99%	-	101.13	0.00%	$50,563	$58,891	85.86%
TOTAL	**13,172,779**	**12,366,376**	**106.52%**	**1,663.56**	**1,907.33**	**87.22%**	**$1,182,960**	**$1,293,312**	**91.47%**

* Goals are reflective of the Supplemental and Amended Energy Smart Implementation Plan PY 7 – 9, approved 12/14/2017. Savings reflect verified savings as documented in ADM's Evaluation, Measurement and Verification (EM&V) report.

Small Commercial Solutions

Program Description

The Small Commercial Solutions offering provides small businesses and other qualified non-residential customers the opportunity to achieve electricity savings through prescriptive or custom projects. Buildings with a peak demand of under 100 kW are eligible for these incentives. The program advises participants of the available offerings through the program as well as financial incentives for eligible efficiency measures that are installed in their facilities.

Program Highlights

In PY7, there were 42 projects implemented in New Orleans and 4 projects in Algiers.

New Orleans

Project Type	Count of Projects	Total Gross Savings (kWh)	Total Incentives
Custom	2	41,075	$4,929
Lighting	32	1,864,401	$221,055
Prescriptive	8	80,469	$2,381
Total	**42**	**1,985,945**	**$230,536**

Algiers

Project Type	Count of Projects	Total Gross Savings (kWh)	Total Incentives
Lighting	4	277,664	$31,254

New Orleans:

- A total of 42 projects were implemented during the program year.
- The program reached 89.29% of the kWh goal, achieving 1,847,496 kWh.
- The program reached 61.02% of the kW target, achieving 244.91 kW.

Algiers:

- A total of 4 projects were implemented during the program year.
- The program reached 115.41% of the kWh goal, achieving 277,330 kWh.
- The program reached 49.39% of the kW target, achieving 20.79 kW.

Percentage of total project cost covered by the incentives:

Project Type	Total Incentives	Total Project Costs	% Covered
Custom	$4,929	$72,236	6.82%
Lighting	$254,480	$542,862	46.88%
Prescriptive	$2,381	$7,330	32.48%
Total	**$261,790**	**$622,428**	**42.06%**

Program Budget, Savings and Participants

Program	Cost			Energy Savings (kWh)			Demand Savings (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
Algiers Small Commercial	$28,297	$31,254	110.45%	277,664	277,330	99.88%	29.76	20.79	69.86%
N.O. Small Commercial	$243,659	$230,536	94.6%	1,985,945	1,847,496	107.49%	257.14	244.91	95.24%

Planned or Proposed Changes to Program and Budget

Several program changes and additions are planned for PY8. APTIM plans to introduce changes to the requirements for pre-approval for prescriptive measures under a specific incentive threshold. This proposed change will aim to reduce barriers to participation and streamline application processing for more routine prescriptive projects. APTIM will also be looking into program design changes and additional offerings to enhance the portfolio in PY8 and PY9.

APTIM is also going to implement a strategic marketing and outreach plan beginning in PY8. The team is segmenting out the ENO customer base by business type and total usage. From there, the program can run marketing campaigns by e-blasts, direct mailers, and other methods, as well as direct targeted outreach on the ground. These strategies will help the program not rely strictly on trade ally production and will continue to increase awareness among small commercial customers that could benefit from the available incentives.

Large Commercial & Industrial Solutions

Program Description

The primary objective of the Large Commercial and Industrial Solutions (“Large C&I”) offering is to provide a solution for non-residential customers interested in purchasing energy efficient technologies that can produce verifiable savings either through a calculated (prescriptive) or a measured and verified (custom) approach. Buildings with a peak demand of 100 kW or more are eligible for these incentives. The Large C&I offering is designed to generate significant energy savings, as well as a longer-term market penetration by developing delivery channels, such as design professionals, distributors, installation contractors, and Energy Service Companies (ESCOs).

Program Highlights

In PY7, APTIM shifted the program focus from lighting projects to custom projects to increase the percentage of non-lighting projects and to generate more, and deeper energy savings. There were 41 projects implemented in New Orleans and one project in Algiers.

New Orleans

Project Type	Count of Projects	Total Gross Savings (kWh)	Total Incentives
Custom	11	2,944,116	$289,068
Lighting	26	6,490,370	$566,117
Prescriptive	4	279,164	$8,321
Total	**41**	**9,713,650**	**$863,507**

Algiers

	Count of Projects	Total Gross Savings (kWh)	Total Incentives
Custom	1	115,900	$7,100

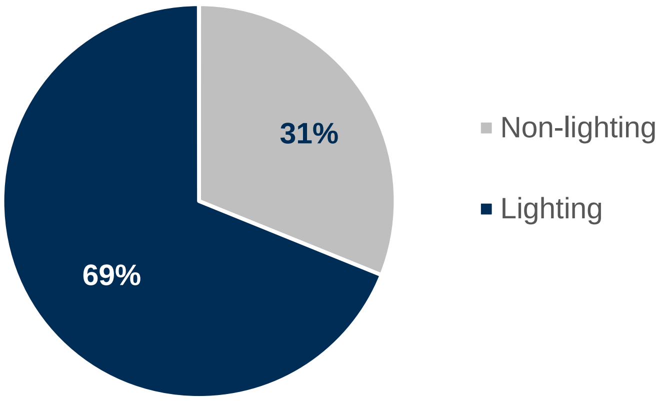
New Orleans:

- A total of 41 projects were implemented during the program year.
- The program reached 114.71% of the kWh goal, achieving 10,248,920 kWh.
- The program reached 109.28% of the kW target, achieving 1,397.86 kW.

Algiers:

- A total of 1 project was implemented during the program year.
- The program reached 24.86% of the kWh goal, achieving 115,900 kWh.
- The program did not achieve any demand savings.

Percentage of gross savings coming from lighting and non-lighting measures:



Percentage of total project cost covered by the incentives:

Project Type	Total Incentives	Total Project Costs	% Covered
Custom	$296,169	$4,376,228	6.77%
Lighting	$566,117	$2,268,642	24.95%
Prescriptive	$8,321	$12,213	68.13%
Total	**$870,607**	**$6,657,083**	**13.08%**

Program Budget, Savings and Participants

PROGRAM	COST			ENERGY SAVINGS (kWh)			DEMAND SAVINGS (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
Algiers Large C&I	$47,428	$7,100	14.97%	115,900	115,900	100.00%	-	-	0.00%
N.O. Large C&I	$908,863	$863,507	95.0%	9,713,650	10,248,920	105.51%	1,366.35	1,397.86	102.31%

Table reflects savings achievement from ADM’s Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Planned or Proposed Changes to Program and Budget

Several program changes and additions are planned for PY8. APTIM plans to introduce changes to the requirements for pre-approval for prescriptive measures below a specific incentive threshold. This proposed change aims to reduce barriers to participation and streamline application processing for more routine prescriptive projects. APTIM will also be looking into program design changes and additional offerings to enhance the portfolio in PY8 and PY9.

The program is also going to implement a strategic marketing and outreach plan. The team will segment the customer base by business type, total usage and past participation, and will run targeted marketing campaigns. Customers will be reached through email blasts, direct mailers, etc. and on the ground outreach tactics. These strategies will help the program to complement existing trade ally production and will ensure that the highest energy users who have the most potential for the energy savings opportunities are aware of the program and incentives available.

In PY8, the program plans to address barriers that trade allies face in providing detailed savings analyses for certain measures by creating evaluator-approved savings calculators for high volume measures. Creating these calculators can give customers and trade allies insight on how savings for these measures are typically calculated, expedite pre-approval review and post installation M&V and remove that barrier to participate.

Publicly Funded Institutions

Program Description

The Publicly Funded Institutions (PFI) offering was added to the C&I portfolio in PY7 in an effort to directly support the City's initiatives to increase efficiency in government buildings. The PFI program provides financial incentives and technical services to encourage publicly funded customers to implement energy saving measures. The PFI program 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 PFI program supports government building participation by carving out a budget specifically for these institutions that in previous years were unable to participate, as funds were exhausted by the time municipalities were able to plan, approve and execute energy efficiency projects.

As its name suggests, the Publicly Funded Institutions program is a public-sector Energy Smart program offering that targets local government and municipality buildings. The unique program aims to assist end-user customers in overcoming barriers that are specific to public funded organizations through hands-on expertise and consulting, program-assisted benchmarking, and the development of an Energy Master Plan that provides customers with a roadmap to decrease energy consumption. As an additional service, the Energy Smart team educates customers on the various financial vehicles available to fund the implementation of energy efficiency improvements as needed.

The Publicly Funded Institutions program is delivered in partnership with Green Coast Enterprises, LLC, one of the program's local disadvantaged business enterprise vendors. The choice to employ a DBE vendor to deliver this program demonstrates Energy Smart's commitment to the City's Office of Supplier Diversity efforts to increase opportunities for small businesses, including disadvantaged, minority and women-owned companies.

To engage public entities during roll out of this new offering, the program provided specialized trainings and workshop sessions for employees of publicly funded institutions, including City and State employees as well as building and facility managers from local schools. Session topics ranged from Energy Smart general awareness training to technical training that helped attendees to better understand and alter their energy use. See more detailed information about these events in the "Program Trainings" section of this report.

Program Highlights

Three PFI projects were implemented in PY7, within the New Orleans territory.

New Orleans

Project Type	Count of Projects	Total Gross Savings (kWh)	Total Incentives
Custom	3	814,317	$50,563

New Orleans:

- A total of three projects were implemented during the program year.
- The program reached 114.99% of the kWh goal, achieving 683,133 kWh.
- The program did not achieve any demand savings.

Percentage of total project cost covered by the incentives:

Project Type	Total Incentives	Total Project Costs	% Covered
Custom	$50,563	$57,491	87.95%
Total	**$50,563**	**$57,491**	**87.95%**

Program Budget, Savings and Participants

PROGRAM	COST			ENERGY SAVINGS (kWh)			DEMAND SAVINGS (kW)		
	Budget	Actual	%	Pre-Evaluated	Evaluated	%	Pre-Evaluated	Evaluated	%
N.O. Publicly Funded	$58,891	$50,563	85.9%	814,317	683,133	83.89%	-	-	0.00%

Table reflects savings achievement from ADM's Evaluation, Measurement and Verification (EM&V) findings relative to pre-evaluated savings reported by TPA.

Planned or Proposed Changes to Program and Budget

Several program changes and additions are planned for PY8. APTIM plans to introduce changes to the requirements for pre-approval for prescriptive measures under a specific incentive threshold. This proposed change will aim to reduce barriers to participation and streamline application processing for more routine prescriptive projects. APTIM will also be looking into program design changes and additional offerings to enhance the portfolio in PY8 and PY9.

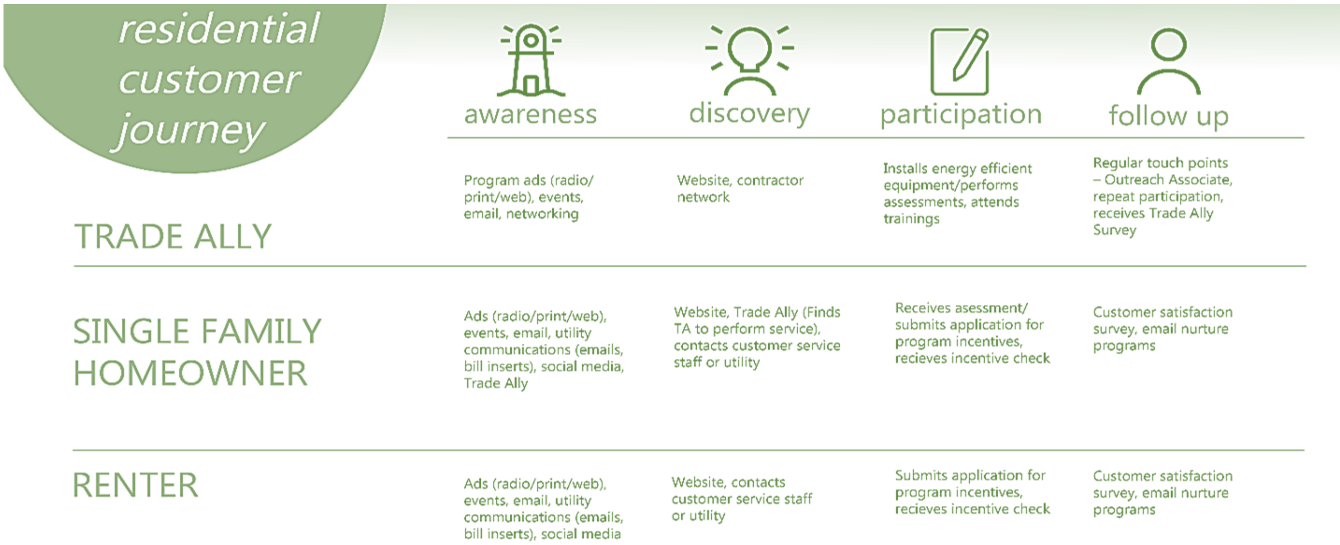
The program also continues to build relationships with local trade allies who have existing relationships with the Publicly Funded sector. Working closely with these trade allies and customers will help the program learn more about the barriers that this sector faces to participating in the program, such as funding and the chain of approvals. Given that feedback, the program is looking into potentially updating the application process for this program to better fit the needs of the customers that would be participating.

MARKETING, OUTREACH & ENGAGEMENT

Marketing and Outreach

Marketing and outreach activities in PY7 focused on the creation of new materials to reflect program changes (including materials translated into Spanish and Vietnamese), re-engaging with stakeholders throughout the city to introduce the new program administration and implementers and creating new partnerships to improve and expand Energy Smart's impact.

Residential Marketing and Outreach Highlights



residential customer journey	awareness	discovery	participation	follow up
TRADE ALLY	Program ads (radio/ print/web), events, email, networking	Website, contractor network	Installs energy efficient equipment/performs assessments, attends trainings	Regular touch points – Outreach Associate, repeat participation, receives Trade Ally Survey
SINGLE FAMILY HOMEOWNER	Ads (radio/print/web), events, email, utility communications (emails, bill inserts), social media, Trade Ally	Website, Trade Ally (Finds TA to perform service), contacts customer service staff or utility	Receives asessment/ submits application for program incentives, recieves incentive check	Customer satisfaction survey, email nurture programs
RENTER	Ads (radio/print/web), events, email, utility communications (emails, bill inserts), social media	Website, contacts customer service staff or utility	Submits application for program incentives, recieves incentive check	Customer satisfaction survey, email nurture programs

Residential marketing tactics in PY7 included bill inserts, digital banner ads and social media. Bill inserts went to 143,000 residential customers from mid-August to mid-September. Digital banner ads directing customers to sign up for the program appeared on Entergy web pages throughout the months of November and December. The program team creates social media posts on a monthly basis to be fed through the Entergy New Orleans Facebook and Twitter channels and the posts are scheduled based on event dates and other campaigns or alerts that Entergy may need to push out through those channels (i.e. if there is a storm or outages). In PY7, Energy Smart posts appeared 9 times on the ENO Facebook page and 22 times on the ENO Twitter feed.

Energy Smart participated in 90 community outreach events that targeted primarily residential audiences throughout the City, see the full list of events in the attachments section. Energy Wise Alliance (EWA) hosts an Energy Smart information table at the Entergy Customer Care Centers (on Canal St and in Algiers) two times per month, usually in the first week of the month when traffic is heaviest. Additional notable initiatives included; EWA established a partnership with the Second Harvest Food Bank's *Healthy Cities Initiative*. At these events, EWA gives customers who sign up for an Energy Smart Assessment a free LED lightbulb. The first event at the Sanchez Center in the Lower Ninth Ward was a huge success signing up 56 residents for assessments. The program also partnered with the New Orleans Office of Resilience and Sustainability for *Energy Efficiency Day* on October 5, hosting an information table with the bike generator in the lobby of City Hall throughout the day and presenting to city hall employees about the benefits of the program. The program also sponsored 4 community events; Algiers Fest (October 7

& 8, 2017, canceled due to Hurricane Nate), Senator Troy Carter's Thanksgiving Feast (November 25, 2017, Algiers), Plant for Peace (November 11, 2017, 7th Ward) and America Recycles Day at The Green Project's Grand Reopening (November 15, 2017).

Commercial Marketing and Outreach Highlights

business customer journey	awareness	discovery	participation	follow up
TRADE ALLY	Program ads (radio/print/web), events, email, networking	Website, contractor network	Installs energy efficient equipment, attends trainings	Regular touch points – Outreach Associate, repeat participation, receives Trade Ally Survey
LARGE BUSINESS OWNER	Ads (radio/print/web), events, email, utility communications	Website, Trade Ally, Account Manager Outreach	Program Staff performs program inspections, receives inspection, equipment installed/ project completed, submits application, gets check	Customer satisfaction survey, email nurture programs
SMALL BUSINESS OWNER	Community events, word of mouth, ad (radio/print/web), email	Fellow business owners, individual touch point from Outreach Associate, website	Receives program or Trade Ally phone call to schedule perfomance inspections, receives inspection, receives DI	Customer satisfaction survey, email nurture programs

Commercial marketing tactics included a direct mail piece sent out to 830 commercial accounts in Algiers, listing the program in the New Orleans Chamber of Commerce Directory (on the incentives page), email invites to 626 commercial accounts classified as "restaurant" or "hospitality" inviting them to the "Increasing Efficiency in New Orleans Restaurants and Hospitality" event, and participating in 18 events (presentation or information table) throughout the city. Commercial outreach focused on reaching small businesses through collaboration with groups such as LifeCity, the Chamber of Commerce, the City's Office of Economic Development, and the Urban League of Louisiana.

Algiers Outreach Highlights

In addition to the activities described above, the program partnered with a local consultant based in Algiers, KT Consulting, to drive further engagement in Algiers. KT Consulting connected the program with several government, neighborhood and business leaders in Algiers. This partnership augments Energy Smart's presence in Algiers and the ongoing outreach that Energy Wise and participating trade allies are performing throughout the city. The program presented to the board of the Algiers Economic Development Foundation (AEDF), which led to the program having an information table at the Wednesdays on the Point events and connections to the Algiers Neighborhood Presidents Council.

Trade Allies

The overall mission of the Energy Smart New Orleans trade ally program is to develop and increase the community's residential, commercial and industrial contractor base by providing training opportunities, market engagement opportunities and assistance completing program-related documentation and other requirements.

Throughout PY7, Energy Smart specifically worked to establish and formalize a high-quality and robust trade ally network. In order to maintain relationships with trade allies from previous years and support the onboarding of a significant number of new trade allies, program staff worked in 2017 to create and stand up the overarching goals, processes, procedures, and contractor documentation that will continue to inform the activities of the trade ally program.

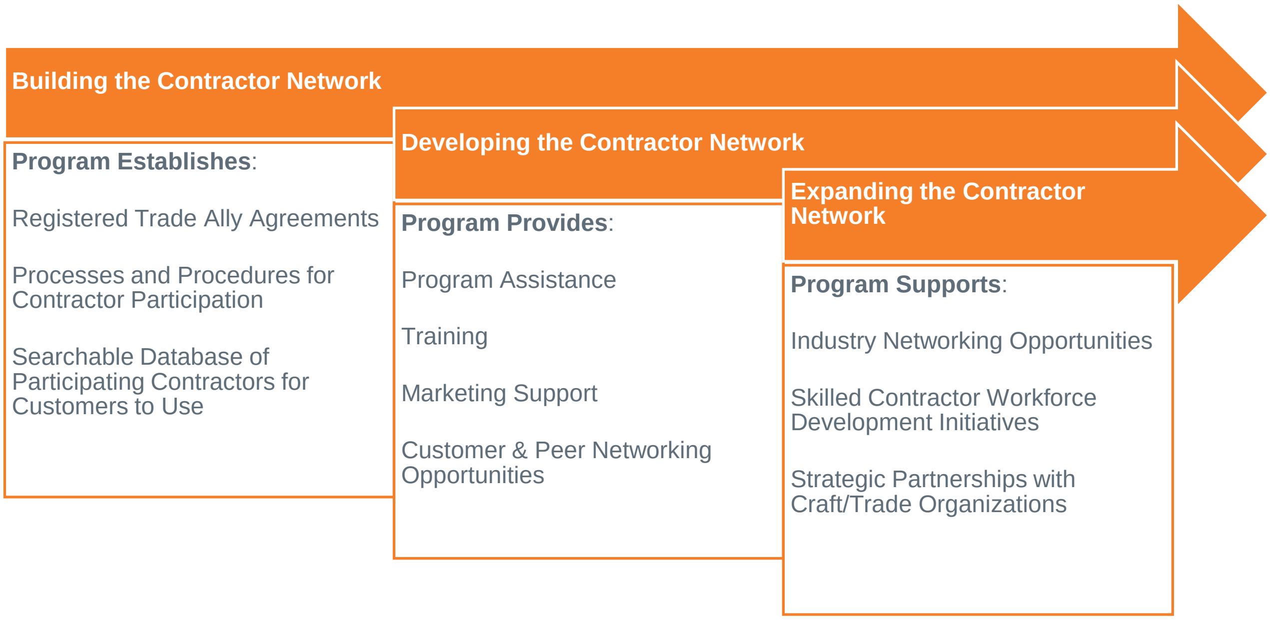
Trade Ally Documents & Processes

In 2017, program staff created the following trade ally-related documentation and processes to organize and enhance the trade ally experience.

- Registered Residential Trade Ally Agreements
- Registered Commercial & Industrial Trade Ally Agreements
    - For the first time in program history, the Registered C&I Trade Ally Agreements were made available as an electronic application on the program website for ease of access.
- Trade Ally focused program materials:
    - Energy Smart C&I Trade Ally Overview collateral
    - Energy Smart C&I Project Checklist collateral
    - Hazard Disclosure Form
    - Duct Testing Reduction Testing Job Aid
    - Combustion Safety testing and Minimum Ventilation Calculation Job Aid
    - Insulation Install Certificate Form
    - Residential Income Qualified Weatherization Work Order Form
- Trade Ally Cobranding Request and Review Process
- Electronic Meeting Request form that offers a more direct route for general program overview/introduction meetings, walk-through requests, calculator demonstrations, or other assistance.
- Trade Ally Internal Incident Tracking process

Trade Ally Network Development Plan & PY7 Highlights

The graphic below depicts the overall trade ally network development plan that was set into motion in PY7 and will continue to make progress and meet milestones over the course of this program cycle, which ends December 31, 2019. PY7 saw significant progress in activities related to "Building the Contractor Network" and "Developing the Contractor Network." In 2017, the program listed participating Residential contractors on the Energy Smart website and provided lists of approved trade allies to Commercial & Industrial to customers upon request. In PY8, Energy Smart is developing a searchable online database of participating contractors for customers that will allow them to search for product and service providers based on their project needs.



Key Components of the Trade Ally Development Plan Addressed in 2017:

- Building the Contractor Network:
    - Registered Trade Ally Agreements – to formalize, communicate and agree upon the standards of the Energy Smart program.
    - Processes and Procedures for Participation – to structure the engagement experience.

- Developing the Contractor Network:
    - Program Assistance – to encourage program participation.
    - Training – to elevate quality of work.
    - Marketing support – to assist trade allies in gaining new customers.
    - Customer and Peer Networking – to encourage projects and partnerships that address all available efficiency opportunities at a facility.

In PY7, the Energy Smart program team worked to align Commercial & Industrial and Residential trade ally processes and procedures while also remaining mindful of intrinsic differences between the Residential and Commercial programs that require the two registered trade ally networks to maintain some separation. Program representatives worked with ENO to establish terms and conditions for a Registered Commercial & Industrial Trade Ally agreement, which is a document that contractors use to apply for trade ally network participation. The C&I Trade Ally agreements were finalized in December. The Residential Trade Ally agreements were created, approved and distributed in June 2017.

Over the course of the year, program representatives provided trade allies support to complete documentation requirements and meet program quality assurance requirements, while making an intentional pivot towards a more holistic support structure that elevates the knowledge, skills and business practices of participating trade allies.

In the start of August, the residential program held a trade ally orientation which covered the overall operating process for the updated Home Performance with Energy Star programs. Participating trade allies received a Duct infiltration Reduction Testing Job Aid, as well as a Combustion Safety testing and Minimum Ventilation Calculation Job Aid, Insulation Install Certificate Form and copies of all available rebates and marketing collateral to distribute to customers in the community.

To develop knowledge and skills, the program provided technical and general awareness training related to program design changes, documentation submittal, and QA/QC processes. Contractor-specific technical training was provided to trade allies through APTIM's resource partnership with the Urban League of Louisiana (ULLA).

To help support robust business practices, the trade ally program directly connected ENO business customers with trade ally professionals who can help them select energy efficient products and services. The program provided a contractor-customer networking opportunity in September that allowed trade allies to train alongside local restaurant owners and managers to learn how to improve efficiency in Orleans Parish restaurants and connect with industry professionals that could help execute resulting projects. Additionally, Energy Smart helped trade allies connect with their customers from a marketing standpoint in 2017 by providing cobranding support that promotes the development and distribution of high quality approved advertisements that showcase a trade ally's partnership with the Energy Smart program. This type of support was particularly impactful because it increases customer interest in pursuing energy efficiency upgrades and customer confidence in the validity of program funding.

Trade Ally Advisory Group (TAAG)

In 2017, Energy Smart program established and launched a Trade Ally Advisory Group (TAAG) to solicit feedback from participating contractors and inform positive changes and enhancements to the Energy Smart Program. The first TAAG meeting was Commercial & Industrial specific and open to all contractors that completed C&I projects in 2017. The attendee mix was a concentrated reflection of the program's larger trade ally network with lighting, non-lighting, and energy consulting capabilities.

The program solicited feedback on a variety of areas including: barriers to customer participation, project pre-approval processes, program calculator tools, program and trade ally marketing efforts and training opportunities. The program made several key changes to address issues and information brought up by trade allies during the first TAAG meeting.

Measuring the Network: Contractor Interest

Interest is defined as local contractors who are in contact with the program and/or have opted into the trade ally distribution list.

CATEGORY	# OF COMPANIES
C&I Network	99
Residential Network	47
Cross-sector Network	10
Total Trade Ally Network	**156**

Measuring the Network: Contractor Engagement

Engagement is defined as contractors who have applied and been approved to become Registered Residential Trade Allies or, in lieu of an operating Registered C&I Trade Ally Network, contractors who applied for one or more C&I project in 2017. Engagement data includes the specific program offerings that each company has the ability to support and their measure level capabilities as reported on their program-approved trade ally application.

CATEGORY	# OF COMPANIES
C&I Network	30
Residential Network	12
Total Engagement	**42**

Measuring the Network: Contractor Participation

Participation is defined as trade allies who have completed and closed out projects in 2017 and the program and/or level measure details associated with the work completed.

CATEGORY	# OF COMPANIES
C&I Network	23
Residential Network	9
Total Participation	**32**

Program Training

In PY7, the Energy Smart program's training efforts significantly increased to support larger savings goals and increase visibility of the program by informing a larger number of ENO customers about the benefits of energy efficiency projects and available program incentives to help execute them. The program accomplished this by training a variety of audiences, many of whom have the platform and ability to distribute Energy Smart information to their larger networks.

In 2017, the Energy Smart program facilitated 38 hours of training in Orleans Parish. 413 individuals received training as a result of Energy Smart program implementation. Training opportunities across all audiences leveraged the engagement of Energy Smart partners, namely the Urban League of New Orleans and Green Coast Enterprise, to contribute to the creation and facilitation of quality learning opportunities.

Not included in documented training data are the individual learning opportunities facilitated by Residential field technician for participating residential trade allies. Topics included program paperwork submittal and processing, field installation quality standards and customer support.

Detailed information regarding program training provided by the Energy Smart Program in 2017 can be found in *Appendix C: Training and Education*.

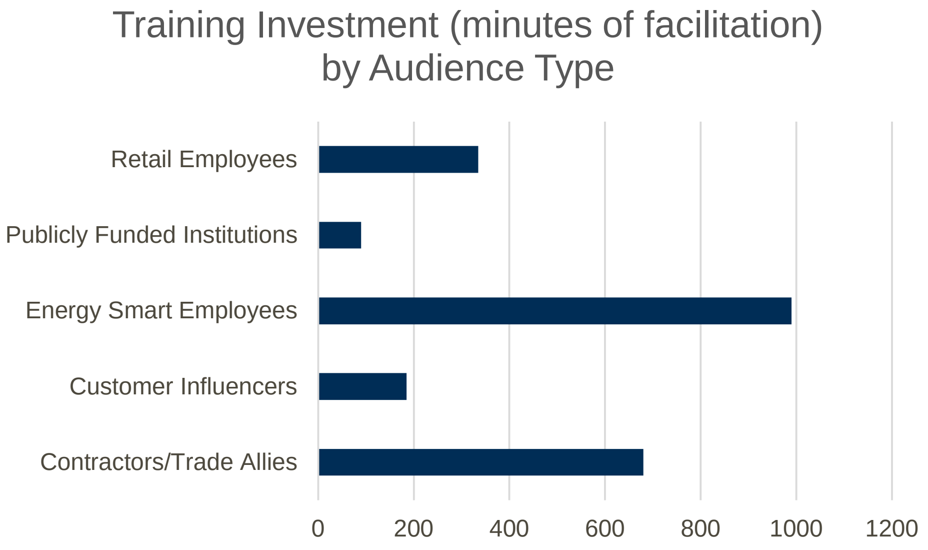
Audiences Trained

In 2017, the Energy Smart program provided training to the following groups:

- **Contractors/Trade Allies**: this group was targeted for training to increase existing technical skill levels, energy efficiency knowledge, and program literacy to generate interest with their customer base and provide customers with a better participation experience.
- **Energy Smart Employees**: this group was targeted for training to leverage existing knowledge and best practices across the multi-org efficiency team.
- **Customer Influencers**: this group was targeted for training to equip individuals who have access to and influence over ENO customers with the information that they need to train and inform their networks about energy efficiency practices and available energy efficiency incentives through the Energy Smart program.
- **Publicly Funded Institutions**: this group was targeted for training to place direct emphasis on engaging City employees, state entity staff, and local school facility managers to support the roll out of the new Publicly Funded Institutions program offering.
- **Orleans Parish Restaurant Reps**: this group was targeted for a market segmentation training to increase understanding of how energy efficiency improvement projects can benefit businesses in the small commercial restaurant industry and raise awareness about applicable Energy Smart program offerings and available incentives to help customers and contractors execute these projects.

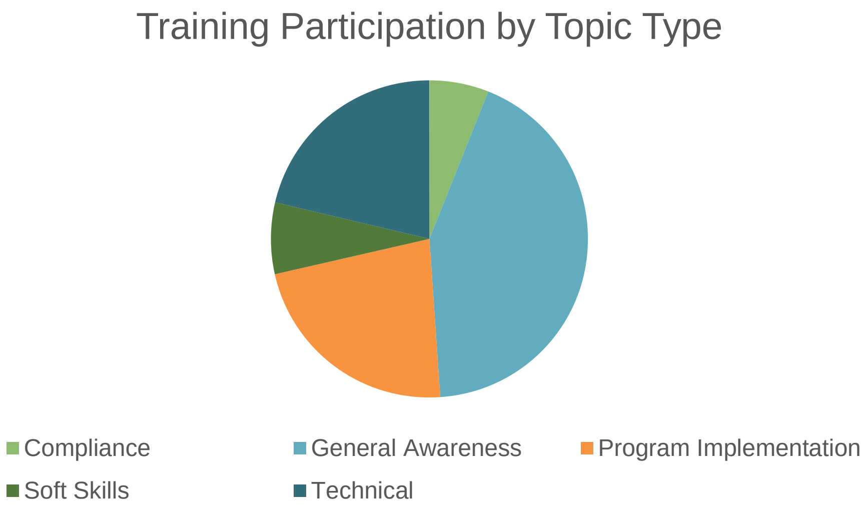
- **Retail Employees**: this group was targeted for training to orient retail managers, cashiers and other employees about energy efficient products available for purchase at their stores and available rebates to help promote and sell them to Orleans Parish homeowners.

Energy Smart program staff received the highest investment of training hours, followed by Trade Allies/Contractors and then Retail Employees. This data reflects the program's efforts to develop and train internal staff and program partners in order to support program implementation.



Training Topics/Content Categories

- **Compliance Training**: topics included confidentiality and protection of customer data.
- **General Awareness Training**: topics included Energy Smart program eligibility and participation guidelines.
- **Soft Skills Training**: topics included customer service skills, client interface best practices and communication topics.
- **Technical Training**: topics included the fundamentals of energy efficiency, intermediate energy efficiency training, demand side management topics, restaurant-specific efficiency opportunities and how to reduce energy usage.
- **Program Implementation Training**: topics included trade ally orientations, retailer orientations and training on program processes, systems and annual plans.



In 2017, Energy Smart provided General Awareness training to 177 individuals. Audiences for individual sessions included Customer Influencers (such as employees from Life City, LLC., a local organization that provides walk-through sustainability audits to businesses in Orleans Parish), Contractors and Trade Allies, Publicly Funded Institutions representatives (such as public school representatives), Retail Employees and Energy Smart employees.

Market Segmentation Training Highlight

Energy Smart, in partnership with the Urban League of Louisiana, held "Increasing Efficiency in New Orleans Restaurants," a customer market segmentation and trade ally training event in September, 2017. The Energy Smart program brought together a collaborative group of local and national resources to contribute to the multi-faceted event, including:

- The Urban League of Louisiana's Contractor Resource Center
    - Event outreach, marketing, and registration support
    - Facility use
    - Event Programming: Contractor Resource Center info session
- Dianne Sclafani, Culinary & Food Service Business Development Consultant
    - Guest Speaker, event promotion
- The Louisiana Restaurant Association
    - Event promotion
- Green Coast Enterprise
- Pel Hughes Printing
    - Event material printing

Louisiana Restaurant Association
September 12 at 2:44pm ·

Energy Smart New Orleans is hosting a training event aimed at Orleans Parish restaurateurs/managers to increase awareness about grant money available to help businesses save money on energy improvement projects.

Energy Smart New Orleans: Increasing Efficiency in NOLA Restaurants & Hospitality

Energy Smart New Orleans, in partnership with the Urban League of Louisiana, invites you to a training workshop designed to increase awareness about...

EVENTBRITE.COM

- National APTIM program support resources
- Local Energy Smart support

Training Objective: This local-focused training aims to increase understanding of how energy efficiency improvement projects can benefit local businesses in the Orleans Parish unique small commercial restaurant market. Contractors and restaurant-specific business customers have the opportunity to network and learn about common restaurant inefficiencies and their negative business impacts, discuss relevant efficiency improvement projects for Orleans Parish restaurants, and ultimately understand how to leverage available Energy Smart incentives to execute efficiency improvement projects.

Technical Emphasis: Identify qualified Energy Smart efficiency projects and measures relevant to small commercial restaurants, including: commercial kitchen equipment, lighting fixtures that maintain customer design focus and New Orleans ambiance (LED Edison bulbs, etc.), HVAC controls and upgrades, kitchen hood system ventilation systems, occupancy controls, etc.

Session Description: The session kicked off with an introduction to the Energy Smart program's background and community impact to date and then transitioned to a customer needs focus. Industry notable guest speaker, Dianne Sclafani, Culinary & Food Service Business Development Consultant understands the unique climate and challenges of Orleans Parish's restaurant and hospitality industry. She's been in the industry for over 20 years and serves an impressive list of clientele whom she helps to adapt and develop for growth. Dianne took the training stage and spoke on the current state of the Orleans Parish restaurant market, what she sees "in the field," the consequences for inefficiencies of all kinds, and a business case for restaurants to use the Energy Smart program as an opportunity wholly in their control to become more efficient and more profitable.

At Dianne's conclusion, the main session continued with program analysis of average restaurant energy use based on Energy Star market research. Energy Smart-specific projects with the potential to address common restaurant inefficiencies in the context of the unique Orleans Parish small restaurant market were identified and expected savings discussed.

Following the main session, participants attended breakout sessions best suited for their learning goals and/or interest. Restaurant representatives attended an Energy Management training session facilitated by Jackie Dadakis, COO of Green Coast Enterprise, that taught attendees about benchmarking and available Energy Smart resources for energy audits. Contractors attended an Energy Smart program QA/QC training presentation to learn about the pre and post project inspection processes and were introduced to the Urban League of Louisiana's Contractor Resource Center. All participants were invited to a calculator demonstration session led by Energy Smart engineering to become more familiar with required program documentation.

The "Increasing Efficiency in Orleans Parish Restaurants" main session slide deck can be found here.

Quality Assurance

Residential Programs Summary

Franklin Energy Services performs multiple checks for quality assurance within the residential portfolio. 100% of project applications were reviewed for accuracy before approving the incentive payment. The team provided both on-site and in-office training with approved trade allies on program requirements to ensure quality work and submissions. Customer calls were reviewed internally with the use of calibration calls to evaluate call center agents on the performance of their interactions with customers. The combined feedback has led to improvements that will be delivered to customers in PY8 and PY9. Additionally, a QA/QC technician was hired that conducted field audits at the end of 2017 and beginning of 2018, and will perform continuous audits throughout 2018 and 2019. The technician reviewed 5.89% of all field work for PY7. The program will increase the number of QA/QC inspections completed on A/C tune-ups completed in PY8.

	% OF PROJECTS INSPECTED
Home Performance	8.36%
Multi-Family	15.52%
Low Income	18.44%
High Efficiency Tune Ups	0.50%

Commercial & Industrial Program Summary

Program representatives actively worked to anticipate, identify, and resolve QA/QC issues throughout PY7. A training on the C&I Quality Assurance and Inspection Process was delivered to contractors as a breakout session during the September, 2017 “Increasing Efficiency in Orleans Parish Restaurants” training. In 2017, contractors were also trained on a one-on-one basis by pre- and post- inspection engineers when their project pre-approval package submittals were incorrect or otherwise flawed.

The program conducted QA/QC checks on 100% of Commercial & Industrial (C&I) projects in PY7. These checks include both pre-installation and post-installation desk reviews and on-site inspections. The checks during the pre-installation reviews ensure the customer/project are eligible for the program and that the estimated savings/incentives that are reserved and communicated to the customer are accurate. That accurate estimate gives the customer and contractor confidence that if the scope of work that was pre-approved is followed that they will have a good idea of the savings and incentive they will receive. The post-installation checks verify that the equipment being incentivized is installed and operational, incentives match the claimed savings and that the claimed savings are accurate and will be realized upon evaluation.

Initiatives

Market Segmentation

The Energy Smart Program chose to target the Orleans Parish restaurant and hospitality industry for additional general awareness and technical training in PY7. This industry was chosen because it represents a large portion of Orleans Parish businesses and further supported Energy Smart's Small Commercial projects and energy savings goals. Detailed information about training and marketing imposed on this group can be found in the "Program Training" section of this report.

Supplier Diversity

The Energy Smart program team was built carefully in 2017, ensuring that that the businesses chosen as implementation partners accurately reflect the community that they serve. APTIM partnered with multiple small and disadvantaged businesses to help deliver the various Energy Smart Program offerings across Orleans Parish. Choosing these partners was part of a conscious decision to create a deliberately dynamic and diverse delivery model and invest in the development of local businesses, providing them with necessary experience to thrive and grow in the energy efficiency sector.

As the third party administrator, APTIM contracted with 15 vendors to help deliver the Energy Smart programs, including: Franklin Energy, Energy Wise Alliance, KT Consulting, Urban League of Louisiana, ILSI Engineering, Green Coast Enterprises, TSG Services, Resource Innovations, PSD, Harden, AMTS, Life City, Pel Hughes, CAD Printing, Gould and Associates, Baynham Consulting (PSD, Harden, AMTS, and Franklin Energy are the four for-profit companies which are ineligible to receive a supplier diversity certification).

The nine small, minority, and/or disadvantaged businesses that worked on the Energy Smart program are meaningful contributors to the program design and delivery. Their scopes of work were developed to increase their skills and capabilities in the energy efficiency field and/or expand capacity and exposure in the New Orleans market. For example, ILSI Engineering is a local minority owned engineering firm with extensive experience in the civil and structural engineering field in the city of New Orleans, but little experience working in the energy efficiency/management field. ILSI engineers are providing calculator desk reviews and field inspection support for the Commercial & Industrial Energy Smart programs. Their partnership with Energy Smart has increased their already impressive capabilities to include energy efficiency.

TSG Services is a project management consulting firm who previously had very little involvement in the energy efficiency sector, but has ample experience working in New Orleans and the Gulf South. TSG supports Energy Smart on both residential and commercial program implementation. When asked about the benefits of partnering with Energy Smart, Michael Sullivan, CEO of TSG Services said, "This program has opened the door and afforded the opportunities for small and minority firms to get involved in energy efficiency, to grow and look at opportunities to do more." He also emphasized that under APTIM administration, Energy Smart has cultivated shared values for corporate responsibility, which has led to partners being more invested in workforce development and supplier diversity.

Workforce Development

A key component of Energy Smart's delivery model is to continuously improve and elevate trade ally skills and capabilities through training and workforce development initiatives. APTIM's main training and workforce development partner is the Urban League of Louisiana, a national organization with significant experience with workforce development and training initiatives.

The Urban League of Louisiana (ULLA) serves an integral role in the New Orleans community as an advocate, a service provider and a trusted source of information for communities of color and underserved populations on a variety of topics. As such, Urban League plays a pivotal role in engaging these communities on behalf of Energy Smart, reaching minority contractors to prepare them to provide energy efficiency services for clients and to prepare them for green industry opportunities in the region. Additionally, ULLA's Contractor Resource Center provides support and training to local contractors who may not have previous experience performing energy efficiency upgrades or who haven't worked with a utility incentive program in the past.

The majority of Energy Smart Program trainings are developed, coordinated and facilitated through the program's partnership with the Urban League of Louisiana's Contractor Resource Center, which already provides year-round training for contractors at their multiple Louisiana locations.

Non-Profit Retrofits (Energy Wise Alliance)

EWA continued their nonprofit retrofit element of community outreach with 3 retrofits at local nonprofits, The Green Project, First Unitarian Church and Church of the Annunciation. This model utilizes the nonprofit's volunteers to perform low-to-no-cost weatherization and upgrades on the nonprofit's facility while educating the volunteers about Energy Smart for their homes. The program also works to feed the nonprofit organizations into the small commercial program when they have upgrade needs that are beyond the ability of volunteers. The Green Project completed an LED upgrade with the Small Commercial Program after they participated in the nonprofit retrofit program with EWA.

Higher Education Cohort

In the last quarter of PY 7, the APTIM began coordinating the Higher Education Cohort which will officially kick off in 2018. The program began outreach and laid the ground work for the initiative that will host quarterly meetings with local higher education institution representatives to assist them with completing energy efficiency upgrades on their campuses. The cohort will bring in subject matter experts and local technical assistance to help campuses achieve deeper savings through benchmarking, retro-commissioning and non-lighting upgrades.

FINANCIAL PERFORMANCE

Incentive Budget Highlights

	ACTUAL INCENTIVE SPENT	INCENTIVE BUDGET*	% OF BUDGET*
ALGIERS – SMALL C&I	$31,254	$28,297	110.45%
ALGIERS - LARGE C&I	$7,100	$47,428	14.97%
ALGIERS – PFI	$-	$6,173	0.00%
ALGIERS - RES	$91,827	$113,633	80.81%
N.O. – SMALL C&I	$230,536	$243,659	94.61%
N.O. - LARGE C&I	$863,507	$908,863	95.01%
N.O. – PFI	$50,563	$58,891	85.86%
N.O. - RES	$1,015,211	$1,282,996	79.13%
TOTAL	**$2,289,998**	**$2,689,940**	**85.13%**

*Goals are reflective of the Supplemental and Amended Energy Smart Implementation Plan PY 7 – 9, approved 12/14/2017.

As of December 31, 2017, ENO-Legacy Energy Smart had a remaining balance of approximately $8.0 million left in the account. This funding is composed of Rough Production Cost Equalization payments as well as funding stemming from a Community Block Development Grant tax treatment. ENO-Algiers Energy Smart had approximately $35K remaining in the account.

Appendices

Appendix A: School Kits & Education Summary

SCHOOL	DATE BOOKED	NUMBER OF STUDENTS	ENROLLMENT OFFERING	COUNCIL DISTRICT	ALGIERS
St. Alphonsus School	9/27/2017	39	Voucher (Private)	B	Eastbank
Joseph A. Craig Charter School	10/6/2017	39	Public	C	Eastbank
St Mary's Academy	10/13/2017	52	Voucher (Private)	E	Eastbank
Einstein Charter Middle	10/19/2017	130	Public	E	Eastbank
Lawrence D Crocker College Prep	10/20/2017	52	Public	B	Eastbank
International School of Louisiana	10/23/2017	130	Public	C	Eastbank
Bishop McManus Academy	10/26/2017	26	Voucher (Private)	E	Eastbank
Lusher Charter School	11/9/2017	156	Public	A	Eastbank
Alice Harte Charter School	12/5/2017	91	Public	C	Westbank
Lake Forest Charter Elementary School	12/7/2017	83		E	Eastbank
Morris Jeff Community School	12/11/2017	91	Public	A	Eastbank
McDonough #32 Literacy Charter School	12/13/2017	85	Public	C	Westbank
St. Alphonsus School	9/27/2017	39	Voucher (Private)	B	Eastbank
Joseph A. Craig Charter School	10/6/2017	39	Public	C	Eastbank
St Mary's Academy	10/13/2017	52	Voucher (Private)	E	Eastbank
Einstein Charter Middle	10/19/2017	130	Public	E	Eastbank
Lawrence D Crocker College Prep	10/20/2017	52	Public	B	Eastbank
Total Kits Distributed		**1,286**			

Appendix B: Community Outreach Summary

DATE	PRESENTATION TYPE	LOCATION/ EVENT NAME	DISTRICT	ALGIERS OR COMMERCIAL	TOTAL REACH
4/3/2017	Fair or Festival	STEM night / Arise	C	Residential	60
4/8/2017	Table at Public Building	Entergy CCC - Canal	B	Residential	120
4/12/2017	Fair or Festival	Bike To Work Day/Week	B	Residential	250
4/20/2017	Fair or Festival	Job1 Green Jobs Fair	A	Residential	212
4/21/2017	Fair or Festival	Loyola Earth Day Festival	A	Residential	30
4/21/2017	Fair or Festival	Xavier University Earth Day Festival	A	Residential	150
4/22/2017	Fair or Festival	Children's Museum Earth Day	B	Residential	25
4/22/2017	Fair or Festival	LSPCA It's Hip to Microchip	D	Residential	220
4/25/2017	Fair or Festival	Botanical Gardens Earth Day Festival	A	Residential	500
4/28/2017	Fair or Festival	Ben Franklin Earth Day (Emily)	B	Residential	560
4/28/2017	Fair or Festival	Zoo To Do for Kids	A	Residential	1400
5/1/2017	Table at Public Building	Entergy CCC - Canal	B	Residential	220
5/8/2017	Table at Public Building	Sojourner Truth Neighborhood classes	D	Residential	97
5/23/2017	Neighborhood Presentation	SRSL Old Fashioned Tent Revival	D	Residential	200
5/24/2017	Fair or Festival	WATS Table	B	Residential	5000
5/24/2017	Neighborhood Presentation	SRSL Old Fashioned Tent Revival	D	Residential	200
5/31/2017	Neighborhood Presentation	Gert Town Retrofits with LA Green Corps	B	Residential	10
6/1/2017	Fair or Festival	Zoobilation	A	Residential	150
6/1/2017	Table at Public Building	Entergy CCC - Canal	B	Residential	75
6/1/2017	Table at Public Building	Entergy CCC - Westbank	C	Residential, Algiers	100
6/5/2017	Table at Public Building	Entergy CCC - Canal	B	Residential	80
6/8/2017	Table at Public Building	Eat Local Challenge Bingo night	B	Residential	25
6/17/2017	Neighborhood Presentation	Green Project Weatherization Workshop	C	Residential	10
6/29/2017	Neighborhood Presentation	Rusty Nail - Drink and Learn Fundraiser	B	Residential	100
6/30/2017	Fair or Festival	Eat Local Challenge Final Party	B	Residential	60
6/30/2017	Neighborhood Presentation	LA Green Corps Class	D	Residential	18
7/6/2017	Table at Public Building	Entergy CCC - Westbank	C	Residential, Algiers	60
7/7/2017	Table at Public Building	Entergy CCC - Westbank	C	Residential, Algiers	85

7/11/2017	Neighborhood Presentation	LA Green Corps Class	D	Residential	18
7/26/2017	Neighborhood Presentation	SOUL NOLA	B	Residential	100
7/27/2017	Presentation	NOLA business alliance retail group breakfast	C	Commercial	20
8/4/2017	Presentation	LifeCity workshop: Energy Efficiency for Businesses	C	Commercial	20
8/7/2017	Table at Public Building	NOPS Meeting - Algiers	C	Residential, Algiers	40
8/8/2017	Table at Public Building	NOPS Meeting - Treme	C	Residential	38
8/9/2017	Table at Public Building	Entergy CCC	B	Residential	60
8/12/2017	Fair or Festival	Lord of the Harvest Resource Fair	D	Residential	120
8/12/2017	Fair or Festival	NORDC - Behrman Rec Center	C	Residential, Algiers	50
8/12/2017	Fair or Festival	NORDC - Joe Brown Park	E	Residential	150
8/14/2017	Table at Public Building	NOPS Meeting - Mid-City Library	A	Residential	40
8/15/2017	Table at Public Building	NOPS Meeting - Broadmoor	B	Residential	45
8/17/2017	Table at Public Building	Second Harvest/MQVCDC	E	Residential	15
8/19/2017	Fair or Festival	NORDC - Rosenwald Rec Center	B	Residential	70
8/19/2017	Neighborhood Presentation	Jehrico Road Workshop - How to conserve water and energy	B	Residential	4
8/21/2017	Neighborhood Presentation	NORD Seniors - Sanchez Multi-Purpose Center	E	Residential	850
8/21/2017	Table at Public Building	NOPS Meeting - Gentilly	D	Residential	38
8/24/2017	Info Table	Small Business Expo at Delgado City Park	A	Commercial	30
9/1/2017	Table at Public Building	Entergy CCC - Westbank	C	Residential, Algiers	48
9/6/2017	Table at Public Building	NOPS Meeting - St. Mary of the Angels Church	E	Residential	27
9/7/2017	Table at Public Building	Healthy Cities - Delores T. Aaron Academy	E	Residential	
9/7/2017	Table at Public Building	NOPS Meeting - Andrew P. Sanchez center	E	Residential	25
9/9/2017	Fair or Festival	PRC - Great Neighborhood Sellabration	B	Residential	120
9/12/2017	Presentation	Energy Smart presentation to school representatives	B	Commercial/Publicly Funded	3
9/13/2017	Nonprofit Retrofit	Green Project Retrofit	C	Residential	12
9/16/2017	Fair or Festival	Children's Museum	B	Residential	632
9/19/2017	Event/Presentation	Energy Smart for Restaurants and Hospitality	A	Commercial/Trade allies	30
9/21/2017	Neighborhood Presentation	LA Green Corps	D	Residential	26

9/22/2017	Presentation	Senior Carnival @ Oak Villa Senior Living	C	Residential, Algiers	20
9/22/2017	Neighborhood Presentation	LA Green Corps	D	Residential	26
9/25/2017	Neighborhood Presentation	Healthy Cities - Sanchez Center	E	Residential	400
9/27/2017	Fair or Festival	Wednesday's At the Point	C	Residential, Algiers	200
9/27/2017	Table at Public Building	NOPS - New Orleans East Hospital	E	Residential	48
10/2/2017	Table at Public Building	Entergy CCC - Canal	B	Residential	250
10/3/2017	Fundraiser	Wings and Watts	B	Residential	200
10/4/2017	Fair or Festival	Wednesday's At the Point	C	Residential, Algiers	200
10/5/2017	Presentation and info table	EE Day at City Hall	C- City Wide	Residential	30
10/5/2017	Table at Public Building	City Hall - Energy Efficiency Day	C	Residential	50
10/5/2017	Table at Public Building	Entergy CCC - Canal	B	Residential	95
10/6/2017	Table at Public Building	World Park(ing) Day	B	Residential	45
10/7/2017	Sponsorship/Info table	Algiers Fest-- Canceled due to weather	C	Residential	0
10/9/2017	Fair or Festival	Healthy Cities - Warren Easton	B	Residential	75
10/11/2017	Fair or Festival	Wednesday's At the Point	C	Residential, Algiers	350
10/11/2017	Presentation	Inspire NOLA schools	C	Commercial, Algiers	3
10/14/2017	Fair or Festival	Children's Museum "Birthday" Party	B	Residential	500
10/14/2017	Fair or Festival	Entergy Bike the Big Easy	A	Residential	900
10/16/2017	Table at Public Building	NOPS - City Hall	B	Residential	355
10/17/2017	Fair or Festival	Night out against crime - Algiers	C	Residential, Algiers	50
10/17/2017	Fair or Festival	Night out against crime - NO East	E	Residential	150
10/17/2017	Presentation	Senator Troy Carter- Algiers	C	Residential, Commercial, Algiers	1
10/18/2017	Fair or Festival	Wednesday's At the Point	C	Residential, Algiers	
10/19/2017	Table at Public Building	Cry You One - Resilience Office Play	D	Residential	75
10/19/2017	Table at Public Building	Second Harvest/MQVCDC	E	Residential	50
10/20/2017	Table at Public Building	Cry You One - Resilience Office Play	D	Residential	100
10/20/2017	Presentation	AEDF Board meeting	C	Commercial, Algiers	10
10/21/2017	Fair or Festival	Out in the Community - A celebration of Service	B	Residential	100

10/21/2017	Nonprofit Retrofit	First Unitarian Church Retrofit	A	Residential	10
10/21/2017	Table at Public Building	Cry You One - Resilience Office Play	D	Residential	150
10/25/2017	Fair or Festival	Wednesday's At the Point	C	Residential, Algiers	400
10/26/2017	Presentation	Sustainability Workshop for Businesses, Broadmoor	B	Commercial and Residential	30
10/31/2017	Fair or Festival	One Shell Square Health Fair	B	Residential	85
10/31/2017	Fair or Festival	Trunk or Treat	C	Residential, Algiers	0
11/1/2017	Info Table	Office of Economic Development Business Information Session- Gentilly	D	Commercial	15
11/1/2017	Table at Public Building	Entergy CCC - Westbank	C	Residential, Algiers	50
11/2/2017	Presentation	Sustainability Workshop for Businesses- Downtown	C	Commercial	20
11/3/2017	Table at Public Building	Entergy CCC - Westbank	C	Residential, Algiers	110
11/8/2017	Info Table	Office of Economic Development Business Information Session- Lower 9	E	Commercial	10
11/15/2017	Table at Public Building	Green Project Grand Reopening Day/Recycling Fair	C	Residential	85
11/17/2017	Presentation	Urban League Veterans Breakfast	A	Small Commercial/Trade Allies	15
11/18/2017	Fair or Festival	Senator Troy Carter's Fabulous Turkey Dinner	C	Residential, Algiers	550
11/30/2017	Table at Public Building	Community Wide Garage Sale	C	Residential, Algiers	18
12/1/2017	Table at Public Building	Entergy CCC - Canal	B	Residential	250
12/2/2017	Info Table	Neighborhood summit- UMC	C- City Wide	Residential & Commercial	50
12/4/2017	Table at Public Building	Entergy CCC - Canal	B	Residential	250
12/6/2017	Neighborhood Presentation	Jericho Road post purchase workshop	B	Residential	5
12/12/2017	Presentation	City park lunch and learn	A	Residential & Commercial	25
	Total	**104 Events**		**Reach**	**19,059**

Appendix C: Training and Education

DATE	TITLE	EVENT TYPE	AUDIENCE	TOPIC TYPE	# OF ATTENDEES /LENGTH (MIN)	OBJECTIVE
3/28/2017	Confidentiality Training	Internal	Energy Smart Employees	Compliance	19/60	Develop a baseline knowledge of confidentiality for program implementation including: general considerations, company standards, and Entergy contractual standards. Required training to satisfy ENO initial training and annual reoccurrence training requirement for all program employees.
3/28/2017	Energy Efficiency 101	Internal	Energy Smart Employees	Technical	12/120	Establish proficient baseline knowledge of energy efficiency basics and common technologies.
3/29/2017	Energy Efficiency 201	Internal	Energy Smart Employees	Technical	9/120	Intermediate level training on efficiency technologies.
3/30/2017	Marketing Overview & Approach Training	Internal	Energy Smart Employees	Program Implementation	9/75	Introductory program marketing training that covers: program marketing objectives and goals, strategies and tactics, key marketing communications channels, marketing messaging, and measuring success.
3/30/2017	Client Interface Training	Internal	Energy Smart Employees	Soft Skills	10/75	Establish an understanding of appropriate handling of external affairs, including the customers/public, the client, the trade allies, etc.
3/30/2017	Customer Service Training	Internal	Energy Smart Employees	Soft Skills	11/60	Develop and increase Customer Service skills including program specific answering of phones, calendars and availability, and response time.
4/27/2017	Confidentiality Training	Internal	Energy Smart Employees	Compliance	5/60	Energy Wise employees who missed orientation training. Develop a baseline knowledge of confidentiality for program implementation including: general considerations, CB&I company standards, and Entergy contractual standards. Required training to satisfy ENO initial training and annual reoccurrence training requirement for all program employees.
6/20/2017	Entergy CSR Training	Internal	Customer Influencers	General Awareness	Information Unavailable/60	Introduce and explain the Energy Smart program offerings and provide guidance on appropriate answers to common customer call in questions to Entergy Louisiana and Entergy New Orleans Customer Care Center representatives.

6/28/2017	Program Champion Training	External	Customer Influencers	General Awareness	2/60	Equip individuals (Life City Energy Assessors) who have access to and influence over C&I customers with the info they need to share program information in a credible way.
6/28/2017	Trade Ally Project Transition Workshop	External	Contractors / Trade Allies	Technical	4/60	Train C&I contractor team (PEMBA) on the process of transitioning a project that was previously approved by previous implementer and starting the work under the new program administration.
7/7/2017	Energy Smart Team Communications	Internal	Energy Smart Employees	Soft Skills	9/60	Introduce program communication standards and best practices. Includes a web demo of google for business accounts.
7/27/2017	Intro to Demand Side Management and the Energy Smart Program	External	Customer Influencers	Technical	17/50	Establish a baseline understanding of Demand Side Management and reintroduce the Energy Smart Program (C&I and residential) for the Women in Energy Network.
8/4/2017	Introduction to Energy Smart	External	Customer Influencers	General Awareness	25/15	Present about ES Commercial programs to LifeCity and NO Chamber members. Program promotion/overview
8/16/2017	Confidentiality Training	Internal	Energy Smart Employees	Compliance	1/60	Develop a baseline knowledge of confidentiality for program implementation including: general considerations, company standards, and Entergy contractual standards. Required training to satisfy ENO initial training and annual reoccurrence training requirement for all program employees.
8/17/2017	Residential Trade Ally Orientation	External	Contractors / Trade Allies	Program Implementation	17/120	Kick off the residential program and orient interested trade allies by informing them about how to participate as a registered Residential Trade Ally that performs work with the program
8/23/2017	Updated Energy Smart Program Overview and Highlights	Internal	Energy Smart Employees	Program Implementation	24/120	Updated program orientation for new team members and partners, project highlights, and results to date.
8/24/2017	Trade Ally Program Participation Workshop	External	Contractors / Trade Allies	General Awareness	10/60	Train engineering/distribution/contractor team (Moses Engineering, LEA-Inc, Acuity Brands, and Marvin Electric Response) how to leverage the Energy Smart program for their large commercial customers.
9/12/2017	Introduction to Energy Smart	External	Publicly Funded Institutions	General Awareness	3/30	Present about ES Commercial programs to School Facility managers. Program promotion/overview

9/13/2017	Residential Suite of Programs: Implementer's Perspective	Internal	Energy Smart Employees	Program Implementation	4/30	Familiarize commercial program implementers with the dynamics of the residential portfolio
9/19/2017	Increasing Efficiency in Orleans Parish Restaurants	External	Contractors / Trade Allies	Technical	30/210	Increase understanding of how energy efficiency improvement projects can benefit businesses in the small commercial restaurant industry and raise awareness about applicable Energy Smart program offerings and available incentives to help customers and contractors execute these projects. C&I trade allies and restaurant representatives network and learn alongside each other.
9/29/2017	Detailed program training	Internal	Energy Smart Employees	General Awareness	2/90	Train KT Consulting outreach staff on all ES programs (residential and commercial). Train staff on protocols including brand standards, approval processes, and reporting. Set goals and deliverables.
10/5/2017	Introduction to Energy Smart	External	Publicly Funded Institutions	General Awareness	50/30	Present about ES general programs to City employees. Program promotion/overview as part of the City's Energy Efficiency Day. Energy Smart portion was roughly 1/4 of presentation.
10/12/2017	Energy Smart Retail Training	Training+ E25 Ti	Retail Employees	General Awareness	5/120	Home Depot employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
11/7/2017	Retail training	External	Retail Employees	General Awareness	1/10	Dollar Tree employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
11/7/2017	Retail training	External	Retail Employees	General Awareness	3/10	Dollar Tree employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present

11/7/2017	Retail training	External	Retail Employees	General Awareness	1/10	Dollar Tree employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
11/8/2017	Retail training	External	Retail Employees	General Awareness	4/10	Dollar Tree employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
11/8/2017	Retail training	External	Retail Employees	General Awareness	2/10	Dollar Tree employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
11/8/2017	Retail training	External	Retail Employees	General Awareness	4/10	Costco employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
11/13/2017	Retail training	External	Retail Employees	General Awareness	7/10	Home Depot employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
11/17/2017	Introduction to Energy Smart	External	Contractors / Trade Allies	General Awareness	15/20	Train Veteran business owners (C&I customers and trade allies) on the benefits of Energy Smart and how to participate.
12/1/2017	Opportunities Outlook: Energy Smart	External	Contractors / Trade Allies	General Awareness	40/30	Present Energy Smart as a way for local contractors (especially contractors holding supplier diversity certs) to grow their businesses as part of Urban League's Opportunities Outlook event. Residential & Commercial focus.
12/4/2017	Trade Ally Plan	Internal	Energy Smart Employees	Program Implementation	9/60	Establish baseline understanding of the C&I Registered trade ally plan roll out and learn about Energy Smart Supplier Diversity initiatives
12/6/2017	TAAG Update	External	Contractors / Trade Allies	Program Implementation	6/120	Highlight 2017 C&I program successes, 2018 direction, and facilitate a C&I trade ally feedback focus group

12/8/2017	Program Participation Workshop	External	Contractors / Trade Allies	General Awareness	3/60	Train engineering/distribution/contractor team (at WESCO) on how to leverage the Energy Smart program for their large commercial customers.
12/12/2017	Introduction to Energy Smart	External	Publicly Funded Institutions	Technical	16/30	Engage City Park staff in better understanding of energy usage in the park and how their team can all be a part of reducing that energy usage
12/18/2017	Retail training	External	Retail Employees	Program Implementation	3/10	Home Depot employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/18/2017	Retail training	External	Retail Employees	Program Implementation	2/10	Dollar Tree Employees: Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/19/2017	Retail training	External	Retail Employees	Program Implementation	1/10	Dollar Tree Employees: Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/19/2017	Retail training	External	Retail Employees	Program Implementation	2/10	Dollar Tree Employees: Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/19/2017	Retail training	External	Retail Employees	Program Implementation	3/15	Dollar Tree Employees: Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/19/2017	Retail training	External	Retail Employees	Program Implementation	1/10	Dollar Tree Employees: Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present

12/19/2017	Retail training	External	Retail Employees	Program Implementation	4/20	Costco employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/19/2017	Retail training	External	Retail Employees	Program Implementation	2/10	Home Depot employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/20/2017	Retail training	External	Retail Employees	Program Implementation	2/15	Walmart employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/20/2017	Retail training	External	Retail Employees	Program Implementation	1/10	Walmart employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/20/2017	Retail training	External	Retail Employees	Program Implementation	2/10	Walmart employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
12/20/2017	Retail training	External	Retail Employees	Program Implementation	1/15	Walmart employees. Train the trainer style walk through of Energy Smart and ES retail program offerings including available rebates for sales with retail managers, cashiers, other applicable employees and interested customers who are present
	2017 Training Totals					**338 Individuals Trained**

Appendix D: Marketing Collateral & Photography

Ready to stay cool with Energy Smart?

Find a participating contractor at **energysmartnola.com** or call **504-229-6868** for more information.

Entergy.

Energy Smart is a comprehensive energy efficiency program developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.

Stay cool and save with an **A/C Tune-up.**

Energy Smart A/C Tune-up Program

EnergySmart
A New Orleans Program

SAVE MONEY AND ENERGY

When you sign up for an Energy Smart A/C Tune-up, you can improve the cooling output and efficiency of your air conditioning system by up to 30 percent.

WHO'S ELIGIBLE?

All Entergy New Orleans residential customers are eligible for an Energy Smart A/C Tune-up through the Energy Smart program.

A/C TUNE-UP BENEFITS

Our state-of-the-art diagnostic tools and procedures result in cooler air inside your home, increased air conditioner performance and lower energy bills.

HOW DOES IT WORK?

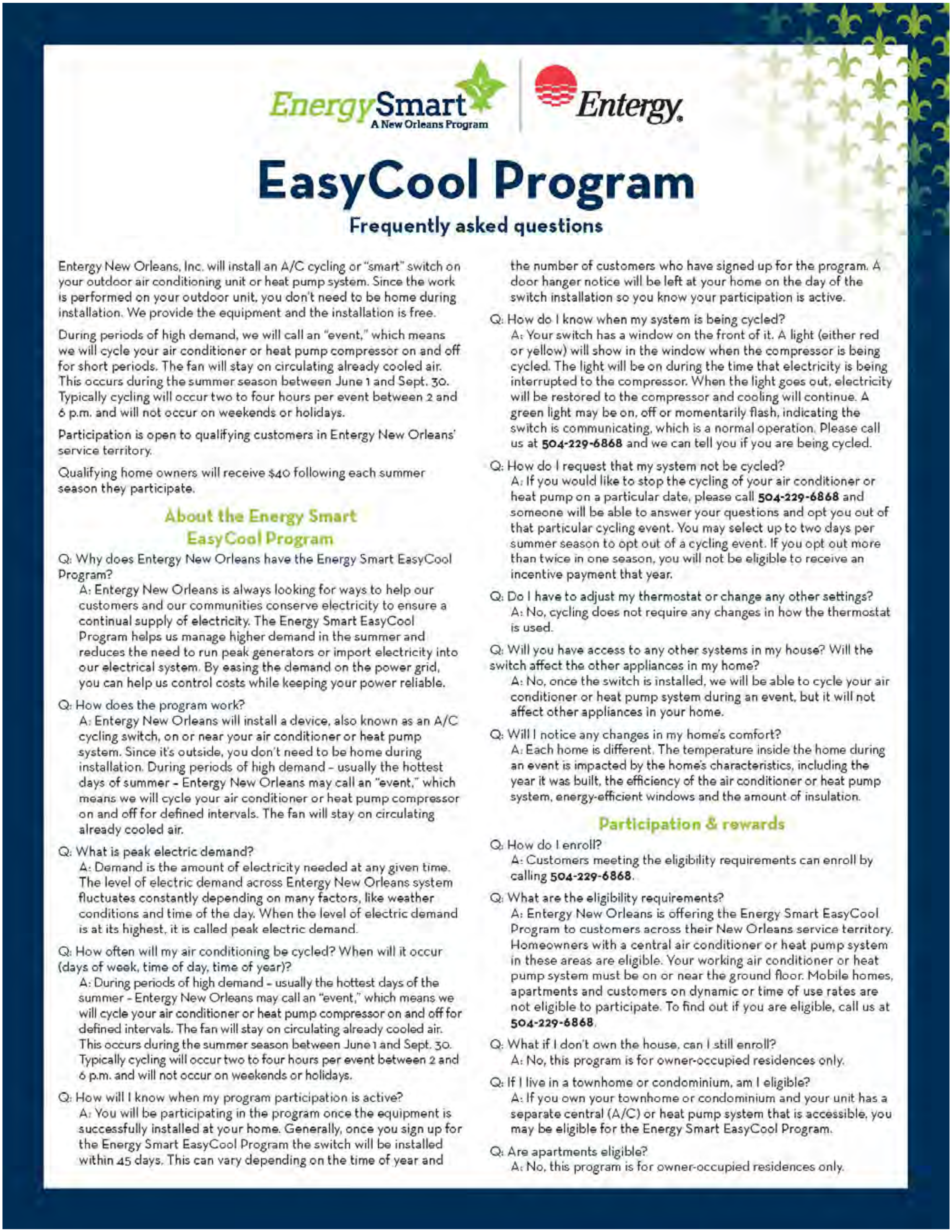
A program qualified technician will inspect your A/C unit to determine which improvements your system needs for better performance, including:

- Measure indoor airflow at filter grill and correct if needed.
- Clean or replace filter.
- Clean outdoor condenser coils.
- Inspect and clean indoor coil and blower.
- Adjust refrigerant charge to manufacturer's specifications using digital refrigerant analyzer.
- Test air conditioner to verify how much cooling you're actually getting.

Apply up to a $150 discount from Energy Smart to your contractor's invoice.

COMPARISON OF TRADITIONAL AND ENERGY SMART TUNE-UPS

Measuring Air Temperature		Measuring Return Airflow		Measuring Refrigerant Charge	
Traditional Tune-up	Energy Smart Tune-up	Traditional Tune-up	Energy Smart Tune-up	Traditional Tune-up	Energy Smart Tune-up



EasyCool Program

Frequently asked questions

Entergy New Orleans, Inc. will install an A/C cycling or "smart" switch on your outdoor air conditioning unit or heat pump system. Since the work is performed on your outdoor unit, you don't need to be home during installation. We provide the equipment and the installation is free.

During periods of high demand, we will call an "event," which means we will cycle your air conditioner or heat pump compressor on and off for short periods. The fan will stay on circulating already cooled air. This occurs during the summer season between June 1 and Sept. 30. Typically cycling will occur two to four hours per event between 2 and 6 p.m. and will not occur on weekends or holidays.

Participation is open to qualifying customers in Entergy New Orleans' service territory.

Qualifying home owners will receive $40 following each summer season they participate.

About the Energy Smart EasyCool Program

Q: Why does Entergy New Orleans have the Energy Smart EasyCool Program?

A: Entergy New Orleans is always looking for ways to help our customers and our communities conserve electricity to ensure a continual supply of electricity. The Energy Smart EasyCool Program helps us manage higher demand in the summer and reduces the need to run peak generators or import electricity into our electrical system. By easing the demand on the power grid, you can help us control costs while keeping your power reliable.

Q: How does the program work?

A: Entergy New Orleans will install a device, also known as an A/C cycling switch, on or near your air conditioner or heat pump system. Since it's outside, you don't need to be home during installation. During periods of high demand – usually the hottest days of summer – Entergy New Orleans may call an "event," which means we will cycle your air conditioner or heat pump compressor on and off for defined intervals. The fan will stay on circulating already cooled air.

Q: What is peak electric demand?

A: Demand is the amount of electricity needed at any given time. The level of electric demand across Entergy New Orleans system fluctuates constantly depending on many factors, like weather conditions and time of the day. When the level of electric demand is at its highest, it is called peak electric demand.

Q: How often will my air conditioning be cycled? When will it occur (days of week, time of day, time of year)?

A: During periods of high demand – usually the hottest days of the summer – Entergy New Orleans may call an "event," which means we will cycle your air conditioner or heat pump compressor on and off for defined intervals. The fan will stay on circulating already cooled air. This occurs during the summer season between June 1 and Sept. 30. Typically cycling will occur two to four hours per event between 2 and 6 p.m. and will not occur on weekends or holidays.

Q: How will I know when my program participation is active?

A: You will be participating in the program once the equipment is successfully installed at your home. Generally, once you sign up for the Energy Smart EasyCool Program the switch will be installed within 45 days. This can vary depending on the time of year and the number of customers who have signed up for the program. A door hanger notice will be left at your home on the day of the switch installation so you know your participation is active.

Q: How do I know when my system is being cycled?

A: Your switch has a window on the front of it. A light (either red or yellow) will show in the window when the compressor is being cycled. The light will be on during the time that electricity is being interrupted to the compressor. When the light goes out, electricity will be restored to the compressor and cooling will continue. A green light may be on, off or momentarily flash, indicating the switch is communicating, which is a normal operation. Please call us at **504-229-6868** and we can tell you if you are being cycled.

Q: How do I request that my system not be cycled?

A: If you would like to stop the cycling of your air conditioner or heat pump on a particular date, please call **504-229-6868** and someone will be able to answer your questions and opt you out of that particular cycling event. You may select up to two days per summer season to opt out of a cycling event. If you opt out more than twice in one season, you will not be eligible to receive an incentive payment that year.

Q: Do I have to adjust my thermostat or change any other settings?

A: No, cycling does not require any changes in how the thermostat is used.

Q: Will you have access to any other systems in my house? Will the switch affect the other appliances in my home?

A: No, once the switch is installed, we will be able to cycle your air conditioner or heat pump system during an event, but it will not affect other appliances in your home.

Q: Will I notice any changes in my home's comfort?

A: Each home is different. The temperature inside the home during an event is impacted by the home's characteristics, including the year it was built, the efficiency of the air conditioner or heat pump system, energy-efficient windows and the amount of insulation.

Participation & rewards

Q: How do I enroll?

A: Customers meeting the eligibility requirements can enroll by calling **504-229-6868**.

Q: What are the eligibility requirements?

A: Entergy New Orleans is offering the Energy Smart EasyCool Program to customers across their New Orleans service territory. Homeowners with a central air conditioner or heat pump system in these areas are eligible. Your working air conditioner or heat pump system must be on or near the ground floor. Mobile homes, apartments and customers on dynamic or time of use rates are not eligible to participate. To find out if you are eligible, call us at **504-229-6868**.

Q: What if I don't own the house, can I still enroll?

A: No, this program is for owner-occupied residences only.

Q: If I live in a townhome or condominium, am I eligible?

A: If you own your townhome or condominium and your unit has a separate central (A/C) or heat pump system that is accessible, you may be eligible for the Energy Smart EasyCool Program.

Q: Are apartments eligible?

A: No, this program is for owner-occupied residences only.

Q: I have a room air conditioner, can I participate in the smart cooling rewards program?
A: No, the technology only works on central air conditioning or heat pump systems.

Q: What if I have more than one central air conditioning or heat pump unit?
A: All accessible air conditioning or heat pump systems at your home are eligible and will have a switch installed to cycle it during called events.

Q: Do I have to sign up again next year?
A: No, you are automatically enrolled every year. If you would like to make changes in your participation please call us at **504-229-6868**.

Q: Will it cost me anything to participate?
A: No, we provide the equipment and the installation is free.

Q: What do I get for participating?
A: We will thank you by crediting your bill $40 at the end of each year you participate.

Q: If I have two air conditioner or heat pump units do I receive two incentives?
A: No, the $40 is per residence, regardless of the number of air conditioner or heat pump systems. All of the air conditioner or heat pump systems at your home will be cycled during an event.

Q: When will I receive the $40?
A: Every year on Sept. 30, we will verify that you are currently participating in the program and you did not override more than two cycling events during that program season. We will credit your bill $40 at the end of each year for the preceding summer season's participation.

Q: How much money could the smart cooling rewards program potentially save me on my bill?
A: You may not see savings on your bill, but keep in mind your air conditioner or heat pump system is running less during the cycling event. Your ability to save money on your bill will be impacted by how much you run your air conditioner during other times of the day.

The Energy Smart EasyCool Program will help manage higher demand and reduce the need to run peak generators or import electricity into our electrical system.

Q: Do I have to participate in the EasyCool program?
A: No, the program is completely voluntary.

Q: If I am unhappy with the EasyCool program, can I stop participating?
A: Yes, if you are not satisfied for any reason, please call **504-229-6868** to speak to a representative.

Q: Can I really make a difference by participating?
A: Yes, by participating, you will help Entergy New Orleans reduce the demand on the electrical system during peak usage periods. By doing your part, you are making a significant contribution to conserving electricity and improving our environment.

Additional information

Q: Do I have to be home when the device is installed?
A: In most cases, you do not have to be present for the device to be installed. During the enrollment process, we will capture information to ensure the technicians have the appropriate access for the installation. If there is a locked gate or animals, we will set up an appointment for the installation.

Q: Who will be installing the switch? What do they do when they come to my house and what are their credentials?
A: The installation will be done by qualified installers working on behalf of Entergy New Orleans They will be wearing a uniform and have an Entergy New Orleans badge with their picture. Upon arriving at your home, they will knock on the door to ensure you are aware that they are at your home. If no one answers the door, the technician will leave a door hanger notice on your front door when the installation is complete. The technicians are well-trained and properly insured.

Q: Exactly how does my switch cut power off to my air conditioner or heat pump compressor?
A: The switch is connected to the low voltage wiring (24 volts) that goes from your thermostat to your air conditioner or heat pump compressor. The switch turns off the compressor just as if you had manually adjusted your thermostat setting to a high enough temperature to turn your air conditioner or heat pump off for a period of time.

Q: Will the on and off caused by the cycling damage my air conditioner or heat pump system?
A: Your air conditioner naturally cycles on and off as needed to maintain a set temperature in your home as determined by the setting on your thermostat. When your air conditioner or heat pump compressor is cycled, the compressor may cycle off for longer periods of time, but it will continue to operate without harming the system.

Q: If my switch fails or is damaged, will it prevent my cooling or heating system from working?
A: The switch installed at your home is extremely reliable. The equipment has been used in similar programs across the country for over 20 years. It is designed to allow your cooling or heating system to continue working in the unlikely event of a failure. If you believe the switch on your home is operating improperly, please give us a call at **504-229-6868**.

Q: Are there any problems associated with this switch and having a programmable thermostat?
A: The switch will not impact any operations you have with setting either a standard thermostat or a programmable thermostat.

Q: If my air conditioner or heat pump is off during the event, will it be turned on so it can cycle?
A: No, the cycling only occurs on air conditioners or heat pumps that are on during the event.

Q: What do the lights indicate on the switch?
A: Your switch has a window on the front of it. A light (either red or yellow) will show in the window when the compressor is being cycled. The light will be on during the time that electricity is being interrupted to the compressor. When the light goes out, electricity will be restored to the compressor and cooling will continue. A green light may be on, off or momentarily flash, indicating that the switch is communicating, which is a normal operation.

Q: What if my heating and air conditioning company's service technician recommends that I have my switch disconnected or removed?
A: Please have your service technician call us at **504-229-6868** before they proceed with disconnection or removal. We have worked with the equipment manufacturers. The switch will not harm your air conditioner or heat pump.

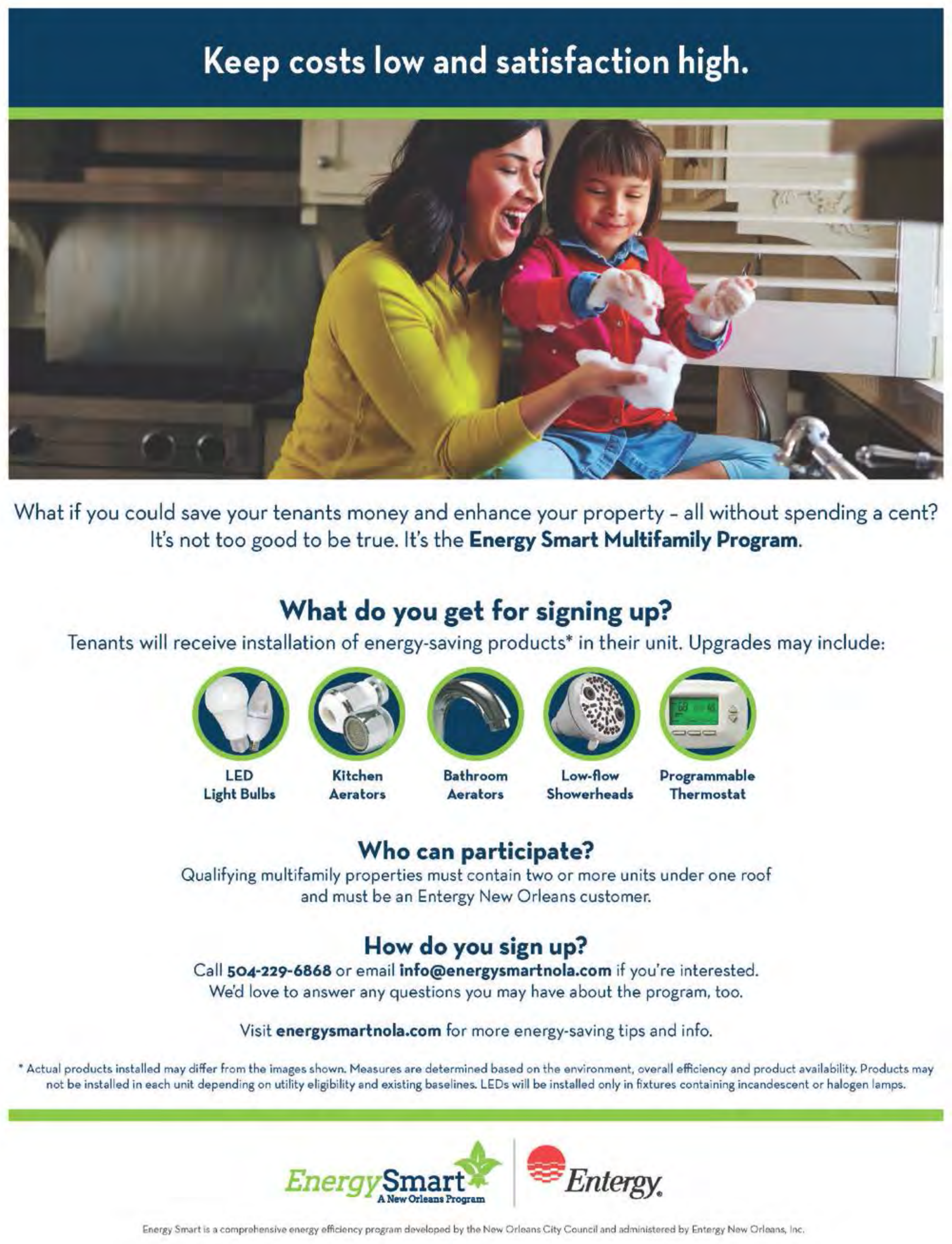
Q: What do I do when I need to replace my air conditioner or heat pump system?
A: Call us toll-free at **504-229-6868** to let us know. We will arrange to have your switch installed on your new air conditioner or heat pump at no additional cost.

Q: I'm moving, what do I do?
A: We will automatically deactivate your switch when you notify Entergy New Orleans of your move and discontinue your electric service at your home. We will offer the new owners the opportunity to participate in the Energy Smart EasyCool Program. Once you move into your new home, please call us toll-free at **504-229-6868**. We will verify your eligibility and arrange to enroll your new home in the program.

Q: I'm going on vacation, is there anything special I should do?
A: No, however we recommend you adjust your thermostat accordingly since no one will be home.

Q: What if I still have more questions?
A: Please call **504-229-6868** to speak to a representative.

Energy Smart is a comprehensive energy efficiency program developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.



Keep costs low and satisfaction high.

What if you could save your tenants money and enhance your property – all without spending a cent? It's not too good to be true. It's the **Energy Smart Multifamily Program.**

What do you get for signing up?

Tenants will receive installation of energy-saving products* in their unit. Upgrades may include:

Who can participate?

Qualifying multifamily properties must contain two or more units under one roof and must be an Entergy New Orleans customer.

How do you sign up?

Call **504-229-6868** or email **info@energysmartnola.com** if you're interested. We'd love to answer any questions you may have about the program, too.

Visit **energysmartnola.com** for more energy-saving tips and info.

* Actual products installed may differ from the images shown. Measures are determined based on the environment, overall efficiency and product availability. Products may not be installed in each unit depending on utility eligibility and existing baselines. LEDs will be installed only in fixtures containing incandescent or halogen lamps.

EnergySmart A New Orleans Program | Entergy.

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Ready to get Energy Smart?

Visit **energysmartnola.com**
Call **504-229-6868**
Email **info@energysmartnola.com**

Energy Smart is a comprehensive energy efficiency program developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.

Home improvements seal up **savings and comfort.**

Energy Smart Home Performance with ENERGY STAR® Program

HOME IMPROVEMENTS MADE EASY

Upgrade your home comfort and lower your utility bills with Energy Smart's Home Performance with ENERGY STAR® Program, a comprehensive, whole-house approach to improving energy efficiency.

The Home Performance with ENERGY STAR Program reduces the up-front cost of installing energy-efficiency upgrades in your home. Depending on the improvements you choose, you could save up to 20 percent or more on your annual utility bill. A free home energy assessment can show you how to improve your home in the following ways:

Fewer drafts and air leaks

Better ventilation and humidity control

Consistent temperatures across rooms

Lower utility bills

Homeowners who participate in the Home Performance with ENERGY STAR Program live in cooler homes in the summer and warmer homes in the winter, and pay less on utility bills.

Rather than focusing on a single problem – like an old heater or cooling system, insufficient attic insulation or leaky windows – the Home Performance with ENERGY STAR Program helps you improve your home's whole system. Our trained local contractors work with you to achieve your savings and comfort goals.

WHERE DO I START?

Residential Entergy customers in Orleans Parish who live in existing single-family homes (up to a four-plex structure) are eligible to receive Energy Smart rebates for installing energy-efficiency improvements.

Step 1. Schedule a free home energy assessment. Call 504-229-6868 or visit energysmartnola.com.

Step 2. An Energy Smart certified energy advisor will conduct a thorough home energy assessment and analyze your home's energy efficiency needs. The assessment will take one to two hours and will include complimentary installation of several energy-efficient products such as:
- Energy-efficient light bulbs.
- Smart power strip.
- Low-flow showerheads and faucet aerators.
- Other products to help seal your home and make it more efficient.

Step 3. Review your home energy assessment report and select an Energy Smart contractor to offer proposals on recommended energy-efficiency improvements for your home.

Step 4. Receive Energy Smart rebates for selected improvements, which will be shown as an instant discount on your contractor's invoice.

MEASURE	REBATE AMOUNT
Attic Insulation	Up to $.40 per sq. ft.
Air Infiltration Sealing	Average $250 per home for 650 CFM50 reduction
Duct Sealing	Average $400 per home for 200 CFM25 reduction for electric heated home and average $200 per home for 200 CFM25 reduction for gas heated home

Step 5. Enjoy energy-efficiency savings and better comfort in your home.

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How does $400 in free energy-saving products sound?

FIND OUT IF YOU QUALIFY TODAY.
Call 504-229-6868 or visit energysmartnola.com.

Receive up to $400 in FREE energy-saving products.

Eligible households can join our Energy Smart Income-Qualified Weatherization Program and receive up to $400 in **FREE** energy-saving products. Energy Smart approved contractors visit your home and make weatherization improvements that can help you save money and energy.

These weatherization improvements include:

- **Attic insulation.**
- **Air sealing.**
- **Duct sealing.**
- **A/C Tune-up.**

FIND OUT IF YOU QUALIFY TODAY.
Call **504-229-6868** or visit **energysmartnola.com.**

Eligibility is based on Entergy account type and income. Income eligibility does not guarantee participation in the Income-Qualified Weatherization Program. Availability may be limited and on a first-come, first-served basis. Energy Smart is a comprehensive energy efficiency program developed by the New Orleans City Council and administered by Entergy New Orleans, LLC. ©2017 Entergy New Orleans, Inc. All Rights Reserved.

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here

Give Expert Advice on ENERGY STAR®

Make energy savings and rebates count towards their purchase.

WHY PROMOTE ENERGY STAR?

It's truly the smart choice. ENERGY STAR means higher quality, better performance and more energy savings. By promoting ENERGY STAR, you're not just helping customers save energy and money, you're doing your part for the environment.

HOW TO PROMOTE ENERGY STAR.

It's top rated and saves money. Let customers know ENERGY STAR qualified lighting solutions and appliances are an easy way to lower their energy bills for years to come. Plus, they can receive instant or mail-in rebates to offset the initial cost.

Entergy New Orleans offers the Energy Smart energy efficiency program to help customers, like yours, lower their utility bills at a lower price tag.

These high-efficiency appliances and lighting solutions reduce energy use for better home efficiency and brighter communities. Your store may include the following products with available rebates:

MEASURE	REBATE AMOUNT
ENERGY STAR LED lighting	Manufacturer discount provided
ENERGY STAR qualified window A/C units	$50 rebate
ENERGY STAR qualified refrigerators	$50 rebate
ENERGY STAR qualified heat pump water heaters	$400 rebate
ENERGY STAR qualified pool pumps	$300 rebate

Energy Smart is a comprehensive energy efficiency program developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.

Selling Stats

LIGHTING

- ENERGY STAR LEDs use only a quarter of the energy standard incandescent light bulbs consume and last up to 25 times longer.
- On average, upgrades save up to $55 each year.
- Customers receive discounted price from manufacturer.

REFRIGERATOR

- ENERGY STAR refrigerators use half the energy of a 15-year-old refrigerator.
- On average, an upgrade saves up to $50 each year.
- Customers can receive a $50 rebate off qualifying refrigerators from Energy Smart.

POOL PUMP

- ENERGY STAR pool pumps run quieter and keep filter systems running longer.
- On average, an upgrade saves over $300 each year.
- Customers can receive a $300 rebate off qualifying pool pumps from Energy Smart.

HEAT PUMP WATER HEATER

- ENERGY STAR heat pump water heaters transfer heat from surrounding air to heat the water. If the air is too cold, it effectively uses a heating element to heat the water instead.
- An ENERGY STAR heat pump water heater will save around $3,500 over its lifespan compared to standard heat pump water heaters.
- Customers can receive a $400 rebate off qualifying heat pump water heaters from Energy Smart.

ROOM WINDOW AIR CONDITIONER

- ENERGY STAR room window air conditioners give customers more control over their comfort, in addition to energy savings.
- On average, an upgrade uses about 10 percent less energy.
- Customers can receive a $50 rebate off qualifying room window A/C units from Energy Smart.

Ask your manager which products qualify in your store.

For more info about the Energy Smart program, visit:
energysmartnola.info

For more info about ENERGY STAR products, visit:
energystar.gov/products/appliances

ENERGY STAR

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Energy Smart is a comprehensive energy efficiency program developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.

ENERGY SMART COMMERCIAL & INDUSTRIAL PROGRAMS

The Energy Smart program connects Entergy New Orleans customers with trade ally contractors to help them select and install energy efficient products that have verifiable energy savings for customers.

Trade allies can leverage these cash incentives to gain new customers and maximize existing customer projects that reduce energy use. The program provides technical assistance to trade allies and customers to identify energy efficiency opportunities, develop cost-effective projects and complete required program documentation.

Energy Smart contractors are invited to participate in various training, development and networking opportunities provided by the program and its partners.

Energy efficient upgrades help your customers:

- Increase comfort for customers and employees.
- Lower maintenance costs with longer lasting, high quality technology, like LED lighting.
- Increase occupancy rates.
- Increase asset value.

Incentives are available for equipment that result in a verifiable electric usage reduction, such as:

- Lighting.
- Chillers.
- Unitary air conditioning and heat pump.
- Motors.
- Window film.

GROW YOUR BUSINESS

More than 440 business customers have completed projects with Energy Smart contractors.

CASH BACK INCENTIVES

Energy Smart has paid out more than $5.7 million for energy efficiency projects.

TRAINING & DEVELOPMENT

Energy Smart is committed to providing training and development to participating contractors.

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ENERGY SMART COMMERCIAL & INDUSTRIAL PROGRAMS

Energy Smart is available for Entergy New Orleans customers. The program works with business owners, facility managers and trade ally contractors to identify energy efficiency opportunities, offer technical assistance to develop cost-effective projects and provide cash rebates for completing eligible upgrades with proven energy savings. Energy efficiency is the most cost-effective way to cut energy use.

Let us help you achieve lower energy costs that increases your bottom line.

Saving on your electric bill allows you to:

- Invest in company growth.
- Enjoy a higher profit margin.

Energy efficient upgrades help your business:

- Increase comfort for customers and employees.
- Lower maintenance costs with longer-lasting, high-quality technology, like LED lighting.
- Increase occupancy rates.
- Increase asset value.

Incentives are available for equipment that result in a verifiable electric usage reduction, such as:

- Lighting.
- Chillers.
- Unitary air conditioning and heat pump.
- Motors.
- Window film.

CONSULTATIVE ENERGY SERVICES

Energy Smart can help guide projects to improve energy savings and cost-effectivness.

CASH BACK INCENTIVES

Energy Smart has paid out more than $5.7 million to business customers.

TRAINING & DEVELOPMENT

Energy Smart is committed to providing training and development to participating trade ally contractors.

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PROGRAM INFORMATION

Small Commercial Solutions

- Average peak demand of less than 100 kW.
- Incentives are based on approximately $0.12 per kWh saved for all upgrades.

Large Commercial Solutions

- Average peak demand of 100 kW.
- Incentives are based on approximately $0.10/kWh saved for lighting projects, and $0.12/kWh saved for non-lighting projects.

Publicly Funded Institutions

- Provides technical assistance and financial incentives to publicly funded institutions (i.e., government buildings, public schools, etc.).
- Average peak demand of 100 kW or more.
- Incentives are based on approximately $0.10/kWh saved for lighting projects, and $0.12/kWh saved for non-lighting projects.

Participants can receive up to:

- $50,000 for lighting.
- $50,000 for non-lighting upgrades.
- Up to 100 percent of the project cost.

How do I participate?

1. Identify a project.
2. Submit an application.
3. Upon pre-approval, start your project.*
4. Submit project completion documentation.
5. A post-project site visit will be conducted by Energy Smart team.
6. Get paid.

*Pre-approval is required prior to any material purchases or installation.

For information about this and other Energy Smart programs, visit **energysmartnola.com**, email **info@energysmartnola.com** or call **504-229-6868**.

Energy Smart is a comprehensive energy efficiency program developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.

ENERGY SMART FOR RESTAURANTS & HOSPITALITY BUSINESSES

Energy Smart is available for Entergy New Orleans electric customers. The program works with business owners, facility managers and trade ally contractors to identify energy efficiency opportunities, offer technical assistance to develop cost-effective projects and provide cash rebates for completing eligible upgrades with proven energy savings.

Restaurants use as much as five times more energy per square foot than any other commercial building. Outfitting an entire commercial kitchen with a suite of ENERGY STAR® equipment can save about $4,500 per year (ENERGY STAR Guide for Restaurants 2013) in energy costs.

Let us help you achieve lower energy costs that increase your bottom line.

Saving on your electric bill allows you to:

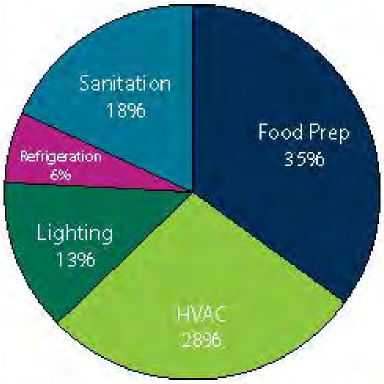
- Invest in company growth.
- Enjoy a higher profit margin.

Energy efficient upgrades help your business:

- Increase comfort for customers and employees.
- Lower maintenance costs with longer-lasting, high-quality technology, like LED lighting.
- Increase occupancy rates.
- Increase property value.

DID YOU KNOW? A typical electric deep fryer uses more electricity than the average U.S. household annually.

Example of the Average Energy Usage in a Full-Service Restaurant



Source: ENERGY STAR 2015

LIGHTING	Replacing incandescent and flourescent light fixtures with LED technology can result in significant electric energy savings that can greatly reduce your annual utility bill. There will also be significant maintenance savings due to the life cycle of LED vs. standard lighting technology (~3-4 times longer). Participants can receive incentives up to $50,000 for their lighting projects.
HVAC	Installing high-effiency HVAC equipment, such as packaged rooftop units, heat pump and split systems will result in electric savings along with an increase in indoor air quality and occupant comfort. Incentives range from $10-25 per ton for A/C units and heat pumps. Participants can receive incentives up to $50,000 for their non-lighting projects.
KITCHEN EQUIPMENT	Installing high-efficiency, ENERGY STAR rated commercial kitchen equipment, such as ice makers, steam cookers and fryers, can result in significant electric savings that reduce your utility bill. Incentives can range from $100 - 1,500 for ENERGY STAR equipment.

PRO TIP Installing occupancy sensors in closets, storage rooms, restrooms and walk-in refrigerators can help save energy by turning off lights automatically in lesser used areas.

LEARN MORE AT energystar.gov

Installing LED bulbs doesn't mean you have to sacrifice ambiance. LEDs come in many colors and shapes to fit your decor. Replacing just eight incandescent bulbs with LEDs may save you more than $200 annually on your utility bill.

For information about this and other Energy Smart programs, visit **energysmartnola.com**, email **info@energysmartnola.com** or call **504-229-6868**.

Energy Smart is a comprehensive energy efficiency program developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.

COMMERCIAL & INDUSTRIAL PRESCRIPTIVE INCENTIVES

Energy Smart is available for Entergy New Orleans customers. The program works with business owners, facility managers and trade ally contractors to identify energy efficiency opportunities, offer technical assistance to develop cost-effective projects and provide cash incentives for completing eligible upgrades with proven energy savings. Energy efficiency is the most cost-effective way to cut energy use.

If your project is not included on the prescriptive list, it will be considered a custom project. Custom lighting incentives are paid $0.10 per kWh saved for businesses with peak demand >100 kW and $0.12 per kWh saved for businesses with peak demand <100 kW. Custom non-lighting incentives are all paid $0.12 per kWh saved. All projects require pre-approval prior to purchase or installation.

Let us help you achieve lower energy costs that increase your bottom line.

Follow these simple steps to earn incentives for your next energy efficiency project.

Step 1 → Step 2 → Step 3 → Step 4

Step 1
INITIATION
Customer or contractor identifies project.

Step 2
PRE-APPROVAL
Submit required documents for program review.

Step 3
EXECUTION
Materials ordered and installed.

Step 4
POST-INSTALLATION
Program completes assessment; distributes incentive.

For information about this and other Energy Smart programs, visit **energysmartnola.com**, email **info@energysmartnola.com** or call **504-229-6868**.

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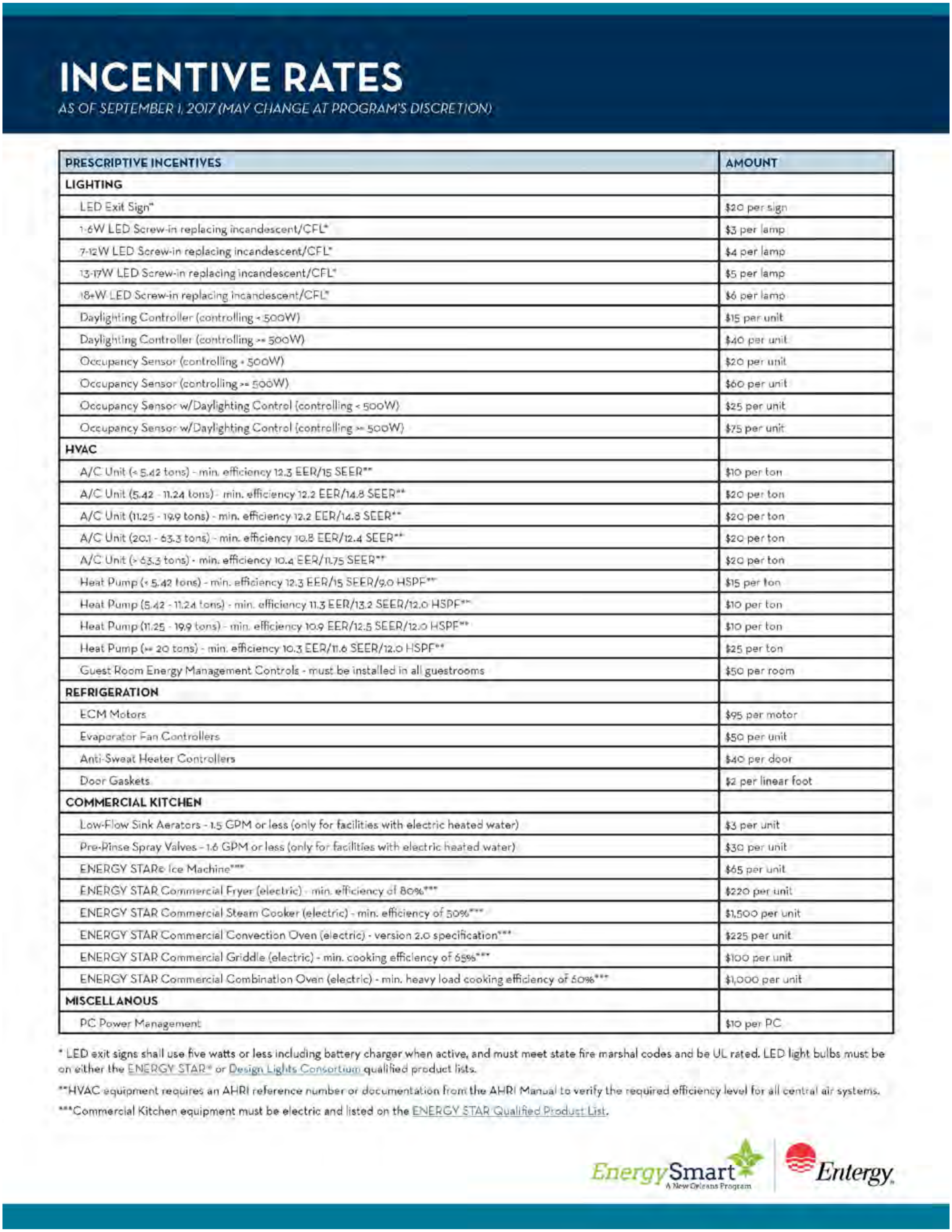

INCENTIVE RATES

AS OF SEPTEMBER 1, 2017 (MAY CHANGE AT PROGRAM'S DISCRETION)

PRESCRIPTIVE INCENTIVES	AMOUNT
LIGHTING	
LED Exit Sign*	$20 per sign
1-6W LED Screw-in replacing incandescent/CFL*	$3 per lamp
7-12W LED Screw-in replacing incandescent/CFL*	$4 per lamp
13-17W LED Screw-in replacing incandescent/CFL*	$5 per lamp
18+W LED Screw-in replacing incandescent/CFL*	$6 per lamp
Daylighting Controller (controlling < 500W)	$15 per unit
Daylighting Controller (controlling >= 500W)	$40 per unit
Occupancy Sensor (controlling < 500W)	$20 per unit
Occupancy Sensor (controlling >= 500W)	$60 per unit
Occupancy Sensor w/Daylighting Control (controlling < 500W)	$25 per unit
Occupancy Sensor w/Daylighting Control (controlling >= 500W)	$75 per unit
HVAC	
A/C Unit (< 5.42 tons) - min. efficiency 12.3 EER/15 SEER**	$10 per ton
A/C Unit (5.42 - 11.24 tons) - min. efficiency 12.2 EER/14.8 SEER**	$20 per ton
A/C Unit (11.25 - 19.9 tons) - min. efficiency 12.2 EER/14.8 SEER**	$20 per ton
A/C Unit (20.1 - 63.3 tons) - min. efficiency 10.8 EER/12.4 SEER**	$20 per ton
A/C Unit (> 63.3 tons) - min. efficiency 10.4 EER/11.75 SEER**	$20 per ton
Heat Pump (< 5.42 tons) - min. efficiency 12.3 EER/15 SEER/9.0 HSPF**	$15 per ton
Heat Pump (5.42 - 11.24 tons) - min. efficiency 11.3 EER/13.2 SEER/12.0 HSPF**	$10 per ton
Heat Pump (11.25 - 19.9 tons) - min. efficiency 10.9 EER/12.5 SEER/12.0 HSPF**	$10 per ton
Heat Pump (>= 20 tons) - min. efficiency 10.3 EER/11.6 SEER/12.0 HSPF**	$25 per ton
Guest Room Energy Management Controls - must be installed in all guestrooms	$50 per room
REFRIGERATION	
ECM Motors	$95 per motor
Evaporator Fan Controllers	$50 per unit
Anti-Sweat Heater Controllers	$40 per door
Door Gaskets	$2 per linear foot
COMMERCIAL KITCHEN	
Low-Flow Sink Aerators - 1.5 GPM or less (only for facilities with electric heated water)	$3 per unit
Pre-Rinse Spray Valves - 1.6 GPM or less (only for facilities with electric heated water)	$30 per unit
ENERGY STAR® Ice Machine***	$65 per unit
ENERGY STAR Commercial Fryer (electric) - min. efficiency of 80%***	$220 per unit
ENERGY STAR Commercial Steam Cooker (electric) - min. efficiency of 50%***	$1,500 per unit
ENERGY STAR Commercial Convection Oven (electric) - version 2.0 specification***	$225 per unit
ENERGY STAR Commercial Griddle (electric) - min. cooking efficiency of 65%***	$100 per unit
ENERGY STAR Commercial Combination Oven (electric) - min. heavy load cooking efficiency of 60%***	$1,000 per unit
MISCELLANOUS	
PC Power Management	$10 per PC

* LED exit signs shall use five watts or less including battery charger when active, and must meet state fire marshal codes and be UL rated. LED light bulbs must be on either the ENERGY STAR® or Design Lights Consortium qualified product lists.

**HVAC equipment requires an AHRI reference number or documentation from the AHRI Manual to verify the required efficiency level for all central air systems.

***Commercial Kitchen equipment must be electric and listed on the ENERGY STAR Qualified Product List.

Appendix E: Program Photos

Energy Wise Nonprofit Retrofit at The Green Project.

Energy Smart Vehicle.

Residential assessment.

Restaurant and hospitality training event at Urban League of Louisiana, September 2017.

Energy Wise in local public schools.


fficiency


Energy
Smart
for KIDS

Commercial lighting upgrade.

Energy Efficiency Day, October 5, 2017 at City Hall.

Commercial lighting walk through at the Smoothie King Center.

Commercial Trade Ally Advisory Group meeting, December 2017.

Evaluation of PY7 Energy Efficiency Programs Portfolio

Submitted to:

Entergy New Orleans

May 2018

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1. Executive Summary

This report provides a summary of the evaluation effort of the 2017 ("Program Year 7" or "PY7") Energy Efficiency (EE) portfolio by Energy New Orleans (ENO) and Entergy New Orleans-Algiers (Algiers). This evaluation was led by ADM Associates Inc. (herein known as "ADM", or "the Evaluators"). This report provides verified gross and net savings estimates for the evaluated programs.

1.1 Summary of ENO Energy Efficiency Programs

In PY7, the ENO EE portfolio contained the following programs:

- Home Performance with Energy Star (HPwES);
- Low Income Audit and Weatherization (LIA&Wx)
- Energy Smart Multifamily (MF);
- Green Light Direct Install (GLDI);
- Residential Heating & Cooling;
- Residential Lighting and Appliances Program (RLA);
- Energy Smart School Kits and Education (SK&E);
- Small Commercial Solutions (SCS);
- Large Commercial and Industrial Solutions (Large C&I);
- Direct Load Control Pilot (DLC); and
- Energy Smart Portfolio Innovations

During PY7 Aptim served as the prime contractor and was ultimately responsible for the overall implementation and the performance of the program. They were also the lead implementer and responsible for the marketing and outreach, trade ally management, rebate processing, and project verification and quality control for the Small Commercial Solutions, Large C&I, and Publicly Funded Institutions programs. Aptim is also responsible for management of the subcontractors Franklin Energy, Energy Wise Alliance, and Green Light New Orleans;

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

- Home Performance with Energy Star
- Low Income Audit and Weatherization
- Multifamily
- Residential Lighting and Appliances

- Residential Heating and Cooling, and
- Direct Load Control

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.

Green Light continues to implement the efficient light bulb direct install program.

During PY7 Energy Smart conducted a pilot smart thermostat program. A full report of this program is available in section 14-1 Smart Thermostat Pilot.

1.2 Evaluation Objectives

The goals of the PY7 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 limited process evaluation. Process evaluation activities included interviews with three implementation contractor staff and brief surveys of program participants.

1.3 Summary of Data Collection

The data collected as part of this EM&V effort is detailed in Table 1-1. The Evaluators collected on-site data for HPwES, SBS, and the Large C&I Programs. In addition to activities described below, the Evaluators completed interviews with three implementation contractor staff to understand the program launch process, program design changes introduced by the new implementation contractor, and key successes and challenges.

Table 1-1 Summary of Data Collected

Program	***Site Visits***	***Participant Surveys***
HPwES	43	58
LIA&Wx	11	0

Multifamily	6	6
Green Light New Orleans	0	0
RLA	0	46
Residential Heating & Cooling	10	51
Energy Smart School Kits and Education	0	0
Small Commercial Solutions	18	6
Large C&I	12	4
Publicly Funded Institutions	1	0
Direct Load Control	68	0
Smart Thermostat Pilot	0	126
Total	**169**	**297**

1.4 Impact Findings

1.4.1 Verified Savings

Table 1-2 and Table 1-3 present verified impacts by program for ENO and Algiers, respectively. The values in these tables are comparisons of the savings listed by ENO and their program implementation staff (“Expected Savings”) and those verified by the Evaluators (“Verified Savings”).

Table 1-2 Gross Impact Summary – New Orleans

Program	Annual Energy Savings (kWh)		Realization Rate	Peak kW		Realization Rate
	Expected	Verified		Expected	Verified	
HPwES	884,935	893,421	100.96%	218.26	222.73	102.05%
LIA&Wx	886,110	880,394	99.35%	222.73	225.05	101.04%
Multifamily	337,413	341,939	101.34%	60.22	62.31	103.47%
Green Light Direct Install	102,745	97,065	94.47%	21.24	20.11	94.68%
Lighting & Appliances	2,752,151	2,763,899	100.43%	572.21	578.96	101.18%
Residential Heating & Cooling	1,149,084	1,304,021	113.48%	381.89	491.06	128.59%
Energy Smart School Kits and Education	271,823	271,823	100.00%	32.62	32.62	100.00%
Small Commercial Solutions	1,985,945	1,847,496	93.87%	257.14	244.91	95.24%
Large C&I	9,713,650	10,248,920	105.51%	1,366.35	1,397.86	102.31%
Publicly Funded Institutions	814,317	683,133	83.89%	-	-	N/A
Direct Load Control	-	-	N/A	-	168.80	N/A
Total	**18,898,173**	**19,332,111**	**102.30%**	**3,132.66**	**3,444.41**	**109.95%**

Table 1-3 Gross Impact Summary - Algiers

Program	Annual Energy Savings (kWh)		Realization Rate	Peak kW		Realization Rate
	Expected	Verified		Expected	Verified	
HPwES	87,991	92,289	104.88%	24.52	24.26	98.94%

LIA&Wx	158,973	158,874	99.94%	37.72	39.57	104.90%
Multifamily	6,011	6,064	100.88%	0.99	0.99	100.00%
Green Light Direct Install	13,271	12,806	96.50%	2.74	2.65	96.72%
Lighting & Appliances	110,536	110,681	100.13%	22.54	23.30	103.37%
Residential Heating & Cooling	69,095	79,105	114.49%	24.12	30.64	127.03%
Energy Smart School Kits and Education	48,723	48,723	100.00%	5.85	5.85	100.00%
Small Commercial Solutions	277,664	277,330	99.88%	29.76	20.79	69.86%
Large C&I	115,900	115,900	100.00%	-	-	N/A
Publicly Funded Institutions	-	-	N/A	-	-	N/A
Direct Load Control	-		N/A	-		N/A
Total	**888,164**	**901,772**	**101.53%**	**148.24**	**148.05**	**99.87%**

In addition, the Evaluators estimated program net-to-gross ratios (NTGRs) through evaluation of free-ridership and spillover effects. The contribution to portfolio savings by program is summarized in Table 1-4 through Table 1-6. NTGRs were estimated at the measure-level in aggregate for both ENO and Algiers programs. However, program-level NTGRs may differ due to variances in contribution to program savings by measure rebated through each program.

Table 1-4 Net kWh and kW Impacts – New Orleans

Program	***Verified Gross kWh***	***Verified Gross kW***	***NTGR***	***Verified Net kWh***	***Verified Net kW***
HPwES	893,421	222.73	97.64%	872,375	216.25
LIA&Wx	880,394	225.05	100.00%	880,394	225.05
Multifamily	341,939	62.31	100.00%	341,939	62.31
Green Light Direct Install	97,065	20.11	90.43%	87,775	18.18
Lighting & Appliances	2,763,899	578.96	66.93%	1,849,985	387.78
Residential Heating & Cooling	1,304,021	491.06	91.42%	1,192,194	443.03
Energy Smart School Kits and Education	271,823	32.62	78.29%	212,813	25.22
Small Commercial Solutions	1,847,496	244.91	100.00%	1,847,496	244.91
Large C&I	10,248,920	1,397.86	100.00%	10,248,920	1,397.86
Publicly Funded Institutions	683,133	-	100.00%	683,133	-
Direct Load Control	-	168.80	100.00%	-	168.80
Total	**19,332,111**	**3,444.41**	**94.23%**	**18,217,024**	**3,189.39**

Table 1-5 Net kWh and kW Impacts – Algiers

Program	Verified Gross kWh	Verified Gross kW	NTGR	Verified Net kWh	Verified Net kW
HPwES	92,289	24.26	97.64%	90,115	23.56
LIA&Wx	158,874	39.57	100.00%	158,874	39.57
Multifamily	6,064	0.99	100.00%	6,064	0.99
Green Light Direct Install	12,806	2.65	90.43%	11,581	2.40
Lighting & Appliances	110,681	23.30	66.57%	73,685	15.60
Residential Heating & Cooling	79,105	30.64	91.42%	72,321	27.64
Energy Smart School Kits and Education	48,723	5.85	78.29%	38,146	4.52
Small Commercial Solutions	277,330	20.79	100.00%	277,330	20.79
Large C&I	115,900	-	100.00%	115,900	-
Total	**901,772**	**148.05**	**93.60%**	**844,016**	**135.07**

Table 1-6 Summary of Goal Attainment – New Orleans

Program	Verified Net kWh	kWh Goal	% kWh Goal Attained	Verified Net kW	kW Goal	% kW Goal Attained
HPwES	872,375	980,222	89.00%	216.25	197.40	109.55%
LIA&Wx	880,394	985,729	89.31%	225.05	213.50	105.41%
Multifamily	341,939	259,377	131.83%	62.31	49.00	127.16%
Green Light Direct Install	87,775	126,112	69.60%	18.18	20.70	87.83%
Lighting & Appliances	1,849,985	3,277,546	56.44%	387.78	683.20	56.76%
Residential Heating & Cooling	1,192,194	1,092,377	109.14%	443.03	341.80	129.62%
Energy Smart School Kits and	212,813	253,937	83.81%	25.22	34.60	72.89%
Small Commercial Solutions	1,847,496	2,069,113	89.29%	244.91	401.30	61.03%
Large C&I	10,248,920	8,934,372	114.71%	1,397.86	1,279.10	109.28%
Publicly Funded Institutions	683,133	594,092	114.99%	-	101.10	0.00%
Direct Load Control	-	-	N/A	168.80	829.90	20.34%
Total	**18,217,024**	**18,572,877**	**98.08%**	**3,189.39**	**4,151.60**	**76.82%**

Table 1-7 Summary of Goal Attainment – Algiers

Program	Verified Net kWh	kWh Goal	% kWh Goal Attained	Verified Net kW	kW Goal	% kW Goal Attained
HPwES	90,115	72,604	124.12%	23.56	14.70	160.27%

LIA&Wx	158,874	74,694	212.70%	39.57	16.00	247.31%
Multifamily	6,064	19,340	31.35%	0.99	3.70	26.76%
Green Light Direct Install	11,581	73,013	15.86%	2.40	12.00	20.00%
Lighting & Appliances	73,685	242,465	30.39%	15.60	51.00	30.59%
Residential Heating & Cooling	72,321	85,830	84.26%	27.64	25.40	108.83%
Energy Smart School Kits and	38,146	39,056	97.67%	4.52	5.30	85.28%
Small Commercial Solutions	277,330	240,297	115.41%	20.79	47.90	43.40%
Large C&I	115,900	466,229	24.86%	-	68.30	0.00%
Publicly Funded Institutions	-	62,273	0.00%	-	9.50	0.00%
Direct Load Control	-	-	N/A	-	62.20	0.00%
Total	**844,016**	**1,375,801**	**61.35%**	**135.07**	**316.00**	**42.74%**

The portfolio overall fell achieved 97.64% of the kWh goal and 76.82% of the kW goal for New Orleans, and 61.35% of the kWh goal and 42.74% of the kW goal for Algiers. These values represent savings net-of-free-ridership, compared to the filed goals that had assumed gross savings without accounting for free-ridership.

1.4.2 Summary of Program Adjustments

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

- **M&V Adjustment:** these adjustments describe instances where the Evaluators revised savings based upon data gathered or verified onsite. Examples include commercial building heating types and the appropriateness of the deemed lighting assumptions reflecting verified on-site operation (e.g. non-8,760 vs. 8,760).
- **Verification Adjustment:** these adjustments include changes made based upon field data collection findings but does not include a change to deemed savings. Examples include differences in fixture counts identified during inspection of a commercial lighting retrofit and differences in leakage values measured as part of the Home Performance with ENERGY STAR evaluation.
- **Baseline Correction:** this includes revisions to savings due to correction of the measure baseline. This occurred with residential HVAC systems which had used an early retirement baseline (based upon preexisting equipment) whereas the Evaluators updated this to reflect current minimum code (based upon replacement-on-burnout criteria).
- **Lighting Classification Error Correction:** this category includes corrections made to per-unit lighting savings values. Several lighting measures in various programs were found to have erroneous deemed savings values and in some cases EISA guidelines had not been correctly applied to savings calculations.
- **Calculation, Rounding and Typographical Error Correction:** this category includes miscellaneous calculation errors. The most notable of these was found in ceiling insulation calculations in the Home Performance with ENERGY STAR®

Program, where the Evaluators found that program savings were markedly understated.

Figure 1-1 Savings Adjustments – New Orleans

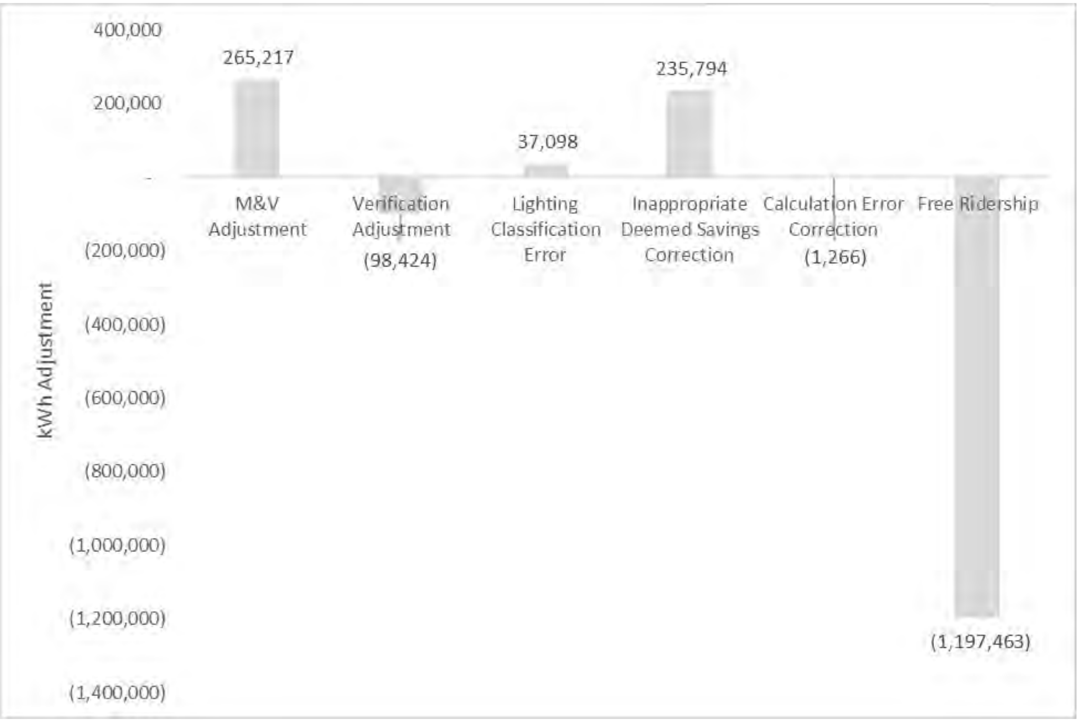
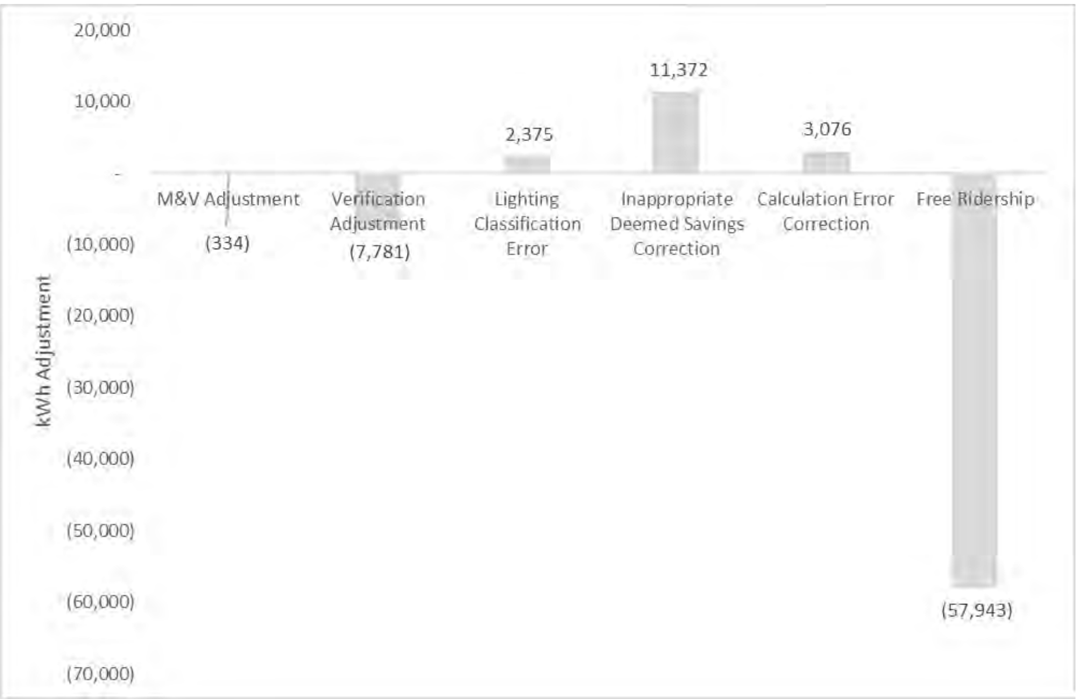


Figure 1-2 kWh Savings Adjustments - Algiers



1.4.3 Cost-Benefit Results

Error! Reference source not found. and **Error! Reference source not found.** present cost-benefit summary results. The portfolios overall passed TRC and UCT screening.

Most individual programs passed as well, with the exception of:

- **ENO:** School Kits & Education.
- **Algiers:** School Kits & Education, Large C&I and PFI.

These can be attributed to verified savings falling short of goals.

Table 1-8 Cost-Effectiveness by Program – New Orleans

Program	*Net Peak Demand Reduction (kW)*	*Net Annual Energy Savings (kWh)*	*Total Program Expenditures*	*TRC (b/c ratio)*	*UCT (b/c ratio)*
HPwES	216.25	872,375	$ 1,311,757	1.34	1.29
LIA&Wx	225.05	880,394			
Multifamily	62.31	341,939			
Green Light New Orleans	18.18	87,775			
Consumer Products	387.78	1,849,985	$ 367,727	3.89	3.91
Residential Heating & Cooling	443.03	1,192,194	$ 344,535	3.23	3.08
Energy Smart School Kits	25.22	212,813	$ 293,105	0.33	0.33

Small Commercial Solutions	244.91	1,847,496	$ 680,949	1.36	1.55
Large C&I	1397.86	10,248,920	$ 1,794,829	2.96	3.91
Publicly Funded Institutions	-	683,133	$ 247,888	1.57	6.00
Direct Load Control	168.8	-	$ 203,341	0.03	0.02
Total	**3,189.39**	**18,217,024**	**$ 5,244,130**	**2.18**	**2.44**

Table 1-9 Cost-Effectiveness by Program - Algiers

Program	***Net Peak Demand Reduction (kW)***	***Net Annual Energy Savings (kWh)***	***Total Program Expenditures***	***TRC (b/c ratio)***	***UCT (b/c ratio)***
HPwES	23.56	90,115	$ 136,816	1.73	1.67
LIA&Wx	39.57	158,874			
Multifamily	0.99	6,064			
Green Light New Orleans	2.4	11,581			
Consumer Products	15.6	73,685	$ 14,350	2.50	4.06
Residential Heating & Cooling	27.64	72,321	$ 24,202	3.27	3.26
Energy Smart School Kits	4.52	38,146	$ 71,090	0.25	0.25
Small Commercial Solutions	20.79	277,330	$ 71,372	1.71	2.04
Large C&I	-	115,900	$ 96,012	0.63	0.66
Publicly Funded Institutions	-	-	$ 11,749	-	-
Direct Load Control	-	-	$ 23,890	-	-
Total	**135.07**	**844,016**	**$ 449,480**	**1.25**	**1.32**

1.5 Process Findings

A limited process evaluation focusing on the launch and initial implementation of the programs during the PY7 partial year was completed. The data collection activities were interviews with implementation contractor staff and brief participant surveys primarily used to estimate net savings.

1.5.1 Residential Portfolio Findings

- A key focus during PY7 was establishing the basic infrastructure needed to implement the programs. These activities included reviewing and developing marketing materials and application forms, establishing procedures for receiving and processing applications, developing a data management system and reporting to manage the programs, and building relationships with contractors to engage them with the programs. Staff indicated that overall the program infrastructure is in place at this time, but that continued developments, such as greater focus on trade ally training will occur in PY8. A critical issue identified by the Evaluator is to complete the work on developing the data management and reporting system. Doing this will improve program function in multiple ways:

  - Allow for timely delivery of program data to the Evaluator to enable effective management of the program evaluation;
  - Allow for accurate understanding of program progress toward goals and forecasting of program activity to manage program progress toward goals; and
  - Allow the program to provide accurate energy reports to customers receiving assessments through the Home Performance with ENERGY STAR, Income Qualified Weatherization, and the Multifamily programs.

- Program staff identified increased engagement with contractors and other trade allies during PY8 as a needed improvement. This engagement is important to improving the program in PY8 because it may help with customer recruitment and improve the quality of the customer's experience with the program. Recurring findings of the PY7 participant surveys were issues related to contractors not finishing all of the planned work or lack of professionalism. While confined to a limited number of participating customers, issues with contractors were noted by participants in HPwES, Multifamily, and Residential Heating and Cooling.
- A notable change made to the design of the HPwES program is that program staff will perform the energy assessments. This change was designed to improve the comprehensiveness of retrofits completed through the program and prevent the risk of contractors "cherry picking" measures. While this likely represents a program improvement, it may also put more onus on the program to market the programs since contractors will not be able to recruit customers and immediately schedule work, but instead will have to refer customers to the program. None of the PY7 HPwES participants indicated that they learned of the program from a contractor.
- The new Multifamily program worked directly with residents in smaller multifamily properties (e.g., duplexes) rather than property managers and larger apartment complexes. Staff indicated that the previous implementation contractor had completed direct install projects in most of the larger managed properties in the service territory. As such, PY8 efforts to recruit property managers will focus on duct system improvements. A potential design issue noted by program staff was the lack of a low income channel for multifamily residents.

1.6 Residential Portfolio Recommendations

The Evaluator offers the following recommendations for improving the residential programs based on its initial review of program design and implementation:

- **Resolve data management issues to facilitate timely delivery of program data.** The Evaluator recognizes the challenges in developing a well-functioning data system but this infrastructure is necessary for effective implementation and evaluation management.
- **Provide assessment participants a report of the assessment findings and recommendations.** Providing an assessment report is a key service the program intends to provide. Additionally, by documenting the planned efficiency improvements, a report of findings may also allow for improvement of issues noted by participants related to not having all of the planned work completed by the contractor.
- **Offer a low income channel to multifamily program participants.**
- **Document participant income qualifications for the Income Qualified Weatherization program.** Because this was done in prior years, participating contractors are likely familiar with this requirement and doing so will ensure that the program is reaching the target population.

1.6.1 Commercial Portfolio Findings

- As with the residential programs, a key focus of the C&I programs was the development of program infrastructure.
- Issues related to the development of data management infrastructure and the timely delivery of data noted above for the residential programs also apply to the nonresidential programs.
- A change made to the Small Commercial Solutions program is that the program no longer includes onsite energy assessments as part of the participation process.
- Staff have focused on increasing the diversity of measures implemented through the C&I programs as compared to program activity in prior years. A key asset in this noted by staff is the efforts made by a program partner, Green Coast Enterprises, which has assisted customers with implementing building automation systems. Additionally, the program has engaged in outreach to companies capable of implementing non-lighting projects.
- A new program targeting publicly funded institutions was added in PY7. The program offers the same incentives and services available to Large C&I participants. Staff indicated that despite the challenges of recruiting publicly funded organizations, which tend to have longer planning processes than private sector organizations, the program was successful in reaching its savings goals.
- An ongoing challenge is meeting savings goals for the C&I programs in the Algiers service territory. Staff noted that the challenges largely exist for the Large

C&I and Publicly Funded Institutions Programs. To address this issue, the program has engaged in marketing efforts targeting Algiers, namely, a direct mail campaign and the hiring of a consulting firm to focus on recruitment of Algiers customers.

1.7 Commercial Portfolio Recommendations

- **Consider reinstating an energy assessment as part of the delivery of the Small Commercial Solutions Program.** Should program activity lag, the provision of no cost audits may be an effective means of gaining customer interest in efficiency improvements. Use of program implementation contractor staff or a third-party to deliver audits would likely be more effective at encouraging adoption of diverse measures than audits completed by contractors. Contractors tend to have specializations which limit their capacity to complete holistic assessments of the building.
- **Resolve data management issues to facilitate timely delivery of program data.**

1.8 Smart Thermostat Pilot Findings

The findings from this pilot are as follows:

- **Statistically valid savings estimates accounted for 2.68% of annual use.** Program participants saved 343 kWh per year on average, accounting for approximately 2.68% of total annual electricity use (with 90% confidence between 249 and 438 kWh annual savings).
- **Statistically significant savings occurred solely among households that did not register their thermostat with Nest.** The thermostat has passive features that function with or without registration. Registration allows thermostat control via mobile app and use of Smart Home Away / Follow-me features. Participants that did not register their thermostat saved 443 kWh (3.60% annual savings) on average.
- **Use of Gen 2 refurbished models resulted in significant program expansion without marring program savings or customer satisfaction.** The Evaluators estimate that the use of refurbished Gen 2 models resulted in 40% more installations in comparison to what would have occurred if new Gen 2 models were used, and 55% more installations compared to new Gen 3 models. The features of the Gen 3 model do not provide additional energy saving features; its improvements are in aesthetic design (with a larger display and slimmer profile).
- **Satisfaction varied by installing contractor.** One of the three registered installing trade allies demonstrated satisfaction rates exceeding 84%, while the other two installing contractors had average satisfaction rates of 61%.

- **Significant rates of difficulty with the units reported.** Twenty-nine percent of survey respondents reported having difficulties using their thermostat. Respondents reported that they generally did not receive sufficiently clear instructions on the operation of the thermostat from the installer. The program included leave-behind instructional guides, but respondents indicated an interest in a more detailed explanation at the outset.
- **Respondents were more likely to indicate that they noticed improved home comfort rather than energy savings.** Fifty-three percent of respondents noted improved comfort, while 42% noted energy savings.
- **Significant market interest was found in a potential demand response/load management program.** Fifty-five percent of respondents indicated high interest in a demand response program if offered a $15 per month bill deduction, while 46% reported interest in a $10 deduction.

1.8.1 Smart Thermostat Pilot Recommendations

Based on the billing impact analysis and process evaluation data collection, the Evaluators' recommendations are as follows:

- **Consider the risks of implementation, accounting for the impact on energy savings for registered and unregistered systems.** The Evaluators found that registered thermostats resulted in increased energy use, while unregistered thermostats provided energy savings. Although the registered group estimate is not statistically significant, the registered group's increased usage is statistically significantly different from the unregistered group's decreased usage. These findings should be considered when deciding whether to include the program as a measure going forward in low-income multifamily direct install. If the target market remains the same as those in the Pilot, then there should be similar average registration rates (and therefore, average aggregate energy savings). Conversely, program staff may take a more active approach in educating participants on how to ensure that their thermostat results in lower energy use.

The remaining recommendations are relevant should program staff elect to keep the measure as an offering to low-income multifamily customers.

- **Document the type of baseline thermostat unit and for programmable thermostats, whether or not the thermostat was programmed.** This information can be used to estimate program savings because the type of thermostat replaced will affect the savings resulting from the installation of the smart thermostat.
- **Document occurrences and reasons for non-installation.** Collection of this data will allow the program to develop a database that can provide information on

key barriers to installation that may potentially be addressed by the program in the future.

- **Provide an educational tip sheet in addition to the thermostat documentation to maximize energy savings.** These sheets could provide information on how to maximize energy savings through the thermostats, such as temperature settings to use during the learning period and the importance of not disabling features such as Auto-Away. Additionally the hand-out could include other energy saving tips such as closing binds and curtains to prevent solar heating in summer and heat loss in the winter.
- **Bundling the installation of thermostats with other program measures such as HVAC tune-ups or additional low cost direct install measures are cost- and time-efficient ways to increase savings through the program.** Smart thermostats can be used as a high-value entry point to multifamily properties that can provide an opportunity for a deeper retrofit.
- **Future program procedures should include processes for educating customers on key aspects of the thermostat, such as what the learning period is and what customers should expect and do during that period.** Additionally, the program should provide information to tenants to inform them of the installation and what to expect during the installation. Doing so may improve satisfaction with the thermostat and the installation process, as well as reduce disabling of the auto-scheduling feature.
- **Although it would limit the share of the low-income population that can participate in the Nest program, staff should consider limiting participation to customers that have internet access because survey results suggest that customers with Wi-Fi were more satisfied with the thermostat.**
- **Formally integrate this measure as part of the Multifamily Program.** The measure provides cost-effective kWh savings and would be a valuable addition to ENO’s new multifamily program.
- **If launching a smart thermostat load control program,**
    - Begin with incentives ranging from $10-$15, to be paid in months where events occurred.
    - Organize a cost-sharing mechanism with the Multifamily program to parse program costs to the two benefit streams. This will allow the kWh savings from the Nest units to be credited to the direct install program while the demand reductions from load control events can be credited to the Direct Load Control program.

- **If measure eligibility is expanded, maintain a strict pre-allowed list.** Given that the cost-risk is entirely on program administrators, the eligibility list should include proven models (such as the EcoBee3 or Honeywell Lyric). These models have been evaluated in other studies and have brand recognition.
- **Track customer satisfaction metrics and trace them to installing contractor.** The Evaluators found a statistically significant difference in satisfaction rates by installing contractor; this should be tracked on an ongoing basis and used to guide contractor retraining until the satisfaction metrics for the lower-performing trade allies are improved.
- **Continue to use refurbished Gen 2 models so long as a reliable supply is available.** The refurbished Gen 2 models have the needed energy-saving features. Higher-cost Gen 3 models largely differ cosmetically and their minor expanded functionality, with esoteric heating system configurations, are not necessary for this program. Another alternative would be to use the lower-cost model Nest E, which includes the same core energy-saving functionality as the higher-cost models.

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 the Home Performance with Energy Star Program (HPwES);
- Chapter 4 provides results for the Low Income Audit and Weatherization Program (LIA&Wx);
- Chapter 5 provides results for the Multifamly Program;
- Chapter 6 provides results for the Green Light New Orleans Program;
- Chapter 7 provides results for the Residential Lighting and Appliances Program (RLA);
- Chapter 8 provides results for the Residential Heating & Cooling Program;
- Chapter 9 provides results for the School Kits and Education Program (SK&E);
- Chapter 10 provides results for the Small Commercial Solutions Program (SCS);
- Chapter 11 provides results for the Large Commercial and Industrial Solutions Program (C&I);
- Chapter 12 provides results for the Publicly Funded Institutions Program (SCS);

- Chapter 13 provides results for the Direct Load Control Pilot;
- Chapter 14 provides results for the Smart Thermostat Pilot;
- Appendix A provides the site-level custom reports for the SCS and C&I Solutions Program;
- Appendix B provides the survey instruments and interview guides used in this evaluation;
- Appendix C presents appendices from the Smart Thermostat Pilot 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[1]:

- *Ex Ante* – Forecasted savings used for program and portfolio planning purposes (from the Latin for “beforehand”)
- *Ex Post* – Savings estimates reported by an evaluator after the energy impact evaluation has been completed (From the Latin for “from something done afterward”)
- *Deemed Savings* – An estimate of an energy savings or demand savings outcome (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 112 kWh savings for a residential advanced power strip)
- *Savings* – The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program
- *Realization Rate* – Ratio of Ex Post Savings / Ex Ante Savings (e.g., if the Evaluators verify 105 kWh per showerhead, Realization Rate = 105/112= 93.8% realization rate

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[1] Arkansas TRM V4.0, Volume 1, Pg. 80-86

2.2 Overview of Methodology

The proposed methodology for the evaluation of the PY5 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:

- Home Performance with ENERGY STAR
- Low Income Audit and Weatherization
- Residential Heating & Cooling
- Energy Smart Lighting and Appliances
- Energy Smart School Kits

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 SCS 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 the SCS and Large C&I Programs were reduced to the following strata:

Table 2-1 Stratified Sampling Summary

Program	***Strata***	***Sites Sampled***
Small Commercial Solutions	4, plus 1 certainty	18
Large Commercial and Industrial	4, plus 1 certainty	11

2.2.2 Impact Calculations

The general approach for calculation of verified kWh and kW savings was to start with deemed savings and refine estimates with primary data collection. Further detail can be found in each program chapter.

2.2.3 Process Evaluation

The Evaluator completed three interviews with five implementation contractor staff to discuss the program launch and efforts made to develop the implementation infrastructure. Staff also discussed changes made to existing program designs and the addition of new programs.

A reduced participant survey was performed for the HPwES, Multifamily, Residential Heating and Cooling, Lighting & Appliances, Small Commercial Solutions, Large C&I, and Publicly Funded Institutions Program. In addition to collection of data to assess net savings impacts, these surveys asked respondents to report on how they learned of the program and their satisfaction with their experience with the program.

In addition, the Evaluator completed a process evaluation of the Smart Thermostat Pilot program. The evaluation activities were surveys of program participants and interviews with installation contractors.

A full process evaluation is planned for PY8.

3. Home Performance with ENERGY STAR®

3.1 Program Description

The Home Performance with ENERGY STAR® Program (HPwES) is designed to promot energy efficiency by offering home energy walkthrough assessments and/or deeper energy assessments to its residential customers through a participating trade ally. HPwES provides residential customers with access to qualified vendors and installation trade allies (trade allies) within the Companies' service areas. The participating trade allies are to help the residential customer analyze their energy use and identify energy efficiency improvements. The trade ally inspection includes a visual inspection of the living space, attic, and crawl space/basement, and exterior of the home, as well as discussion of lifestyle and customer behaviors that impact energy use. Following the assessment, the trade ally recommends home improvements to increase energy efficiency. HPwES provides incentives for installing ceiling insulation, duct sealing, and air infiltration sealing in the form of a discount to the customer.

A total of 348[2] households participated in HPwES, Table 3-1 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 3-1 Summary of Measures and Expected Savings – New Orleans

Measure	***Number of Homes***	***Expected kWh Savings***	***Expected kW Savings***
AC Tune-up	53	42,976	15.56
Aerators	57	1,954	0.20
Air Sealing	45	60,587	19.64
Ducts	179	522,451	139.52
LED	7239	211,118	38.75
Pipe Wrap	29	4,659	0.53
Power Strip	91	23,843	2.59
Showerheads	63	14,238	1.48
Thermostat	2	3,108	-
Total:	**7,758**	**884,935**	**218.27**

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[2] This total does not equal the sum of the "Number of Homes" column in Table 3-1, Table 3-2 and **Error! Reference source not found.** due to individual residences receiving multiple measures.

Table 3-2 Summary of Measures and Expected Savings – Algiers

Measure	*Number of Homes*	*Expected kWh Savings*	*Expected kW Savings*
AC Tune-up	1	816	0.30
Aerators	2	53	0.01
Air Sealing	5	11,088	3.59
Ducts	17	36,407	12.24
Insulation	1	10,844	2.87
LED	989	26,899	5.18
Power Strip	6	1,431	0.16
Showerheads	2	452	0.05
Total:	**1,023**	**87,991**	**24.39**

In PY7 the program introduced six new measures: AC tune-ups, faucet aerators, LED light bulbs, pipe wrap, advanced power strips and low-flow showerheads. Overall program participation fell by 52.6% in PY7, but expected savings by home creased by 3.9%.

Table 3-3 Measure Type and Count Installed by Program Year[3]

Measure	***Expected kWh PY7***	***Expected kWh PY6***	***Expected kWh PY5***
AC Tune-up	43,792	-	-
Aerators	2,008	-	-
Air Sealing	71,675	349,896	204,014
Ceiling Insulation	10,844	60,345	196,735
Duct Sealing	558,858	1,564,937	1,807,226
Floor Insulation	-	-	-
LEDs	238,017	-	-
Pipe Wrap	4,659	-	-
Power Strip	25,275	-	-
Showerheads	14,690	-	-
Thermostats	3,108	-	-
Wall Insulation	-	-	956

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[3] Figures adjusted to reflect 9-month PY7 program period.

Table 3-4 Participation and Expected Savings by Program Year[4]

PY	Count Homes	Percent Difference	Expected kWh per Home	Percent Difference
PY6	734	-52.6%	2,691	3.9%
PY7	348		2,796	

The program goals and achievement of the goals is summarized below.

Table 3-5 Summary of Program Goals

Operating Company	kWh	kW
ENO	980,222	197.4
Algiers	72,604	14.7

Table 3-6 HPwES Summary of kWh Goal Achievement

Operating Company	Verified Net kWh	kWh Goal	% of Goal Attained	Verified kW	kW Goal	% of Goal Attained
ENO	872,375	980,222	89.00%	216.25	197.4	109.55%
Algiers	90,115	72,604	124.12%	23.56	14.7	160.26%

3.2 M&V Methodology

Evaluation of HPwES included the following:

- Surveys with participants;
- Interviews with program staff;
- Interviews with program trade allies; and
- On-site testing and data collection.

Verified savings were calculated using methods and inputs in the New Orleans TRM 1.0 and incorporated results from on-site testing where appropriate. PY7 major savings components are air infiltration, duct sealing and LEDs. The following section discusses savings calculation methods for these measure in detail.

3.2.1 Air Infiltration Reduction Savings Calculations

Methods for calculating he deemed savings values for air infiltration reduction came from the New Orleans TRM, section B.4.6. Deemed savings multipliers were developed through EnergyGauge, a simulation software program. Multiple equipment

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[4] Figures adjusted to reflect 9-month PY7 program period.

configurations were simulated in in developing savings values denominated in deemed savings per CFM50 of air leakage rate reduction. Table 3-7 summarizes the deemed savings values for New Orleans.

Table 3-7 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:

$$Air\ Infiltration\ Savings = 0.4108\frac{kWh\ Savings}{CFM_{50}} \cdot \left(5{,}200\ CFM_{50\ pre} - 3{,}500\ CFM_{50\ post}\right)$$

$$Air\ Infiltration\ Savings = 698.36\ kWh$$

3.2.1.1 Field Data Collection

The Evaluators conducted on-site testing at a sample of 23 residencies that received air sealing. This sample was comprised of 16 homes in HPwES, 5 homes in LIA&Wx, and 2 multifamily residences. During these site visits, the Evaluators' field staff conducted blower door testing in an effort to validate post-retrofit leakage estimates indicated in program tracking data.

The results of the Evaluators' field testing are summarized in

Figure 3-1. In this figure, results are organized such that homes with verified leakage that is lower than shown in tracking data (i.e., homes with realization greater than 100%) are at the left end of the graph and homes with verified leakage higher than shown in tracking data (i.e., homes with realization less than 100%) are on the right. The Evaluators found that 52.2% of tested homes had higher leakage than shown in program tracking, while 47.8% had lower leakage.

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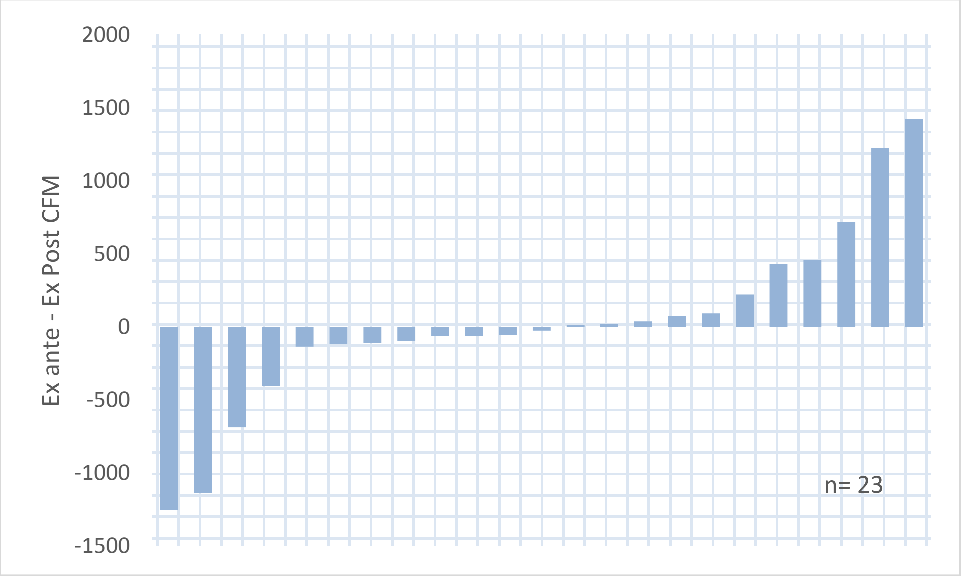
[5] New Orleans TRM V1.0, Table 81, page B-112.

Figure 3-1 Air Infiltration Field Testing Results



The Evaluators' field testing found that average post-retrofit leakage was 1% lower than indicated in program tracking data. Summary statistics of the Evaluators' field measurements are as follows:

- Mean difference of –24.7 CFM50, 1.0% below expected.
- Median difference of –40.5 CFM50, 1.8% below expected.

Most homes were within reasonable range of ex ante estimates. However, there were three outlier homes result in an average ex post leakage measurement that is 37.7% higher than expected, which raises savings for this measure, but not enough to offset the lower-than-expected leakage measured on other sites. Three outlier homes with ex post leakage measurements averaging 33.7% lower than expected were also identified, further increasing savings for this measure.

3.2.1.2 Air Sealing Savings Results

The savings resulting from using TRM algorithms and deemed savings parameters, plus the application of field results are summarized in Table 3-8 and Table 3-9.

Table 3-8 Expected and Realized Air Sealing Savings – New Orleans

Heating Type	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Realized Peak kW Savings***	***Peak kW Realization Rate***

Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	60,587	61,733	101.9%	19.64	20.09	102.3%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**60,587**	**61,733**	**101.9%**	**19.64**	**20.09**	**102.3%**

Table 3-9 Expected and Realized Air Sealing Savings - Algiers

Heating Type	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*Peak kW Realization Rate*
Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	11,088	11,248	101.4%	3.59	3.67	102.2%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**11,088**	**11,248**	**101.4%**	**3.59**	**3.67**	**102.2%**

3.2.2 Duct Sealing Savings Calculations

Duct sealing savings was calculated using the following savings algorithms from the New Orleans TRM, section B.3.7.

3.2.2.1 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) See Table 3-10

h_{in} = Indoor design specific enthalpy (Btu/lb.) See Table 3-10

Table 3-10 Deemed Savings Values for Duct Sealing Calculations

Parameter	*Value*
EFLHC	1,637
HDD	1,349
hout	40
hin	30
ρin	.076
Pout	.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]
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 (40x0.076 – 30x0.074) x 60 / (1000 x 11.5) = 1,891 kWh per year.

3.2.2.2 Heating Savings (Heat Pump):

$$kWh_{savings,H} = \frac{\left(DL_{pre} - DL_{post}\right) x\ 60\ x\ HDD\ x\ 24\ x\ 0.018}{1{,}000\ x\ HSPF}$$

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
$EFLH_H$ = Equivalent full load heating hours
60 = Constant to convert from minutes to hours
HDD = Heating degree days (1,349)
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft3°F)
CAP = Heating capacity (Btu/hr)
$1{,}000$ = Constant to convert from W to kW
$HSPF$ = Heating Seasonal Performance Factor of existing system (Btu/W·hr)
Default value for HSPF = 7.30.7

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

3.2.2.3 Heating Savings (Electric Resistance):

$$kWh_{savings,H} = \frac{(DL_{pre} - DL_{post})\ x\ 60\ x\ HDD\ x\ 24\ x\ 0.018}{3{,}412}$$

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
60 = Constant to convert from minutes to hours
HDD = Heating degree days (1,349)
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft3°F)
$EFLH_H$= Equivalent full load heating hours
CAP = Heating capacity (Btu/hr)
3,412 = Constant to convert from Btu to kWh

3.2.2.4 Demand Savings (Cooling):

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

Where:

$kWhsavings_c$ = Calculated kWh savings for cooling
$EFLH_C$ = Equivalent full load cooling hours
CF = Coincidence factor = 0.77[8]

3.2.2.5 Field Data Collection

The Evaluators conducted on-site testing at a sample of 63 residencies that received duct sealing. This sample was comprised of 41 homes in HPwES, 11 homes in LIA&Wx, 5 multifamily residences and 6 homes from Residential Heating and Air During these site visits, the Evaluators' field staff conducted blower door testing in an effort to validate post-retrofit leakage estimates indicated in program tracking data.

The results of the Evaluators' field testing are summarized in Figure 3-2. In this figure, results are organized such that homes with verified leakage that is lower than shown in tracking data (i.e., homes with realization greater than 100%) are at the left end of the

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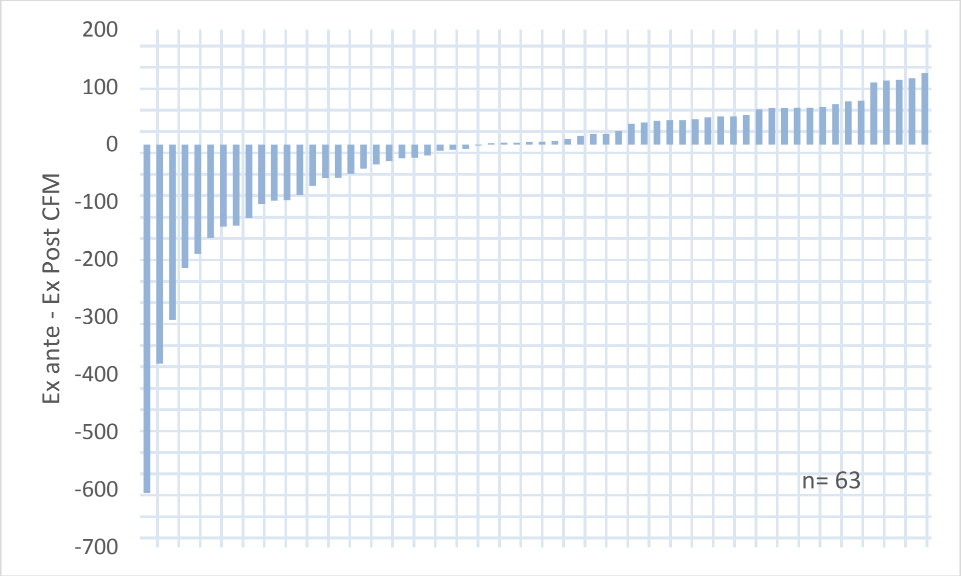
[7] Average of Department of Energy minimum allowed HSPF for new heat pumps from 1992-2006 (6.8 HSPF) and after January 23, 2006 (7.7 HSPF)

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

graph and homes with verified leakage higher than shown in tracking data (i.e., homes with realization less than 100%) are on the right.

Figure 3-2 Dust Sealing Field Testing Results



The Evaluators' field testing found that average post-retrofit leakage was lower than indicated in program tracking data. Summary statistics of differences between the Evaluators' field measurements and values listed in tracking data are as follows:

- Mean difference of: 22.3 CFM25, 14.5% higher than expected
- Median difference of: -4.5 CFM25, 3.2% lower than expected

Most homes were within reasonable range of ex ante estimates. However, the Evaluators found that 42.9% of tested homes had higher leakage than shown in program tracking, while 57.1% had lower leakage. The Evaluators found a total of 14 homes with leakage greater than 50% of what tracking data claimed, averaging 123.5% higher for all 14 homes. These findings decreased savings for this measure accordingly.

3.2.2.6 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 3-11 and

Table 3-12.

Table 3-11 Expected and Realized Duct Sealing Savings – New Orleans

Heating Type	**Expected kWh Savings**	**Realized kWh Savings**	**kWh Realization Rate**	**Expected Peak kW Savings**	**Realized Peak kW Savings**	**Peak kW Realization Rate**
Natural Gas Furnace	130,027	112,505	86.5%	58.63	52.92	90.3%
Electric Resistance	390,850	376,376	96.3%	80.42	75.13	93.4%

Air Source Heat Pump	1,574	1,462	92.9%	0.46	0.43	93.5%
Total	**522,451**	**490,343**	**93.9%**	**139.51**	**128.48**	**92.1%**

Table 3-12 Expected and Realized Duct Sealing Savings - Algiers

Heating Type	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*Peak kW Realization Rate*
Natural Gas Furnace	14,403	13,479	93.6%	6.78	6.34	93.5%
Electric Resistance	22,004	24,558	111.6%	5.46	4.90	89.7%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**36,407**	**38,037**	**104.5%**	**12.24**	**11.24**	**91.8%**

3.2.3 LED Savings Calculations

Methods for calculating he deemed savings values for LEDs came New Orleans TRM, sections B.5.1.7. Calculation of Deemed Savings, B.5.3. ENERGY STAR® Directional LEDs and B.5.4. ENERGY STAR® Omni-Directional LEDs. Deemed per-unit kWh and kW savings were applicable to several lamp types installed during PY7.

3.2.3.1 Deemed Energy Savings

Table 3-13 ENERGY STAR® Omnidirectional LEDs – Deemed Savings Per Lamp[9]

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

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[9] TRM Table 105, page B-138

Table 3-14 Deemed Savings for ENERGY STAR® Directional LEDs[10]

Lamp Type	**Incandescent Equivalent (Pre-EISA)**	**Baseline Watts**	**Efficient Watts**	**kWh/Lamp**	**kW/Lamp**
PAR20	50	35	8	19.69	0.00408
PAR30	50	35	11	17.50	0.00363
R20	50	45	8	26.98	0.00559
PAR38	60	55	11	32.08	0.00665
BR30	65	65	10	40.10	0.00832
BR40	65	65	14	37.19	0.00771
ER40	65	65	14	37.19	0.00771
BR40	75	65	14	37.19	0.00771
BR30	75	65	13	37.92	0.00786
PAR30	75	55	13	30.62	0.00635
PAR38	75	55	14	29.89	0.00620
R30	75	65	9	40.83	0.00847
R40	75	65	12	38.64	0.00801
PAR38	90	70	11	43.02	0.00892
PAR38	120	70	15	40.10	0.00832
R20	≤ 45	45	6	28.44	0.00590
BR30	≤ 50	50	9	29.89	0.00620
BR40	≤ 50	50	12	27.71	0.00575
ER30	≤ 50	50	11	28.44	0.00590
ER40	≤ 50	50	12	27.71	0.00575

For those lamps which did not have an applicable deemed savings value, savings were calculated using the following TRM algorithms:

3.2.3.2 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[11]

Table 3-15 ENERGY STAR® Directional LEDs –Baseline Watts for EISA-Exempt Lamps[12]

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[10] TRM Table 100, page B-133

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

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

W_{post} = Actual wattage of LED installed

$Hours$ = Average hours of use per year (see Table 3-16)

IEF_E = Interactive Effects Factor to account for cooling energy savings and heating energy penalties (see Table 3-16)

IEF_D = Interactive Effects Factor to account for cooling demand savings (see Table 3-16)

CF = Coincidence Factor, (see Table 3-16)

ISR = In Service Rate, or percentage of rebate units that get installed, to account for units purchased but not immediately installed (see Table 3-16)

Table 3-16 Deemed Savings Values for Lighting Calculations

Parameter	***Interior Value***	***Exterior Value***
Hours	819.43	1,439
IEFE	0.91	1.00
IEFD	1.21	1.00
CF	12.74%	0.0%
ISR	.98	.98

3.2.3.3 LED Savings Results

The savings resulting from applying TRM algorithms and deemed savings parameters are summarized in Table 5-7 and Table 5-8.

Table 3-17 Expected and Realized LED Savings – New Orleans

Lamp Type	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Realized Peak kW Savings***	***Peak kW Realization Rate***
LED 11W (A-Type)	32,520	32,520	100.0%	6.75	6.75	100.0%
LED 11W Flood	16,879	17,043	101.0%	3.50	3.54	101.0%
LED 15W (A-Type)	5,152	5,153	100.0%	1.07	1.07	100.0%

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[12] TRM Table 102, page B-135.

LED 5W Candelabra	48,886	50,436	103.2%	10.14	10.44	102.8%
LED 6W Globe	9,468	9,218	97.4%	1.96	1.91	97.2%
LED 7.5W (A-Type)	241	241	100.0%	0.05	0.05	100.9%
LED 8W Flood	18,687	18,687	100.0%	3.88	3.88	100.0%
LED 9W (A-Type)	54,117	54,117	100.0%	11.22	11.22	100.0%
Outdoor LED 15W (A-Type)	24,672	42,060	170.5%	0.18	-	0.0%
Outdoor LED 9W (A-Type)	397	698	176.0%	-	-	N/A
Outdoor LED 9W (Photocell)	99	175	176.0%	-	-	N/A
Total	**211,118**	**230,348**	**109.1%**	**38.75**	**38.84**	**100.3%**

Table 3-18 Expected and Realized LED Savings - Algiers

Lamp Type	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Realized Peak kW Savings***	***Peak kW Realization Rate***
LED 11W (A-Type)	2,571	2,571	100.0%	0.53	0.53	100.0%
LED 11W Flood	1,524	1,524	100.0%	0.32	0.32	100.0%
LED 15W (A-Type)	540	540	100.0%	0.11	0.11	100.0%
LED 5W Candelabra	8,230	8,492	103.2%	1.71	1.76	103.0%
LED 6W Globe	357	348	97.4%	0.07	0.07	97.2%
LED 8W Flood	962	962	100.0%	0.20	0.20	100.0%
LED 9W (A-Type)	10,808	10,808	100.0%	2.24	2.24	100.0%
Outdoor LED 15W (A-Type)	1,807	3,072	170.0%	-	-	N/A
Outdoor LED 9W (A-Type)	99	175	176.0%	-	-	N/A
Total	**26,899**	**28,492**	**105.9%**	**5.18**	**5.23**	**101.0%**

- Sixteen BR30 11W flood lamps were misclassified as and given deemed savings values for 11W a-lamps. Deemed savings for 11W a-lamps is 29.89kWh, however deemed savings for BR30 lamps of these wattage is deemed at 40.10, resulting in a slightly higher realization rate for these 16 lamps.
- Candelabra LEDs with ≤ 1049 lumens are exempt from EISA. 52,304 5W candelabra lamps were misclassified and given a deemed unit savings value of 24.79 kWh. The Evaluators recalculated savings using a baseline wattage of 40, based on lumen output, from Table 102[13] resulting in a per-unit kWh savings of 25.58, and thus slightly high realization rate.
- Globe LEDs with ≤ 1049 lumens are exempt from EISA. 385 6W globe lamps were misclassified and assumed to save 25.52 kWh. The Evaluators

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[13] Table 102: ENERGY STAR® Directional LEDs –Baseline Watts for EISA-Exempt Lamps, page B-135.

recalculated savings using a baseline wattage of 40, based on lumen output, from Table 10214 resulting in a per-unit kWh savings of 24.85, and thus slightly low realization rate.

- Ex ante calculations for 22 exterior LEDs assumed a peak coincidence factor >0, which is not applicable to exterior lighting. Ex post savings results do not attributable kW savings to these lamps.
- Ex ante calculations for exterior LEDs (641 lamps in total) assumed interior operating hours (819.43), however the Evaluators used exterior values appropriate for exterior lighting (1,439) in ex post savings calculations, resulting in high kWh realization rates. Savings for 5W candelabras used a deemed savings value of 24.79 kWh per lamps, taken from TRM table 10515.

3.2.4 Deemed Savings for Other Measures

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

Table 3-19 Summary of Measures and Expected Savings – New Orleans

Measure	***TRM Section***	***Calculated/Deemed***	***TRM Table(s)***	***Table Page(s)***
AC Tune-up	B.3.6	Calculated	N/A	
Aerators	B.2.4	Deemed	Table 33	B-54
Ceiling Insulation	B.4.2	Calculated with deemed savings multipliers	Table 63	B-96
LEDs	B.5.3, B.5.4	Deemed and Calculated	Table 99, Table 100, Table 105	B-132, B-133, B-138
Pipe Wrap	B.2.3	Deemed	Table 31	B-51
Power Strips	B.1.5	Deemed	Table 11	B-26
Showerheads	B.2.5	Deemed	Table 38	B-60
Thermostats	2.1.12 Arkansas TRM 7	Deemed	Equation 71	86

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[14] Table 102: ENERGY STAR® Directional LEDs –Baseline Watts for EISA-Exempt Lamps, page B-135.

[15] Table 105: ENERGY STAR® Omnidirectional LEDs – Deemed Savings Per Lamp, page B-138.

3.3 Verified Savings by Measure – HPwES

After reviewing the tracking data and inputs for savings calculations, the Evaluators provided verified savings using deemed values developed for New Orleans combined with in-field testing results.

3.4 Verified Gross Savings

Realized savings is presented by program channel in Table 3-20 through Table 3-21.

Table 3-20 Gross Realization Summary – New Orleans

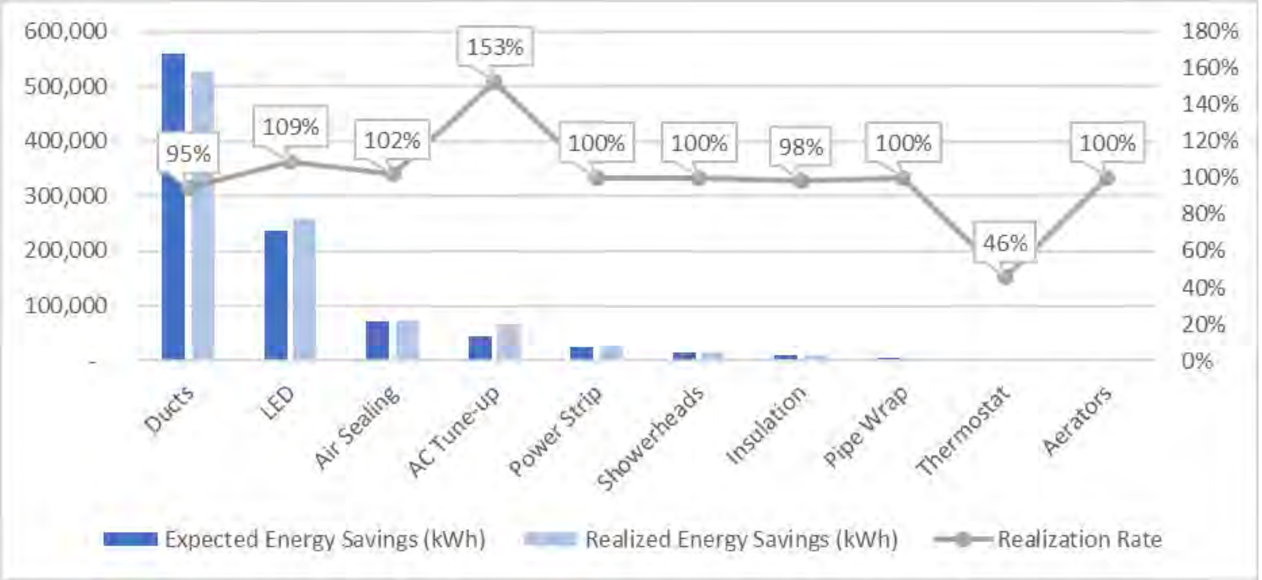
Measure	Expected kWh Savings	Expected kW Savings	Verified kWh Savings	Verified kW Savings	Realization	
					kWh	kW
AC Tune-up	42,976	15.56	64,878	30.52	150.96%	196.14%
Aerators	1,954	0.20	1,954	0.20	100.00%	100.00%
Air Sealing	60,587	19.64	61,733	20.09	101.89%	102.29%
Duct Sealing	522,451	139.51	490,343	128.48	93.85%	92.09%
LED	211,118	38.75	230,348	38.84	109.11%	100.23%
Pipe Wrap	4,659	0.53	4,659	0.53	100.00%	100.00%
Power Strip	23,843	2.59	23,843	2.59	100.00%	100.00%
Showerheads	14,238	1.48	14,238	1.48	100.00%	100.00%
Thermostat	3,109	-	1,425	-	45.83%	N/A
Total	**884,935**	**218.26**	**893,421**	**222.73**	**100.96%**	**102.0%**

Table 3-21 Gross Realization Summary – Algiers

Measure	Expected kWh Savings	Expected kW Savings	Verified kWh Savings	Verified kW Savings	Realization	
					kWh	kW
AC Tune-up	817	0.30	1,936	0.90	236.96%	306.67%
Aerators	53	0.01	53	0.01	100.00%	100.0%
Air Sealing	11,088	3.59	11,248	3.67	101.44%	102.2%
Duct Sealing	36,407	12.24	38,037	11.24	104.48%	91.8%
Attic Insulation	10,844	3.00	10,640	3.00	98.12%	100.0%
LED	26,899	5.18	28,492	5.23	105.92%	100.9%
Power Strip	1,431	0.16	1,431	0.16	100.00%	100.0%
Showerheads	452	0.05	452	0.05	100.00%	100.0%
Total	**87,991**	**24.52**	**92,289**	**24.26**	**104.88%**	**99.0%**

Ex ante AC tune-ups savings was based on deemed savings values of 816 kWh per each unit >2.5 tons cooling, 545 kWh per each unit ≤ 2.5 tons cooling. The Evaluators calculated savings based on algorithms and inputs found in section B.3.6 of the New Orleans TRM, resulting in higher ex post savings.

Figure 3-3 Savings contribution by measure, HPwES



3.5 Estimation of Net Savings

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 Evaluator attempted to complete surveys with all of the forty-seven customers who completed projects by December 2017. In total, 29 program participants completed the survey.

3.5.1 Estimation of Free Ridership

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.

Participant responses to these questions were used to calculate three scores corresponding to the presence of prior plans, the likelihood of completing the project in the absence of the program, and the timing of that project if it had been completed.

3.5.1.1 Prior Plans Score

Respondents were scored as 1 on the prior plans score if both of the following were true:

- The participant had plans to complete the project prior to learning about the program.
- The participant indicated that they would have been financially able to complete the project had a discount or rebate not been provided.

Respondents that did not have prior plans and could afford the measures were not deemed to be free riders.

3.5.1.2 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 and 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

The likelihood score is equal to either:

- 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 discount.

3.5.1.3 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

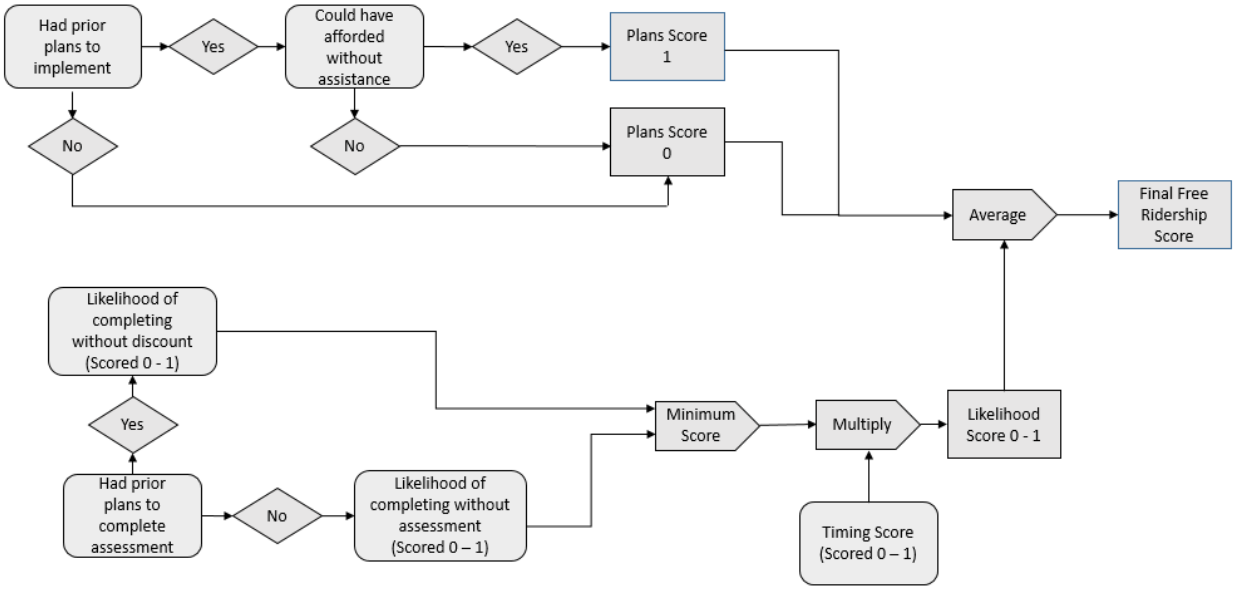
3.5.1.4 Final Free Ridership Score

The final free ridership score is equal to the following:

*Free Ridership = Average (Plans Score + Likelihood Score * Timing Score)*

The procedures used to estimate free ridership are summarized below in Figure 3-4.

Figure 3-4 Summary of Free Ridership Scoring Algorithm



3.5.2 Estimation of Participant Spillover

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.

No measures reported measures that qualified as program spillover.

3.5.3 Net Savings Results

Free ridership for the program was estimated by weighting each participant's response by the associated verified gross kWh savings or peak kW reductions for the measure. 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.[16] Table 3-22 and Table 3-23 summarize the program net kWh savings and peak kW demand reduction impacts of the HPwES Program.

Table 3-22 HPwES Summary of Verified Net Savings

Utility	***Expected kWh Savings***	***Verified Gross kWh Savings***	***Free Ridership***	***Spillover***	***Verified Net kWh Savings***	***Net to Gross Ratio***
ENO	884,935	893,421	2%	0	872,375	98%
Algiers	87,991	92,289	2%	0	90,115	98%
Total	**972,926**	**985,710**	2%	**0**	**962,489**	**98%**

Table 3-23 HPwES Summary of Verified Net Peak Demand Reductions

Utility	***Expected Peak kW Reductions***	***Verified Gross Peak kW Reductions***	***Free Ridership***	***Spillover***	***Verified Net Peak kW Reductions***	***Net to Gross Ratio***
ENO	218.27	222.73	3%	0	216.25	97%

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

Algiers	24.39	24.26	3%	0	23.56	97%
Total	**242.66**	**247.00**	**3%**	**0**	**239.80**	**97%**

3.6 Process Evaluation Findings

3.6.1 Staff Interview Findings

The Evaluator completed two interviews with five implementation contractor program management staff.

Three of the interviewees were from Aptim, the prime contractor, and two were from GoodCents, subcontractor to Aptim who oversees the residential portfolio.

3.6.1.1 Program Launch

The program launch date was April 1st, however, there was a period of transition between January and April that involved coordination with the previous implementation contractor to understand projects in the pipeline and to review marketing collateral, intake procedures, and other aspects related to the implementation of the programs.

During the transition period, staff coordinated with Entergy and the City Council's advisors, including participating in technical conferences held to review the program implementation and design. Program staff also developed new documentation and procedures, including development of marketing collateral, application forms and transitioning the website. The implementation contractor noted that a few residential contractors were operating in the market prior to April 1st. Other activities that occurred before April first included providing program overview contractor training and the distributing a letter informing contractors that the program was transitioning to a new implementation contractor.

3.6.1.2 Program Design and Goals

As in previous years, there are annual savings goals set for each program and for the New Orleans and Algiers service territories. In addition, the implementation contractor has various key performance indicators (KPIs) related to addressing customer issues, timely payment on projects, supplier diversity, and customer satisfaction.

The HPwES and LIA&Wx program design changed in 2017. The energy assessments are now completed by the implementation contractor rather than by a program trade ally. This change was made to avoid the potential that a trade ally may cherry-pick certain measures at the expense of offering comprehensive retrofits. Blower door testing is performed as part of the assessment completed by the implementation contactor for LIA&Wx, but not for HPwES, and duct pressure testing is not performed for either program. Instead, the determination of who should receive air or duct sealing is based on a discussion with the customer about their energy costs as well as visual inspections of the home. If air or duct sealing measures are implemented, the installing trade ally completes the pre- and post-testing. The audits are completed using a software program. Once the audit is completed, the intent is to provide the customer with a report of the audit. Because of technical issues that results in errors in the report, the assessment report was not provided to customers as of the January 2018 interview date. Staff reported that they follow up with customers regarding moving forward with projects after the completion of the audit and estimated that 70% of audits convert to program projects.

3.6.1.3 Program Performance

For the residential programs, staff noted that there was a slow start for the programs because of a need to build and develop the basic program infrastructure. Additionally, because the programs shut-down and then restarted, some contractors largely disengaged from the program. As a result of the need to develop the program infrastructure, including re-establishing relationships with contractors, the first contractor payment was not made until August. For the lighting discounts component, staff indicated that the first MOUs were in place by July and the first payments for discounted lighting were made in August.

Despite the initial delays, staff indicated that they came close to meeting all of the program savings goals. Nevertheless, the PY7 savings for HPwES and the LIA&Wx programs fell substantially in comparison to PY6. In addition to the initial delays in launching the program noted above, staff also noted that the PY6 programs exceeded their planned incentive budgets through the reallocation of funds from underperforming programs and as a result, greatly exceeded their goals. The current contract does not allow the program savings to exceed 120% of program goal.

3.6.1.4 Marketing and Outreach

The implementation contractors discussed the planned and actualized portfolio marketing strategy. In terms of planned activities, staff indicated that they intend to create an enhanced website that is more user-friendly and includes more information for interested contractors and customers. Additionally, the program has a goal of creating refreshed collateral that may have previously been insufficiently detailed and not readily available to the market.

Staff cited increased community engagement in PY7 with groups such as the Urban League and through presentations at events like women's business conferences. These activities are part of their strategy to improve awareness of the programs and to present Entergy New Orleans as a trusted partner in the market.

In PY7, the implementation contractor also engaged in outreach to contractors that had participated in prior program years. They communicated with the contractors via email blasts and developed a notification letter outlining the transition of the programs to the new implementation contractor. They also hosted a webinar on the transition of the programs and held individual in-person meetings with trade allies. In addition, one meeting specific to the business program contractors and two for residential program contractors were held. Staff characterized these as the “beginnings of focus group” meetings with contractors. Additionally, the program developed FAQ documents for contractors and for Entergy customer service representatives.

The residential marketing approach was based on seasonal campaigns (e.g., marketing AC tune-ups during warming months). Direct customer outreach was largely done through bill inserts and direct mail campaigns. Staff noted that they were planning greater use of social media in 2018. The appliance rebates and lighting discounts are primarily promoted with point-of-sale materials at participating retailers.

A key point emphasized by staff was that the limited marketing budget required very strategic use of those dollars to maximize their impact on enrollments. Staff also thought they had effectively leveraged those budgets in 2017.

Future plans for enhancing the outreach include greater engagement with AC tune-up providers and pool suppliers to promote the high efficiency pool pumps.

3.6.1.5 Trade Ally Training and Development

Training was provided to residential trade allies in PY7 that focused on providing information about the program the program. This training was provided through a general meeting and through one one-on-one follow up meetings. Technical training is planned for 2018.

3.6.1.6 Quality Control Processes

For HPwES, all contractors were shadowed for their first five jobs. After the successful completion of five projects, the program aims to inspect 5% of the work performed by each contractor is inspected. Staff indicated that they provide the contractors with a checklist used during the verification visits to communicate their quality expectations.

For AC tune-ups, the program plans to inspect 5% of the program work done. During 2017 they did not shadow the work performed by the contractors because of the lack of staffing to complete that work. However, staff noted that the contractor that performed the tune-ups has worked with the tune-up program for several years.

For lighting discounts, the trade ally liaison visits the retail locations and uses a spreadsheet of rebated SKUs and makes sure these are applied to the products correctly. The visits are performed on a weekly basis, with each store getting a visit twice a month. The high frequency of visits was due to issues with stores not stocking all of the SKUs in 2017. Staff indicated that the number of store visits will likely decline as this issue has been largely resolved.

3.6.1.7 Opportunities for Program Improvement

Staff indicated that there were opportunities to improve the reporting for the residential program to make it more efficient and effective. Staff reported that some challenges were encountered during 2017 that may have impacted forecasting but indicated that the challenges were not unusual when new programs are launched.

Another opportunity for program improvement identified was improved outreach and engagement of pool and HVAC tune-up contractors to increase uptake of efficient pool pumps and tune-ups.

Staff may alter incentives for lighting discounts to slow down the program activity. At one point they noted that about 10% of the program goal was being achieved per week. One approach may be to focus more specialty lamps and moving away from 60W A-line bulbs.

Staff is planning on outreach to managed properties. Because many of these properties received direct install measures through the previous implementation contractor, the effort will be made to make improvements to duct systems.

Two other potential changes are to have contactors perform air leakage testing instead of Aptim staff for the income qualified program. This change would bring the program in-line with the procedures for HPwES Program.

Staff also suggested that a low-income channel should be added to the multifamily program.

3.6.2 Participant Survey Results

The survey used to estimate net savings also asked participants questions about how they learned of the program and their satisfaction with it.

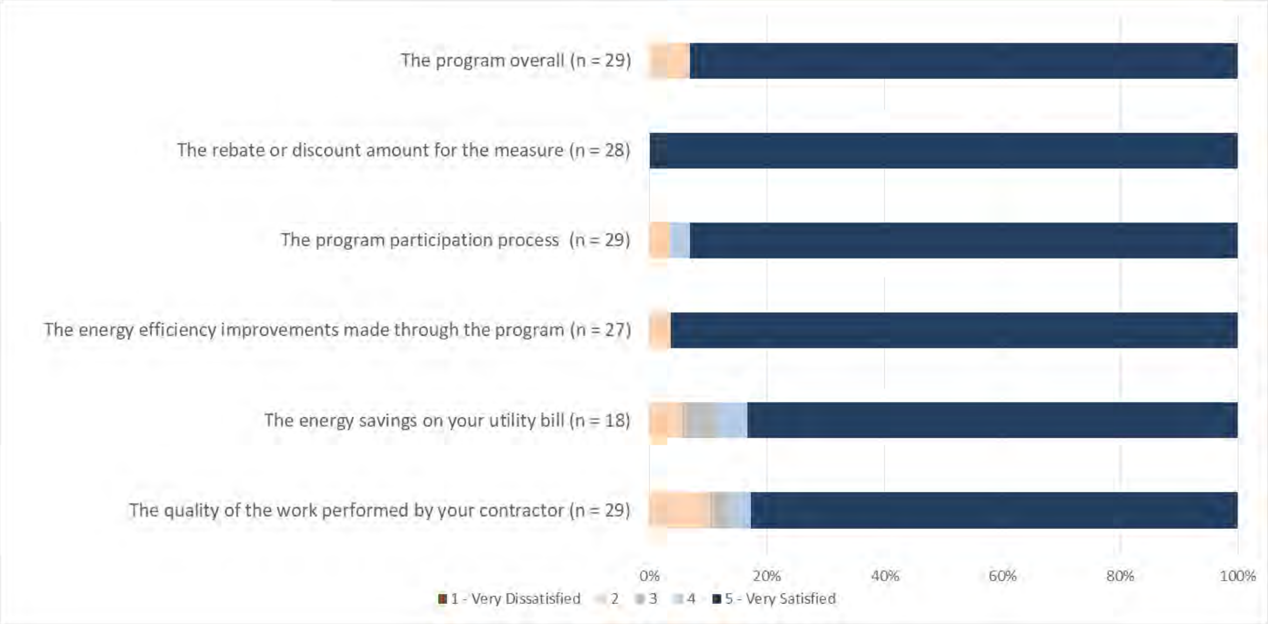
The two most common means by which participants learned of the program were from a friend, family member, colleague (41%) or from print advertisement (31%).

Table 3-24 How Participants Learned of the Program

Response	***Percentage of Respondents (n=29)***
Friend, family member, or colleague	41%
A print advertisement	31%
Email from utility	7%
Program representative	3%
From utility’s website	3%
Other	7%
Don't know	7%

Figure 3-5 summarizes participant satisfaction. Eighty-six percent of respondents indicated satisfaction with the program overall by providing a rating of four or five on a five-point scale. Dissatisfaction was highest with the quality of the work performed by the contractor. Two customers reported that the contractors did not finish completing the work and two reported that the contractors were inexperienced or unprofessional.

Figure 3-5 Participant Satisfaction



3.7 Recommendations

The Evaluators' recommendations are as follows:

- **Plan to add radiant barriers to the program.** These are to be added in TRM V2.0 for New Orleans and would make a viable addition to the current building envelope measures.
- **Work with program evaluators to establish "mystery shop QA" in PY8.** This entails pre-testing homes prior to them being referred to program trade allies in order to assess the accuracy of their pre-retrofit leakage tests for duct sealing and air sealing measures. This would supplant the post-retrofit QA performed by the Evaluators for PY5-PY7.

4. Low Income Audit and Weatherization

4.1 Program Description

The Low Income Audit and Weatherization Program (LIA&Wx) 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 LIA&Wx program is intended to be primarily implemented through local participating trade allies who provide energy efficiency upgrades available to income qualifying customers. 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 LIA&Wx program provides customers with household incomes at or below 60% of the estimated State's median income with home energy upgrades at low or no cost.[17] The Program offers these customers a free home energy assessment through a qualified and participating trade ally.

A change made to the LIA&Wx program is that documentation that substantiates that the customer meets the program income requirements is not required. Staff noted that they believe the contractors are still collecting this information, but the collection of it is not stated in the program implementation plan.

A total of 316[18] households participated in LIA&Wx, Table 4-1 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 4-1 Summary of Measures and Expected Savings – New Orleans

Measure	***Number of Homes***	***Expected kWh Savings***	***Expected kW Savings***
AC Tune-up	31	25,024	9.06
Aerators	103	3,882	0.41
Air Sealing	47	9,941	3.22
Ducts	138	368,860	98.91
Ceiling Insulation	42	323,977	85.00

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[17] 60% of the State's median income is the qualification requirement for Louisiana's Low Income Home Energy Assistance Program (LIHEAP).

[18] This total does not equal the sum of the "Number of Homes" column in Table 3-1, Table 3-2 and **Error! Reference source not found.** due to individual residences receiving multiple measures.

LED	4,717	130,903	23.66
Pipe Wrap	22	2,279	0.26
Showerheads	94	21,244	2.21
Total:	**5,194**	**886,110**	**222.73**

Table 4-2 Summary of Measures and Expected Savings – Algiers

Measure	***Number of Homes***	***Expected kWh Savings***	***Expected kW Savings***
Aerators	16	601	0.06
Air Sealing	15	4,570	1.48
Ducts	23	57,581	15.27
Ceiling Insulation	10	73,925	17.00
LED	701	18,222	3.47
Pipe Wrap	5	684	0.08
Showerheads	15	3,390	0.35
Total	**785**	**158,973**	**37.72**

In PY7 the program introduced six new measures: AC tune-ups, faucet aerators, LED light bulbs, pipe wrap, advanced power strips and low-flow showerheads. Program efforts were shifted from air sealing to focus more on LEDs. Overall program participation increased by 19.2% in PY7 and expected savings by home decreased by 44.9%.

Table 4-3 Participation and Expected Savings by Program Year[19]

PY	***Count Homes***	***Percent Difference***	***Expected kWh per Home***	***Percent Difference***
PY6	265	19.2%	6,003	-44.9%
PY7	316		3,307	

The program goals and achievement of the goals is summarized below.

Table 4-4 Summary of Program Goals

Operating Company	***kWh***	***kW***
ENO	985,729	213.5
Algiers	74,694	16.0

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[19] Figures adjusted to reflect 9-month PY7 program period.

Table 4-5 LIA&Wx Summary of kWh Goal Achievement

Operating Company	**Verified Net kWh**	**kWh Goal**	**% of Goal Attained**	**Verified kW**	**kW Goal**	**% of Goal Attained**
ENO	880,394	985,729	89.31%	225.05	213.5	105.41%
Algiers	158,874	74,694	212.70%	39.57	16	247.31%

4.2 Impact Savings Calculation Methodology

Evaluation of the LIA&Wx included the following:

- Surveys with participants;
- Interviews with program staff;
- Interviews with program trade allies; and
- On-site testing and data collection.

The LIA&Wx has received comprehensive impact and process evaluations in PY5 and PY6. The evaluations provided discussions of program satisfaction and strategic recommendations for program improvement. Due to the income qualification requirements to participate in the program, NTGR for the LIA&Wx is stipulated at 100%. In the initial review of the PY7 program, the Evaluators concluded that the LIA&Wx program did not warrant more than a brief overview of program activity. The rationales for this are as follows:

- **Similarity program scope.** In PY7, all program implementation was taken over by Aptim from CLEAResult. Process sections in this report discuss differences in program implementation by year. HPwES, LIA&Wx and Multifamily operate identically aside from: LIA&Wx participants household incomes at or below 60% of the estimated State’s median income, and Multifamily participants do not have this stipulation but must live in homes of two or more attached dwelling units. Other program factors are identical and are managed by the same implementation program manager. Discussion of the changeover and other Process-related items are discussed in the Process section of HPwES.
- **Coverage of program measures in New Orleans TRM.** All measures installed in LIA&Wx have deemed savings provided in the New Orleans TRM, with lighting usage estimates based on the New Orleans lighting metering study conducted in the PY6 evaluation and EFLHc specific to New Orleans based on data collected during the PY6 evaluation.
- **Past evaluations showed high satisfaction metrics.** As seen in the figure below, the LIA&Wx program has high participant satisfaction. The Evaluators did not find operational issues with the program that warranted further review in PY7.

Impact savings were calculated using methods and inputs in the New Orleans TRM 1.0 and incorporated results from on-site testing where appropriate. PY7 major savings components are duct sealing, insulation and LEDs. Impact methodologies for LIA&Wx are the same as described for HPwES, described in section 3.2 M&V Methodology, however due to the high kWh saving contribution of ceiling insulation to the LIA&Wx program, its savings calculation methods are discussed below.

4.3 Verified Savings by Measure

4.3.1 Ceiling Insulation

4.3.1.1 Ceiling Insulation Savings Multipliers

Methods for calculating he deemed savings values for ceiling insulation came from the New Orleans TRM, section B.4.2. 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 4-6 shows the deemed savings multipliers for New Orleans.

Table 4-6 Deemed Savings Multiplier for R-30[20]

Ceiling Insulation Base R-Value	AC/Gas Heat kWh (/ sq. ft.)	AC/Electric Resistance kWh (/ sq. ft.)	Heat Pump kWh (/ sq. ft.)	AC Peak Savings (kW) (/ sq. ft.)
0 to 4	2.3451	5.9291	3.6430	0.0016
5 to 8	1.1392	3.1249	1.8749	0.0005
9 to 14	0.6446	1.8343	1.1072	0.0003
15 to 22	0.3402	1.0027	.6018	0.0001

All PY7 LIA&Wx insulation measures were R-0 to 4 to R-30.

4.3.1.2 Ceiling Insulation Savings Results

Verified savings for this measure are provided in Table 4-7 and Table 4-8.

Table 4-7 Expected and Realized Attic Insulation Savings – New Orleans

Heating Type	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Realized Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	8,617	8,455	98.1%	2.00	2.00	100.0%

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[20] TRM Table 66, page B-97

Electric Resistance	315,360	314,251	99.6%	83.00	85.00	102.4%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**323,977**	**322,706**	**99.6%**	**85.00**	**87.00**	**102.4%**

Table 4-8 Expected and Realized Attic Insulation Savings - Algiers

Heating Type	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Realized Peak kW Savings***	***Peak kW Realization Rate***
Natural Gas Furnace	5,608	5,502	98.1%	1.00	1.00	100.0%
Electric Resistance	68,317	71,587	104.8%	16.00	19.00	118.8%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**73,925**	**77,089**	**104.3%**	**17.00**	**20.00**	**117.6%**

Minor differences in realization can be attributed to rounding in ex ante and clerical errors in ex ante data.

4.3.2 Infiltration/Air Sealing Savings

Details about M&V Impact methodologies for LIA&Wx Air Infiltration are the same as described for HPwES, described in section 3.2.1 Air Infiltration Reduction Savings Calculations.

Table 4-9 Expected and Realized Air Sealing Savings – New Orleans

Heating Type	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Realized Peak kW Savings***	***Peak kW Realization Rate***
Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	9,941	11,292	113.6%	3.22	3.67	114.0%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**9,941**	**11,292**	**113.6%**	**3.22**	**3.67**	**114.0%**

Table 4-10 Expected and Realized Air Sealing Savings - Algiers

Heating Type	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Realized Peak kW Savings***	***Peak kW Realization Rate***
Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	4,570	4,884	106.9%	1.48	1.61	108.8%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**4,570**	**4,884**	**106.9%**	**1.48**	**1.61**	**108.8%**

4.3.3 Duct Sealing Savings

Details about M&V Impact methodologies for LIA&Wx Duct Sealing are the same as described for HPwES, described in section 3.2.2 Duct Sealing Savings Calculations.

Table 4-11 Expected and Realized Duct Sealing Savings – New Orleans

Heating Type	**Expected kWh Savings**	**Realized kWh Savings**	**kWh Realization Rate**	**Expected Peak kW Savings**	**Realized Peak kW Savings**	**Peak kW Realization Rate**
Natural Gas Furnace	93,242	87,500	93.8%	43.87	41.16	93.8%
Electric Resistance	275,618	254,441	92.3%	55.04	50.79	92.3%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**368,860**	**341,941**	**92.7%**	**98.91**	**91.95**	**93.0%**

Table 4-12 Expected and Realized Duct Sealing Savings - Algiers

Heating Type	**Expected kWh Savings**	**Realized kWh Savings**	**kWh Realization Rate**	**Expected Peak kW Savings**	**Realized Peak kW Savings**	**Peak kW Realization Rate**
Natural Gas Furnace	13,922	12,619	90.6%	6.55	5.94	90.7%
Electric Resistance	43,659	40,191	92.1%	8.72	8.02	92.0%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**57,581**	**52,810**	**91.7%**	**15.27**	**13.96**	**91.4%**

4.3.4 LED Lighting Savings

The savings resulting from applying TRM algorithms and deemed savings parameters are summarized in HPwES, section 3.2.3 LED Savings Calculations.

Table 4-13 Expected and Realized LED Savings – New Orleans

Lamp Type	**Expected kWh Savings**	**Realized kWh Savings**	**kWh Realization Rate**	**Expected Peak kW Savings**	**Realized Peak kW Savings**	**Peak kW Realization Rate**
LED 11W (A-Type)	12,973	12,973	100.0%	2.69	2.69	100.0%
LED 15W (A-Type)	623	623	100.0%	0.13	0.13	100.0%
LED 5W Candelabra	35,922	37,061	103.2%	7.45	7.67	103.0%
LED 6W Globe	4,976	4,845	97.4%	1.03	1.00	97.2%
LED 8W Flood	11,228	11,228	100.0%	2.33	2.33	100.0%
LED 9W (A-Type)	48,390	48,390	100.0%	10.03	10.03	100.0%
Outdoor LED 15W (A-Type)	16,692	28,381	170.0%	-	-	N/A
Outdoor LED 9W (Photocell)	99	175	176.0%	-	-	N/A
Total	**130,903**	**143,676**	**109.8%**	**23.66**	**23.85**	**100.8%**

Table 4-14 Expected and Realized LED Savings - Algiers

Lamp Type	**Expected kWh Savings**	**Realized kWh Savings**	**kWh Realization Rate**	**Expected Peak kW Savings**	**Realized Peak kW Savings**	**Peak kW Realization Rate**

LED 11W (A-Type)	538	538	100.0%	0.11	0.11	100.0%
LED 15W (A-Type)	166	166	100.0%	0.03	0.03	100.0%
LED 5W Candelabra	6,371	6,573	103.2%	1.32	1.36	103.0%
LED 6W Globe	1,200	1,168	97.3%	0.25	0.25	100.0%
LED 8W Flood	80	80	100.0%	0.02	0.02	100.0%
LED 9W (A-Type)	8,404	8,404	100.0%	1.74	1.74	100.0%
Outdoor LED 15W (A-Type)	1,463	2,487	170.0%	-	-	N/A
Total	**18,222**	**19,416**	**106.6%**	**3.47**	**3.51**	**101.2%**

4.4 Verified Gross Savings

Realized savings is presented by program channel in Table 4-15 and Table 4-16.

Table 4-15 Gross Realization Summary – New Orleans

Measure	*Expected kWh Savings*	*Expected kW Savings*	*Verified kWh Savings*	*Verified kW Savings*	*Realization*	
					kWh	*kW*
AC Tune-up	25,024	9.06	33,374	15.70	133.37%	173.23%
Aerators	3,882	0.41	3,882	0.41	100.00%	100.01%
Air Sealing	9,941	3.22	11,292	3.67	113.59%	113.98%
Ducts	368,860	98.91	341,941	91.95	92.70%	92.96%
Insulation	323,977	85.00	322,706	87.00	99.61%	102.35%
LED	130,903	23.66	143,676	23.85	109.76%	100.81%
Pipe Wrap	2,279	0.26	2,279	0.26	100.00%	100.00%
Showerheads	21,244	2.21	21,244	2.21	100.00%	100.00%
Total	**886,110**	**222.73**	**880,394**	**225.05**	**99.35%**	**101.04%**

Table 4-16 Gross Realization Summary – Algiers

Measure	*Expected kWh Savings*	*Expected kW Savings*	*Verified kWh Savings*	*Verified kW Savings*	*Realization*	
					kWh	*kW*
Aerators	601	0.06	601	0.06	100.00%	100.01%
Air Sealing	4,570	1.48	4,884	1.61	106.86%	108.84%
Ducts	57,581	15.27	52,810	13.96	91.71%	91.42%
Insulation	73,925	17.01	77,089	20.00	104.28%	117.65%
LED	18,222	3.47	19,416	3.51	106.56%	100.92%
Pipe Wrap	684	0.08	684	0.08	100.00%	100.00%
Showerheads	3,390	0.35	3,390	0.35	100.00%	100.00%
Total	**158,973**	**37.72**	**158,874**	**39.57**	**99.94%**	**104.91%**

4.5 Verified Net Savings

Due to the income qualification requirements to participate in the program, NTGR for the LIA&Wx is stipulated at 100%.

5. Energy Smart for Multifamily

5.1 Program Description

The Energy Smart for Multifamily (Multifamily) Program was introduced in PY7. The program is designed to promoted 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 two or more attached dwelling units. Any property with more than one meter is considered a multifamily property. Staff noted this definition conforms well to the types of housing stock in New Orleans that has a large share of duplex housing and comparatively fewer large apartment complexes. 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. Staff indicated that there is not a low income channel for multifamily tenants and the program manager said that they requested that this channel be added to the program.

A total of 261[21] households participated in the Multifamily program, 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 – New Orleans

Measure	***Number of Homes***	***Expected kWh Savings***	***Expected kW Savings***
AC Tune-up	9	7,343	2.66
Aerators	159	5,722	0.60
Air Sealing	13	19,560	6.34
Ducts	36	107,972	26.08
LED	4,104	110,199	22.05
Pipe Wrap	2	228	0.03
Showerheads	105	23,730	2.47
Thermostats	90	62,659	-

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[21] This total does not equal the sum of the "Number of Homes" column in *Table 3-1*, *Table 3-2* and **Error! Reference source not found.** due to individual residences receiving multiple measures.

Total:	**4,518**	**337,413**	**60.22**

Table 5-2 Summary of Measures and Expected Savings – Algiers

Measure	***Number of Homes***	***Expected kWh Savings***	***Expected kW Savings***
Aerators	8	283	0.03
LED	142	3,694	0.75
Showerheads	9	2,034	0.21
Total:	**159**	**6,011**	**0.99**

The program goals and achievement of the goals is summarized below.

Table 5-3 Summary of Program Goals

Operating Company	***kWh***	***kW***
ENO	259,377	49.00
Algiers	19,340	3.70

Table 5-4 Multifamily Summary of kWh Goal Achievement

Operating Company	***Verified Net kWh***	***kWh Goal***	***% of Goal Attained***	***Verified kW***	***kW Goal***	***% of Goal Attained***
ENO	341,939	259,377	131.8%	62.31	49.00	127.2%
Algiers	6,064	19,340	31.4%	0.99	3.70	26.7%

5.2 Evaluation Scope

Measure installations for PY7 began to occur in April 2017, however tracking data sent to the Evaluators in December 2017 indicated that the program only had 14 participants at that time, too few to perform a process evaluation. Program factors and management of the Multifamily program are identical HPwES, where a discussion of the PY6 to PY7 implementation contractor changeover and other Process-related items are discussed. Due to these reasons the Evaluators will perform a comprehensive formal Process evaluation of the Multifamily program in PY8.

5.3 Impact Savings Calculation Methodology

Impact methodologies for Multifamily are the same as described for HPwES, described in section 3.2 M&V Methodology.

5.4 Verified Savings by Measure

5.4.1 Infiltration/Air Sealing Savings

Details about M&V Impact methodologies for Multifamily Air Infiltration are the same as described for HPwES, section 3.2.1 Air Infiltration Reduction Savings Calculations.

Table 5-5 Expected and Realized Air Sealing Savings – New Orleans

Heating Type	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*Peak kW Realization Rate*
Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	19,560	19,951	102.0%	6.34	6.51	102.7%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**19,560**	**19,951**	**102.0%**	**6.34**	**6.51**	**102.7%**

There were no Air Sealing projects in the Algiers territory.

5.4.2 Duct Sealing Savings

Details about M&V Impact methodologies for Multifamily Duct Sealing are the same as described for HPwES, section 3.2.2 Duct Sealing Savings Calculations.

Table 5-6 Expected and Realized Duct Sealing Savings – New Orleans

Heating Type	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*Peak kW Realization Rate*
Natural Gas Furnace	15,877	14,841	93.5%	7.47	6.98	93.4%
Electric Resistance	85,319	84,005	98.5%	17.26	16.77	97.2%
Air Source Heat Pump	6,776	4,338	64.0%	1.35	1.27	94.1%
Total	**107,972**	**103,183**	**95.6%**	**26.08**	**25.02**	**95.9%**

There were no Duct Sealing projects in the Algiers territory.

5.4.3 LED Lighting Savings

The savings resulting from applying TRM algorithms and deemed savings parameters are summarized in HPwES, section 3.2.3 LED Savings Calculations.

Table 5-7 Expected and Realized LED Savings – New Orleans

Lamp Type	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*Peak kW Realization Rate*
LED 11W (A-Type)	31,863	31,863	100.0%	6.61	6.61	100.0%
LED 15W (A-Type)	1,496	1,496	100.0%	0.31	0.31	100.0%
LED 5W Candelabra	17,775	18,339	103.2%	3.69	3.79	103.0%
LED 6W Globe	12,249	11,926	97.4%	2.54	2.47	97.2%

LED 8W Flood	1,083	1,083	100.0%	0.22	0.22	100.0%
LED 11W Flood	40	40	100.0%	0.01	0.01	100.0%
LED 9W (A-Type)	41,821	41,821	100.0%	8.67	8.67	100.0%
Outdoor LED 15W (A-Type)	3,872	6,583	170.0%	-	-	N/A
Total	**110,199**	**113,151**	**102.7%**	**22.05**	**22.09**	**100.1%**

Table 5-8 Expected and Realized LED Savings - Algiers

Lamp Type	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*Peak kW Realization Rate*
LED 11W (A-Type)	717	717	100.0%	0.15	0.15	100.0%
LED 5W Candelabra	199	205	103.2%	0.04	0.05	125.0%
LED 6W Globe	510	497	97.4%	0.11	0.10	97.2%
LED 9W (A-Type)	2,182	2,182	100.0%	0.45	0.45	100.0%
Outdoor LED 15W (A-Type)	86	146	170.0%	-	-	N/A
Total	**3,694**	**3,747**	**101.4%**	**0.75**	**0.75**	**100.0%**

5.5 Verified Gross Savings

Realized savings is presented by program channel in Table 5-9 and Table 5-10.

Table 5-9 Gross Realization Summary – New Orleans

Measure	*Expected kWh Savings*	*Expected kW Savings*	*Verified kWh Savings*	*Verified kW Savings*	*Realization*	
					kWh	*kW*
AC Tune-up	7,343	2.66	11,903	5.60	162.1%	210.5%
Aerators	5,722	0.60	5,722	0.60	100.0%	100.0%
Air Sealing	19,560	6.34	19,951	6.51	102.0%	102.7%
Ducts	107,972	26.08	103,183	25.02	95.6%	95.9%
LED	110,199	22.05	113,151	22.09	102.7%	100.2%
Pipe Wrap	228	0.03	228	0.03	100.0%	100.0%
Showerheads	23,730	2.47	23,730	2.47	100.0%	100.0%
Thermostats	62,659	-	64,072	-		N/A
Total	**337,413**	**60.22**	**341,939**	**62.31**	**101.3%**	**103.5%**

Table 5-10 Gross Realization Summary – Algiers

Measure	*Expected kWh Savings*	*Expected kW Savings*	*Verified kWh Savings*	*Verified kW Savings*	*Realization*	
					kWh	*kW*
Aerators	283	0.03	283	0.03	100.0%	100.0%
LED	3,694	0.75	3,747	0.75	101.4%	99.8%
Showerheads	2,034	0.21	2,034	0.21	100.0%	100.0%

Total	**6,011**	**0.99**	**6,064**	**0.99**	**100.9%**	**100.0%**

5.6 Estimation of Net Savings

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.

Fourteen participants had completed the program as of December 2017. The Evaluator attempted to complete surveys with all fourteen participants. In total, six program participants completed the survey.

5.6.1 Estimation of Free Ridership

Free ridership for the program was estimated using the same methods as described in HPwES, section 3.5 Estimation of Net Savings.

5.6.2 Net Savings Results

Table 5-11 and Table 5-12 summarize the program net kWh savings and peak kW demand reduction impacts of the Multifamily Program.

Table 5-11 Multifamily Summary of Verified Net Savings

Utility	Expected kWh Savings	Verified Gross kWh Savings	Free Ridership	Spillover	Verified Net kWh Savings	Net to Gross Ratio
ENO	337,413	341,939	0%	0	341,939	100%
Algiers	6,011	6,064	0%	0	6,064	100%
Total	**343,424**	**348,002**	**0%**	**0**	**348,002**	**100%**

Table 5-12 Multifamily Summary of Verified Net Peak Demand Reductions

Utility	Expected Peak kW Reductions	Verified Gross Peak kW Reductions	Free Ridership	Spillover	Verified Net Peak kW Reductions	Net to Gross Ratio
ENO	60.22	62.31	0%	0	62.31	100%
Algiers	0.99	0.99	0%	0	0.99	100%
Total	**61.21**	**63.29**	**0%**	**0**	**63.29**	**100%**

5.7 Participant Survey Results

The survey used to estimate net savings also asked participants questions about how they learned of the program and their satisfaction with it.

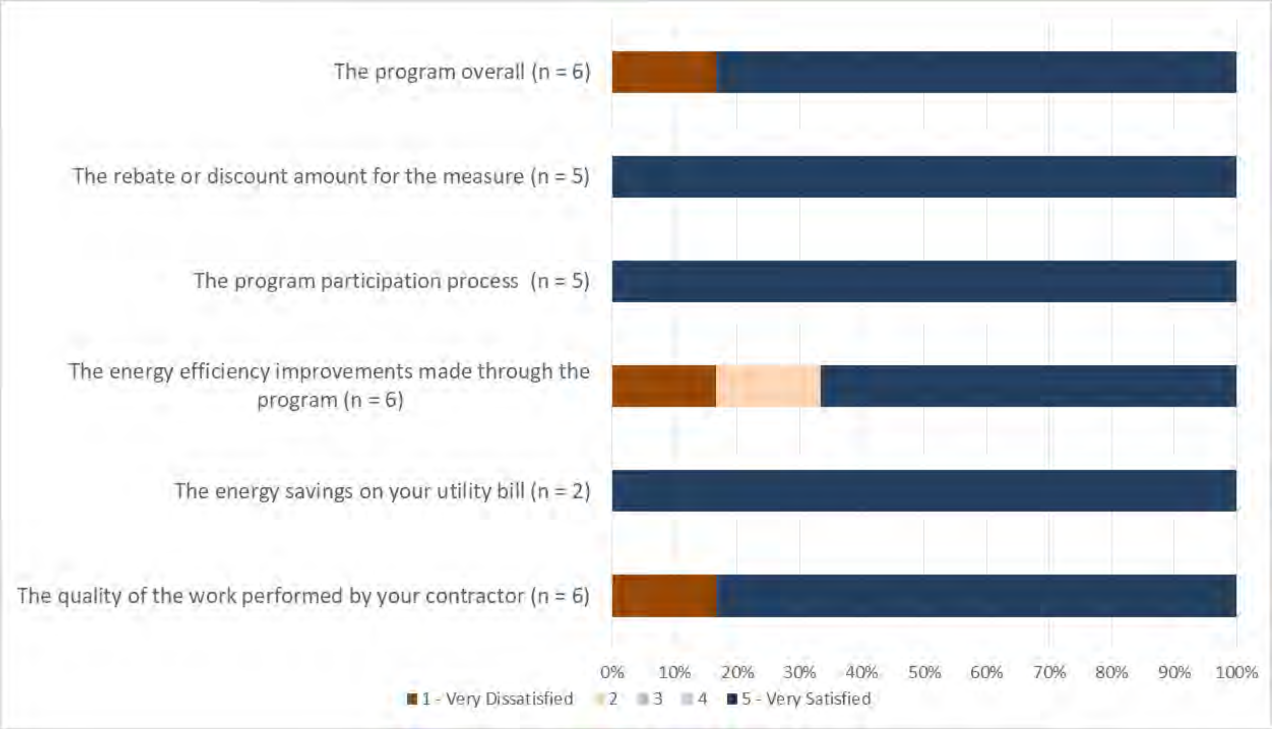
The two most common means by which participants learned of the program were from a friend, family member, colleague (50%) or from print advertisement (33%).

Table 5-13 How Participants Learned of the Program

Response	Percentage of Respondents (n= 6)
Friend, family member, or colleague	50%
A print advertisement	33%
Social media post	17%

Figure 5-1 summarizes participant satisfaction. All but one participant was satisfied with the program overall. Two participants who indicated dissatisfaction indicated that the contractors did not finish the work.

Figure 5-1 Participant Satisfaction



6. Green Light Direct Install

6.1 Program Description

The Green Light Direct Install (GLDI) Program provides direct installation of compact fluorescent lamps (CFLs) and light emitting diodes (LEDs) in participating residences. The GLDI Program is intended to reduce residential energy use through the one-for-one replacement of incandescent lamps with energy efficient CFLs and LEDs.

Residential customers in New Orleans Parish are eligible for the program. There is no limit on the number of bulbs that can be installed in a residence so long as they replace incandescent lamps.

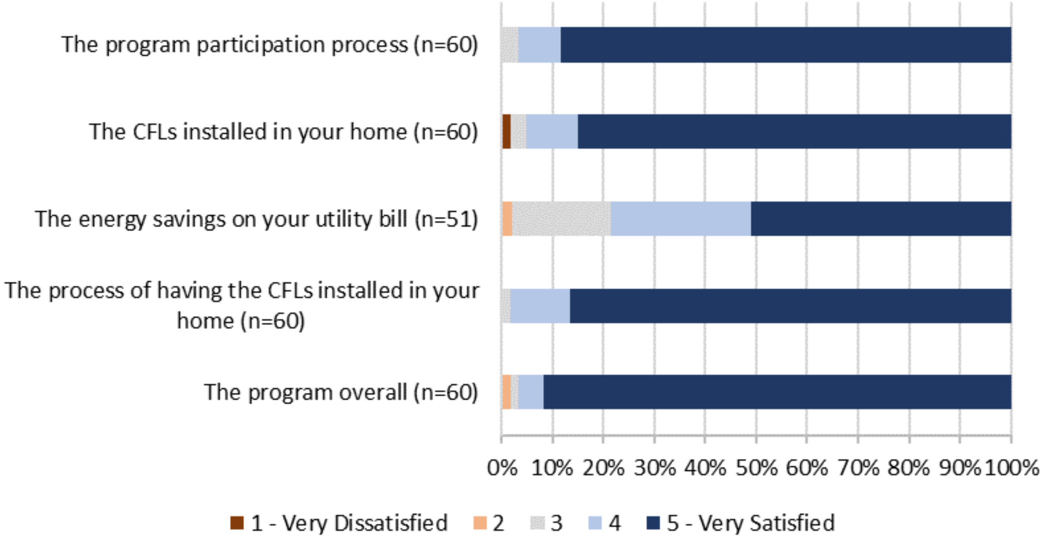
Installation is completed by volunteers, which have included student groups and local charities. Installation is tracked by-resident and by-installing volunteer group.

6.2 Evaluation Scope

The GLDI Program has received comprehensive impact and process evaluations in PY5 and PY6.The evaluations provided estimates of in-service rates for installed lighting, benchmarks against other direct install programs, and strategic recommendations for program improvement. In the initial review of the PY7 program, the Evaluators concluded that the GLDI program did not warrant more than a brief overview of program activity. The rationales for this are as follows:

- **Limited program scope.** In PY7, the program provided 116,016 expected kWh savings, comprising 0.62% of the Energy Smart portfolio. In comparison, in PY5 the program was 5.48% of portfolio savings.
- **Coverage of program measures in New Orleans TRM.** All measures installed in GLDI have deemed savings provided in the New Orleans TRM, with usage estimates based on the New Orleans lighting metering study conducted in the PY6 evaluation.
- **Past evaluations showed high satisfaction metrics.** As seen in the figure below, the GLDI program has high participant satisfaction. The Evaluators did not find operational issues with the program that warranted further review in PY7.

Figure 6-1 GLDI Participant Satisfaction – PY6



6.3 Expected Savings and Program Participation

In PY7, a total of 4,770 lamps were installed through the program in 341 residences, including one multifamily residence. Of these, 245 were in the ENO territory and 96 in the Algiers territory. The tables below summarize the total measures installed and the expected kWh and kW savings.

Table 6-1 Summary of Measures and Expected Savings – New Orleans

Measure	***Total Quantity of Measures***	***Total Expected kWh Savings***	***Total Expected kW Savings***
9W CFL Candelabra	803	17,602	3.61
14W CFL Candelabra	393	13,213	2.71
13W CFL	1,301	27,568	5.72
20W CFL	146	3,522	0.73
23W CFL	163	5,480	1.12
8.5W LED	1,413	35,028	7.26
16W LED	8	332	0.07
Total:	**4,227**	**102,745**	**21.24**

Table 6-2 Summary of Measures and Expected Savings - Algiers

Measure	***Total Quantity of Measures***	***Total Expected kWh Savings***	***Total Expected kW Savings***
9W CFL Candelabra	113	2,477	0.51
14W CFL Candelabra	33	1,109	0.23
13W CFL	212	4,492	0.93
20W CFL	5	121	0.03
23W CFL	69	2,320	0.48
8.5W LED	111	2,752	0.57
Total	**543**	**13,271**	**2.74**

Table 6-3 below displays lamp type breakdowns and averages by service territory.

Table 6-3 Lamps per Home, by Territory and Type

Territory	***Homes***	***Lamps***	***CFLs***	***LEDs***	***Average lamps per home***
New Orleans	245	4,227	602	1,092	17.25
Algiers	96	543	248	280	5.66
Total	**341**	**4,770**	**850**	**1,372**	**13.99**
Average per home			5.61	3.48	

In PY7 the program introduced 8.5w and 16w LEDs. Total lamps distributed through the program decreased by 41.7% however, expected kWh savings decreased by 15.3%. See Table 6-4 for comparisons.

Table 6-4 Program Year Comparisons

Year	***Lamps Distributed***	***Lamps per Home***	***% LEDs***	***Expected kWh Savings***
PY6	8,178	21.08	0.00%	136,989
PY7	4,770	13.99	28.76%	116,016
Difference	-41.7%	-33.6%	N/A	-15.3%

Distribution percentages of lamps between New Orleans and Algiers did not change.

Total verified savings and percentage of goals for the GLDI Program are summarized in Table 6-5 separated by program.

Table 6-5 GLDI Savings Goals & Attainment by Service Area

Utility	*kWh goal*	*Net Realized kWh*	*Percentage of kWh goal realized*	*kW goal*	*Net Realized kW*	*Percentage of kW goal realized*
ENO	126,112	87,775	69.60%	20.72	18.18	87.77%
Algiers	73,013	11,581	15.86%	12.00	2.40	19.97%
Total	**199,125**	**99,355**	**49.90%**	**32.72**	**20.58**	**62.90%**

6.4 Gross Impact Savings Calculation Methodology

For equipment and retrofits rebated through the PY7 GLDI Program, calculation methodologies were performed using section B.5 of the New Orleans TRM. Calculations used to analyze the program are described in this section.

6.4.1 Savings Calculations

6.4.1.1 Deemed Energy and Demand Savings

Table 6-6 ENERGY STAR® CFLs – Deemed Savings Per Lamp[22]

Minimum Lumens	*Maximum Lumens*	*Incandescent Equivalent 1st Tier EISA 2007 (W_{base})*	*CFL Wattage*	*kWh/Lamp*	*kW/Lamp*
310	749	29	10	13.88	0.0029
750	1,049	43	14	21.19	0.0044
1,050	1,489	53	20	24.12	0.0050
1,490	2,600	72	26	33.62	0.0069

Table 6-7 ENERGY STAR® Omnidirectional LEDs – Deemed Savings Per Lamp[23]

Minimum Lumens	*Maximum Lumens*	*Incandescent Equivalent 1st Tier EISA 2007 (W_{base})*	*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

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[22] New Orleans TRM V1.0, Table 83, page B-116.

[23] New Orleans TRM V1.0, Table 105, page B-138.

6.4.1.2 Energy and Demand Savings Calculation

Both candelabra CFLs distributed through the program are exempt from EISA. Their per unit savings was calculated as follows:

$$kWh_{savings} = ((W_{base} - W_{post})/1000) \times Hours \times ISR \times IEF_{E}$$

$$kW_{savings} = ((W_{base} - W_{post})/1000) \times CF \times ISR \times IEF_{D}$$

Where,

- W_{base} = Baseline watts (Based on EISA standard see Table 6-8)
- W_{post} = Installed watts
- Hours = Annual hours of use, 819.43[24]
- IEF_{E} = Energy Interactive Factor, .91
- ISR = In Service Rate, the percentage of CFLs installed, 0.96[25]
- CF = Summer Peak Coincidence Factor, 12.74%
- IEF_{D} = Interactive Effects Factor, 1.21
- 1000 = W/kW conversion

Table 6-8 Baseline Wattage for Specialty, EISA Exempt Lamps

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

6.5 Verified Savings

Realized savings are presented by utility and measure type in tables Table 6-9 and Table 6-10.

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[24] Hours based on a residential lighting study done as part of development of the New Orleans TRM.

[25] Developed form PY5 and PY6 survey responses.

Table 6-9 Verified Gross Savings – New Orleans

Measure	Ex Ante kWh Savings	Ex Post kWh Savings	kWh Realization Rate	Ex Ante kW Savings	Ex Post kW Savings	Peak kW Realization Rate
9W CFL Candelabras	17,602	17,820	101.24%	3.61	3.68	101.95%
14W CFL Candelabras	13,213	7,315	55.36%	2.71	1.51	55.76%
13W CFL	27,568	27,568	100.00%	5.72	5.72	100.00%
20W CFL	3,522	3,522	100.00%	0.73	0.73	100.00%
23W CFL	5,480	5,480	100.00%	1.12	1.12	100.00%
8.5W LED	35,028	35,028	100.00%	7.26	7.26	100.00%
16W LED	332	332	100.00%	0.07	0.07	100.00%
Total	**102,745**	**97,065**	**94.47%**	**21.24**	**20.11**	**94.68%**

Table 6-10 Verified Gross Savings – Algiers

Measure	Ex Ante kWh Savings	Ex Post kWh Savings	kWh Realization Rate	Ex Ante kW Savings	Ex Post kW Saving	Peak kW Realization Rate
9W CFL Candelabras	2,477	2,508	101.24%	0.51	0.52	101.95%
14W CFL Candelabras	1,109	614	55.36%	0.23	0.12	52.17%
13W CFL	4,492	4,492	100.00%	0.93	0.93	100.00%
20W CFL	121	121	100.00%	0.03	0.03	100.00%
23W CFL	2,320	2,320	100.00%	0.48	0.48	100.00%
8.5W LED	2,752	2,752	100.00%	0.57	0.57	100.00%
Total	**13,271**	**12,806**	**96.50%**	**2.74**	**2.65**	**96.36%**

6.6 Estimation of Net Savings

The Evaluators established a NTGR based on primary research in PY6. The Evaluators surveyed 60 participants and estimated a NTGR of 90%. This NTGR was applied to the PY7 participants.

6.7 Net Savings Results

Table 6-11 and Table 6-12 summarize the ex post net kWh and kW achieved through the GLDI Program.

Table 6-11 GLDI Summary of Ex Post Net kWh Savings

Service Territory	Expected kWh Savings	Realized Gross kWh Savings	Free Ridership	Realized Net kWh Savings	Net to Gross Ratio
ENO	102,745	97,065	9,290	87,775	90%
Algiers	13,271	12,806	1,226	11,581	90%
Total	**116,016**	**109,871**	**10,516**	**99,355**	**90%**

Table 6-12 GLDI Summary of Ex Post Net Peak kW Reductions

Service Territory	Expected kW Reductions	Realized Gross kW Reductions	Free Ridership	Realized Net kW Reductions	Net to Gross Ratio
ENO	21.24	20.11	1.92	18.18	90%
Algiers	2.74	2.65	0.25	2.40	90%
Total	**23.98**	**22.76**	**2.18**	**20.58**	**90%**

6.8 Lifetime Savings

Table 6-13 and Table 6-14 present the lifetime kWh and peak kW savings attributable to lamps distributed through the PY7 GLDI program:

Table 6-13 ENO Lifetime Savings

Measure	Lifetime kWh
9W CFL Candelabras	96,685
14W CFL Candelabras	39,687
13W CFL	149,578
20W CFL	19,107
23W CFL	29,733
8.5W LED	190,054
16W LED	1,804
Total:	**526,649**

Table 6-14 Algiers Lifetime Savings

Measure	Lifetime kWh
9W CFL Candelabras	13,606
14W CFL Candelabras	3,333
13W CFL	24,374
20W CFL	654
23W CFL	12,587
8.5W LED	14,930
Total:	**69,483**

6.9 Recommendations

The Evaluators' recommendation for the GLDI Program are as follows:

- **Continue the transition to LED lighting.** In PY7, 26% more LEDs were distributed than in PY6, and fewer CFL options were offered. LED costs have continued to decline, a variety of options are now available and LEDs off more savings per lamp than CFLs (based on lumen equivalence). The Evaluators recommend transitioning more CFL lamps offered by GLDI to LED, as well as consider also offering specialty (directional) LEDs, such as those offered in other PY7 residential programs.

- **Unless significantly expanded, move GLDI to a schedule of one evaluation per program cycle.** The program provides modest savings using well-established estimates from the New Orleans TRM. The Evaluators recommend reviewing this program once in each three-year program cycle, and that program administrators apply an in-service rate of 96% and a NTGR of 90% for this period. The program should be revisited for evaluation in PY10.

7. Residential Lighting and Appliances

7.1 Program Description

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

- Light Emitting Diodes (LEDs);
- Pool Pumps;
- ENERGY STAR refrigerators;
- Window ACs; and
- Heat Pump Water Heaters

In PY7 the program stopped offering rebates for compact fluorescent lamps (CFLs).

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

Table 7-1 Summary of Measures and Expected Savings – New Orleans

Measure	***Total Quantity of Measures***	***Total Expected kWh Savings***	***Total Expected kW Savings***
LED Lighting	134,889	2,741,531	568.39
Pool Pump	2	3,720	0.56
Refrigerator	56	3,118	0.72
Room AC	47	3,782	2.54
Total	**134,994**	**2,752,151**	**572.21**

Table 7-2 Summary of Measures and Expected Savings - Algiers

Measure	***Total Quantity of Measures***	***Total Expected kWh Savings***	***Total Expected kW Savings***
LED Lighting	5,941	106,929	22.18
HP water heater	2	2,767	0.000088
Refrigerator	8	445	0.1
Room AC	5	394	0.27
Total	**5,956**	**110,535**	**22.55**

In PY7 the program stopped offering advanced power strips but introduced ENERGY STAR® refrigerators and heat pump water heaters.

Table 7-3 Savings by Measure Type[26]

Measure	Expected kWh PY7	Expected kWh PY6
Lighting	2,848,460	105,775
Pool Pumps	3,720	8,524
Window ACs	4,176	40,931
Power Strips	-	112
Refrigerators	3,564	-
HP Water Heaters	2,767	-
Total	**2,862,687**	**155,343**

Expected savings increased from PY6 to PY7 by 1,742.8%. This is attributable to the program focusing on LED lighting: In PY6 both CFLs and LEDs were included however, all lighting discounted through the PY7 program was LED, which has a higher per-unit savings values associated with it.

Table 7-4 Savings by Measure Type

Measure	PY7 Count	PY6 Count	Average Savings per Unit by Technology Type[27]
CFL	-	6,230	16.36
LED	140,830	18,711	21.05
Total	**140,830**	**24,941**	

Total verified savings and percentage of goals for the RLA Program are detailed in Table 7-5.

Table 7-5 Savings Goals by Utility

Utility	kWh goal	Net Realized kWh	Percentage of kWh goal realized	kW goal	Net Realized kW	Percentage of kW goal realized
ENO	3,277,546	1,849,985	56.4%	683.20	387.78	56.8%
Algiers	242,465	73,685	30.4%	51.00	15.60	30.6%

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[26] Figures adjusted to reflect 9-month PY7 program period.

[27] Average per-unit savings derived from lamps distributed through the PY6 and PY7 programs.

7.2 M&V Methodology

Electricity and peak demand reductions of the PY7 RLA program were estimated using the New Orleans TRM 1.0

Evaluation of the RLA Program included the following:

- Updating pool pump calculations to reflect ENERGY STAR parameters by drive type and horsepower;
- Review of program tracking and recreation of deemed savings calculations;
- Interviews with program staff; and
- Review of program Memoranda of Understanding (MOU).

For equipment and retrofits rebated through the PY7 RLA Program, calculation methodologies were performed as described in the New Orleans TRM. Measure-specific impact methodology and results are discussed below.

7.2.1 LEDs

Methods for calculating he deemed savings values for LEDs came from the New Orleans TRM, sections B.5.1.7. Calculation of Deemed Savings, B.5.3. ENERGY STAR® Directional LEDs and B.5.4. ENERGY STAR® Omni-Directional LEDs.

7.2.1.1 Deemed Savings

Table 7-6. ENERGY STAR® Omnidirectional LEDs – Deemed Savings Per Lamp[28]

Minimum Lumens	***Maximum Lumens***	***Incandescent Equivalent 1st Tier EISA 2007 (W_{base})***	***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

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[28] TRM Table 105, page B-138

7.2.1.2 Calculated Savings

Table 7-7 ENERGY STAR® Directional LEDs – Reflector Lamps Baseline Watts [29]

Lamp Type ***(a)***	***Incandescent Equivalent (Pre-EISA)*** ***(b)***	***$Watts_{Base}$ (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

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[29] TRM Table 98, page B-131

Table 7-8 ENERGY STAR® Directional LEDs –Baseline Watts for EISA-Exempt Lamps[30]

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

7.2.1.3 LED Savings Results

The savings resulting from applying TRM algorithms and deemed savings parameters are summarized in Table 7-9 and

Table 7-9 Expected and Realized LED Savings – New Orleans

Location Type	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Realized Peak kW Savings	Peak kW Realization Rate
Big Box Store	786,249	786,249	100.00%	162.96	162.96	100.00%
Membership Store	1,569,071	1,569,071	100.00%	325.42	325.42	100.00%
Discount Grocery Store	19,821	22,184	111.92%	4.11	5.20	126.52%
Hardware Store	366,390	371,850	101.49%	75.9	77.10	101.58%
Total	**2,741,531**	**2,749,354**	**100.27%**	**568.39**	**570.68**	**100.40%**

Table 7-10 Expected and Realized LED Savings – Algiers

Location Type	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Realized Peak kW Savings	Peak kW Realization Rate
Membership Store	106,929	106,929	100.00%	22.18	22.18	100.00%
Total	**106,929**	**106,929**	**100.00%**	**22.18**	**22.18**	**100.00%**

Data provided to the Evaluators by Aptim contained multiple lamps aggregated into several general categories. Several categories often contained multiple lamp shapes, such as a-lamps, BR30 and specialty LEDs within a single category. Franklin Energy was unable to provide sufficient documentation to disaggregate all categories, including counts of specific lamp types distributed through the program, necessary for full analysis of all lamps distributed through the Big Box store and Membership Grocery

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[30] TRM Table 99, page B-132

Store retailers. The Evaluators were able to disaggregate data for the Discount Grocery store and Hardware store retailers. Differences in realization rates for those stores are discussed below:

(a) Discount Grocery

- 287 9w BR30 lamps with lumen outputs of 650lm were given a unit savings value of 20.42kWh. Deemed unit savings for this lamp type is 29.89 kWh.
- 108 9w BR30 lamps with lumen outputs of 650lm were given a unit savings value of 33.18kWh. Deemed unit savings for this lamp type is 29.89 kWh.

(b) Hardware Store

- 15,000 A-lamps with lumen outputs of 800lm were given a unit savings value of 24.43 kWh each in ex ante calculations. Deemed savings for a-lamps in this lumen output range is 24.79 kWh.

No LEDs were distributed in the Algiers territory during PY7.

7.2.2 Window Air Conditioner Calculations

7.2.2.1 Savings Calculations

Window air conditioner savings was calculated using the following savings algorithms from the New Orleans TRM, section B.3.2.

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

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

Where,

CAP = Rated equipment cooling capacity of the new unit (Btu/hr)

RAF = Room AC adjustment factor (0.49)

$EFLH_C$ = Equivalent full-load cooling hours (1,637)

η_{base} = Energy efficiency rating (EER) of the baseline cooling equipment (Table 7-11)

η_{post}= Energy efficiency rating (EER) of the installed cooling equipment (at least equal to value from Table 7-11)

%CF = Peak Coincidence Factor, 77%

Table 7-11 Window AC Replacement – Baseline and Efficiency Standards[31]

Reverse	***Louvered***	***Capacity***	***Baseline***	***Efficient***

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[31] TRM Table 45, page B-69.

Cycle?	Sides?		CEER	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 7-12 Window AC Realization Summary

Measure	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Realized Peak kW Savings	kW Realization Rate
ENO	3,782	7,097	187.6%	2.54	6.81	267.8%
Algiers	394	820	208.1%	0.27	0.79	297.0%
Total	**4,176**	**7,917**	**189.6%**	**2.81**	**7.60**	**270.5%**

Ex ante Calculations used a deemed savings values of 78.8 kWh and 0.053 kW to estimate savings. The Evaluators used the methods described above, resulting in high realization rates.

7.2.3 ENERGY STAR® Pool Pump Calculations

7.2.3.1 Deemed Energy Savings

ENERGY STAR® Pool Pump savings was calculated using the following savings algorithms from the New Orleans TRM, section B.1.8.

Table 7-13 ENERGY STAR® Variable Speed Pool Pumps – Deemed Savings Values[32]

Pump HP	kW Savings	kWh Savings
0.5	0.24	1,713
0.75	0.28	1,860

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[32] TRM table 16, page B-37

1	0.36	2,063
1.5	0.47	2,465
2	0.52	2,718
2.5	0.57	2,838
3	0.72	3,364

Table 7-14 Pool Pumps Realization Summary

Measure	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Realized Peak kW Savings	kW Realization Rate
ENO	3,720	4,325	116.3%	0.56	0.75	133.9%
Total	**3,720**	**4,325**	**116.3%**	**0.56**	**0.75**	**133.9%**

One pool pump was misspecified with having a 0.75 horsepower rating. Upon verification the Evaluators found that the unit was rated for 1.5 horsepower, raising the deemed savings from 1,860 to 2,465 kWh. There were no PY7 pool pump measures in the Algiers territory.

7.2.4 ENERGY STAR® Refrigerator Calculations

7.2.4.1 Deemed Energy Savings

ENERGY STAR® Refrigerator savings was calculated using the following savings algorithms from the New Orleans TRM, section B.1.4. After verifying model configurations and features, deemed savings were assigned to each unit using TRM Table 9: Formulas to Calculate the ENERGY STAR® Refrigerator Criteria[33]

Table 7-15 ENERGY STAR® Refrigerator Realization Summary

Measure	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Realized Peak kW Savings	kW Realization Rate
ENO	445	561	126.2%	0.10	0.13	126.05%
Algiers	3,118	3,123	100.2%	0.72	0.72	100.19%
Total	**3,564**	**3,684**	**103.4%**	**0.82**	**0.85**	**103.43%**

Ex ante Calculations used a deemed savings values of 55.68 kWh and 0.01283 kW to estimate savings. The Evaluators used the methods described above, resulting in high realization rates.

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[33] Pages B-16 to B-19

7.2.5 Heat Pump Water Heater Calculations

7.2.5.1 Deemed Energy Savings

HPWH savings was calculated using the following savings algorithms from the New Orleans TRM, section B.2.1. After verifying model specifications deemed savings were assigned to each unit using TRM Table 23: Deemed kWh Savings for Water Heater Replacement[34] and Table 24: Deemed kW Savings for Water Heater Replacement[12]

Table 7-16 HPWH Realization Summary

Measure	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*kW Realization Rate*
Algiers	2,767	4,071	147.1%	0.000175	0.357	203,534.8%
Total	**2,767**	**4,071**	**147.1%**	**0.000175**	**0.357**	**203,534.8%**

Ex ante Calculations used a deemed savings values of 55.68 kWh and 0.01283 kW to estimate savings. The Evaluators used the methods described above, resulting in high realization rates. There were no PY7 HPWH measures in the ENO territory.

7.3 Verified Savings by Measure

Table 7-17 and

Table 7-18 summarize the savings from the RLA Program.

Table 7-17 kWh and Peak kW Realization Summary – New Orleans

Measure	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*kW Realization Rate*
LED Lighting	2,741,531	2,749,354	100.3%	568.39	570.68	100.4%
Pool Pump	3,720	4,325	116.3%	0.56	0.75	133.9%
Refrigerator	3,118	3,123	100.2%	0.72	0.72	100.2%
Window AC	3,782	7,097	187.6%	2.54	6.81	267.8%
loadTotal	**2,752,151**	**2,763,899**	**100.4%**	**572.21**	**578.96**	**101.2%**

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[34] Page B-43

Table 7-18 kWh and Peak kW Realization Summary - Algiers

Measure	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Realized Peak kW Savings	kW Realization Rate
LED Lighting	106,929	106,929	100.0%	22.18	22.18	100.0%
HP water heater	2,767	2,371	85.7%	0.000088	0.2079	237,058.2%
Refrigerator	445	561	126.0%	0.10	0.13	126.1%
Window AC	394	820	208.1%	0.27	0.79	297.0%
Total	**110,536**	**110,681**	**100.1%**	**22.54**	**23.30**	**103.4%**

7.4 Estimation of Net Savings

The following sections describe the approach used to estimate net savings for the lighting and appliance components of the RLA Program.

7.4.1 Lighting Component

Free ridership for the lighting component was estimated using the Revenue Neutral Sales Model (RNSM).[35] The model attempts to estimate a maximum free ridership value based on an assumed framework of retailer decision making.

- Retailers participate in the program only if their “top line” sales (revenues) will not decrease.
- A retailer must sell a greater number of bulbs under program prices than they would without the buy-downs to prevent top line sales from decreasing.
- Retailers take this into consideration when negotiating their agreement with the program sponsor in terms of mark down levels and quantity of bulbs to be discounted.
- By looking at the discount levels and quantities of bulbs the retailer agrees to, one can calculate the “revenue neutral” counterfactual number or bulbs that would have had to have been sold without the mark downs for revenues to remain equal.
- Subtracting the revenue neutral counterfactual sales from the actual program sales results in the net sales attributable to the program.

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[35] Opinion Dynamics Corporation (2013). The Revenue Neutral Sales Model: A new approach to estimating lighting program free ridership. International Energy Program Evaluation Conference, Chicago IL.

The model relies on at least two assumptions that must hold true for the model to produce meaningful results. Namely, the model is based on the following assumptions:

- Retailers will only participate in utility lighting programs if their participation is revenue neutral. This assumption implies that retailers or specific decision makers within retailers are more interested in their “top-line” sales (within their lighting department specifically) than they are in overall profit.
- Retailers can accurately forecast lighting sales under program conditions and non-program conditions. This assumption is implied by the condition that retailers will only participate if they believe their top-line sales will be unaffected.

The Revenue Neutral Sales Model is a simple model that is used in other jurisdictions, it tends to be a conservative estimate of free ridership.

The logic of the RNSM is that retailers will not participate unless they feel they can do so without reducing revenue. The model relies on this assumption to calculate the number of bulbs sold under normal retail pricing required to meet the same level of revenues the retailers have implicitly agreed to by participating in the program. As such, the estimate of free ridership represents a maximum free ridership value. It relies on the idea that retailers are concerned with top-line sales for each discounted lamp, and that they are able to accurately forecast sales under program and non-program conditions. The sales required to meet the same level of revenues as are expected through program sales sets the baseline sales condition for what would have been sold in the absence of the program.

Under this model free ridership is equal to:

$$FR = \frac{Quantity\ without\ Program}{Quantity\ with\ Program} \leq \frac{Price\ with\ Program}{Price\ without\ Program}$$

The quantity without the program is estimated by divided the total revenue for the program discounted product by the sales price without the program discount.

7.4.2 Appliance Component

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

The Evaluator attempted to complete surveys with 87 participants who received a rebate as of December 2017. In total, forty-six customers that received an appliance rebate responded to the survey.

7.4.2.1 Estimation of Free Ridership

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.

Participant responses to these questions were used to calculate three scores corresponding to the presence of prior plans, the likelihood of completing the project in the absence of the program, and the timing of that project if it had been completed.

7.4.2.2 Prior Plans Score

Respondents were scored as 1 on the prior plans score if all of the following were true:

- The participant had plans to complete the project prior to learning about the program.
- The participant confirms that they were planning to install an efficient unit as opposed to a standard efficiency unit.
- The participant indicated that they would have been financially able to complete the project had a discount or rebate not been provided.

Respondents that did not have prior plans and could afford the measures were not deemed to be free riders.

7.4.2.3 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?

A likelihood score was assigned to each response for this question as follows:

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

- Very unlikely: 0

7.4.2.4 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

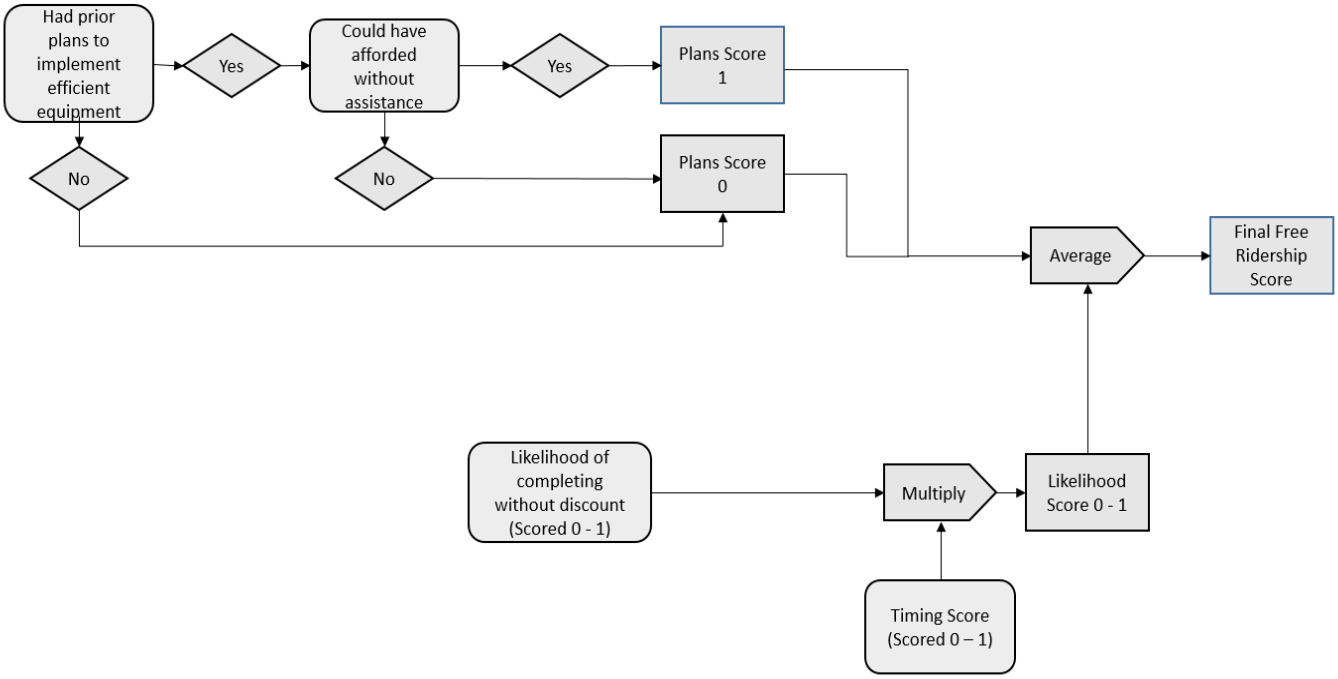
7.4.2.5 Final Free Ridership Score

The final free ridership score is equal to the following:

*Free Ridership = Average (Plans Score + Likelihood Score * Timing Score)*

The procedures used to estimate free ridership are summarized below in Figure 7-1.

Figure 7-1 Summary of Free Ridership Scoring Algorithm



7.4.2.6 Estimation of Participant Spillover

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.

One respondent reported that the program influenced them to install an additional room air conditioner without getting a program rebate. The estimated savings for the unit are presented in Table 7-19.

Table 7-19 Participant Reported Spillover Impacts

Measure	***Per Unit kWh Estimate***	***Per Unit Peak kW Estimate***	***Total kWh***	***Total Peak kW***
Room Air Conditioner	820	.79	820	.79
Total			**820**	**.79**

7.4.3 Net Savings Results

7.4.3.1 Lighting Component

The free ridership rate for LEDs is 33%[36]. The verified net kWh savings of the lighting component are displayed in Table 7-20 followed by verified net peak kW reductions in Table 7-21. The net-to-gross ratio is equal to 33% for both kWh savings and peak kW reductions.

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[36] Sufficiently detailed program tracking data for the lighting portion of Consumer Products was not made available the Evaluators, so the previous program year’s LED NTG rate was applied. In PY8 the Evaluators will recalculate lighting NTG.

Table 7-20 Summary of Verified Net Savings – Lighting Component

Utility	Expected kWh Savings	Verified Gross kWh Savings	Free Ridership	Verified Net kWh Savings	Net to Gross Ratio
ENO	2,741,531	2,749,354	907,287	1,842,067	67%
Algiers	106,929	106,929	35,287	71,642	67%
Total	**2,848,460**	**2,856,283**	**942,573**	**1,913,709**	**67%**

Table 7-21 Summary of Verified Net Peak Demand Reductions – Lighting Component

Utility	Expected Peak kW Reductions	Verified Gross Peak kW Reductions	Free Ridership	Verified Net Peak kW Reductions	Net to Gross Ratio
ENO	568.39	570.68	188.32	382.36	67%
Algiers	22.18	22.18	7.32	14.86	67%
Total	**590.57**	**592.86**	**195.64**	**397.21**	**67%**

7.4.3.2 Appliance Component

Free ridership for the appliance component of the program was estimated by applying the measure level net to gross ratios 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.[37] Table 7-22 and Table 7-23 summarize the program net kWh savings and peak kW demand reduction impacts of the RLA Program.

Table 7-22 Summary of Verified Net Savings – Appliance Component

Utility	Expected kWh Savings	Verified Gross kWh Savings	Free Ridership	Spillover	Verified Net kWh Savings	Net to Gross Ratio
ENO	10,620	14,545	7,544	917	7,918	54%
Algiers	3,607	3,752	1,946	237	2,043	54%
Total	**14,227**	**18,297**	**9,490**	**1,154**	**9,961**	**54%**

Table 7-23 Summary of Verified Net Peak Demand Reductions – Appliance Component

Utility	Expected Peak kW Reductions	Verified Gross Peak kW	Free Ridership	Spillover	Verified Net Peak kW	Net to Gross Ratio

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

		Reductions			**Reductions**	
ENO	3.82	8.28	4.07	1.21	5.43	66%
Algiers	0.37	1.12	0.55	0.16	0.74	66%
Total	**4.19**	**9.41**	**4.62**	**1.38**	**6.16**	**66%**[38]

7.4.3.3 Measure Level Free Ridership Results

Table 7-24 summarizes the average free ridership scores by measure.

Table 7-24 Average Free Ridership by Measure

Measure	***Number of Responses***	***Average Free Ridership***
ENERGY STAR window air conditioner	22	38%
ENERGY STAR refrigerator	20	65%
energy efficient heat pump water heater	3	0%
energy efficient pool pump	1	100%

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[38] NTGRs for kWh and kW differ due to the weighting of FR results with kWh and kW.

7.4.3.4 Final Net Savings

Table 7-25 Verified Net Savings – New Orleans

Measure Category	Expected Gross kWh	Verified Gross kWh	Verified Net kWh	Expected Gross kW	Verified Gross kW	Verified Net kW
Lighting	2,741,531	2,749,354	1,842,067	568.39	570.68	382.36
Appliances	10,620	14,545	7,918	3.82	8.28	5.43
Total	**2,752,151**	**2,763,899**	**1,849,985**	**572.21**	**578.96**	**387.78**

Table 7-26 Verified Net Savings – Algiers

Measure Category	Expected Gross kWh	Verified Gross kWh	Verified Net kWh	Expected Gross kW	Verified Gross kW	Verified Net kW
Lighting	106,929	106,929	71,642	22.18	22.18	14.86
Appliances	3,607	3,752	2,043	0.37	1.12	0.74
Total	**110,536**	**110,681**	**73,685**	**22.54**	**23.30**	**15.60**

7.5 Participant Survey Results

The survey used to estimate net savings also asked participants questions about how they learned of the program and their satisfaction with it.

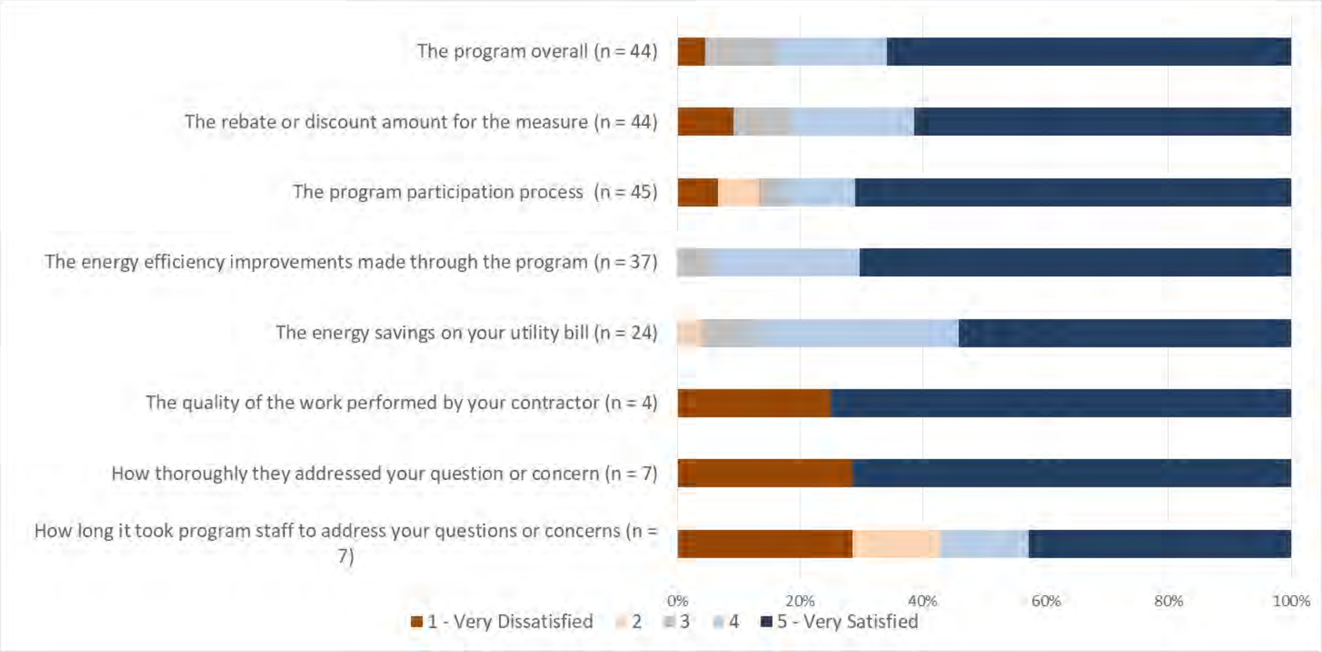
The two most common means by which participants learned of the program were through a retailer (57%) or from an internet search (17%).

Table 7-27 How Participants Learned of the Program

Response	Percentage of Respondents (n = 46)
Through a retailer	57%
Through an internet search	17%
Contractor	4%
Friend, family member, or colleague	2%
Bill insert or utility mailer	2%
Email from utility	2%
Don't know	7%

Figure 7-2 summarizes participant satisfaction. Eight-four percent of respondents indicated satisfaction with the program overall by providing a rating of four or five on a five-point scale. Fourteen percent of respondents rated their satisfaction with the participation process as a one or a two, indicating dissatisfaction with it. Although relatively few respondents contacted staff with questions (seven did this), some dissatisfaction was noted with the response. Six respondents reported delays and other issues with getting the rebate check. One respondent indicated that they had difficulty determining which appliance at a big box store qualified for the program.

Figure 7-2 Participant Satisfaction



8. Residential Heating & Cooling

8.1 Program Description

The Residential Heating & Cooling (RH&C) Program 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 and for HVAC system replacements.

Tune-ups are provided by a qualified technician 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.

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. The AC Tune-Up program now uses a paper-based processes rather than the electronic tools used in the program in prior years. Savings are based on deemed values.

A total of 372 customers participated in the Residential Heating & Cooling Program; 410 tune-ups, 396 duct sealings, and 2 replacements. Overall program participation decreased by 64.5% in PY7 but expected savings by home increased by 46.5%.

Table 8-1 Program Year Comparison[39]

PY	# Participants	Percent Difference	Expected kWh per Home	Percent Difference
PY6	1,048	-64.5%	2,235	46.5%
PY7	372		3,275	

Below, Table 8-2 and Table 8-3 summarize the total number of measures conducted and distributed through the program and overall expected savings:

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[39] Figures adjusted to reflect 9-month PY7 program period.

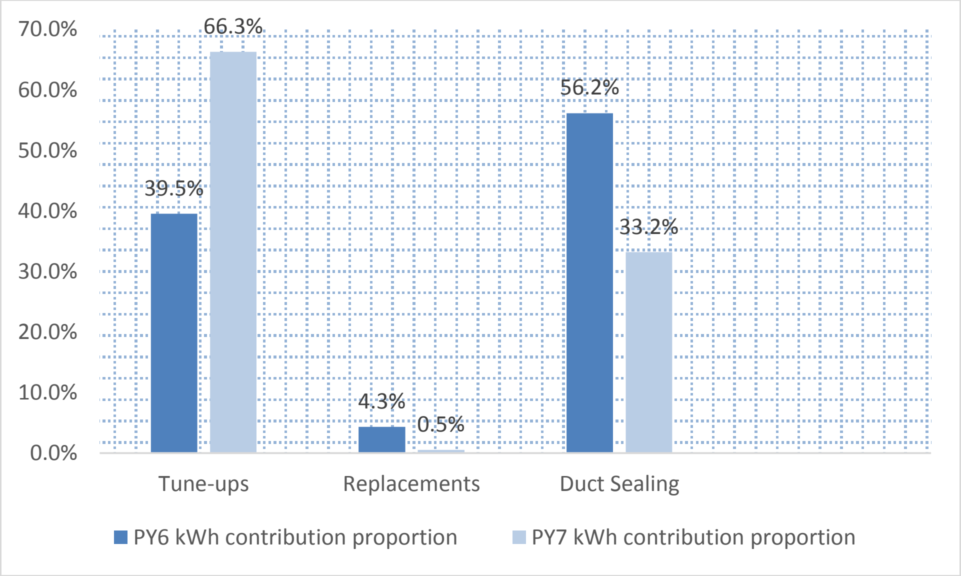
Table 8-2 Summary of Measures and Expected Savings – New Orleans

Measure	***Total Quantity of Measures***	***Total Expected kWh Savings***	***Total Expected peak kW Savings***
Tune-ups	385	305,769	110.62
Replacements	2	2,581	1.12
Duct Sealing	371	840,735	270.16
Total	**758**	**1,149,901**	**381.89**

Table 8-3 Summary of Measures and Expected Savings -Algiers

Measure	***Total Quantity of Measures***	***Total Expected kWh Savings***	***Total Expected peak kW Savings***
Tune-ups	25	20,128	7.29
Duct Sealing	25	48,967	16.83
Total	**50**	**69,095**	**24.12**

Figure 8-1 Contribution by measure



In PY7 the program efforts shifted away from duct sealing towards AC tune-ups. Total verified savings and percentage of goals for the Residential Heating & Cooling Program are summarized in Table 8-4.

Table 8-4 Savings Goals & Attainment by Utility

Utility	***kWh goal***	***Net Realized kWh***	***Percentage of kWh goal realized***	***kW goal***	***Net Realized kW***	***Percentage of kW goal realized***
ENO	1,092,377	1,192,194	109.14%	341.8	443.03	129.62%
Algiers	85,830	72,321	84.26%	25.4	27.64	108.82%

8.2 M&V Methodology

Evaluation of the Residential Heating & Cooling Program included the following:

- Surveys with participants;
- Interviews with program staff;
- Interviews with program trade allies; and
- On-site testing and data collection.

Verified savings were calculated using methods and inputs in the New Orleans TRM 1.0 and incorporated results from on-site testing where appropriate. The following section discusses savings calculation methods for these measure in detail.

8.2.1 Central Air Conditioner Tune-Up Savings Calculations

Central Air Conditioner Tune-Up savings was calculated using the following savings algorithms from the New Orleans TRM, section B.3.6.

8.2.1.1 CAC Tune-Up Energy Savings Calculations

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

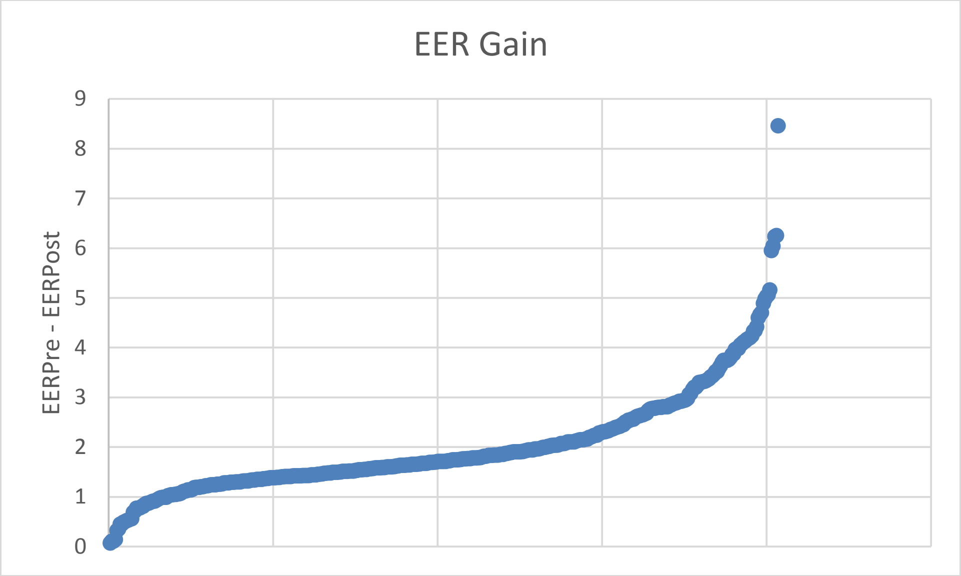
$$kW_{Savings} = CAP_c \times 1{,}000\, {}^{W}\!/_{kW} \times \left(\frac{1}{EER_{pre}} - \frac{1}{EER_{post}}\right) \times \%CF$$

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

Where,

CAP_c = Cooling capacity (in BTU)
EER_{pre} = Efficiency of the equipment prior to tune-up
EER_{post}= Nameplate efficiency of the existing equipment
EFLHc = Equivalent Full-Load Cooling Hours (1,637)
%CF = Peak Coincidence Factor (.77)

Figure 8-2 EER Gain



8.2.1.2 CAC Tune-Ups Results

Resulting gross savings are summarized in Table 8-5.

Table 8-5 CAC Tune-Up Savings Summary

Territory	***Expected kWh***	***Realized kWh***	***kWh Realization Rate***	***Expected kW***	***Realized kW***	***Peak kW Realization Rate***
New Orleans	305,769	502,315	164.3%	110.62	236.08	213.4%
Algiers	20,128	30,350	150.8%	7.29	14.28	195.9%
Total	**325,897**	**532,666**	**163.4%**	**117.91**	**250.36**	**212.3%**

The program implementer applied fixed deemed savings values as follows:

- Up to 2.5 tons cooling capacity: 545 kWh
- Greater than 2.5 tons or cooling capacity: 816 kWh

The Evaluators calculated savings based on algorithms and inputs found in section B.3.6 of the New Orleans TRM, resulting in higher ex post savings.

8.2.2 Central AC Replacement

The PY7 Residential Heating & Cooling Program rebated 2 central air conditioners. The Evaluators calculated savings for both replacements were as Replacement-on-Burnout ("ROB"), using current minimum code as baseline. Methods for calculating he deemed savings values for LEDs came New Orleans TRM, section B.3.1. Central Air Conditioner Replacement. Deemed per-unit kWh and kW savings were applied to both units installed during PY7.

8.2.2.1 Deemed Energy Savings

Table 8-6. High Efficiency Central AC Deemed kWh[40]

Efficiency	kWh Saved per Ton	Average Tons	kWh if Tonnage Unknown
15 SEER	93.54	3.65	341.43
16 SEER	175.39	3.65	640.18
17 SEER	247.61	3.65	903.79
18 SEER	311.81	3.65	1,138.10
19 SEER	369.25	3.65	1,347.76
20 SEER	420.94	3.65	1,536.44
21 SEER	467.71	3.65	1,707.16

Table 8-7. High Efficiency Central AC Deemed kW[41]

Efficiency	kWh Saved per Ton	Average Tons	kWh if Tonnage Unknown
12 EER	0.0131	3.65	0.0476
13 EER	0.0723	3.65	0.2638
14 EER	0.1231	3.65	0.4491
15 EER	0.1671	3.65	0.6097
16 EER	0.2056	3.65	0.7503
17 EER	0.2395	3.65	0.8743
18 EER	0.2697	3.65	0.9845

8.2.2.2 CAC Replacement Results

Resulting gross savings are summarized in Table 8-8.

Table 8-8 CAC Savings Summary – New Orleans

Measure	Expected kWh	Realized kWh	kWh Realization Rate	Expected kW	Realized kW	Peak kW Realization Rate
Central AC	2,581	3,368	130.5%	1.12	0.58	51.9%
Total	**2,581**	**3,368**	**130.5%**	**1.12**	**0.58**	**51.9%**

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[40] TRM Table 42, page B-66

[41] TRM Table 42, page B-66

There were no CAC or HP replacements in the Algiers territory. Overall kWh realization for HVAC replacements was 130.5% and overall kW realization was 59.5%.

8.2.3 Duct Sealing

Duct sealing savings was calculated using the following savings algorithms from the New Orleans TRM, section B.3.7.

8.2.3.1 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 (ft^3/min)

DL_{post} = Post-improvement duct leakage at 25 Pa (ft^3/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) See Table 3-10

h_{in} = Indoor design specific enthalpy (Btu/lb.) See Table 3-10

Table 8-9 Deemed Savings Values for Duct Sealing Calculations

Parameter	Value
$EFLH_C$	1,637
HDD	1,349
h_{out}	40
h_{in}	30
ρ_{in}	.076
P_{out}	.074
SEER	13

ρ_{out}= Density of outdoor air at 95°F = 0.0740 (lb/ft^3)[42]

ρ_{in} = Density of conditioned air at 75°F = 0.0756 ($lb./ft^3$)4

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 $EFLH_c$ 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 $EFLH_c$ of

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

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 (40x0.076 – 30x0.074) x 60 / (1000 x 11.5) = 1,891 kWh per year.

8.2.3.2 Heating Savings (Electric Resistance):

$$kWh_{savings,H} = \frac{\left(DL_{pre} - DL_{post}\right) x\ 60\ x\ HDD\ x\ 24\ x\ 0.018}{3{,}412}$$

Where:

DL_{pre}= Pre-improvement duct leakage at 25 Pa (ft^3/min)
DL_{post}= Post-improvement duct leakage at 25 Pa (ft^3/min)
ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05
60 = Constant to convert from minutes to hours
HDD = Heating degree days (1,349)
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft^3°F)
$EFLH_H$ = Equivalent full load heating hours
CAP = Heating capacity (Btu/hr)
3,412 = Constant to convert from Btu to kWh

8.2.3.3 Demand Savings (Cooling):

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

Where:

$kWh_{savings,C}$ = Calculated kWh savings for cooling
$EFLH_C$ = Equivalent full load cooling hours
CF = Coincidence factor = 0.77[43]

8.2.3.4 Incorporating Onsite findings

Data from 63 onsite verification and measurements performed by the Evaluators was incorporated into deemed duct sealing savings calculations. Details of this are described in subsequent sections.

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

The savings resulting from applying TRM algorithms and deemed savings parameters, plus the application of field results are summarized in Table 8-10 and Table 8-11.

8.2.3.5 Duct Sealing Results

Table 8-10 Expected and Realized Duct Sealing Savings – New Orleans

Heating Type	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*Peak kW Realization Rate*
Natural Gas Furnace	372,506	351,028	94.2%	175.28	165.11	94.2%
Electric Resistance	468,229	447,311	95.5%	94.88	89.29	94.1%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**840,735**	**798,338**	**95.0%**	**270.16**	**254.40**	**94.2%**

Table 8-11 Expected and Realized Duct Sealing Savings - Algiers

Heating Type	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Realized Peak kW Savings*	*Peak kW Realization Rate*
Natural Gas Furnace	24,598	24,480	99.5%	11.57	11.51	99.5%
Electric Resistance	24,369	24,274	99.6%	5.26	4.85	92.2%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**48,967**	**48,755**	**99.6%**	**16.83**	**16.36**	**97.2%**

8.3 Savings Results

Verified savings are summarized in Table 8-12 and Table 8-13.

Table 8-12 Realization Summary – New Orleans

Measure	*Expected kWh*	*Realized kWh*	*kWh Realization Rate*	*Expected kW*	*Realized kW*	*Peak kW Realization Rate*
Tune-ups	305,769	502,315	164.3%	110.62	236.08	213.4%
Replacements	2,581	3,368	130.5%	1.12	0.58	51.9%
Duct Sealing	840,735	798,338	95.0%	270.16	254.40	94.2%
Total	**1,149,084**	**1,304,021**	**113.5%**	**381.89**	**491.06**	**128.6%**

Table 8-13 Realization Summary - Algiers

Measure	*Expected kWh*	*Realized kWh*	*kWh Realization Rate*	*Expected kW*	*Realized kW*	*Peak kW Realization Rate*
Tune-ups	20,128	30,350	150.8%	7.29	14.28	195.9%
Duct Sealing	48,967	48,755	99.6%	16.83	16.36	97.2%

Total	**69,095**	**79,105**	**114.5%**	**24.12**	**30.64**	**127.0%**

8.4 Estimation of Net Savings

Participant survey responses were used to estimate the net energy impacts of appliance component of the Residential Heating & Cooling Program. The program net savings are equal to gross savings, less savings associated with free ridership, plus participant spillover savings.

In total, 64 program participants that completed tune-ups or duct sealing projects completed the survey. One respondent was removed from the analysis because responses because the respondent did not answer he net-to-gross questions. Eleven customers that replace air conditioners or heat pumps also completed the survey.

8.4.1 Estimation of Free Ridership

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.

Participant responses to these questions were used to calculate three scores corresponding to the presence of prior plans, the likelihood of completing the project in the absence of the program, and the timing of that project if it had been completed.

8.4.1.1 Prior Plans Score

Respondents were scored as 1 on the prior plans score if all of the following were true:

- The participant had plans to complete the project prior to learning about the program.
- The participant indicated that they would have been financially able to complete the project had a discount or rebate not been provided.

Respondents that did not have prior plans and could afford the measures were not deemed to be free riders.

8.4.1.2 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?

A likelihood score was assigned to each response for this question as follows:

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

8.4.1.3 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

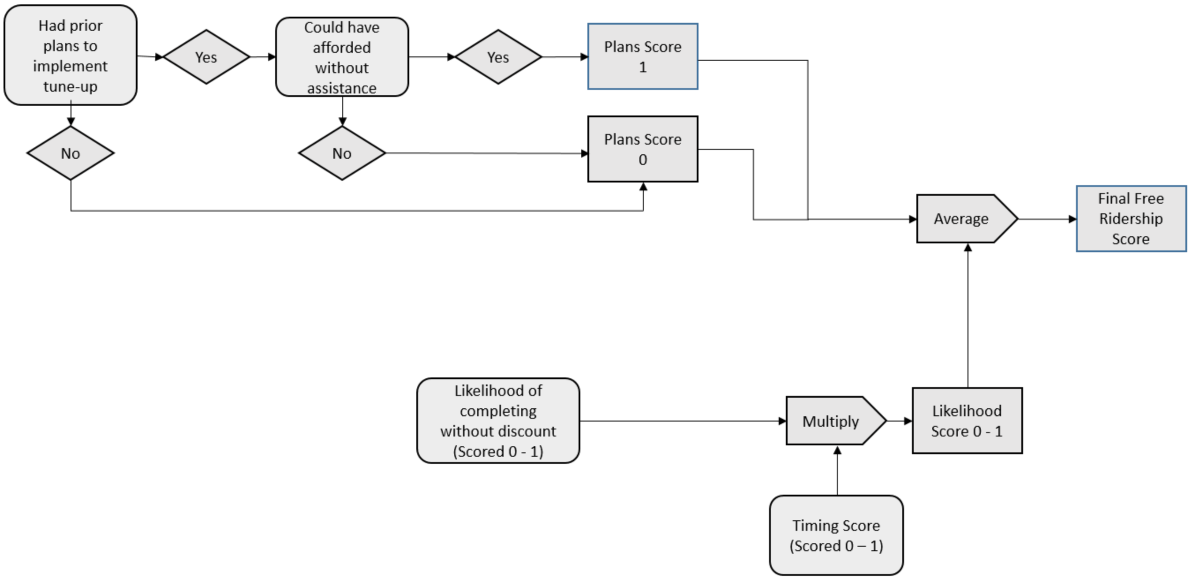
8.4.1.4 Final Free Ridership Score

The final free ridership score is equal to the following:

*Free Ridership = Average (Plans Score + Likelihood Score * Timing Score)*

The procedures used to estimate free ridership are summarized below in Figure 8-3.

Figure 8-3 Summary of Free Ridership Scoring Algorithm



8.4.2 Estimation of Participant Spillover

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.

8.4.3 Net Savings Results

The results of the net savings analysis are presented below in Table 8-14 and Table 8-15. As shown the net-to-gross ratios for kWh savings and peak kW reductions are both equal to 79%.

Table 8-14 Summary of Verified Net Savings

Utility	Expected kWh Savings	Verified Gross kWh Savings	Free Ridership	Verified Net kWh Savings	Net to Gross Ratio
ENO	1,149,084	1,304,021	8.6%	1,192,194	91.4%
Algiers	69,095	79,105	8.6%	72,321	91.4%
Total	**1,218,180**	**1,383,126**	**8.6%**	**1,264,515**	**91.4%**

Table 8-15 Summary of Verified Net Peak Demand Reductions

Utility	Expected Peak kW Reductions	Verified Gross Peak kW Reductions	Free Ridership	Verified Net Peak kW Reductions	Net to Gross Ratio
ENO	381.89	491.06	9.8%	443.03	90.2%
Algiers	24.12	30.64	9.8%	27.64	90.2%
Total	**406.01**	**521.70**	**9.8%**	**470.67**	**90.2%**

8.5 Process Evaluation

This chapter presents the results of the process evaluation of the Residential Heating & Cooling Program. The process evaluation focuses on aspects of program policies and organization, as well as the program delivery framework.

The process chapter begins with an overview of the program. This is followed by a discussion of the methodological approach used in the evaluation. A summary of findings and recommendations for program improvement follow the discussion of the methodology. This discussion is followed by detailed findings of the evaluation activities.

8.5.1 Data Collection Activities

The process evaluation of the Residential Heating & Cooling Program included the following data collection activities:

Table 8-16 Residential Heating & Cooling Process Evaluation – Summary of Data Collection

Activity	Sample Size
The Companies Staff	1
Participant Survey – AC Tune-up	64
Participant Survey – HVAC Replacement	11

8.5.2 Program Overview

The Residential Heating & Cooling Program provides financial incentives to encourage residential customers to improve the efficiency of their HVAC systems or replace their systems with more efficient units.

8.5.3 Detailed Findings

8.5.3.1 Database Review

Table 8-17 displays the number of projects and the expected kWh savings by measure type. During PY7 the total expected savings for the Residential Heating and Cooling Program equaled 46% of the PY6 savings. As shown, tune-ups and duct sealing accounted for more than 99% of the program expected kWh savings. AC replacements accounted for less than 1% of program savings.

In terms of expected savings, the savings acquisition cost for program measures ranged from $0.15 per kWh saved for AC replacement to $0.19 per kWh saved for tune-ups.

Table 8-17 Program Activity by Measure Implemented

Measure Type	Expected Savings (kWh)	Share of Total Program Savings	Share of Total Projects	$ per kWh in Expected Savings
Duct Sealing	889,702	73.0%	49.0%	$0.17
Tune-Up	326,713	26.8%	50.9%	$0.19
Central AC	2,581	0.2%	0.1%	$0.15
Total	**1,218,996**	**100.0%**	**100.0%**	**$0.18**

Table 8-18 displays savings and the number of tune-up and duct sealing projects by system type and tonnage. As shown, most savings and projects were performed on central air conditioner systems. Also shown is that the system tonnage was missing for 24 projects.

Table 8-18 AC Tune Up Activity by Unit Size the Type

Unit Tonnage by Cooling Source	Expected Savings (kWh)	Share of Tune Up / Duct Sealing Savings	Project Count	Average Savings per Project
AC Tonnage				
1.5	4,984	0.4%	3	1,661
2	62,420	5.1%	34	1,836
2.5	89,274	7.3%	40	2,232
3	403,230	33.1%	153	2,635
3.5	148,788	12.2%	55	2,705
4	343,365	28.2%	102	3,366
5	153,193	12.6%	40	3,830
Missing	10,042	0.8%	24	418
AC Totals	**1,215,296**	**99.9%**	**451**	**2,695**
Heat Pump Tonnage				
2.5	1,119	0.1%	1	1,119
Heat Pump Totals	**1,119**	**0.1%**	**1**	**1,119**

Figure 8-4 Monthly and Cumulative HVAC Tune Up Expected kWh Savings

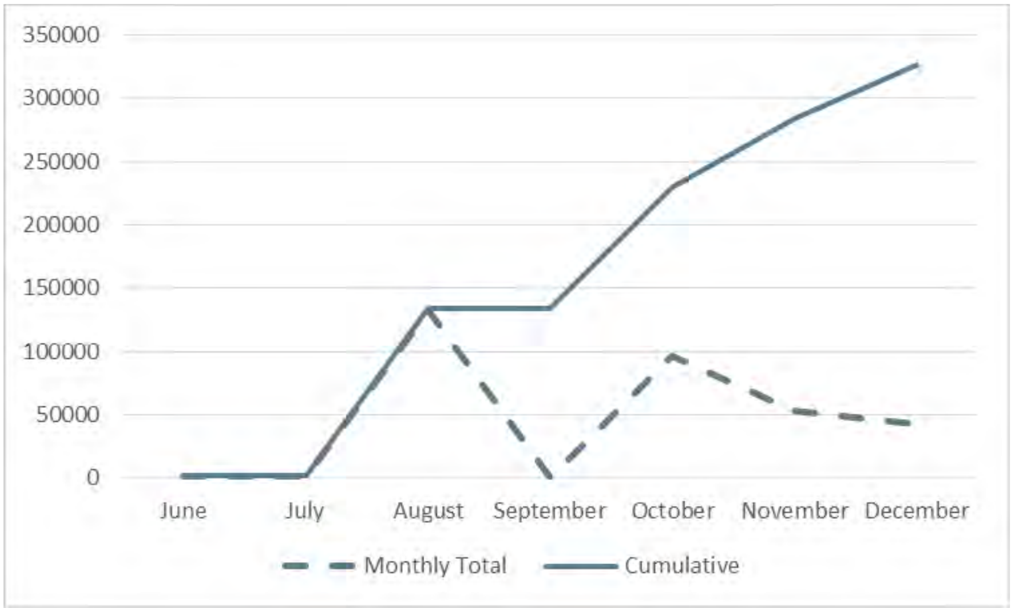


Figure 8-5 Monthly and Cumulative Duct Sealing Expected Savings

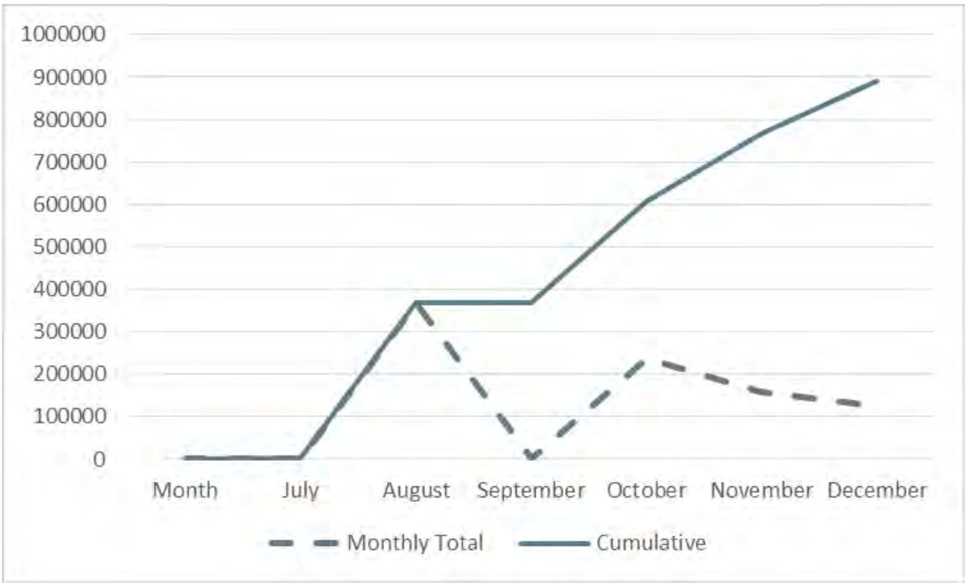
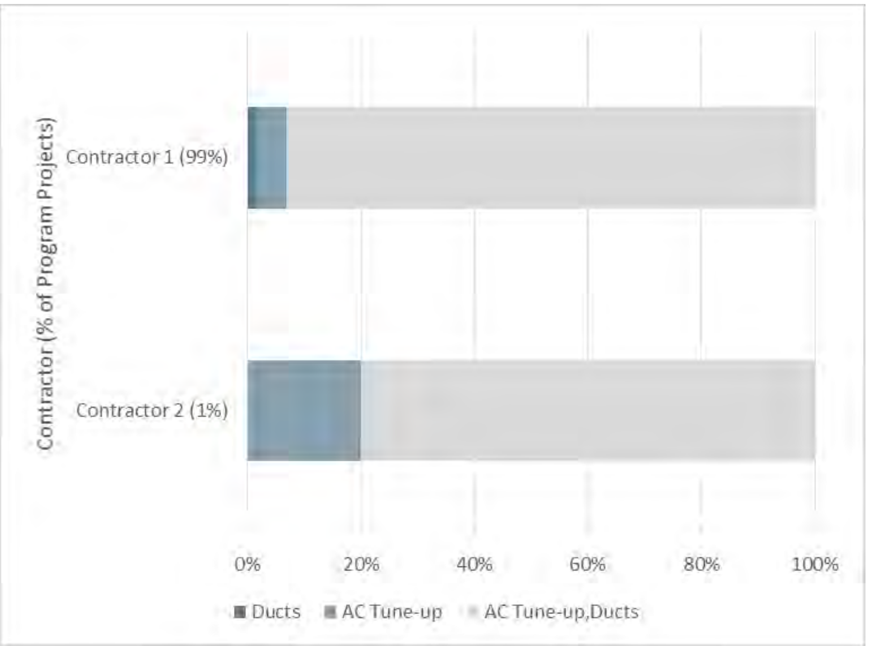


Figure 8-6 provides a summary of tune-up and duct sealing projects completed by contractor. As shown, one contractor accounted for nearly all program projects. The data is further disaggregated to show which contractors implemented duct sealing in addition to performing a general tune-up, and which contractors provided only one of those services. As shown, most projects included duct sealing and system tune-ups.

Figure 8-6 Summary of Tune-up and Duct Sealing Projects



One contractor installed both of the system replacements and both systems were installed at a single location.

8.5.3.2 Participant Survey Results

The survey used to estimate net savings also asked participants questions about how they learned of the program and their satisfaction with it.

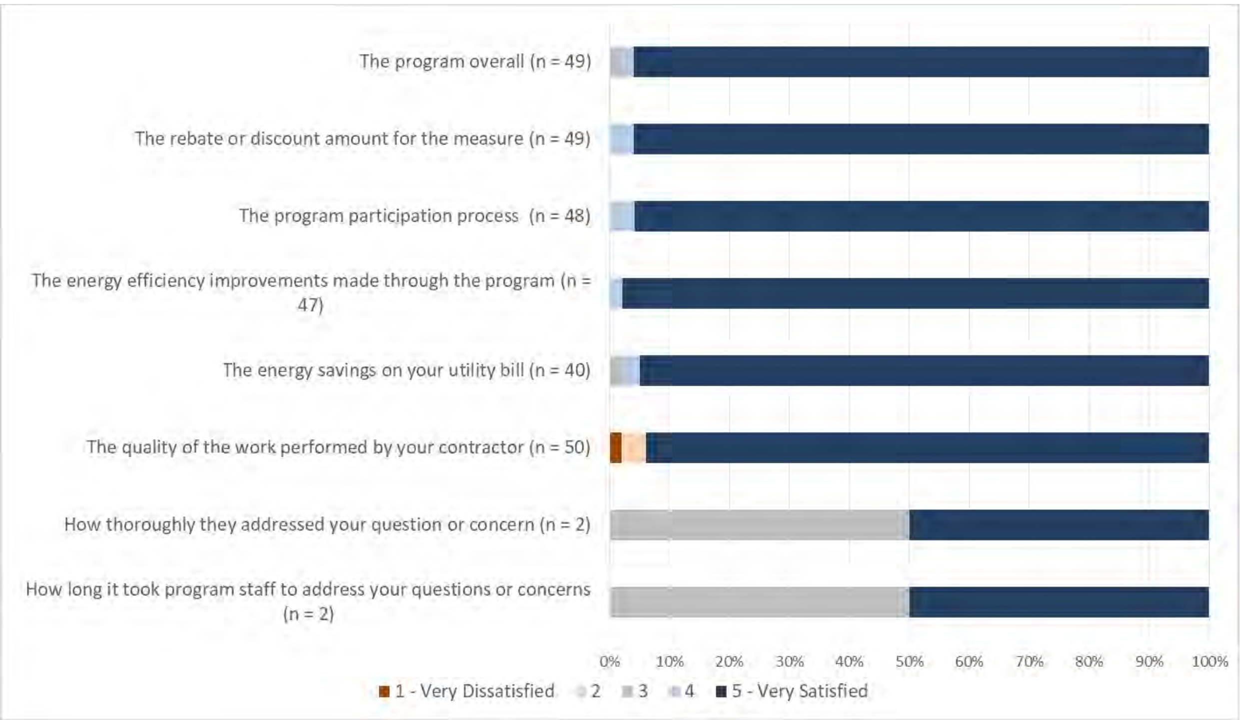
The two most common means by which participants learned of the program were from a friend, family member, colleague (82%) or from print advertisement (12%).

Table 8-19 How Participants Learned of the Program

Response	Percentage of Respondents (n=50)
Friend, family member, or colleague	82%
A print advertisement	12%
Program representative	2%

Figure 8-7 summarizes participant satisfaction. Ninety-eight percent of respondents indicated satisfaction with the program overall by rating it as a four or five on a five-point scale. Three participants indicated dissatisfaction with the contractor's work. Two of these customers indicated that a call-back was required to address an issue. The third did not elaborate on the matter.

Figure 8-7 Participant Satisfaction



8.6 Conclusions

The Evaluators' conclusions are summarized below:

- Most program participants were satisfied with the contractors that completed the work and few reported that was difficult to find a contractor to complete the work.
- Ninety-seven percent of tune-up/duct sealing participants and 80% of HVAC replacement participants were satisfied with the program overall.
- A significant percentage of program participants received a tune-up within three years of participating in the program. This may have implications as to the EUL for tune-ups as-listed in the New Orleans TRM.

8.7 Recommendations

The Evaluators' recommendations for the Residential Heating & Cooling Program are as follows:

- **Discuss barriers contractors may face in completing multiple measure projects and develop approaches to mitigate any barriers present.** A large number of contractors are completing single measure projects. Staff should discuss with these contractors any barriers they face in completing multi-measure projects and consider approaches to mitigate these barriers such as additional training to address knowledge gaps and potential payoffs in terms of increased business for contractors that need to purchase the required diagnostic equipment.
- **Track tune-ups on the basis of specific activities completed.** The deemed savings and EUL shown in the New Orleans TRM assume a refrigerant charge correction. Due to the issue of tune-ups occurring in a significantly shorter period than the tune-up EUL, the Evaluators advise requiring contractors to report whether a tune-up included a refrigerant charge correction, and apply a lower EUL for tune-ups that do not include this service.

9. Energy Smart School Kits & Education

9.1 Program Description

The Energy Smart School Kits and Education (SK&E) Program provides classroom education on energy use and saving energy, energy efficiency kits to students, and adult outreach activities to promote energy efficiency and the rebates and discounts offered by Entergy through the Energy Smart Programs.

The School Kits component of the program includes a 45 to 90-minute presentation given by program staff to 5th, 6th, or 7th grade students. The presentation focuses on energy use 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; and
- A flyer included in the kit that describes the kit items and their benefits.

The adult outreach activities are intended to educate the Companies' customers about energy efficiency and the Entergy Energy Smart efficiency programs. The outreach activities include:

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

The adult outreach component also provides energy efficiency retrofits to nonprofits. The primary goal of the retrofits is to inform the membership of energy saving opportunities by demonstrating the benefits of efficient technologies.

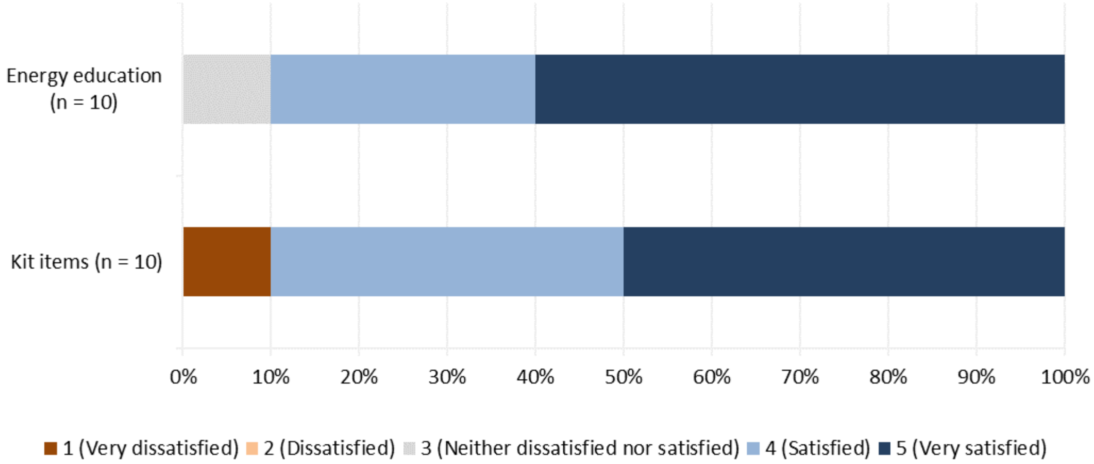
9.2 Evaluation Scope

The SK&E Program has 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 PY7 program, the Evaluators concluded that the SK&E program did not warrant more than a brief overview of program activity. The rationales for this are as follows:

- **Limited program scope.** In PY7, the program provided 320,546 expected kWh savings, comprising 1.25% of the Energy Smart portfolio. In comparison, the program comprised 2.93% of portfolio savings in PY5.

- **Coverage of program measures in New Orleans TRM.** All measures installed in SK&E have deemed savings provided in the New Orleans TRM, with lighting usage estimates based on the New Orleans lighting metering study conducted in the PY6 evaluation and average hot water heater setpoints collected during the PY6 evaluation.
- **Past evaluations showed high satisfaction metrics.** As seen in the figure below, the SK&E program has high participant satisfaction. The Evaluators did not find operational issues with the program that warranted further review in PY7.

Figure 9-1 Satisfaction with the Energy Education and Kits Contents



9.3 Expected Savings and Program Participation

A total of 1,500 kits were distributed to a total of 14 schools through the program during PY7, an increase from 1,317 in PY6 during the same time period[44] Expected savings per kit was greater in PY7 than either previous program years. The difference in savings per kit can be attributed to the replacement of CFLs with LEDs, which have a higher per-unit savings associated with them. Below, Table 9-1 summarizes the measures per kit, average kit kWh savings per program year.

Table 9-1 SK&E Summary of Measures and per Kit Savings by Program Year

Item	PY5	PY6	PY7

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[44] Figures adjusted to reflect 9-month PY7 program period.

13 W CFL	4	4	
18 W CFL	2	2	
Bathroom Aerator 1.5gpm		1	1
Kitchen Aerator 1.5gpm	1	1	1
Showerhead 1.5gpm	1	1	1
Nightlight	1	1	
9W LED		2	4
15W LED			2
Average kWh savings per kit	**159.13**	**160.79**	**213.70**

Table 9-2 below summarizes the total number of kits distributed and expected kWh and kW savings per territory.

Table 9-2 Summary of Measures and Expected Savings

Service Territory	***Total Number of Kits***	***Total Expected kWh Savings***	***Total Expected kW Savings***
New Orleans	1,272	271,823	32.62
Algiers	228	48,723	5.85
Total:	**1,500**	**320,546**	**38.47**

Total verified savings and percentage of goals for the SK&E Program are summarized in Table 9-3.

Table 9-3 SK&E Savings Goals by Utility

Service Territory	***kWh goal***	***Net Realized kWh***	***Percentage of kWh goal realized***	***kW goal***	***Net Realized kW***	***Percentage of kW goal realized***
ENO	253,937	212,813	83.8%	34.6	25.22	72.9%
Algiers	39,056	38,146	97.7%	5.3	4.52	85.3%

9.4 Impact Calculation Methodology

Electricity savings and peak demand reductions of the PY7 SK&E Program were estimated using the New Orleans TRM 1.0. Measure-specific tables are provided below.

9.4.1 Savings Calculations

Table 9-4 ENERGY STAR® Omnidirectional LEDs – Deemed Savings Per Lamp[45]

Minimum Lumens	***Maximum Lumens***	***Incandescent Equivalent 1st Tier EISA 2007 (W_{base})***	***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

Table 9-5 Faucet Aerators – Deemed Savings[46]

Efficient GPM Rating	***kWh***	***kW***
1.5 GPM	26.53	.0028
1.0 GPM	44.22	.0046

Table 9-6 Low Flow Showerhead Retrofit Deemed Energy Savings[47]

1.5 GPM Showerhead		
Water gal. saved /year/showerhead @ 1.5 GPM	2,860	
T_{Supply}	74.8°F	
T_{Mixed}	105.0°F	
Water heater EF (excluding standby losses)	0.98 (Electric Resistance) / 2.2 (Heat Pump)	
Energy Savings	Electric: 226 kWh	Heat Pump: 101 kWh
Demand Savings	Electric: 0.0235 kW	Heat Pump: 0.0105 kW

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. Table 9-7 presents the ISRs found in the PY6 and PY7 evaluations. Across all measures, ISRs increased in comparison to PY7. The most notable improvements were in lighting (increasing from a range of 60%-62% to 72%-

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[45] New Orleans TRM V1.0, Table 105, page B-138.

[46] New Orleans TRM V1.0, Table 33, page B-54.

[47] New Orleans TRM V1.0, Table 38, page B-60.

75%) and bathroom aerators (increasing from 32% to 47%). This improvement in ISR accounts for 14.9% of PY7 program savings.

Table 9-7 SK&E Summary of In-Service Rates

Item	PY6	PY7
13W CFL / 9W LED	60%	72%
18W CFL / 15W LED	62%	75%
Bathroom Aerator 1.5	32%	47%
Kitchen Aerator 1.5	42%	46%
Showerhead	58%	64%

9.5 Verified Savings by Measure

During program administration, the implementation team consulted with the Evaluators on final savings calculations methodologies, resulting in 100% kWh and kW realization rates for all measures.

Table 9-8 Verified Gross Savings – New Orleans

Measure	Ex Ante kWh Savings	Ex Post kWh Savings	kWh Realization Rate	Ex Ante kW Savings	Ex Post kW Savings	Peak kW Realization Rate
9W LED	91,237	91,237	100.00%	12.26	12.26	100.00%
15W LED	79,482	79,482	100.00%	9.83	9.83	100.00%
Kitchen Aerator	7,294	7,294	100.00%	0.77	0.77	100.00%
Bathroom Aerator	7,427	7,427	100.00%	0.78	0.78	100.00%
Showerhead	86,383	86,383	100.00%	8.98	8.98	100.00%
Total	**271,823**	**271,823**	**100.00%**	**32.62**	**32.62**	**100.00%**

Table 9-9 Verified Gross Savings – Algiers

Measure	Ex Ante kWh Savings	Ex Post kWh Savings	kWh Realization Rate	Ex Ante kW Savings	Ex Post kW Saving	Peak kW Realization Rate
9W LED	16,354	16,354	100.00%	2.20	2.20	100.00%
15W LED	14,247	14,247	100.00%	1.76	1.76	100.00%
Kitchen Aerator	1,307	1,307	100.00%	0.14	0.14	100.00%
Bathroom Aerator	1,331	1,331	100.00%	0.14	0.14	100.00%
Showerhead	15,484	15,484	100.00%	1.61	1.61	100.00%
Total	**48,723**	**48,723**	**100.00%**	**5.85**	**5.85**	**100.00%**

9.6 Savings and In-Service Rate Findings

CFLs and LED nightlights were removed from PY7 kits. In-service rates for comparable general-use LED lamps were on average 10.2% higher than PY6.

Table 9-10 SK&E In-Service Rate and Electric Water Heating Comparisons PY5, PY6 & PY7

Measure	PY5	PY6	PY7
13 W CFL	66%	60%	-
18 W CFL	66%	62%	-
9W LED	-	68%	72%
15W LED	-	-	75%
Kitchen Aerator	84%	41%	46%
Bathroom Aerator	84%	34%	47%
Showerhead	63%	58%	64%
LED Nightlight	91%	86%	-
% Electric Water Heating	30%	55%	47%

9.7 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 PY7 participants.

9.7.1 Measure Level Free Ridership Results

Table 9-11 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 9-11 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%[48]

9.7.2 Impact of EISA Phase II on Program Savings

When EISA Phase II takes effect, the savings from the 9W LED will decline by 68% and the savings from the 15W LED will decline 52%. If this code were in effect in 2017, program savings would be reduced by 38% as a result. Program administrators should plan for this decline and address it with possible new measures for the school kit:

- **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.

9.8 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 in Table 9-12, the overall Net-to-Gross ratio for this program was 78%.

Table 9-12 SK&E Summary of Verified Net Savings

Service Territory	Expected kWh Savings	Verified Gross kWh Savings	Free Ridership	Verified Net kWh Savings	Net to Gross Ratio
ENO	271,823	271,823	59,010	212,813	78%
Algiers	48,723	48,723	10,577	38,146	78%
Total	**320,546**	**320,546**	**69,588**	**250,959**	**78%**

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

Table 9-13 SK&E Summary of Verified Net Peak Demand Reductions

Service Territory	***Expected Peak kW Reductions***	***Verified Gross Peak kW Reductions***	***Free Ridership***	***Verified Net Peak kW Reductions***	***Net to Gross Ratio***
ENO	32.62	32.62	7.40	25.22	77%
Algiers	5.85	5.85	1.33	4.52	77%
Total	**38.47**	**38.47**	**8.72**	**29.75**	**77%**

9.9 Lifetime Savings

Table 9-14 and Table 9-15present the lifetime kWh and peak kW savings attributable to lamps distributed through the PY7 SK&E program:

Table 9-14 ENO Lifetime Savings

Measure	***Lifetime kWh***
9W LED	547,425
15W LED	476,891
Kitchen Aerator	72,940
Bathroom Aerator	74,274
Showerhead	863,826
Total	**2,035,355**

Table 9-15 Algiers Lifetime Savings

Measure	***Lifetime kWh***
9W LED	98,123
15W LED	85,480
Kitchen Aerator	13,074
Bathroom Aerator	13,313
Showerhead	154,837
Total	**364,828**

9.10 Recommendations

The Evaluators' recommendation for the SK&E Program is as follows:

- **Plan long-term for a non-lighting kit redesign.** It is a popular program, and there is at this time no evidence to suggest that it faces issues with saturation. The program design should be revisited in advance of EISA Phase II code enforcement however, as that code taking effect will curtail the savings potential for this program significantly.

- **Include informational materials about online utility energy savings calculators and free home energy assessments.** Ten percent of survey respondents reported awareness of other Energy Smart efficiency programs. Including program materials about other residential programs or directing them to the NOLA Energy Smart website can help raise awareness of other residential programs offered by the Utility.
- **Unless significantly expanded, move SK&E to a schedule of one evaluation per program cycle.** The program provides modest savings using well-established estimates from the New Orleans TRM. The Evaluators recommend reviewing this program once in each three-year program cycle. During this period, if further primary data is not collected by program administrators, the program can use the following stipulated metrics:
    - ISR(Lighting): 72%
    - ISR (Aerators): 46%
    - ISR (Showerheads): 64%
    - NTGR (Overall): 78%

  The program should be revisited for evaluation in PY10.

10.Small Commercial Solutions

10.1 Program Description

The ENO and Algiers Small Commercial Solutions Program (SCS) offers enhanced 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 SCS Program is designed to provide small business owners with energy efficiency information and develop awareness of energy/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 ENO and Algiers small business customers. Through the SCS Program, a network of contractors was developed that work with small business customers. The Program provides the tools and training for contractors to quantify the energy savings and incentives for small business customers.

Table 10-1 Savings Expectations by Program Component ENO

Program Component	***Count of Projects***	***Expected kWh Savings***	***Expected kW Savings***
Custom	2	41,075	15.63
Lighting	32	1,864,401	219.15
Prescriptive	8	80,469	22.36
Total	**42**	**1,985,945**	**257.14**

Table 10-2 Savings Expectations by Program Component Algiers

Program Component	***Count of Projects***	***Expected kWh Savings***	***Expected kW Savings***
Lighting	4	277,664	29.76
Total	**4**	**277,664**	**29.76**

Data provided by Aptim showed that during PY7, there were 42 and 4 projects for ENO and Algiers respectively. These projects were expected to provide a combined savings of 2,263,821 kWh and 286.90 kW. Annual program savings have declined by 34% as compared to PYs 5 and 6 averaged. However, savings per-project have increased from an average of 34,768 kWh in PY5-PY6 to 49,209 kWh in PY7. These results are summarized in Table 10-3.

Table 10-3 Small Business Program Participation Summary Comparison[49]

Project Year	# Projects	Expected kWh	kWh per Project	% Non-Lighting
PY5	184	3,937,104	21,397	11.16%
PY6	61	2,936,485	48,139	1.94%
PY7	46	2,263,609	49,208	5.38%

Total verified savings and percentage of goals for the SCS Program are summarized in Table 10-4.

Table 10-4 SCS Savings Goals by Utility

Utility	kWh goal	Realized Net kWh	Percentage of kWh goal realized	kW goal	Realized Net kW	Percentage of kW goal realized
ENO	2,069,113	1,847,496	89.29%	401.3	244.91	61.03%
Algiers	240,297	277,330	115.41%	47.9	20.79	43.40%

10.2 M&V Methodology

Evaluation of the SCS Program requires the following:

- Stratified Random Sampling (as detailed in section 2.2.1.3 Stratified Sampling) and by selecting large saving sites with certainty.
- Review of deemed savings parameters for prescriptive projects;
- On-site verification;
- 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 Aptim, sample designs were developed for on-site data collection for the impact evaluation. Sample sizes were determined that provide savings estimates for the program with ±10% precision at the 90% confidence level. The on-site inspections were used to verify installations and to determine any changes to the operating parameters since the measures were first installed. The Evaluators verified that TRM deemed lighting hours of operation had been correctly assigned by space type. Projects were analyzed using the methods described in the New Orleans TRM

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[49] Figures adjusted to reflect 9-month PY7 program period.

1.0, section C.6.3., Lighting Efficiency. Specific algorithms and explanation of deemed inputs are below.

10.2.1 Lighting Savings Calculations

$$kW_{savings} = \sum\left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000}\right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000}\right]_{post}\right) \times CF \times IEF_D$$

$$kWh_{savings} = \sum\left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000}\right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000}\right]_{post}\right) \times AOH \times IEF_E$$

Where:

$N_{fixt(i),pre}$ = Pre-retrofit number of fixtures of type i
$N_{fixt(i),post}$ = Post-retrofit number of fixtures of type i
$W_{fixt(i),pre}$ = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table, Appendix E pages C-323 to C-475)
$W_{fixt(i),post}$ = 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)
IEF_D = Interactive effects factor for demand savings (TRM Table 228, page C-296)
IEF_E = Interactive effects factor for energy savings (TRM Table 228, page C-296)

10.3 Gross Impact Findings

Table 10-5 summarizes the total participation in the PY7 Small Business Program.

Table 10-5 PY7 Small Business Program Participation Summary

Utility	# Projects	Expected kWh	Expected Peak kW
ENO	42	1,985,945	257.14
Algiers	4	277,664	29.76
Total	**46**	**2,263,609**	**286.90**

Table 10-6 Small Business Sample Summary

Utility	# Sites in Population	Site Visit Sample Size	# Surveys
ENO	42	9	5
Algiers	4	1	1
Total	**46**	**26**	**6**

Sampling for evaluation of ENO and Algiers' SBS program 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 achieved sampling precision was ±9.93% at

90% confidence. The population and sample include both utilities pooled. However, savings in this report are presented for each utility individually as well as aggregated.

10.3.1 Small Business Program Sample Design

The participant population for the SBS was divided into four strata. Table 10-7 summarizes the strata boundaries and sample frames for the SBS and Table 10-8 summarizes expected savings for of both the sample and population.

Table 10-7 Small Business Program Sample Design (Pooled)

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Stratum 5***	***Totals***
Strata boundaries (kWh)	< 15,000	15,001 - 40,000	40,001 - 80,000	80,001 - 200,000	> 200,001	
Number of projects	17	13	8	6	2	**46**
Total kWh savings	127,920	358,722	431,206	658,587	687,174	**2,263,609**
Average kWh Savings	7,525	27,594	53,901	109,765	343,587	**49,209**
Standard deviation of kWh savings	4,170	6,259	12,778	28,512	177	**72,589**
Coefficient of variation	0.554	0.227	0.237	0.260	0.001	**1.475**
Final design sample	2	2	2	2	2	**10**

Table 10-8 Expected Savings for Sampled and Non-Sampled Projects by Stratum

Stratum	***Sample Expected Savings***	***Total Expected Savings***
1	17,824	127,920
2	57,422	358,722
3	110,371	431,206
4	283,638	658,587
5	687,174	687,174
Total	**1,156,429**	**2,263,609**

10.3.2 Small Business 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 10-9 presents realization at the stratum level, with Table 10-10 presenting results at the site level.

Table 10-9 Summary of kWh Savings for Small Business Program by Sample Stratum (Pooled)

Stratum	Sample Expected kWh Savings	Sample Realized kWh Savings	Realization Rate
1	17,824	14,067	78.9%
2	57,422	38,187	66.5%
3	110,371	100,827	91.4%
4	283,638	303,546	107.02 %
5	687,174	687,174	100.0%

Table 10-10 shows the expected and realized energy savings for the program by project.

Table 10-10 Expected and Realized Savings by Sampled Project

Project ID(s)	Facility Type	Expected kWh Savings	Realized kWh Savings	Realization Rate
SN7-002	Retail Store	7,030	8,264	117.55%
SN7-006	Pharmacy and Convenience Store	10,794	5,803	53.76%
SN7-003	Pharmacy and Convenience Store	28,053	14,744	52.56%
SN7-008	Pharmacy and Convenience Store	29,369	23,442	79.82%
SN7-001	Convenience Store	41,188	45,561	110.62%
SN7-007	Pharmacy and Convenience Store	69,183	55,266	79.88%
SA7-001	Grocery Store	122,625	132,537	108.08%
SN7-014	Convenience Store	161,013	171,009	106.21%
SN7-044	Shipping Warehouse	343,462	343,462	100.00%
SN7-046	Shipping Warehouse	343,712	343,712	100.00%
Total		**1,156,849**	**1,143,800**	**98.87%**

10.3.3 Small Business Program-Level Realization

Using the realization rates presented in Table 10-10, the Evaluators extrapolated results from sampled sites to non-sampled sites in developing program-level savings estimates. Table 10-11 presents results by stratum.

Table 10-11 Small Business Program-Level Realization by Stratum

Stratum	# Sites	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected kW Savings	Realized kW Savings	kW Realization Rate
1	17	127,920	100,959	78.92%	17.78	12.47	70.16%
2	13	358,722	238,555	66.50%	56.50	40.72	72.07%
3	8	431,206	393,920	91.35%	67.11	60.59	90.29%
4	6	658,587	704,219	106.93%	86.17	74.84	86.85%
5	2	687,174	687,174	100.00%	59.34	77.07	129.87%
Total	**46**	**2,263,609**	**2,124,826**	**93.87%**	**286.90**	**265.69**	**92.61%**

Table 10-12 Small Business Program-Level Realization by Utility

Utility	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected kW Savings	Realized kW Savings	kW Realization Rate
ENO	1,985,945	1,847,496	93.03%	257.14	244.91	95.24%
Algiers	277,664	277,330	99.88%	29.76	20.79	69.86%
Total	**2,263,609**	**2,124,826**	**93.87%**	**286.90**	**265.69**	**92.61%**

10.3.4 Small Business Realization by Contractor

The Evaluator extrapolated results from the program into savings by project contractor trade ally. The results are presented below in Table 10-13.

Table 10-13 Savings by Contractor

Contractor	Expected kWh	Realized kWh	kWh Realization Rate	Expected Peak kW	Realized Peak kW	Peak kW Realization Rate
Lighting Contractor #1	902,634	868,590	96.23%	124.80	97.70	78.29%
Lighting Contractor #2	771,358	754,513	97.82%	65.18	81.56	125.13%
Other Contractor	590,037	501,723	85.03%	96.92	86.43	89.18%
Total	**2,264,029**	**2,124,826**	**93.85%**	**286.90**	**265.69**	**92.61%**

10.3.5 Small Business – Causes of Savings Deviations

The Evaluators have summarized these adjustments and others in Table 10-14 for illustrative purposes.

Table 10-14 Small Business – Causes of Variance in Savings

Project ID	Expected kWh	Realized kWh	Realization Rate	Causes of Variance in Savings
SN7-002	7,030	8,264	117.56%	Retail. Ex ante calculations used 3,668 deemed annual operating hours, rather than the 4,312 specified in the New Orleans TRM for exterior non-daylight lighting. .
SN7-006	10,794	5,803	53.76%	• Retail. Baseline and installed EER values in ex ante calculator do not match the values provided or the unit cutsheets. One unit had a verified base SEER equal to that of the efficient model, thus no savings

Project ID	Expected kWh	Realized kWh	Realization Rate	Causes of Variance in Savings
				could be attributed to it. • Ex-ante EFLH was calculated using weather data and assumes the system is on 24/7 whenever the outdoor air temperature is greater than 49 degrees, resulting in EFLHc of 7,792. This is a low outdoor air temperature to switch from heating to cooling and the facility is not open 24/7. The Evaluators used deemed EFLH for retail buildings, 3,191. • The ex ante saving calculator included additional savings for VFD units were not installed, or part of the project.
SN7-003	28,053	14,744	52.56%	Retail. Ex ante calculations assumed gas heating with and interactive factor of 1.20, however on site the Evaluators found the site was heated via electric resistance and applied and factor of 0.87 to ex ante calculations, lowering the kWh realization rate. The rate was further reduced when Evaluators found that some areas of the site did not use continuous lighting (8,760). Verified lighting operation in these areas was that of a conventional retail store, thus 4,312 AOH operating hours and a peak CF of 0.90 were used in ex ante calculations, further reducing the kWh realization rate.
SN7-008	29,369	23,442	79.82%	Retail. Ex ante calculations assumed gas heating with and interactive factor of 1.20, however on site the Evaluators found the site was heated via electric resistance and applied and factor of 0.87 to ex ante calculations, lowering the kWh realization rate.
SN7-001	41,188	45,561	110.62%	Convenience store. Ex ante calculations assumed electric resistance heating with and interactive factor of 0.87 in certain areas of the facility, however on site the Evaluators found the site was heated via gas and applied and factor of 1.20 to ex ante calculations, raising the kWh realization rate.
SN7-007	69,183	55,266	79.88%	Pharmacy and convenience store. Ex ante calculations assumed gas heating with and interactive factor of 1.20, however on site the Evaluators found the site was heated via electric resistance and applied and factor of 0.87 to ex ante calculations, lowering the kWh realization rate.
SA7-001	122,625	132,537	108.08%	Grocery store. Ex ante calculations used 3,996 deemed annual operating hours, rather than the 4,319 specified in the New Orleans TRM for exterior lighting.
SN7-014	161,013	171,009	106.21%	Convenience store. Ex ante calculations used 3,996 deemed annual operating hours, rather than the 4,319 specified in the New Orleans TRM for exterior lighting. The Evaluators also changed the heating type in coolers from gas heating to no heating.

Key issues identified in site-level analyses include:

- **Incorrect deemed hours source**. Ex ante calculations used deemed annual lighting hours of operation from the AR TRM 6.0, rather than the New Orleans TRM 1.0. This factor accounts for a 3.00% difference on program realization.

- **Incorrect space heating type.** Four sites' claimed heating types differed from those verified on site. This factor accounts for a 5.05% difference on program realization.

10.4 Net Impact Findings

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.

As of December 2017, eight unique customers completed projects through the SCS Program. The Evaluators attempted to complete surveys with all customers and in total, completed surveys with six program participants. Eighty-three percent of SCS projects were not recorded in program participation tracking until late January of 2018, and this lack of available projects for review marred the evaluation effort.

10.4.1 Estimating Free Ridership

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 then asked to rate how certain they are that their organization could not have afforded the measure. If a customer indicated that their organization could not have afforded the measure and indicates that they were very certain of this, 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 participating in the program?” and “Would you have gone ahead with this planned installation even if you had not participated in the program?”
- The respondent answers “definitely would have installed” to the following question: “If the financial incentive 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 financial incentive from the program 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 that provided the energy assessment of your facility 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 11-15 shows these values.

Table 10-15 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	100%
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%

10.4.2 Estimating Spillover

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.

None of the survey respondents indicated that they had implemented additional measures that met the criterion for attributing the savings to the program.

10.4.3 Net Savings Results

Table 10-16 summarizes the results of the free ridership scoring. Free ridership for the program was estimated by weighting each participant's response by the associated verified gross kWh savings or peak kW reductions for the measure. Free ridership was low for the program because most participants indicated that they could not have implemented the measures without the program's financial assistance (21%) or that they did not have prior plans to implement the measures (79%). These reasons for the lack of program free ridership are consistent with the theory underlying the SCS program – small businesses face financial and informational barriers that program incentives and the network of program contractors seek to mitigate.

Table 10-16 Free-Ridership Scoring Results

Had Plans and Intentions to Install Measure without C&I Program? (Definition 1)	Had Plans and Intentions to Install Measure without C&I Program? (Definition 2)	C&I Program had influence on Decision to Install Measure?	Had Previous Experience with Measure?	Percentage of Total Ex Post Gross kWh Savings	Free Ridership Score
N	N	N	N	79%	0%
Required program to implement measures.				21%	0%
Total				100%	0%

Table 10-17 and Table 10-18 summarize the verified net kWh savings and peak kW demand reduction, which equaled 100% of gross program savings.

Table 10-17 Summary of Net Ex Post kWh Savings

Utility	Expected kWh Savings	Verified Gross kWh Savings	Free Ridership	Spillover	Verified Net kWh Savings	Net to Gross Ratio
ENO	1,985,945	1,847,496	0	0	1,847,496	100%
Algiers	277,664	277,330	0	0	277,330	100%
Total	**2,263,609**	**2,124,826**	**0**	**0**	**2,124,826**	**100%**

Table 10-18 Summary of Ex Post Net Peak kW Reductions

Utility	Expected Peak kW Reductions	Verified Gross Peak kW Reductions	Free Ridership	Spillover	Verified Net kW Savings	Net to Gross Ratio
ENO	257.14	244.91	0	0	244.91	100%
Algiers	29.76	20.79	0	0	20.79	100%
Total	**286.90**	**265.69**	0	0	**265.69**	100%

10.5 Process Evaluation

10.5.1 Staff Interview Findings

The Evaluator completed two interviews with three Aptim implementation contractor program management staff.

This section presents findings pertaining to all of the nonresidential programs.

10.5.1.1 Program Launch

Activities related to the launch of the program were discussed in Section 3.6.1.1

10.5.1.2 Program Design and Goals

The structure and types of program goals and objectives for the portfolio were discussed in Section 3.6.1.2.

Under the previous implementation contractor included a walk-through audit as the primary customer engagement strategy but was discontinued in PY7. Staff noted that while they can provide an audit, this is not required part of the program delivery. Staff noted that they are looking at a small business lighting direct install pilot.

10.5.1.3 Program Performance

The Small Commercial Solutions program officially launched on April 1st and full-scale marketing and outreach did not start until June 2017 due to a delay between the notification of the program launch and the availability of the trade allies to begin program projects. Staff noted that there the performance of the Small Commercial Solutions Program was not a strong as hoped and that additional contractor engagement was needed for it to perform better.

Staff noted that meeting savings goals for the Algiers territory is a challenge for the nonresidential programs. However, the Small Commercial Solutions Program overachieved in comparison to its savings goal in Algiers, out-performing other C&I programs in this regard.

10.5.1.4 Marketing and Outreach

Marketing and outreach activities specific to the nonresidential market segment included hosting a restaurant focused training event. This training was the only commercial customer event targeting ENO and Algiers customers held during the year. Restaurants were targeted because of the robust hospitality segment in New Orleans and staff noted the high potential for projects savings for engaging these customers and staff.

Additional marketing activities directed at customers included:

- A direct mail campaign targeting businesses in the Algiers service territory;

- Convening a meeting of charter school facility managers that highlighted the availability of a free audit; and
- Contracting with a consulting firm to focus on recruiting commercial customers in Algiers. This effort also targeted residential customer recruitment.

Staff also noted that they are attempting to simplify how the programs are presented in the market by presenting the program as offering prescriptive and custom solutions for customers. The focus is on how the dollars per kWh work for the customer rather than distinctions between small and large businesses. To this end, the program has revised marketing materials that explain the difference between prescriptive and custom incentives. For example, the program provides a prescriptive program overview that lists the per unit prescriptive incentives and notes that custom calculated incentives are available for qualifying measures not included on the list. Additionally, the program has a budget carve out for publicly funded institutions, and directly markets to this segment of non-residential customer. In particular, Green Coast Enterprises, a program partner, engages in direct outreach to publicly funded institutions.

More broadly, staff indicated that the New Orleans culture puts a priority on face-to-face outreach for recruiting customers. Similarly, staff also stressed that an important part of the outreach strategy is to partner with local businesses to put a local business “face” on the program. Staff identified case studies as a means of doing this.

10.5.1.5 Trade Ally Training and Development

The program formalized its trade ally network in December of 2017 but did not launch until January of 2018. Five of the previous 20 PY6 active trade allies participated in PY7 activity, as well as 18 new trade allies. In addition to the 23 trade allies that participated in PY7, program staff reported that another seven registered as part of the C&I trade ally network.

Table 10-19 Count of Trade Allies by Program Year

	PY7	*PY6*	*PY5*
Active trade allies	23	11	16

Staff supported trade allies through a variety of activities in PY7, including providing technical assistance on projects and providing them program materials. Additionally, staff mentioned that a trade ally advisory group was developed to get feedback from trade allies on what is working well and what needs to be improved. Staff reported that some feedback was received during a December meeting and through a survey of trade allies as well. While some changes were made in response to the feedback, other more complicated requests such as the development of calculator tools are in the process of being developed.

A planned trade ally newsletter has been put on hold for two reasons. Firstly, Aptim's experience in other service areas is that trade ally newsletters provide little benefit relative to the time and effort required. Secondly, the trade allies provided the feedback that they wanted limited email communication.

Staff plans additional activities to develop the network of trade allies in the future including enhanced training.

10.5.1.6 Quality Control Processes

Staff discussed the project quality control processes for the nonresidential programs. A pre-installation and post-installation visit is completed for each project. When applications are submitted staff schedules the site visit and completes the desk review of the application. The desk review includes verification that the proposed equipment qualifies for the program. Additionally, staff requires one Entergy bill to confirm that the site receives electric service from Entergy. During the pre-installation site visit, staff verifies that the baseline conditions are consistent what is provided in the application. Once the equipment is installed, the participants submit a completion notice that includes the install date and to whom the rebate should be paid. A customer signature is required if a third party is designated to receive the incentive payment. Additionally, project costs are reviewed to make sure the incentive payment does not exceed the cost. During site visits, staff checks that all of the listed equipment is installed and operational.

Staff is considering reducing the 100% pre- and post-inspection requirement for prescriptive projects because that requirement may be perceived as burdensome to customers. The Evaluators support this in principle as it is common practice to conduct QA on a sample rather than an entire population, and conducting a census QA is an undue cost burden. However in four of 10 field inspections conducted by the Evaluators in PY7 it was found that there was an incorrect heating system listed in the application.

10.5.1.7 Program Improvements

Staff discussed some program improvements planned for PY8. One of the planned improvements is to align some activities with a program put on by the Mayor's Office of Resilience and Stability, the DowntownNOLA Energy Challenge. Building owners, operators and managers will be invited to join a friendly contest among peers to start measuring and monitoring energy data with the end goal of reducing energy use. Through this challenge, building owners and managers can monitor their energy use and compete with other buildings on energy efficiency improvements.

10.5.1.8 Application Processing

Many program contractors did not submit completed project paperwork until late in the program year or after program close. The average time elapsed between installation and being provided in program tracking was 64 days. Twenty-six percent of PY7 projects took in excess of 100 days to enter into program tracking be made available for the Evaluators to review. This delay left the evaluation effort with a limited time period to recruit participants for on-site inspections or telephone surveys. In PY8 Aptim plans to impose a post-install timeframe in which paperwork must be submitted, as well as a deadline after program close for projects completed late in the year.

10.5.1.9 Exploratory Billing Review

The project applications provided customer bills to validate eligibility for the program. The Evaluators took this opportunity to compare the energy savings of the proposed projects against billed use. The lowest usage was identified as facility baseload. This issue was of particular importance for Projects SN7-044 and SN7-046, as these two projects accounted for 34.6% of program savings.

The savings potential for these two sites is based strictly on the baseload lighting scaled to annual use; the facilities operate 24/7, and thus the maximum achievable savings are constrained by this baseload limit. The Evaluators found that these two projects had baseloads and savings values as follows:

- SN7-046 Baseload of 467,520 kWh, expected savings of 343,712 kWh (73.5% of billed baseload use).
- SN7-044: Baseload of 235,200 kWh, expected savings of 343,462 kWh (146.0% of billed baseload use).

Given the savings exceeded possible billed use, the Evaluators conclude that the following possibilities may have occurred:

1) **Incorrect tying of bill to project**. This is customer and facility with multiple meters and projects, and it is possible that the bill provided does not align fully with the scope of the retrofit.
2) **Incorrect assumptions of hours of use**. Through all indications were that the area requires lighting 24/7 and that the shipping operation works year-round, it is possible that this is something that could be disproven through a metering effort.

10.6 Conclusions

The Evaluators' conclusions are as follows:

- **The program has reduced participation from independently owned businesses.** Corporate chain locations constituted a larger share of participation in PY7 in comparison to prior program years, increasing from 3.6% to 27.1% of total participation.
- **Program QA surrounding some larger projects may be insufficient.** The Evaluators found instances of large projects in the program having outsized savings as a percent of annual use.

- **Total participation declined, while savings per-participant increased.** Program participation declined by 73.5% and savings by 36.8%, while per-project savings increased by 245%. This latter figure is due in large part to the engagement of the shipping industry, from which two projects accounted for 34.6% of expected savings.
- **The program has had its first non-lighting projects.** In prior years, the program had 100% of its savings come from lighting projects. In PY7, 5.4% of program savings came from non-lighting projects.

10.7 Recommendations

The Evaluators' recommendations for the Small Commercial Solutions Program are summarized in the following categories:

- **Report annual customer billed use and use this as a secondary reasonableness check for savings values.** The PY7 evaluation included a high-level review of billing information from a sample of projects and identified instances of an outsized percent of annual use shown as ex ante savings. This should be a reasonableness check completed by program staff, flagging high percentages for enhanced review.
- **Return marketing emphasis to independently owned businesses.** The program had 27.1% of savings in PY7 come from corporate chain projects. These facilities do not face the same first-cost barrier as independently owned businesses and may not warrant the higher incentives offered by the SCS.
- **Correct the spreadsheet calculators to use New Orleans TRM deemed lighting hours of operation.** Ex ante calculations used deemed annual lighting hours of operation from the AR TRM 6.0, rather than those developed from primary research for the New Orleans TRM 1.0.
- **Perform more rigorous post-retrofit verification inspections.** Four of the ten sampled sites did not accurately record the sites heating type, accounting for a 5.05% disparity in overall program realization. Staff should provide training on the importance of correctly identifying space heating type and add it as a checkpoint to project verifications.

11.Large Commercial & Industrial

11.1 Program Description

The Large Commercial & Industrial Solutions Program (Large C&I) provides financial incentives and technical services to encourage nonresidential customers with greater than 100 kW peak demand to implement energy saving measures. The C&I Program 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.

In PY7 there has been a focus on increasing the adoption of non-lighting measures. While staff noted that lighting was still a common project type, steps had been taken to increase adoption of non-lighting measures and that the program had some success in developing non-lighting projects. The development of non-lighting projects was facilitated by assistance from Green Coast Enterprises, which has assisted customers with the implementation building automation projects. Additionally, they have engaged in outreach to non-lighting trade allies, namely, with larger national companies that have the capacity to implement non-lighting projects. Another planned program development is additional training provided to facility management. Staff noted that they were currently working on a training plan for the 2018 program year.

The incentives provided are summarized below in Table 11-1.

Table 11-1 Large C&I Summary of Program Incentives

Measure	***Incentive***
Lighting	$0.10 per kWh Saved
Non-Lighting	$0.12 per kWh Saved

Table 11-2 Savings Expectations by Program Component ENO

Program Component	***Count of Projects***	***Expected kWh Savings***	***Expected kW Savings***
Custom	11	2,944,116	281.82
Lighting	26	6,490,370	1,059.63
Prescriptive	4	279,164	24.90
Total	**41**	**9,713,650**	**1,366.35**

Table 11-3 Savings Expectations by Program Component Algiers

Program Component	***Count of Projects***	***Expected kWh Savings***	***Expected kW Savings***

Custom	1	115,900	-
Total	**1**	**115,900**	**-**

Data provided by Aptim showed that during PY7, there were 41 projects for ENO and one project for Algiers. These projects were expected to provide a combined savings of 9,829,550 kWh and 1,366.35 kW. Annual program savings have increased by 25.8% from PY6 and savings per-project have increased from 195,320 kWh in PY6 to 234,037 kWh in PY7. These results are summarized in Table 11-4.

Table 11-4 Large C&I Program Participation Summary Comparison[50]

Project Year	***# Projects***	***Expected kWh***	***kWh per Project***	***% Non-Lighting***
PY5	40	9,522,908	238,073	34.5%
PY6	35[51]	6,845,619	195,589	17.0%
PY7	42	9,829,550	234,037	34.0%

The percentage of non-lighting projects has also increased. In PY7 program implementors shifted focus from lighting projects to custom engineering projects which produce more savings.

Total verified savings and percentage of goals for the Large C&I Program are summarized in Table 11-5.

Table 11-5 Large C&I Savings Goals by Utility

Utility	***kWh goal***	***Realized Net kWh***	***Percentage of kWh goal realized***	***kW goal***	***Realized Net kW***	***Percentage of kW goal realized***
ENO	8,934,372	10,248,920	114.7%	1,279.10	1,397.86	109.3%
Algiers	466,229	115,900	24.9%	68.30	-	0.0%

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[50] Figures adjusted to reflect 9-month PY7 program period.

[51] In PY6 a single site accounted for 4,469,510 lighting kWh or 36.4% of total program savings. This site and its associated savings were removed from these figures to present a more representative comparison.

11.2 M&V Methodology

Evaluation of the Large C&I Program 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;
- 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 Aptim, sample designs were developed for on-site data collection for the impact evaluation. Sample sizes were determined that provide savings estimates for the program with ±10% precision at the 90% confidence level. 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 measure are described in the Small Commercial Solutions Chapter, section 10.2 M&V Methodology,

11.2.1 Large C&I Program Sample Design

Sampling for evaluation of ENO and Algiers' Large C&I program 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 was divided into four strata. Table 11-6 summarizes the strata boundaries and sample frames for the program and Table 11-7 summarizes expected savings for of both the sample and population. The achieved sampling precision was ±9.07% at 90% confidence. The population and sample include both utilities pooled. However, savings in this report are presented for each utility individually as well as aggregated.

Table 11-6 Large C&I Program Sample Design (Pooled)

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Totals***
Strata boundaries (kWh)	< 120,000	120,001 - 400,000	400,001 - 700,000	> 700,000	
Number of projects	20	14	6	2	**42**
Total kWh savings	1,276,057	3,301,405	3,152,755	2,099,332	**9,829,550**
Average kWh Savings	63,803	235,815	525,459	1,049,666	**234,037**
Standard deviation of kWh savings	32,346	69,495	79,560	369,339	**255,210**
Coefficient of variation	0.51	0.29	0.15	0.35	**1.09**
Final design sample	6	4	2	2	**14**

Table 11-7 Expected Savings for Sampled and Non-Sampled Projects by Stratum

Stratum	Sample Expected Savings	Total Expected Savings
1	456,120	1,276,057
2	57,422	3,301,405
3	110,371	3,152,755
4	284,058	2,099,332
Total	**907,971**	**9,829,550**

11.2.2 Large C&I Parallel Path Savings

During the program year, projects expected to save more than 500,000 kWh or 100 kW were discussed with the Evaluators. The Evaluators would review project eligibly and savings methodology before project completion. Upon project completion final documents were reviewed to verify instructions had been carried out. This ensured a 100% realization rate for these three projects.

11.3 Gross Impact Findings

11.3.1 Large C&I 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 10-9 presents realization at the stratum level, with Table 10-10 presenting results at the site level.

Table 11-8 Summary of kWh Savings for Large C&I Program by Sample Stratum (Pooled)

Stratum	Sample Expected kWh Savings	Sample Realized kWh Savings	Realization Rate
1	456,120	437,106	95.8%
2	1,075,796	1,111,999	103.4%
3	1,113,189	1,164,065	104.6%
4	2,099,332	2,432,606	115.9%

Table 11-9 shows the expected and realized energy savings for the program by project.

Table 11-9 Expected and Realized Savings by Sampled Project

Project ID(s)	Facility Type	Expected kWh Savings	Realized kWh Savings	Realization Rate
LN7-001	Office Building	20,059	20,059	100.0%
LN7-045	Restaurant	46,471	65,062	140.0%
LN7-035	Mini Market	65,728	66,137	100.6%
LN7-028	Office Building	90,782	81,198	89.4%
LA7-001	High School	115,900	115,900	100.0%
LN7-005	Hotel	117,180	88,750	75.7%
LN7-022c	Hotel	198,106	213,995	108.0%
LN7-027	Highrise Apartment Complex	268,091	288,405	107.6%
LN7-030	Supermarket	288,347	288,347	100.0%
LN7-037	Sports Complex	321,252	321,252	100.0%
LN7-002	Parking Garage	457,879	508,755	111.1%
LN7-008	Office Building	655,310	655,310	100.0%
LN7-050	Hotel	788,504	790,304	100.2%
LN7-025	Sports Complex	1,310,828	1,642,302	125.3%
Total		**4,744,437**	**5,145,776**	**108.5%**

11.3.2 Large C&I Program-Level Realization

Using the realization rates presented in Table 11-10, the Evaluators extrapolated results from sampled sites to non-sampled sites in developing program-level savings estimates. Table 11-11 presents results by stratum.

Table 11-10 Large C&I Program-Level Realization by Stratum

Stratum	# Sites	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected kW Savings	Realized kW Savings	kW Realization Rate
1	20	1,276,057	1,222,863	95.8%	151.27	157.10	103.9%
2	14	3,301,405	3,412,507	103.4%	412.77	430.60	104.3%
3	6	3,152,755	3,296,844	104.6%	418.49	426.34	101.9%
4	2	2,099,332	2,432,606	115.9%	383.82	383.82	100.0%
Total	**42**	**9,829,550**	**10,364,820**	**105.5%**	**1,366**	**1,397.86**	**102.3%**

Table 11-11 Large C&I Program-Level Realization by Utility

Utility	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected kW Savings	Realized kW Savings	kW Realization Rate
ENO	9,713,650	10,248,920	105.5%	1,366.35	1,397.86	102.3%
Algiers	115,900	115,900	100.0%	-	-	N/A
Total	**9,829,550**	**10,364,820**	**105.4%**	**1,366.35**	**1,397.86**	**92.6%**

11.3.3 Large C&I Realization by Contractor

The Evaluator extrapolated results from the program into savings by project contractor trade ally. The results are presented below in Table 11-12.

Table 11-12 Savings by Contractor

Contractor	*Expected kWh*	*Realized kWh*	*kWh Realization Rate*	*Expected Peak kW*	*Realized Peak kW*	*Peak kW Realization Rate*
Lighting Contractor #1	2,131,125	2,507,231	117.6%	451.60	455.20	100.8%
Lighting Contractor #2	2,111,148	2,216,021	105.0%	261.71	270.87	103.5%
Other Contractor	5,587,277	5,641,568	101.0%	653.04	671.79	102.9%
Total	**9,829,550**	**10,364,820**	**105.4%**	**1,366.35**	**1,397.86**	**102.3%**

11.3.4 Large C&I – Causes of Savings Deviations

The Evaluators have summarized these adjustments and others in Table 11-13 for illustrative purposes.

Table 11-13 Large C&I – Causes of Variance in Savings

Project ID	*Expected kWh*	*Realized kWh*	*Realization Rate*	*Causes of Variance in Savings*
LN7-045	46,471	65,062	140.0%	Restaurant. Ex ante calculations assumed electric resistance heating, but it was confirmed on site that the building uses natural gas heating, resulting in a 25.1% increase in savings. Some areas that were estimated to operate 4,731 hours annually in ex ante calculations, however in site the Evaluators found that they operate continuously (8,760), increasing the savings by 14.9%.
LN7-035	65,728	66,137	100.6%	Mini Market. Ex ante calculations which used AR TRM exterior hours (3,996) which the Evaluators updated to 4,319 from the New Orleans TRM, slightly increasing the kWh realization rate.
LN7-028	90,782	81,198	89.4%	Office Building. Ex ante calculations used deemed 'office' hours of operation (3,227) from the AR TRM. On site the Evaluators recorded lighting hours of operation for all spaces with retrofitted lighting. From this, verified AOH of 3,214 were calculated and used for most spaces in ex post calculations. The Evaluators used deemed hours from the New Orleans TRM for restrooms and storage areas, as well as updated calculations with exterior hours from 3,996 to 4,319. The majority of the expected savings came from spaces assuming 3,227 AOH, so realized kWh savings is lower than expected. However, the deemed peak CF for restroom areas increased from 0.77 in ex ante calculations to .90 in ex post,

Project ID	Expected kWh	Realized kWh	Realization Rate	Causes of Variance in Savings
				resulting in a high kW realization rate.
LN7-005	117,180	88,750	75.7%	Hotel. Ex ante calculations use the prescriptive calculator from Arkansas TRM, which the Evaluators updated to the New Orleans TRM in ex post calculations.
LN7-022c	198,106	213,995	108.0%	Hotel. Ex ante savings calculations included 16 13W LED downlamps replacing 175W metal halide lamps under the front canopy on the exterior of the building. On site the Evaluators found that previous fixtures were 50E halogen lamps and new fixtures were 12W LED. These fixtures were corrected in ex post calculations, partly reducing the kWh realization rate. The Evaluators also adjusted lighting hours of operation from (6,630) to continuous (8,760) operation to reflect on-site findings. This raised both the kWh and kW realization rates. Three areas were controlled by occupancy sensors and in these areas the Evaluators applied a 0.77 adjustment factor to the hours. Ex ante calculations for exterior spaces used 3,990 AOH, a deemed value from the AR TRM. The Evaluators updated these with 4,319 to reflect the New Orleans latitude, further increasing the kWh realization rate.
LN7-027	268,091	288,405	107.6%	Highrise Apartment complex. The kWh realization rate is high because it was confirmed on site that all areas operate 24/7. The ex ante calculations estimated only some areas operated 8,760 while most areas operated 6,630 or 7,884 hours annually. Ex post calculations reflect 8,760 operation in all areas which were verified to operate continually. The high kW realization rate is due to the coincidence factor adjustment to 1.0 to reflect the hours of operation.
LN7-002	457,879	508,755	111.1%	Parking Garage. Ex ante calculations used deemed hours of operation of 7,884, however onsite the Evaluators found that all retrofitted fixtures operated continuously so ex post calculations used AOH of 8,760, resulting in the high kWh realization rate.
LN7-050	788,504	790,304	100.2%	Hotel. The realization rate is slightly off because the Evaluators used TMY3 weather data to calculate the hours for each temperature bin. Additionally, a few units had a large discrepancy since the ex-ante calculations had a few calculator mistakes. One, the fan load for the upper half of the temperature bins was not calculated linearly as stated. The calculated post fan HP was lower than what the Evaluators calculated using the equations provided. The ex-ante calculations did not provide the formulas used to obtain their numbers so an exact explanation of the error is not

Project ID	*Expected kWh*	*Realized kWh*	*Realization Rate*	*Causes of Variance in Savings*
				possible.
LN7-025	1,310,828	1,642,302	125.3%	Sports Complex. Ex ante calculations assumed electric resistance heating (IEF = 0.87), however on site the Evaluators found the facility was heated by natural gas (IEF = 1.09). Using the gas kWh factor in ex post calculations lead to 25.3% higher kWh savings.

Key issues identified in site-level analyses include:

- **Ex Ante Savings Frequently based on Arkansas TRM.** Six sampled sites used deemed savings parameters coming from the Arkansas TRM 6.0. The New Orleans TRM, based on primary data collected during the PY6 evaluation.
  - **Incorrect non-daylight hours.** Three sites' ex ante calculations used exterior deemed annual lighting hours of operation from the AR TRM 6.0 (3,996), rather than the New Orleans TRM (4,319), calculated using non-daylight hours at the New Orleans latitude. Corrections of non-daylight hours constitute a difference in overall program savings of 1.51%.
- **Spaces where deemed hours in spaces with continuous lighting operation**. Four sites used deemed annual lighting hours of operation for spaces with verified continuous (8,760) lighting hours. Examples: Ex ante savings calculations in project LN7-045 used hours 4,731 and 6,552 for several spaces, however facility staff confirmed that all space' lighting is never turned off, operating 8,760. This is also true of LN7-27 where ex ante calculations assumed AOH 6,630 and 7,884 in areas site contacts reported as operating continuously. This accounts for a 1.2% difference in program realization.

Incorrect space heating type. Two sites' claimed heating types differed from those verified on site. This factor accounts for a 5.01% difference on program realization.

11.4 Net Impact Findings

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 Evaluator attempted to complete surveys with all seven unique questions with a telephone number listed in the program data. In total, four program participants completed the survey, but one respondent was dropped because they did not respond to several questions.

11.4.1 Estimating Free Ridership

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 rate how certain they are that their organization could not have afforded the measure. If a customer indicated that their organization could not have afforded the measure and indicates that they were very certain of this, 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 11-14 shows these values.

Table 11-14 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%

11.4.2 Estimating Spillover

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.

None of the survey respondents indicated that they had implemented additional measures that met the criterion for attributing the savings to the program.

11.4.3 Net Savings Results

Table 11-15 summarizes the results of the free ridership scoring. Free ridership for the program was estimated by weighting each participant’s scored responses by the associated realized gross kWh savings or peak kW reductions for the measure. Thirty-eight percent of gross kWh savings were associated with a respondent that met the criteria for the most restrictive definition of prior plans but did not meet the criteria for previous experience with the measure or program influence. Another 14% of kWh savings was associated with responses that met the criteria for the less restrictive prior plans definition.

Table 11-15 Free-Ridership Scoring Results

Had Plans and Intentions to Install Measure without C&I Program? (Definition 1)	***Had Plans and Intentions to Install Measure without C&I Program? (Definition 2)***	***C&I Program had influence on Decision to Install Measure?***	***Had Previous Experience with Measure?***	***Percentage of Total Ex Post Gross kWh Savings***	***Free Ridership Score***
N	N	N	N	23%	0%
N	N	Y	N	5%	0%
N	N	Y	Y	72%	0%
Required program to implement measures.				0%	0%
Total				**100%**	**0%**

Table 11-16 and Table 11-17 summarize the realized net kWh savings and peak kW demand reductions of the program. Net kWh savings totaled to 10,364,820 kWh and equal 100% of gross program savings. Net kW reductions totaled 1,397.86 kW and equal 100% of realized gross program savings.

Table 11-16 Summary of Net Ex Post kWh Savings

Utility	***Expected Gross kWh Savings***	***Realized Gross kWh Savings***	***Free Ridership***	***Spillover***	***Realized Net kWh Savings***	***Net to Gross Ratio***
ENO	9,713,650	10,248,920	0	0	10,248,920	100%
Algiers	115,900	115,900	0	0	115,900	100%
Total	**9,829,550**	**10,364,820**	**0**	**0**	**10,364,820**	**100%**

Table 11-17 Summary of Ex Post Net Peak kW Reductions

Utility	***Expected Gross Peak kW Reductions***	***Realized Gross Peak kW Reductions***	***Free Ridership***	***Spillover***	***Realized Net kW Savings***	***Net to Gross Ratio***
ENO	1,366.35	1,397.86	0.00	0.00	1,397.86	100%
Algiers	-	-	0.00	0.00	-	100%
Total	**1,366.35**	**1,397.86**	**0.00**	**0.00**	**1,397.86**	**100%**

11.5 Participant Survey Results

The survey used to estimate net savings also asked participants questions about how they learned of the program and their satisfaction with it.

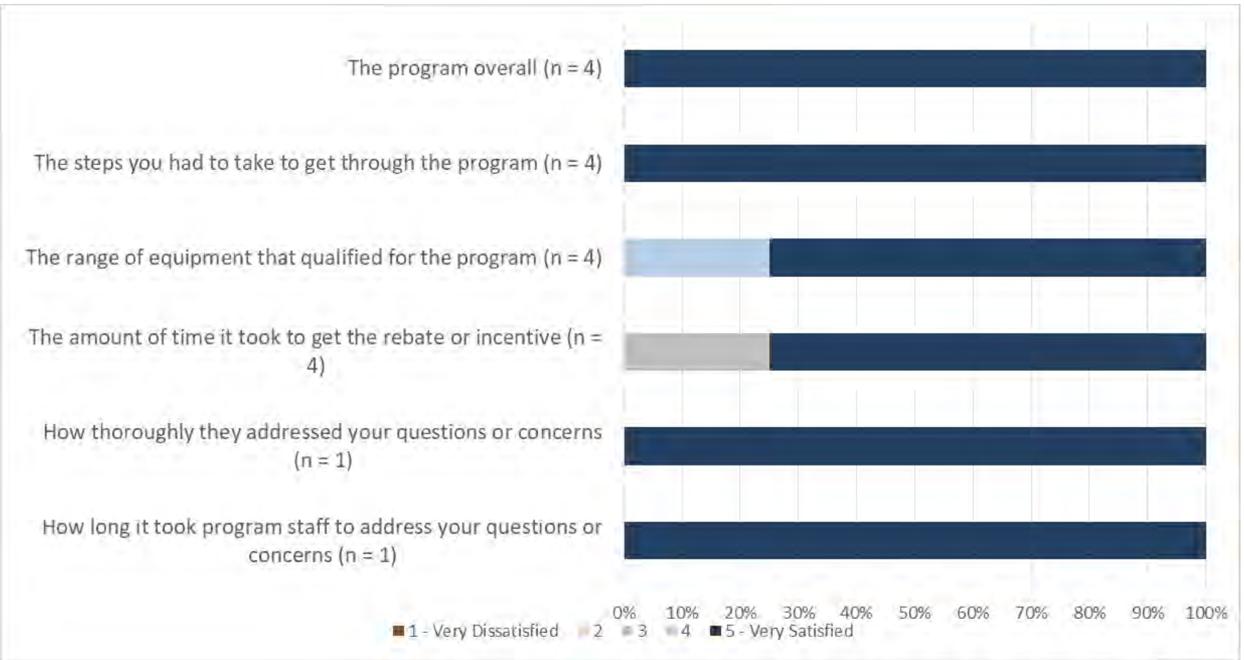
One-half of respondents learned of the program from a contractor.

Table 11-18 How Participants Learned of the Program

Response	***Percentage of Respondents (n = 4)***
From a contractor	50%
From an Entergy customer service representative	25%
Other	25%

Figure 11-1 summarizes participant satisfaction. All respondents were satisfied with the program overall and none indicated dissatisfaction with any of the rated aspects of the program.

Figure 11-1 Participant Satisfaction



11.6 Recommendations

The Evaluators' recommendations for the Large Commercial & Industrial Solutions Program are summarized in the following categories:

- **Report annual customer billed use and use this as a secondary reasonableness check for savings values.** The PY7 evaluation included a high-level review of billing information from a sample of projects and identified instances of an outsized percent of annual use shown as ex ante savings. This should be a reasonableness check completed by program staff, flagging high percentages for enhanced review.
- **Correct the spreadsheet calculators to use New Orleans TRM deemed lighting hours of operation.** Ex ante calculations used deemed annual lighting hours of operation from the AR TRM 6.0, rather than those developed from primary research for the New Orleans TRM 1.0.
- **Perform more rigorous post-retrofit verification inspections.** Two of the fourteen sampled sites did not accurately record the sites heating type, accounting for a 5.01% disparity in overall program realization. Staff should provide training on the importance of correctly identifying space heating type and add it as a checkpoint to project verifications.

12.Publicly Funded Institutions

12.1 Program Description

The Publicly Funded Institutions Program (PFI) provides financial incentives and technical services to encourage publicly funded customers. The PFI Program 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 12-1.

Table 12-1 Publicly Funded Institutions Summary of Program Incentives

Measure	*Incentive*
Lighting	$0.10 per kWh Saved
Non-Lighting	$0.12 per kWh Saved

Total realized savings and percentage of goals for the PFI program are summarized in Table 12-2.

Table 12-2 PFI Goals by Utility

Utility	*kWh goal*	*Realized Net kWh*	*Percentage of kWh goal realized*	*kW goal*	*Realized Net kW*	*Percentage of kW goal realized*
ENO	594,092	814,317	137.07%	101.10	-	0.00%
Algiers	62,273	-	0.00%	9.50	-	0.00%

12.2 Evaluation Scope

The PFI program was introduced in PY7. In the initial review of the PY7 program, the Evaluators concluded that the PFI program did not warrant more than a brief overview of program activity. The rationales for this are as follows:

- **Limited program scope.** In PY7, the program provided 814,317 expected kWh savings comprising 4.15% of the Energy Smart portfolio.
- **Few projects.** The only had one participant by December 2017, who declined to be interviewed regarding the program. Only three projects were completed before the program closed.
- **Similarity to Large C&I program.** Program factors and projects are near identical to those found in the Large C&I program. The Evaluators choose to perform comprehensive desk audits of two of the three projects completed during the program year.

Due to these reasons the Evaluators will perform a comprehensive formal Impact and Process evaluations of the PFI program in PY8.

12.3 Gross Impact Findings

12.3.1 Projects Reviewed

12.3.1.1 PN7-001

The participant is a public facility that received incentives from Entergy New Orleans for upgrading the building energy management system (BAS) to allow the HVAC to run based on an occupancy schedule instead of 24/7. The BAS upgrade allows the HVAC units to turn off during unoccupied hours. Savings are calculated using the motor HP, motor kW, motor efficiency, and operating hours. Additionally, the pump motors and chiller use less energy based on the percent airflow, which is based linear off the outdoor air temperature. There are no expected demand savings for this measure because there is no planned operating during peak hours.

The Evaluators verified the savings calculations using the information provided, calculation equations stated above, and information collected from the site visit. The Implementor did not provide trending or power measurements to verify the percent heating and cooling loads compared to outdoor air temperature. The assumptions and approach to estimating energy savings are reasonable. On-site, the evaluators verified the participant had installed the BAS controls, verified the HVAC equipment and recorded the operating schedule. Savings calculations require the total operating hours split into temperature bins based on the outside air temperature. Weather temperature was based on TMY3 data for New Orleans. The system is programmed to switch between heating mode and cooling when the outdoor air temperature is 76 degrees Fahrenheit. During the site visit, the HVAC schedule was stated to be 7 am to 8 pm Monday through Friday instead of 6 am to 7 pm. The site visit also states that the system switches from heating into cooling mode at 76 degrees Fahrenheit instead of the assumed below 50 degrees Fahrenheit for heating and greater than 55 degrees Fahrenheit for cooling.

The kWh realization rate for project PN7-001 is 71.71% with no demand savings. The Evaluators found a few errors with the calculator and an on-site visit showed the system operating setpoints to be different than what was stated. The calculator had two mistakes that decreased the potential savings. First, the calculator used the affinity law with the exponent of 3 to calculate the kW for the pump motors. This value is a theoretical value and is generally not used in practice. The Evaluator used 2.5 as the exponent as a more practical value to predict the pump motor kW. Secondly, the chilled water pump motor lookup table did not include the whole temperature range and limited the maximum pump power to 2.2 kW.

12.3.1.2 PN7-002

The participant is a high school facility that received incentives from Entergy New Orleans for implementing a night setback temperature on 107 WSHPs. HVAC control savings are calculated using an energy model with Trane Trace. The Evaluators did not receive the actual energy model to verify but did verify the model outputs for a typical building. The energy model simulated the saving associated with adjusting the cooling setpoint from 70 to 80 degrees Fahrenheit from 6 pm to 6 am. There is no demand savings since the setback only happens during non-peak hours. A billing regression could not be used since an adequate correlation could not be determined.

The kWh realization rate for project PN7-002 is 100% and the kW realization rate is 100%. The Evaluators verified the energy model output billing data versus the actual billing data. The billing data shows unpredictability that is difficult to calibrate a model to match so the model gets close most months and then underestimates energy usage during some months. This underestimate means that the percentage of savings associated with this measure will show a conservative savings.

12.3.2 PFI Program-Level Realization

Using a kWh-weighted average the realization rates of the two reviewed sites, the Evaluators extrapolated a 83.9% realization ate to be applied to the third site. Overall program results are presented in Table 12-3 PFI Program-Level Realization

Table 12-3 PFI Program-Level Realization

Project #	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected kW Savings	Realized kW Savings	kW Realization Rate
PN7-004	327,695	274,905	83.9%	-	-	N/A
PN7-001	277,097	198,703	71.7%	-	-	N/A
PN7-002	209,525	209,525	100.0%	-	-	N/A
Total	**814,317**	**683,133**	**83.9%**	**-**	**-**	**N/A**

Table 12-4 PFI Program-Level Realization by Utility

Utility	Expected kWh Savings	Realized kWh Savings	kWh Realization Rate	Expected kW Savings	Realized kW Savings	kW Realization Rate
ENO	814,317	683,133	83.9%	-	-	N/A
Algiers	-	-	N/A	-	-	N/A
Total	**814,317**	**683,133**	**83.9%**	**-**	**-**	**N/A**

12.4 Net Impact Findings

The December 2017 data indicated that one project was completed at the time the survey was administered. The Evaluator attempted to complete an interview with the participant but did not succeed. The net-to-gross ratios found for the Large C&I program were applied to estimate the net program impacts.

12.4.1 Net Savings Results

Table 12-5 and Table 12-6 summarize the realized net kWh savings and peak kW demand reductions of the program. Net kWh savings totaled to 814,317 kWh and equal 100% of gross program savings. No kW reductions we expected or realized.

Table 12-5 Summary of Net Ex Post kWh Savings

Utility	**Expected Gross kWh Savings**	**Realized Gross kWh Savings**	**Free Ridership**	**Spillover**	**Realized Net kWh Savings**	**Net to Gross Ratio**
ENO	814,317	683,133	0.00	0.00	683,133	100%
Algiers	-	-	0.00	0.00	-	100%
Total	**814,317**	**683,133**	**0.00**	**0.00**	**683,133**	**100%**

Table 12-6 Summary of Ex Post Net Peak kW Reductions

Utility	**Expected Gross Peak kW Reductions**	**Realized Gross Peak kW Reductions**	**Free Ridership**	**Spillover**	**Realized Net kW Savings**	**Net to Gross Ratio**
ENO	-	-	0.00	0.00	-	100%
Algiers	-	-	0.00	0.00	-	100%
Total	**-**	**-**	**0.00**	**0.00**	**-**	**100%**

12.5 Process Findings

The Publicly Funded Institutions Program has been slow in accruing projects. A key challenge was that because publicly funded organizations tend to have slower approval processes, identifying projects that could be completed within the program year but were not already in process when the program launched was challenging. These challenges notwithstanding, staff indicated that the program would hit goal. A key aspect to the success of the program was the partnership with Green Coast Enterprises, which was able to leverage their existing relationships with public institutions to engage these businesses.

It is anticipated that the PFI Program will have a longer ramp-up period due to the slower purchasing processes in public sector facilities; a more comprehensive review is pending until participation increases.

13.Direct Load Control Pilot

The Direct Load Control ("DLC") Pilot Program ("the Pilot") was administered by Aptim/Franklin ("Implementers") on behalf of Entergy New Orleans ("ENO") under the direction of the New Orleans City Council. The Pilot is designed to assess the potential for administering a full-scale DLC program in future program years. The Pilot initially ran events during September of 2016 (Program Year 6). Participation was held constant for Program Year 7.

The Pilot recruited 312 residential customers comprising 400 air conditioners. Control switches were installed on these units in order to run test events. The control strategies employed were fixed cycling. In such a strategy, a 50% duty cycle is selected *a priori* and all participants have their air conditioner limited to a maximum of this duty cycle[52].

The goals of this evaluation of the Pilot are to Evaluate the sensitivity to baseline specification. We analyzed events according to four baseline schemes:

- Three of five days;
- Three of eight days;
- Three of 10 days; and
- Five of 10 days.

13.1 M&V Methodology

13.1.1Household Recruitment

Where possible, the Evaluators would install monitoring equipment while Pilot staff were installing the load control switches. However, we were not able to do this for all households. The Evaluators provided participation lists by The Implementers, from which we recruited households to participate in the metering component of the study. Recruited households were compensated with a $40 incentive upon completion of the metering and successful collection of the equipment. All four events had 100% meter deployment.

13.1.2 Data Collection

The assessment of load reductions was based on data collected for a sample of 58 central air conditioning units. ADM 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.

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[52] A 50% duty cycle cap would limit controlled air conditioners to running for 30 minutes in an event hour.

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

13.1.3 Calculation Methodology

Our 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, we then compare loads 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-10
- 5-of-10
- 3-of-8

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

13.1.4 Event Summary

Table 13-1 summaries the dates and times of events as well as the control strategy applied.

Table 13-1 Event Summary

Date	Event Time
9/19/2017	2:00 PM – 6:00 PM
9/21/2017	2:00 PM – 6:00 PM
9/27/2017	2:00 PM – 6:00 PM
9/28/2017	2:00 PM – 6:00 PM

13.1.5 Event Results

Table 13-2 through Table 13-5 summarize the event load reductions in terms of kW/Ton for each baseline specification.

Table 13-2 Event Performance – 3-of-5 Baseline

Date	Hour 1	Hour 2	Hour 3	Hour 4
9/19/2017	0.118996	0.097481	0.042787	0.038198
9/21/2017	0.080216	0.056167	0.003172	-0.03125
9/27/2017	0.058051	0.07292	-0.03417	-0.04917
9/28/2017	0.095216	0.129049	0.069445	0.030224

Table 13-3 Event Performance – 3-of-10 Baseline

Date	Hour 1	Hour 2	Hour 3	Hour 4
9/19/2017	0.113745	0.078563	0.030363	0.018644
9/21/2017	0.080216	0.056167	0.003172	-0.03125
9/27/2017	0.068031	0.065274	-0.04586	-0.0692
9/28/2017	0.107065	0.119973	0.055566	0.006452

Table 13-4 Event Performance – 5-of-10 Baseline

Date	Hour 1	Hour 2	Hour 3	Hour 4
9/19/2017	0.123601	0.087892	0.034627	0.034324
9/21/2017	0.07531	0.032584	-0.01849	-0.0453
9/27/2017	0.06887	0.080438	-0.03138	-0.05344
9/28/2017	0.10806	0.137975	0.072761	0.025157

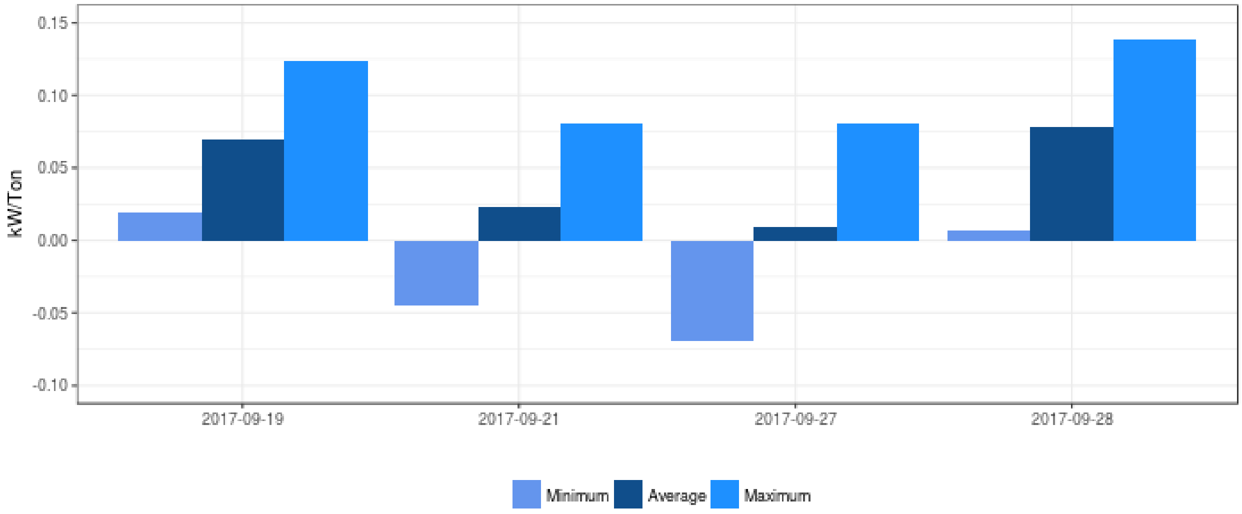
Table 13-5 Event Performance – 3-of-8 Baseline

Date	Hour 1	Hour 2	Hour 3	Hour 4

9/19/2017	0.118996	0.097481	0.042787	0.038198
9/21/2017	0.080216	0.056167	0.003172	-0.03125
9/27/2017	0.068031	0.065274	-0.04586	-0.0692
9/28/2017	0.107065	0.119973	0.055566	0.006452

Figure 13-1 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. In addition, two events had negative load reductions during the last two hours of the event. The reason for this occurrence is not clear, however negative load reductions were seen during the last two hours of those events for a little more than half of the monitored units.

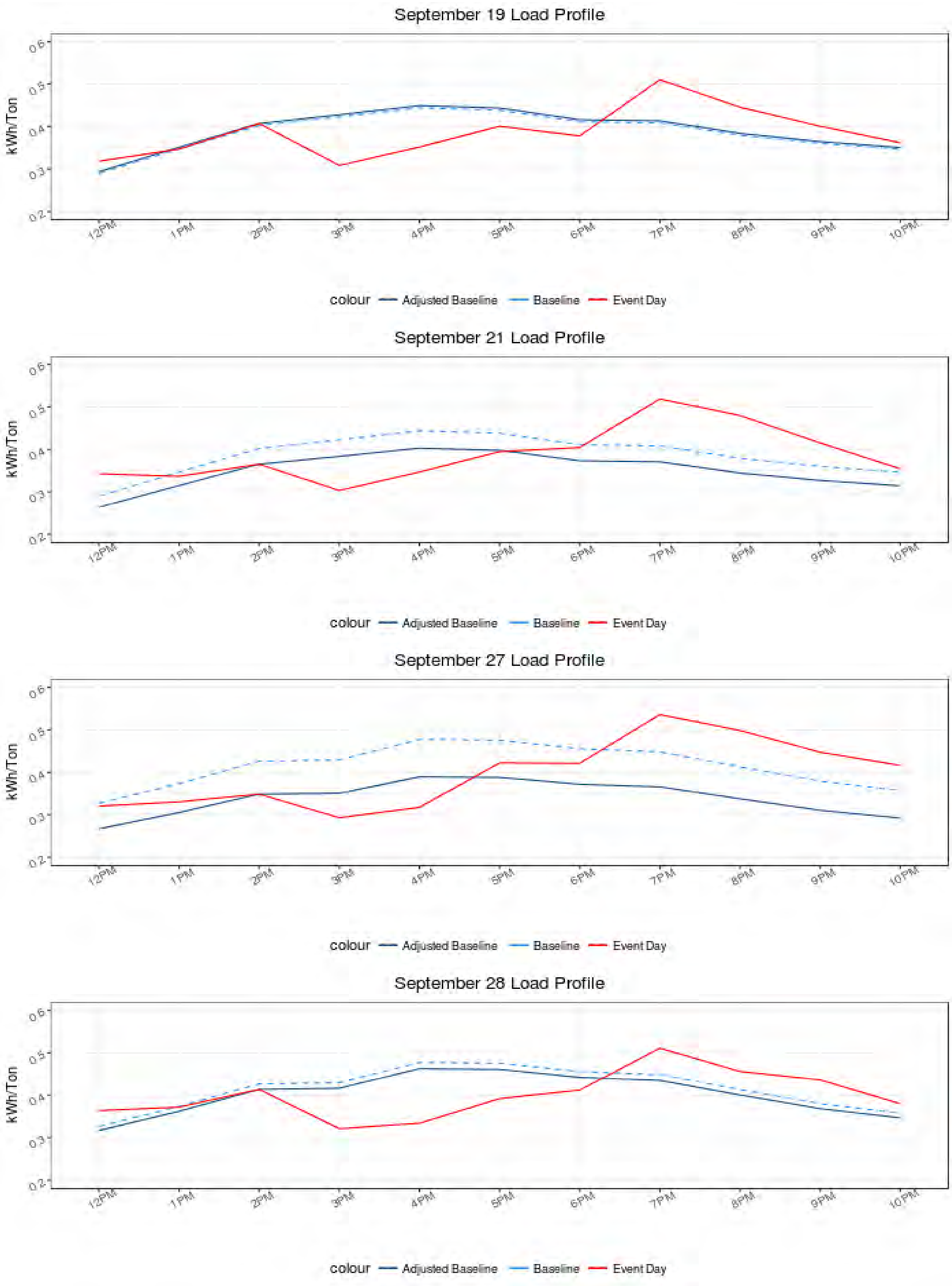
Figure 13-1 Variation in Load Reduction from Baseline Specification



13.1.6 Event Load Profiles

Figure 13-2 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 13-2 Event Load Profiles



September 19 Load Profile

September 21 Load Profile

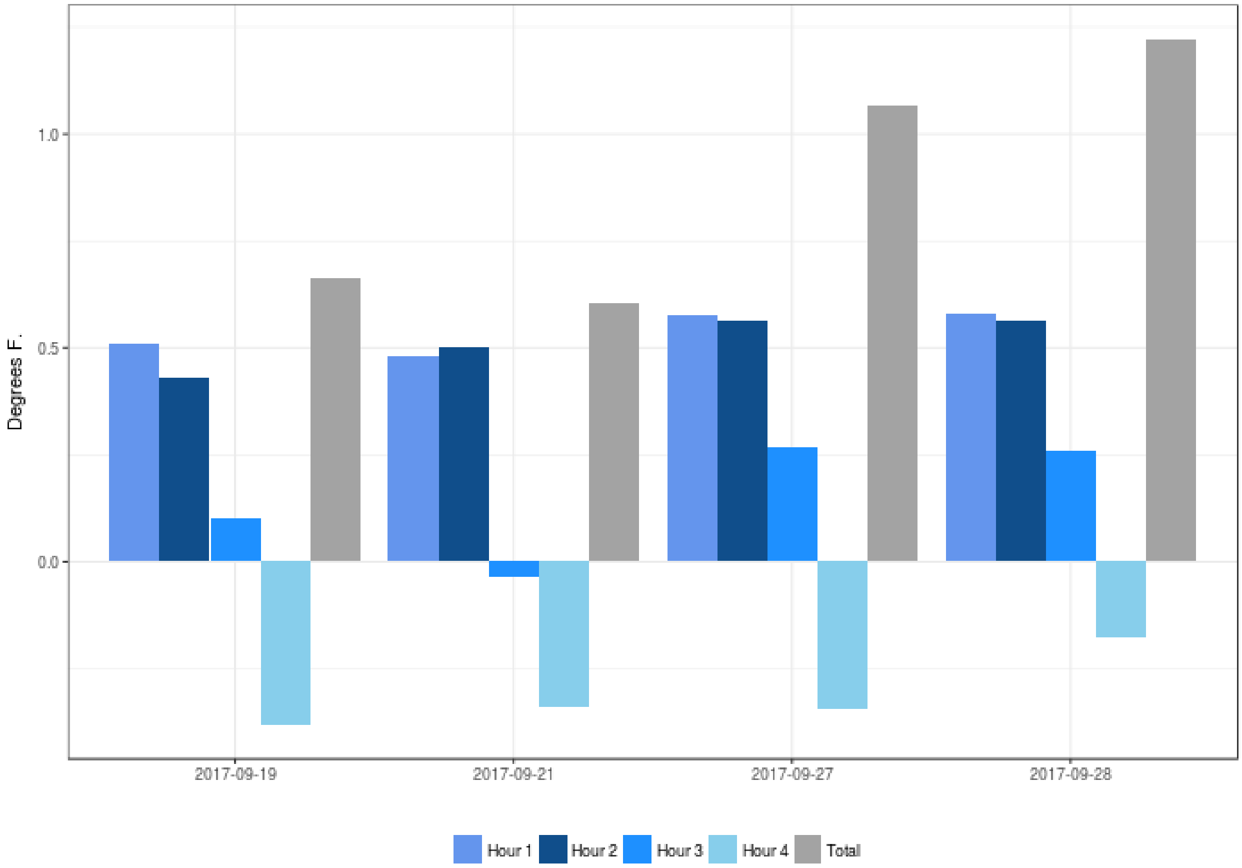
September 27 Load Profile

September 28 Load Profile

13.1.7 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 13-3. The average temperature increase in a residence over the course of a system event was 0.89 degrees Fahrenheit. The last hour of each event displayed an average temperature decrease of 0.3 degrees. Overall, the temperature increase over the events is very small. Typically, programs that use a thermostat setback method display a 4-6 degrees Fahrenheit increase in temperature.

Figure 13-3 Temperature Increase During DLC Events



13.1.8 Savings Summary

The Evaluators applied the 3-of-5 baseline in assessing final kW demand reductions from the DLC pilot. Most of the events this year were at a moderate temperature, and the max temp during the event days this year was two to six degrees Fahrenheit lower compared to the max temperatures seen during last year's events. This resulted in lower savings relative to the events that were run last year. Demand savings were 0.129 kW/Ton (or 0.129 kW/Ton*3.19 Average Ton = 0.422 kW per unit), or 168.80kW for the program. kWh savings were 2.48 kWh per customer (0.777 kWh/Ton*3.19 Ton) or 991 kWh for the program.

14.Smart Thermostat Pilot

This section presents the results of the Multifamily Smart Thermostat Direct Install Pilot Program ("the Pilot") that was administered by Entergy New Orleans ("ENO") under the direction of the New Orleans City Council and their Advisors. The Pilot provided direct installation of Nest smart thermostats in low-income multifamily housing focused on the 70131 ZIP code in Algiers. No other measures were provided, allowing for the isolation of the effects of the thermostat in regression modeling. The Pilot was originally comprised of 1,000 participant dwelling units. After removing duplicate customers and invalid values, 894 unique dwellings remained. After accounting for returned thermostats and households with insufficient billing history to support analysis, 749 dwelling units were included in the final analysis. The Pilot is designed to assess the potential for administering a full-scale Nest Smart Thermostat program in the future.

Entergy New Orleans used refurbished second-generation (Gen 2) Nest thermostats for the Pilot. The model uses a control group of low-income multifamily housing units that were pre-qualified for the program but did not receive installation, matched to the program households using kWh used per day for each month of the 12-month baseline period.

Verified kWh savings are summarized in Table 14-1**Error! Reference source not found.**.

Table 14-1 Nest Pilot Verified Energy Savings

Metric	Value	90% Confidence Interval
Number of Participants	1,000	NA
Participant Annual kWh Savings	343	(249, 438)
Pilot Annual kWh Savings	343,143	(248,633, 437,635)
Lifetime kWh Savings	3,774,476	(2,734,967, 4,813,984)

14.1 Impact Evaluation

The analysis incorporates monthly billing reads and interval metered trend data from the thermostats. Furthermore, this paper presents survey findings detailing thermostat usability. This includes features used by those with and without internet service and customer satisfaction with refurbished models. The goals of this evaluation are to assess the effectiveness of Nest thermostats on kWh savings.

The Nest thermostats have the following energy-savings features:

- Learning household usage schedules;
- Optimizing setpoints based on outdoor temperature and humidity;
- Usage control via mobile app;

- Reminders and alerts to change filters and/or have the system serviced;
- Smart Home/Away and the Follow Me features which use remote sensors that will override a manual setpoint if the Nest senses that the home is unoccupied;
- Setting minimum fan runtime, which may reduce energy use through increased airflow in the home, distributing cooler air to warmer areas of the home; and
- Lockout systems limiting use of the thermostat by other household members (such as children).

A concern with the Pilot was that some low-income participants may not have in-home Wi-Fi service or may face service interruptions. Most features do not require Wi-Fi; however, it was expected at the outset of program design that Wi-Fi service would enhance program savings. Table 14-2 summarizes key energy savings features of Nest thermostats and whether they require Wi-Fi to operate.

Table 14-2 Smart Thermostat Features

Feature	Needs Wi-Fi	Doesn't Need Wi-Fi
Learning household usage schedules		✓
Optimizing setpoints based on temperature/humidity		✓
Usage control via mobile app	✓	
Reminders/alerts to change filters or service system		✓
Smart Home/Away/Follow-me features	✓	
Setting minimum fan runtime		✓
Lockout systems		✓

14.1.1 M&V Methodology

14.1.1.1 Participant Data

The Entergy New Orleans dataset included monthly billing reads for 894 unique participating customers (from the original 1,000 delivered). The raw participant dataset contained records spanning from September 1, 2015 to November 1, 2017. A dataset of participant household information such as number of rooms, nominal tonnage of air conditioner, and heating type was also provided, but was not used in this analysis. The smart thermostats with Wi-Fi connectivity measured the run time of the air conditioning system and the temperature and humidity data of indoor air. A summary of data used in this analysis is provided in the table below:

Table 14-3 Participant Data Used in Analysis

Data Point	Data Interval

Pre-installation Billing Data	September 1, 2015 – August 31, 2016
Post-installation Billing Data	November 1, 2016 – November 30, 2017
Runtime, Temperature, Humidity Data	November 1, 2016 – November 30, 2017
Household, Heating and Cooling System Data	NA – Single Point Estimate

14.1.1.2 Non-Participant Data

The analysis was supplemented by use of a control group. CLEAResult provided a dataset of non-participant dwellings that were eligible but not included in the Pilot due to participation and expenditure limitations. The raw, non-participant dataset was five times the size of the participant group to for a sufficient post-hoc control group. Entergy New Orleans provided monthly billing reads for the controls across the pre and post-installation timeframe. A summary of data used in this analysis is provided in Table 14-4.

Table 14-4 Non-Participant Data Used in Analysis

Data Point	Data Interval
Pre-installation Billing Data	September 1, 2015 – August 31, 2016
Post-installation Billing Data	November 1, 2016 – November 30, 2017

14.1.1.3 kWh Savings Calculation Methodology

The analysis was performed in R, an open-source statistics package. The regression method used for this analysis is a “difference-in-differences” calculation and estimates the change in treatment group usage (pre- and post-retrofit), netting out the effects of any change observed in the *post-hoc* control group. Twelve months of pre-period billing data were matched between the treatment and control groups.

Thermostat installation occurred over a two-month period from September 1, 2016 to October 31, 2016. Retrofits occurred mid-billing cycle and as a result the values for those billing cycles cannot be cleanly delineated as “pre” or “post” retrofit. In the interest of maintaining an even participation window across participants, the installation months (September and October 2016) were excluded from the analysis. In addition, not all participants had a full period of billing data available due to rental tenant turnover.

The Evaluators used Propensity Score Matching with the nearest matching method to build a post-hoc control group from the non-participant data. This post-hoc control group was matched to the treatment group based on pre-period billed use at a ratio of two control customers for every one treatment customer. Using the matched control and treatment group, the Evaluators calculated cooling and heating kWh savings from the smart thermostats. The Evaluators approach in analyzing the kWh savings from the Nest smart thermostats was to employ a regression model that incorporated controls for month, pre-post installation of the thermostat, and customer-specific dummy variables which account for exogenous heterogeneity that cannot be explicitly controlled for. This is called a Fixed Effects Model specification, which allows the model to capture much of the baseline differences across customers while obtaining reliable estimates of the impact of the thermostat installation. The reductions are calculated in terms of kWh per day. The Evaluators used robust standard errors to address any potential problems with auto-correlation and heteroskedasticity that may be present with the time-series data (for further details, see Appendix C: Smart Thermostats Appendices.

The Evaluators used a pre-post fixed effects model with a vector of control variables for each month to capture seasonal effects:

Equation 14-1 Pre-Post Fixed Effects Model

$$kWh\ Usage_{it} = \alpha_0 + \beta_1 * Post_i + \beta_2 * Post_i * Treatment_i$$
$$+ \beta_3 * Month_t + \beta_4 * Post_i * Month_t + \beta_5 * Post_i * Treatment_i * Month_t$$
$$+\beta_6 * Customer_i + \varepsilon_{it}$$

Where

- *i* denotes the *i*th customer
- *t* denotes the first, second, third, etc. month of the post-treatment period
- $kWh\ Usage_{it}$ is the average daily use during month *t* for household *i* in the post-treatment period
- $Post_i$ is a dummy indicator for whether an observation for household *i* occurs pre- or post-installation of the thermostat
- $Treatment_i$ is a dummy indicator for whether the household was a participant household with a Nest thermostat installed
- $Month_t$ is the month of the billing period *t*
- $Post_i * Treatment_i$ is an interaction term between the Post and Treatment variables
- $Post_i * Month_t$ is an interaction term between the Post and Month variables
- $Post_i * Treatment_i * Month_t$ is an interaction term between the Post, Treatment and Month variables
- $Customer_i$ is a customer-specific dummy variable which account for exogenous heterogeneity that cannot be explicitly controlled for (for a Fixed Effects Model)
- α_0 is an intercept term
- ε_{it} is an error term

In this specification, the predicted participant savings in the post-period are calculated as in Equation 14-2.

Equation 14-2 Participant Annual Savings

$$Participant\ Annual\ Savings = \sum_{t=1}^{12\ months} \left\{ \beta_{2t} * \frac{Days}{Month_t} + \beta_{5t} * \frac{Days}{Month_t} \right\}$$

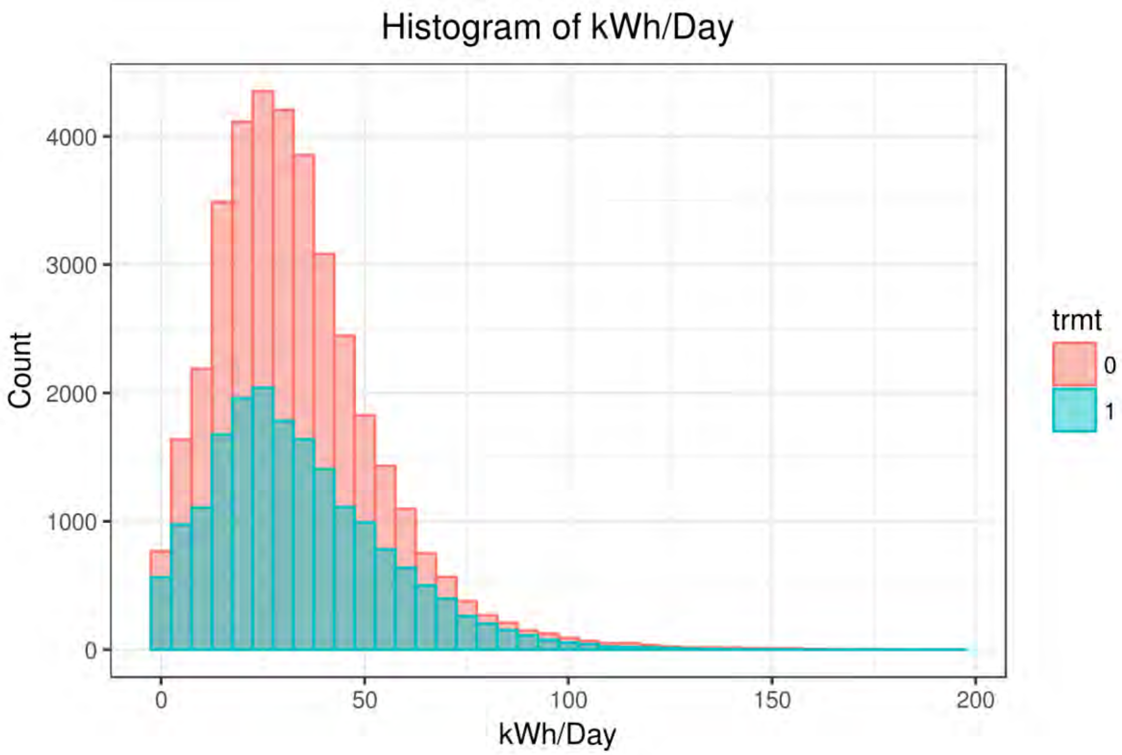
Where,

- β_2 is the coefficient for Post*Treatment parameter
- β_5 is the coefficient for the Post*Treatment*Month parameter, which captures the seasonal factors following the installation of the thermostat
- $\frac{Days}{Month_t}$ is the total number of days during billing period *t*

14.1.2 kWh Savings Analysis

Several steps were taken to prepare the raw billing data for analysis. One initial step was dropping duplicate records and eliminating customers lacking full pre-period billing data. Customers with less than nine months of post-installation data were also excluded from the analysis. The next step was to limit the billing data interval to the pre- and post-installation intervals described above. Billing records with average daily kWh greater than 200 in the pre- or post-period were labeled as outliers and dropped from analysis. The distribution of average daily kWh per billing cycle across the pre-period and post-period is shown in Figure 14-1.

Figure 14-1 Histogram of kWh/Day



One hundred forty-five treatment customers were removed from analysis (from the unique 894 customers) because they lacked full pre and post-installation interval billing data or were considered outliers (usage more than 200 kWh per day). Table 14-5 summarizes the total number of customers from the raw data provided and total number of customers utilized in the analysis.

Table 14-5 Treatment and Control Group Totals

Group	N total	N Electric Resistance	N Heat Pump
Unique Participants	894	662	232
Qualifying Non-Participants	4,802	NA	NA
Eligible Treatment Group	749	531	218
Post-hoc Control Group	1,498	NA	NA

Table 14-6 summarizes the proportions of heating type and cooling capacity in both the raw dataset and the finalized treatment group. The proportions of each heating type and capacity in the finalized treatment group closely mimics the raw participant group heating type and capacity proportions.

Table 14-6 Treatment Group Cooling Capacity Distribution

Heating Type	Capacity in Tons	Total Participants	Included in Model
Total	NA	894	749
Electric Resistance	1.5	188 (21%)	147 (20%)
	2	381 (43%)	305 (41%)
	2.5	88 (10%)	74 (10%)
	3	5 (1%)	5 (1%)
Heat Pump	2.5	102 (11%)	94 (12%)
	3	130 (14%)	124 (16%)

The Evaluators matched all 12 pre-installation months between the treatment and control customers using Propensity Score Matching. The post-hoc control group is twice as large as the treatment group, as it was matched to the treatment group at a 2:1 ratio to create a more similar comparison group. Figure 14-2 and

Figure 14-3 display the control and treatment group propensity score distribution before and after matching. Figure 14-4 displays the control and treatment group average kWh per day values before and after matching. Table 14-7 displays the mean differences in kWh per day values between the two groups before and after matching.

Figure 14-2 Unmatched Groups Histogram

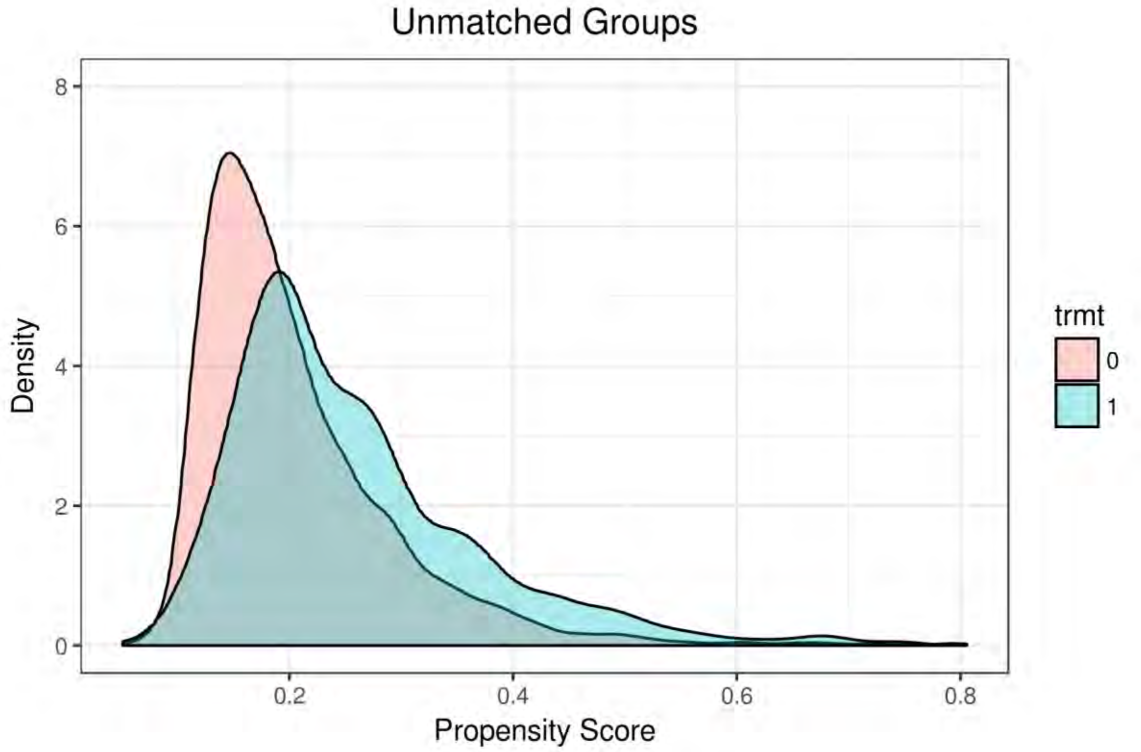


Figure 14-3 Matched Groups Histogram

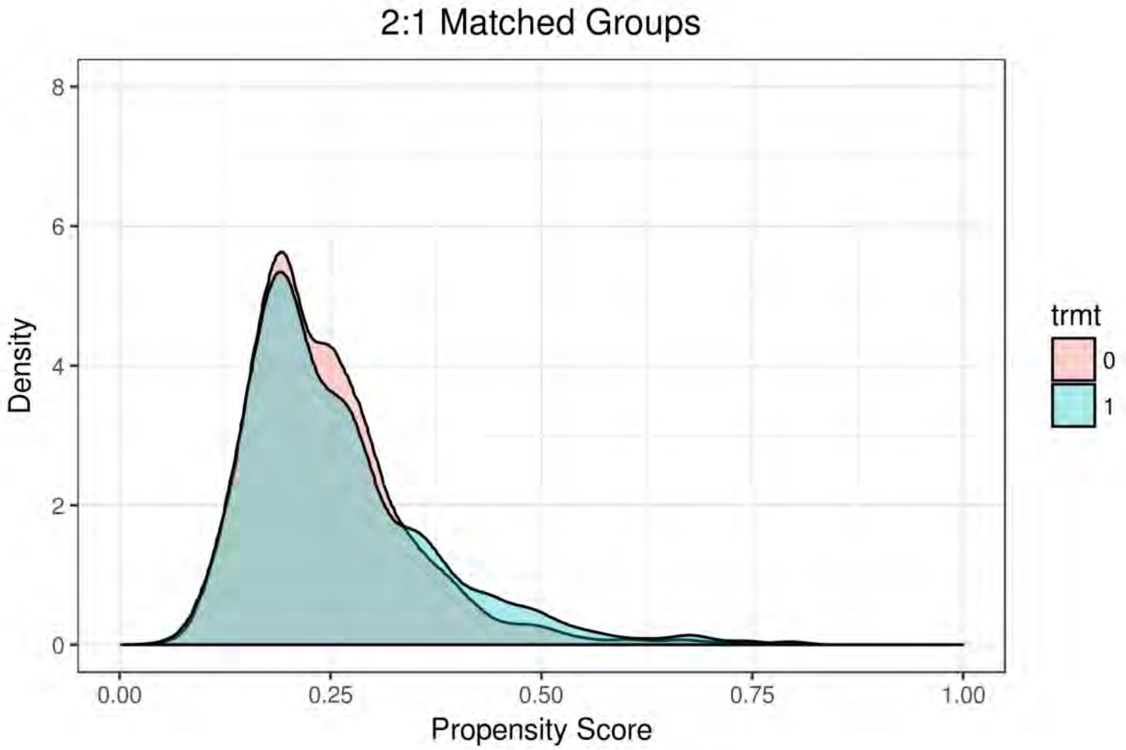


Figure 14-4 Daily kWh Pre- & Post-Retrofit

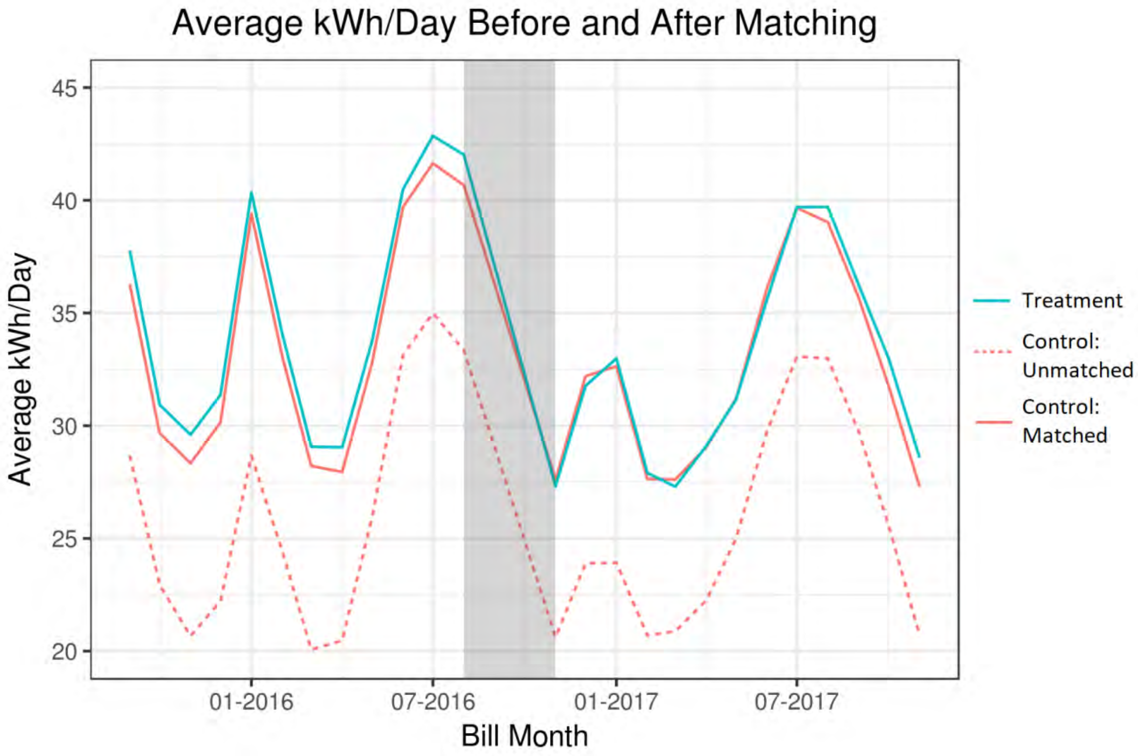


Table 14-7 Average kWh/day After Propensity Score Matching

Billing Month	Treatment Mean kWh/day Usage	Before Matching		After Matching	
		Control Mean kWh/day Usage	Mean Difference in kWh/day Usage	Control Mean kWh/day Usage	Mean Difference in kWh/day Usage
Total Number of Customers	**749**	**2,710**		**1,498**	
September 2015	37.78	29.13	8.63	36.28	1.49
October 2015	30.93	23.07	7.86	29.67	1.26
November 2015	29.60	21.51	8.09	28.33	1.26
December 2015	31.37	22.88	8.49	30.15	1.22
January 2016	40.35	30.19	10.16	39.39	0.96
February 2016	34.06	25.00	9.06	33.06	1.00
March 2016	29.07	21.18	7.89	28.21	0.85
April 2016	29.04	21.56	7.48	27.95	1.09
May 2016	33.75	25.99	7.77	32.78	0.97
June 2016	40.49	32.77	7.72	39.70	0.79
July 2016	42.86	34.44	8.42	41.64	1.22
August 2016	42.02	33.32	8.70	40.67	1.35

14.1.2.1 Verified savings

The results of the fixed effects regression using the treatment group and matched control group are shown in Table 14-8. The “Post*Treatment” interaction term captures the annual savings effect in the post-period of the treatment group over the entire year, net of any naturally-occurring changes in energy use found in the control group. The coefficient for the “Post*Treatment” variable (-0.68) indicates that, net of any pre-post differences in the control group and controlling for the effect of monthly weather differences, customers in the treatment group used 0.68 fewer kWh per day in the post-period due to Nest thermostat installations. The coefficient for the “Post*Treatment*February” variable (-0.10) indicates that customers in the treatment group used 0.10 fewer kWh per day than its control counterpart during the post-period in February (in relation to the “Post*Treatment” variable). Aggregating the monthly savings results in the predicted annual savings for participants in the post-period.

Table 14-8 Model Coefficient Summary

	Model Term	Coefficient	Standard Error	t	P>t
α_0	Intercept	53.18	4.53	11.74	8.75E-32
β_1	Post	-6.69	0.48	-13.87	1.08E-43
β_2	Post*Treatment	-0.68	0.55	-1.24	2.15E-01
β_3	February	-6.32	0.44	-14.21	9.65E-46
β_3	March	-11.21	0.41	-27.31	4.70E-163
β_3	April	-11.40	0.41	-27.49	3.20E-165
β_3	May	-6.61	0.42	-15.88	1.10E-56
β_3	June	0.25	0.45	0.56	5.76E-01
β_3	July	2.33	0.46	5.07	3.92E-07
β_3	August	1.41	0.45	3.12	1.78E-03

β_3	September	-2.93	0.44	-6.65	2.90E-11
β_3	October	-9.62	0.42	-23.13	9.80E-118
β_3	November	-10.96	0.42	-26.30	2.00E-151
β_3	December	-9.16	0.42	-21.72	3.9E-104
β_4	Post*February	1.32	0.60	2.20	2.79E-02
β_4	Post*March	6.12	0.57	10.78	4.50E-27
β_4	Post*April	7.80	0.58	13.55	9.10E-42
β_4	Post*May	5.22	0.59	8.92	4.73E-19
β_4	Post*June	3.23	0.63	5.16	2.52E-07
β_4	Post*July	4.65	0.66	7.09	1.39E-12
β_4	Post*August	5.01	0.66	7.64	2.24E-14
β_4	Post*September	5.97	0.63	9.55	1.34E-21
β_4	Post*October	8.72	0.59	14.71	7.45E-49
β_4	Post*November	5.77	0.56	10.37	3.58E-25
β_4	Post*December	8.69	0.61	14.32	2.13E-46
β_5	Post*Treatment*February	-0.10	0.71	-0.14	8.87E-01
β_5	Post*Treatment*March	-0.76	0.70	-1.09	2.76E-01
β_5	Post*Treatment*April	-0.38	0.70	-0.55	5.85E-01
β_5	Post*Treatment*May	-0.64	0.72	-0.90	3.69E-01
β_5	Post*Treatment*June	-1.12	0.76	-1.48	1.40E-01
β_5	Post*Treatment*July	-0.44	0.82	-0.54	5.88E-01
β_5	Post*Treatment*August	0.22	0.82	0.27	7.88E-01
β_5	Post*Treatment*September	0.16	0.79	0.20	8.38E-01
β_5	Post*Treatment*October	0.82	0.77	1.07	2.86E-01
β_5	Post*Treatment*November	0.03	0.63	0.05	9.59E-01
β_5	Post*Treatment*December	-0.90	0.74	-1.22	2.22E-01

Adjusted R-Squared: 0.6797

The "Post*Treatment" coefficient combined with the "Post*Treatment*Month" coefficients allows prediction of total kWh savings for the participants after installing the Nest smart thermostats (see Equation 2). The interactive terms between post, treatment, and the vector of month variables are not themselves statistically significant. However, when the model is run with a single savings indicator variable (Post*Treatment) its coefficient is significant[53]. The Evaluators have run the model with a month vector to include the best-available estimate of seasonal effects.

The average annual kWh usage from the pre-retrofit interval of treatment customers is 12,822 kWh per year. The model predicts a mean annual savings of 343 kWh, 2.68% of annual use.

Table 14-9 shows the average monthly kWh usage and savings in the post-period. This table also includes the monthly variance, robust standard error, and 90% confidence interval. The methods used to produce these statistics are provided in Appendix C: Smart Thermostats Appendices

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[53] T-stat of -4.3876

Table 14-9 Monthly and Annual Average kWh Usage and Savings

Period	Average Monthly Usage (kWh)	Monthly kWh Savings (kWh)	kWh Savings (%)	Monthly kWh Savings Variance[54]	Error[55]	90% Confidence Interval
January	1,250.89	21.09	1.69%	289.56	27.99	(-6.9, 49.08)
February	953.71	21.88	2.29%	194.01	22.91	(-1.03, 44.79)
March	901.15	44.61	4.95%	219.68	24.38	(20.23, 68.99)
April	871.27	31.83	3.65%	206.36	23.63	(8.2, 55.47)
May	1,046.31	41.02	3.92%	246.32	25.82	(15.2, 66.83)
June	1,214.64	53.94	4.44%	284.46	27.74	(26.2, 81.68)
July	1,328.63	34.87	2.62%	400.81	32.93	(1.94, 67.8)
August	1,302.55	14.22	1.09%	403.94	33.06	(-18.84, 47.29)
September	1,133.25	15.56	1.37%	329.03	29.84	(-14.27, 45.4)
October	958.81	-4.33	-0.45%	320.05	29.43	(-33.76, 25.1)
November	887.95	19.43	2.19%	129.24	18.70	(0.73, 38.14)
December	972.41	48.99	5.04%	276.72	27.36	(21.63, 76.36)
Annual	**12,821.58**	**343.13**	**2.68%**	**3,300.19**	**94.50**	**(248.63, 437.63)**

The adjusted R-squared value for the model is 0.6797. The monthly dummy variables account for seasonal differences in usage. Figure 14-5 displays the monthly savings estimates with 90% confidence bars. The confidence intervals on the monthly values are too wide to make inferences, as a few the intervals extend across negative and positive savings. However, the confidence intervals allow the conclusion that positive savings occur in the summer cooling months as well as in December.

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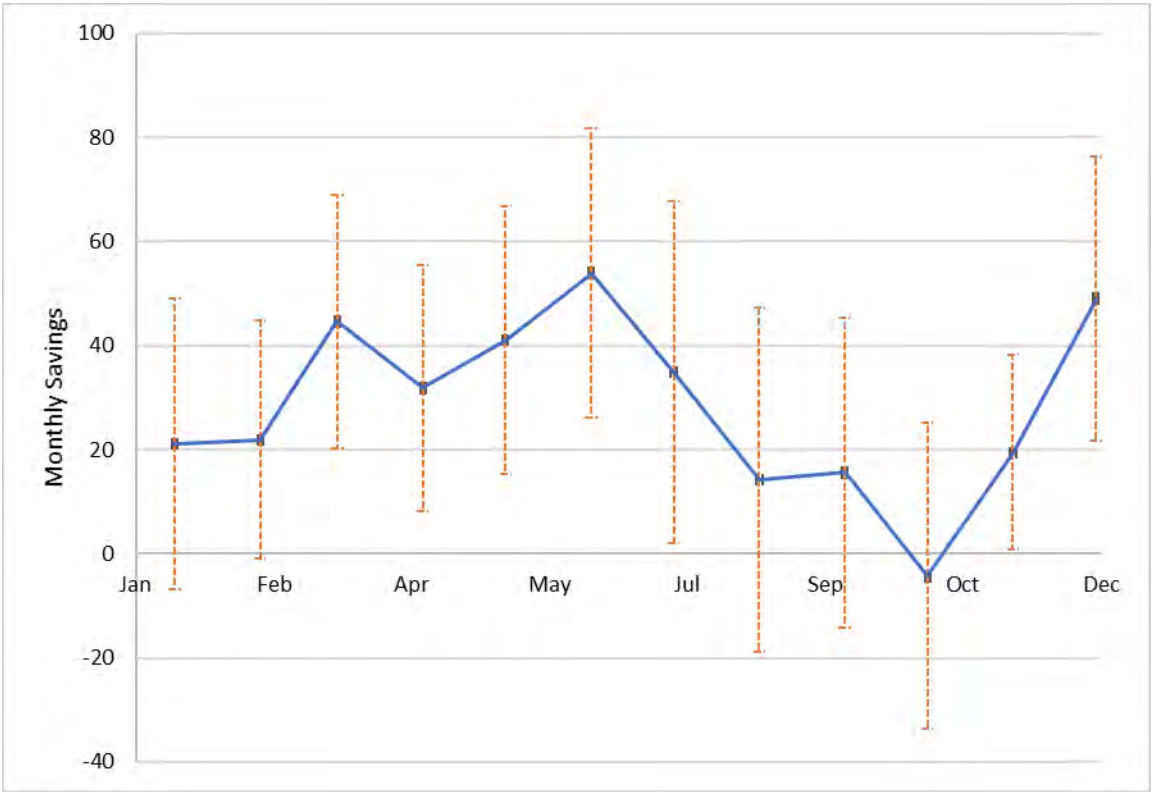
[54] Equal to SE of combined estimates (Variance of Treatment*Post, Variance of Treatment*Post*Month interaction, Covariance of Treatment*Post and Treatment*Post*Month). For further details, see Appendix D.

[55] Square root of Monthly kWh Savings Variance, multiplied by 1.645 (z-score at 90% confidence). For further details, see Appendix D.

Figure 14-5 Monthly Savings Estimate with 90% Confidence Boundaries



One should note that Propensity Score Matching does not provide a perfect match for each customer. The matched control group used 0.5 to 1.5 more kWh per day across the pre-period months as shown in Table 14-7 and Figure 14-4. This could mean the model results are slightly underestimating savings. If the pre-treatment control and treatment groups could be exactly matched, the model would be more robust. There is also no guarantee that the control and treatment groups have similar behaviors. However, this was to some extent mitigated as the billing data provided to the Evaluators was from a pool of pre-qualified multifamily properties that were not given thermostats in the treatment period; they are likely future program participants and made for the best-available post-hoc control group for this analysis.

14.1.2.2 kWh Savings Results Summary

The model demonstrates that the Nest Gen 2 smart thermostats provide savings throughout the year, with higher kWh savings in the summer and winter than in the shoulder months. Overall, participating customers save an average of 2.68% of annual consumption.

The results of the analysis demonstrate the bulk of savings to occur during the summer months and December. Program participants' smart thermostats are most likely raising the cooling setpoint, thus reducing summer season energy use. However, savings effects in more temperate months are lower. It is possible that savings in the winter months could be improved by adjusting the smart thermostat heating setpoint at the onset of installation using temperature comfort-level input from the program participant. This adjustment could mitigate any participants who may override the smart thermostat settings in the winter.

Negative savings are displayed in the shoulder month of October. The shoulder months have the lowest cooling degree days (CDD) and heating degree days (HDD) of the year, resulting in reduced HVAC loads. However, the confidence intervals on monthly estimates are too wide to make certain inferences.

14.1.2.3 Program Level Savings

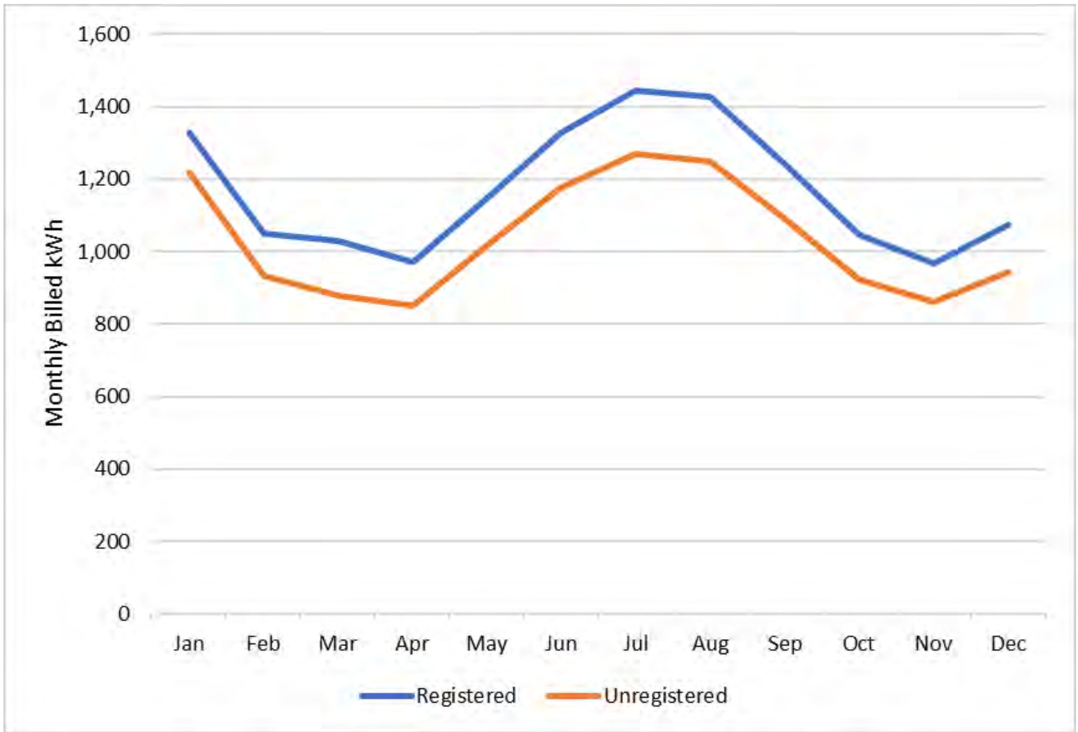
The Evaluators found kWh savings in the program period equal to:

- 343 kWh per unit
- 343,000 annual kWh during the program period
- 3,773,000 over the lifetime of the equipment (11-year EUL, per CA DEER).

14.1.3 Evaluating Impacts of Nest Registration

The Evaluators analyzed Nest thermostat registration impacts. Registration provides access to added features, including ability to control the thermostat remotely. The Evaluators found that 213 of the 749 final participants in the analysis registered their Nest thermostat. The pre-retrofit billed use and load profile, based on registration, is summarized in Figure 14-6.

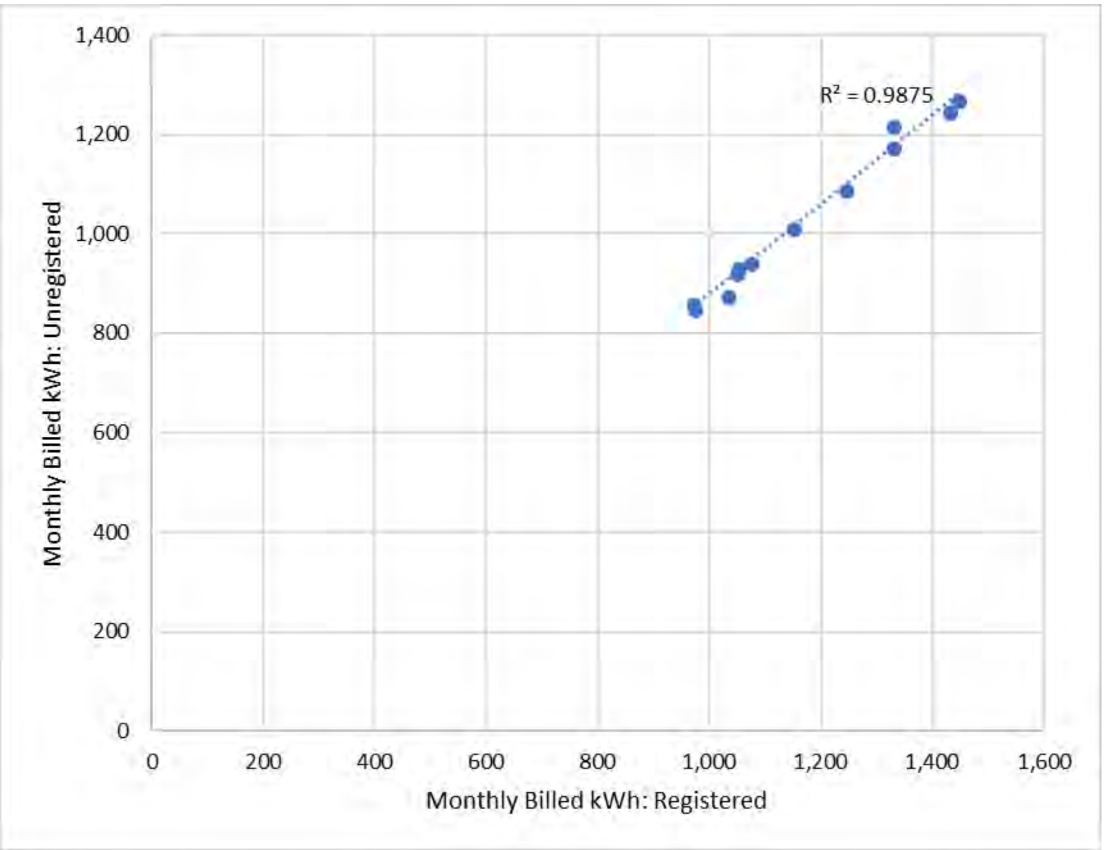
Figure 14-6 Pre-Period Usage: Registered & Unregistered Thermostats



The Evaluators note that:

- **Registered users had higher pre-retrofit energy use across all months.**
- **The load profile of registered and unregistered customers did not differ.** The billed-use correlation between groups has an R-square of .9875.

Figure 14-7 Correlation of Registered and Unregistered Accounts Monthly Billed Use



The Evaluators ran separate regressions for the registered and unregistered units and their matched control groups. The model details are provided in Appendix C. They key model statistics are presented in Table 14-10.

Table 14-10 Model Results Comparison

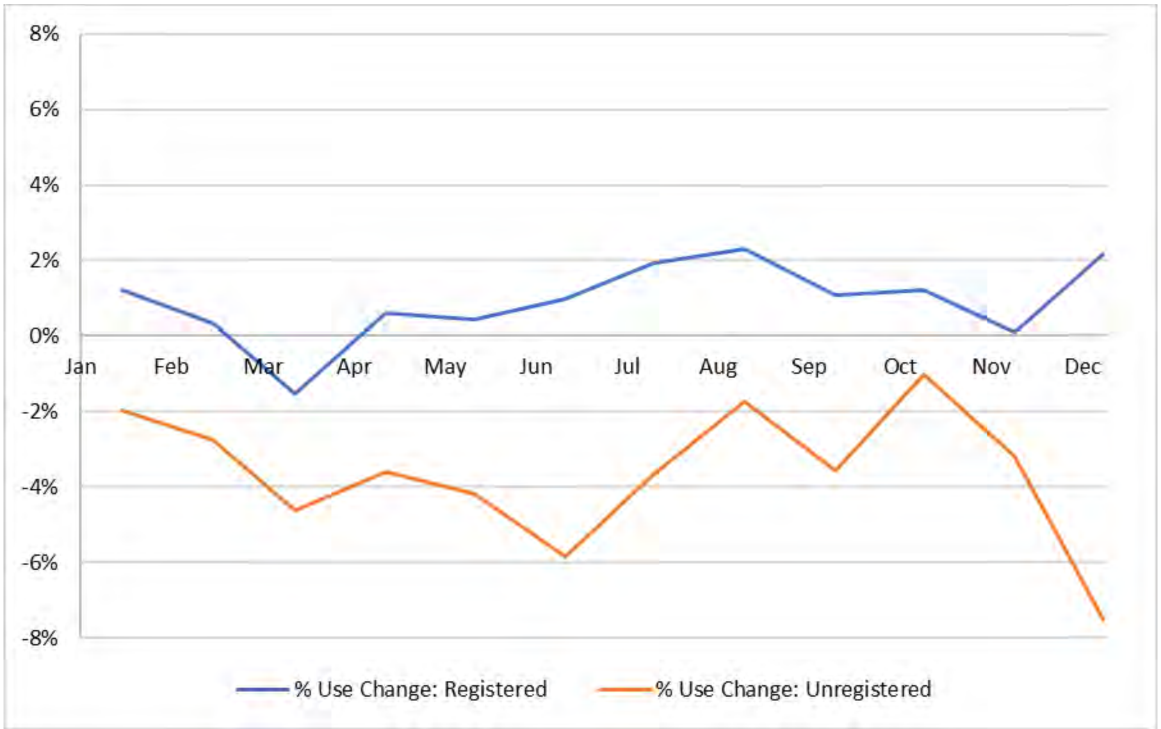
Parameter	Registered	Unregistered	Aggregated
N	213	536	749
R-Square	.6860	.6775	.6797
% Savings off Annual	-1.00%	3.60%	2.68%
Annual kWh Savings	-141	443	343
90% Confidence Interval (CI)	(-328, 47)	(332, 554)	(249, 438)

Participants that registered their thermostat and gained full access to its features demonstrated increased energy use. While the aggregate population saved 343 kWh annually, savings based on registration are:

- 443 kWh (±111.02) decrease in use by unregistered units (statistically significant);
- 141 kWh (±187.81) increase in use by registered units (not statistically significant)

The change in monthly energy use between the two groups is summarized in Figure 14-8. The data is presented as a percent change in use; therefore, negative values are equal to energy savings.

Figure 14-8 Percent Change in Monthly Use: Registered vs. Unregistered



The estimated 443 kWh annual savings from the unregistered group is statistically significant, CI [332, 554], and as 72% of the aggregate group consisted of unregistered users (the majority), it follows that the unregistered and aggregate group savings estimates are statistically significantly similar. The confidence interval surrounding the savings estimate for registered thermostats is very wide (ranging from a savings of 47 kWh to an increased use of 329 kWh annually). Given this confidence interval crosses the boundary between kWh savings and increased use (0 kWh), the Evaluators cannot confidently assert whether registered units provide savings or result in increased energy use, because the registered group estimate is not statistically significant. The registered group estimate is, however, statistically significantly different from the unregistered users' estimate and from the aggregate savings estimate.

14.1.4 Savings as Percent of HVAC Load

The Evaluators disaggregated the heating and cooling use from 2017 billing data for treatment households to provide estimates of savings as a percent of HVAC load.

The most typical approach is to identify the lowest use month as a "baseload month" and subtract it from monthly usage to estimate heating and cooling. This is not possible in this study for two reasons:

(1) 100% of the participants have electric space heating; and
(2) New Orleans has significant HVAC load in all months.

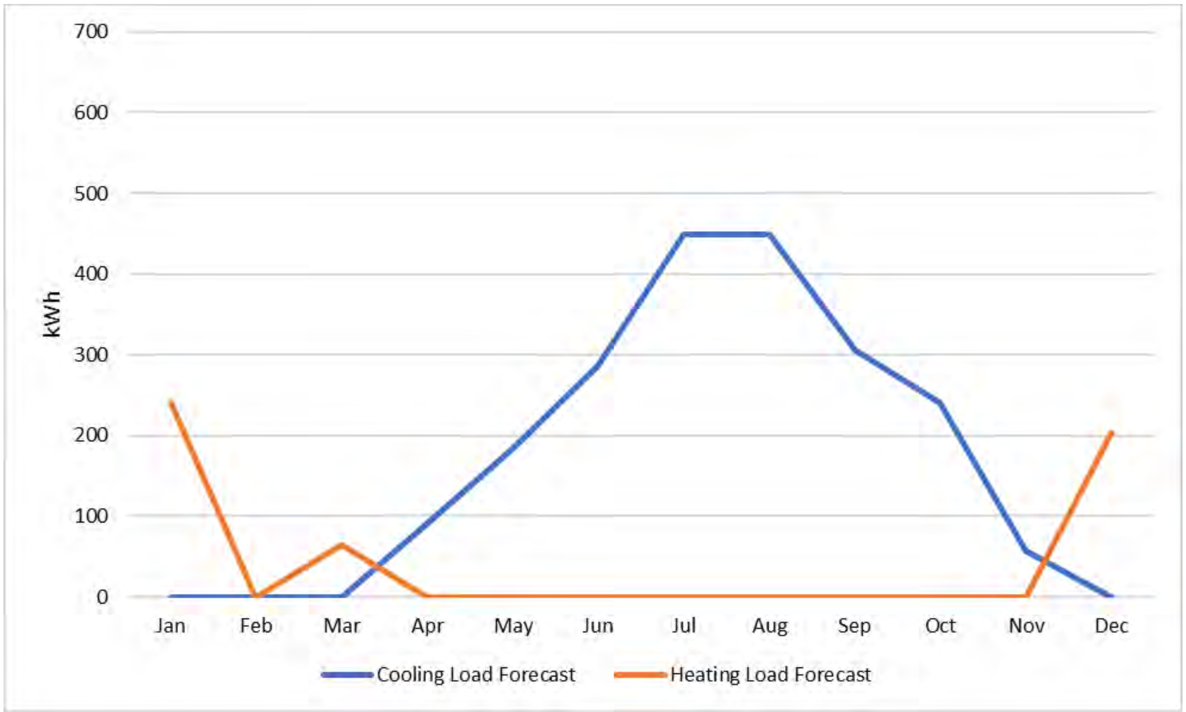
To account for this, the Evaluators instead used regression-corrected load disaggregation. The two methods are summarized in the subsections to follow.

14.1.4.1 Method 1: Lowest-Month Subtraction

Figure 14-9 summarizes the results of disaggregation by this method. The estimates of cooling and heating are as follows:

- 2,065 cooling kWh (April – November);
- 509 heating kWh (December – February);
- Total HVAC constitutes 22% of annual use.

Figure 14-9 Disaggregated HVAC Load – Method 1 – Lowest-Month Subtraction



If this method was used, the savings estimates as a percent of heating and cooling use are:

- Cooling: 11%

- Heating: 22%

14.1.4.2 Method 2: Regression-Corrected Load Subtraction

In this method, the Evaluators regressed billed use against cooling and heating degree days (base 65) for each month of the post-treatment period.

Figure 14-10 and Table 14-11 summarizes the model output when kWh is regressed against HDD and CDD. The model R-square is .59.

Figure 14-10 Summary of kWh, HDD, and CDD used in Regression-Corrected Load Disaggregation

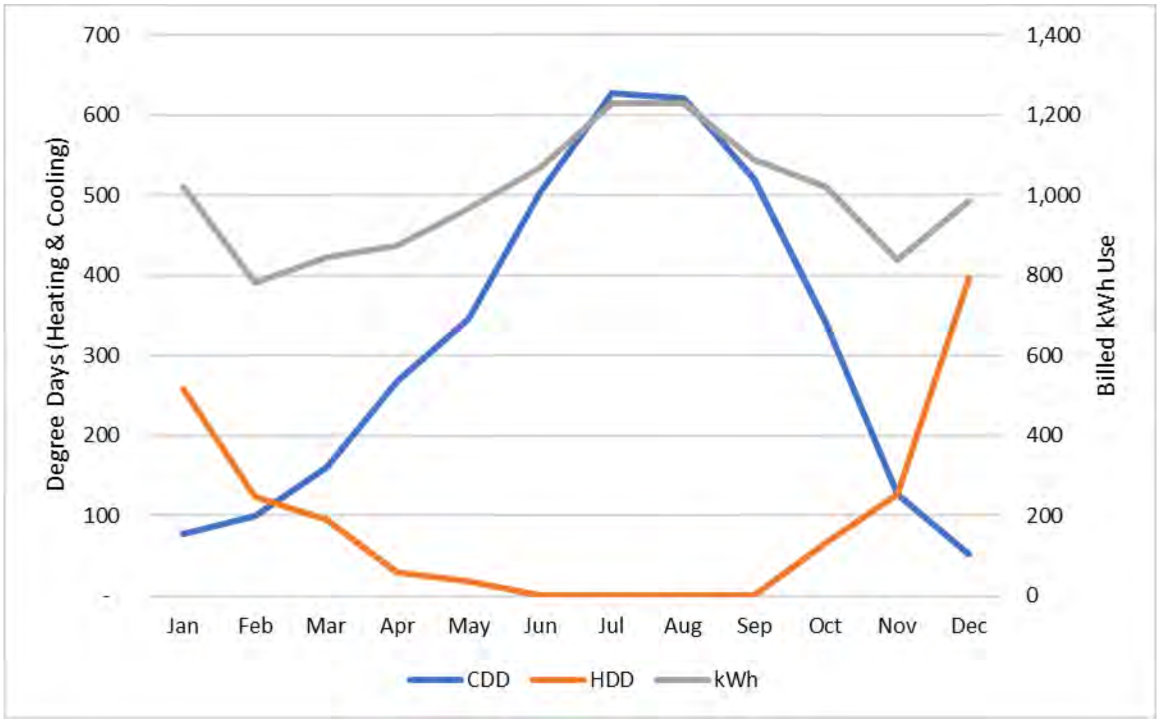


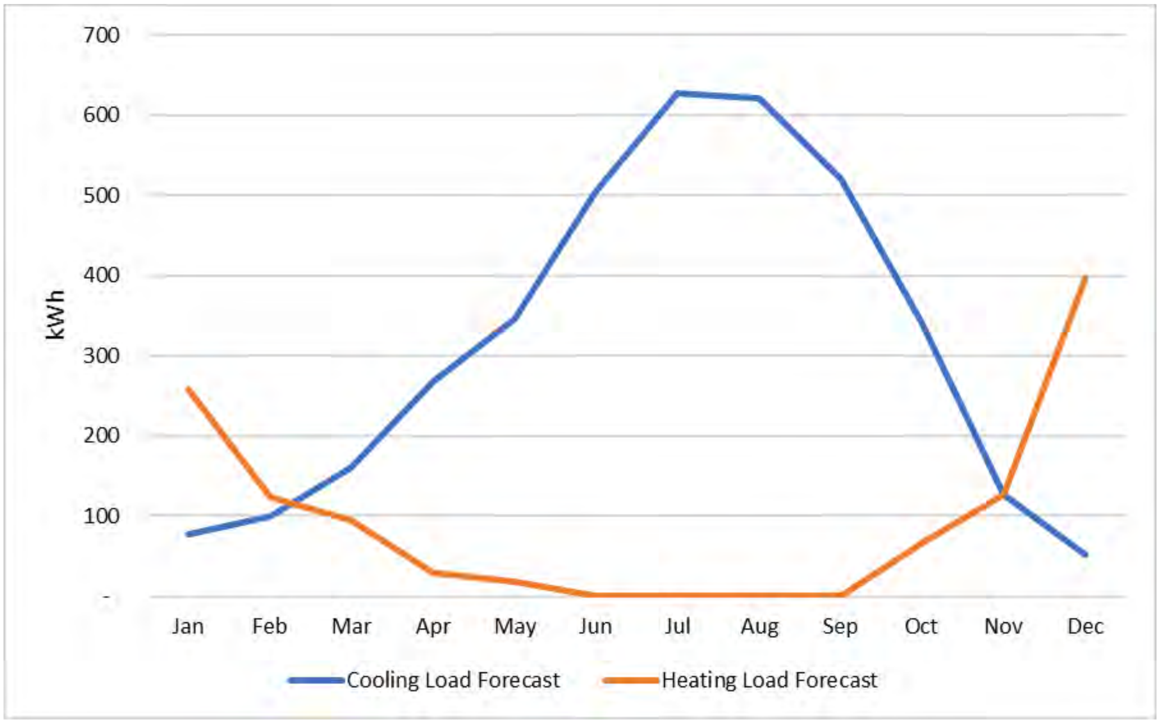
Table 14-11 Model Output: Regression-Corrected Load Disaggregation

Parameter	Estimate	SE	T-stat
Intercept	656.5612	111.6996	5.88
CDD	1.1045	.2809	3.93
HDD	1.0612	.4904	2.16

Adjusted R-square: .59

When this method is used to predict monthly cooling and heating loads, more months demonstrate heating or cooling than would be expected with Method 1. This forecast is summarized in Figure 14-11.

Figure 14-11 Disaggregated HVAC Load – Method 2 – Regression-Corrected



The estimates of cooling and heating use are as follows:

- Cooling kWh: 3,507;
- Heating kWh: 1,000;
- HVAC is 38% of annual use.

There is significant uncertainty surrounding heating and cooling loads in shoulder months, as New Orleans will demonstrate both heating and cooling loads occurring to significant degrees in these months. The Evaluators nonetheless present the savings as a percent of heating and cooling use, though there is also a value for percent reduction in annual HVAC use.

- Annual reduction in cooling use: 6.61%;
- Annual reduction in heating use: 11.14%;
- Annual reduction in aggregate HVAC use: 7.61%.

14.2 Process Evaluation

The Smart Thermostat Pilot process evaluation was aimed to obtain feedback from installing contractors and program participants to provide strategic recommendations should the Pilot be expanded to program-scale.

The data collected for the Pilot is as follows:

Table 14-12 Process Evaluation Data Collection Summary

Data Source	Activity	n
Program Administrators	At the outset of the evaluation, ADM interviewed program administration staff from ENO and CLEAResult	2
Trade Allies	ADM conducted semi-structured interviews with installing contractors supporting the Pilot	2
Program Participants	ADM conducted telephone surveys with tenants that received smart thermostats through the program.	126

14.2.1 Thermostat Model Review

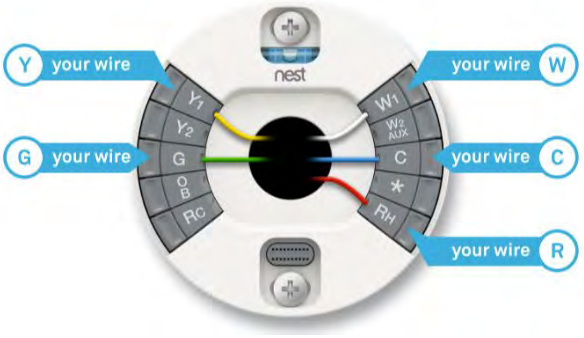
The Pilot provided refurbished Nest Second Generation thermostats. The Evaluators researched these as well as the features of newer Gen 3 models to assess model selection suitability. Gen 3 has many of Gen 2's features and capabilities; the changes in the newer model are, however, largely cosmetic, with a slimmer profile and more customizable user interface.

14.2.1.1 Installation

The installation process is as follows:

1) Shut off the power to the HVAC system via the circuit breaker.
2) Remove the old thermostat and replace it with the Nest base. The wires should be labeled and attached to their respective connector buttons as displayed in Figure 14-12.
3) Push the display in to place and wait for the auto-setup to complete.
4) Input necessary information to connect the thermostat to the home Wi-Fi network. Gen 2 Nest thermostats can be connected to common 2.4 GHz internet connections and the Gen 3 can connect to 2.4 GHz and 5 GHz wireless networks.

Figure 14-12 HVAC System Connected to Nest Base Connector[56]



14.2.1.2 Design

The Gen 3 has a slimmer size, larger display size, more sensors, and more color options than Gen 2 models. The energy savings features are largely the same as Gen 2; the only added functionality is the ability to integrate with Hydronic systems, which are not a common system configuration in New Orleans.

Figure 14-13 List of features Gen 2 (left) vs. Gen 3 (right)

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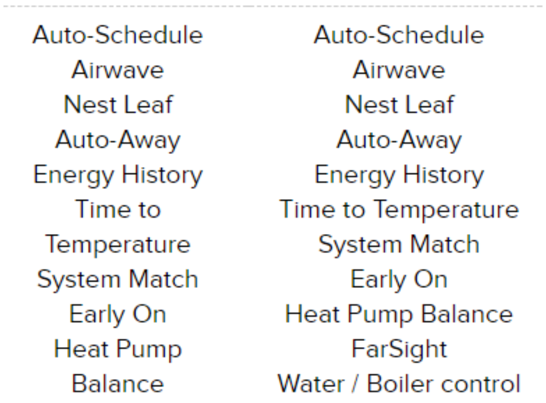
[56] Nest, How to install your Nest Learning Thermostat, 2017



Auto-Schedule	Auto-Schedule
Airwave	Airwave
Nest Leaf	Nest Leaf
Auto-Away	Auto-Away
Energy History	Energy History
Time to Temperature	Time to Temperature
System Match	System Match
Early On	Early On
Heat Pump Balance	Heat Pump Balance
	FarSight
	Water / Boiler control

14.2.1.3 Measure Cost

The Evaluators reviewed the retail pricing of Nest Gen 3, Gen 2, and Gen 2 refurbished thermostats. Pricing was found from a minimum of three large retailers. Current average costs for the Nest thermostats are as follows:

- Gen 3: $249.00
- Gen 2 (New): $198.00
- Gen 2 (Refurbished): Range of $129.00 - $179.00, greater savings with economics of scale purchase.

The Evaluators concluded that the use of Gen 2 Refurbished models was a cost-effective program design choice that does not affect the product quality nor energy savings; the features of the higher cost, newer models are generally cosmetic or tailored towards esoteric heating systems which are not relevant to this market. We estimate that the use of refurbished models allowed for 55% to 60% more installations during this pilot.

14.2.2 Trade Ally Interview Findings

In September 2017, ADM spoke with two of the three trade allies that participated in the Nest Smart Thermostat Pilot Program. The trade allies installed the thermostats between September 2016 and October 2016, and in January 2017. The interviews lasted 30-45 minutes and focused on their experiences with the program and suggestions to improve its operations and delivery in future years.

The interview with one of the trade ally firms was completed with the company owner who was responsible for coordinating the installation crew and communicating with CLEAResult about the installation status of the thermostats. He indicated that two technicians performed the installations over a period of a few days.

ADM researchers spoke with two staff members from a second trade ally firm that participated in the Nest Smart Thermostat Pilot Program. The respondents included the company service manager, who was responsible for maintaining communication with

CLEAResult, and the dispatcher/office manager, who was responsible for drafting work orders and handling logistics with the service technicians. The number of service technicians performing the installs varied throughout the scheduled work period. A minimum of four to a maximum of eight were onsite installing the thermostats at any given time. Both companies indicated they had the internal resources necessary to install the thermostats in the timeframe defined by CLEAResult.

Both companies indicated they had experience installing smart thermostats prior to their participation in ENO's Nest Smart Thermostat Pilot Program. The first contractor indicated that their company installs a thermostat with every new HVAC installation; 70% of the units installed are general, non-programmable units while 30% are smart thermostats. The interviewee went on to say they would not typically recommend a smart thermostat unless there is a promotion from the dealer/distributor. The second trade ally indicated they are a premier dealer for Nest and will typically recommend a Nest thermostat if the HVAC unit is compatible. They indicated that the proportion of smart thermostats installed to general, non-programmable units installed is roughly 50/50. Both indicated they are installing more now than they were a few years ago.

All interviewees indicated they were first contacted by CLEAResult to participate in the program. They were given between one and three weeks' notice, which both trade allies indicated to be reasonable lead preparation time. One interviewee indicated that the timing was good because the fall tends to be a slow time and they were happy to have the extra work.

The trade allies were not required to sign a Statement of Work or another contractual document with CLEAResult. They did, however, sign Memorandum of Understanding (MOUs) with the property management companies. Outlined in the MOUs are the general work provisions and the insurance minimums trade allies are required to carry.

After MOU execution, work commenced. CLEAResult provided trade ally property manager contact information, installations dates and a list of addresses for thermostat installations. Both interviewees indicated that the scheduling process was smooth – they simply had to confirm via email and show up on the installation date at the agreed time and place. The thermostats were on-site and ready for installation.

According to interviewees, property managers were responsible for tenant installation notifications. Tenants were not required to be home; if the residence was unoccupied, the property manager granted the trade ally unit access. One of the trade allies indicated that very few of the tenants were home during installation.

One of the interviewees indicated that they were accompanied by both the property manager and a CLEAResult staff member. The other interviewed trade ally did not mention the presence of CLEAResult staff, although he was not asked directly if they were in attendance. Both interviewees had positive feedback about their experiences working with property managers, indicating they were well-organized and on-time. They went on to say that program efficiency was completely dependent on the property managers' preparedness level. Only one interviewee described a morning where the property manager did not show up on time and did not have the residence's keys. This instance was an outlier as all other feedback about property managers was very positive. Both trade allies emphasized their satisfaction with the scheduling, installation process and program overall. Their responsibilities were limited to installing the units and providing CLEAResult with a list of addresses of installed units.

Both trade allies indicated they did not provide residents in-person thermostat instruction, nor were there set points predefined by the program. They left behind the unit's original packaging which included operating instructions and a manufacturer's warranty. It was the property manager's responsibility to provide support if residents had questions, concerns or problems with their new thermostats.

The first company spoken with did not provide details about installations times but emphasized that they paid their installation team on a per unit basis as an incentive to expedite the process. The second company we spoke with indicated that installations took approximately 20-30 minutes. They first checked to ensure the HVAC unit was in working condition by turning on both the heat and air conditioner. If the system was not working, they did not replace the thermostat. Once the thermostat was replaced, the contractor again checked to ensure the both the heat and air conditioner were working.

Both trade allies indicated that they were not required to document the type of thermostat replaced or its set points, or other information about HVAC system.

Neither of the contractors interviewed received training from the program. Both said they had previous experience working with smart thermostats; they were familiar with the technical features and installation procedures and therefore did not think it was necessary. One contractor indicated that since they are a Nest dealer they received training through Nest.

We spoke with trade allies about ways the program could be improved. The first interviewee reiterated his high satisfaction level with program stating it was streamlined and efficient, compared to many utilities with documentation requirements that are over-burdensome and discourage them from participating in the past. The second trade ally discussed the importance of residential HVAC maintenance. In his opinion, a smart thermostat paired with regular maintenance is the only way for systems to run at peak efficiency and realize maximum energy savings potential. Therefore, he suggested that the program consider expanding its offerings to include system some type of training for property managers or additional dollars for contractors to perform tune-ups as well.

- Both trade allies interviewed indicated they were first contacted by CLEAResult to participate in the program. They were given between one and three weeks' notice as an installation deadline, which was reasonable in their opinions. They also both indicated their companies had the internal resources necessary to install the thermostats in timeframe defined by the implementation contractor.

- The TA's interviewed did not receive training by the program and both had previous experience installing smart thermostats; the feedback suggests smart thermostats are common product offering for HVAC contractors and the market uptake is increasing.
- Overall program satisfaction among trade allies was very high; all interviewees expressed particular satisfaction with the ease of participation as it pertained to installation logistics and documentation requirements. They described the program as "effortless" and "turnkey."
- One trade ally stressed the importance of system efficiency through regular maintenance and cleaning, in addition to smart thermostats. He suggested training with property managers and/or additional rebate dollars for contractors to turn-up existing equipment.

14.2.3 Participant Survey Summary

This section summarizes the results of a survey of customers who received the Nest smart thermostat through the Pilot program. In October 2017, the survey was sent to 985 customer residences that received the smart thermostats through the program by postal mail. Customers were provided the options of completing and returning a paper version of the survey in a stamped and addressed envelope or to complete the survey online using a link provided in the survey letter.

In total, 126 (13%) surveys were returned or completed online by customers that confirmed the thermostat was currently installed in their home. Of these, 14 responses were dropped because the customers reported they did not reside at the location at the time the thermostat was installed. These responses were dropped because several questions referred to the customers' experience with the installation, the information provided about the thermostat, and changes in home comfort that resulted from the installation of the thermostat.

14.2.3.1 Home and Demographic Characteristics

Table 14-13 and Table 14-14 compare the survey respondents' characteristics to all program participants ("population"). Overall, these results show that the survey sample was generally representative of the program participants, although customers with electric resistance heating, or who lived in multifamily or senior housing were slightly overrepresented in the survey sample.

Table 14-13 Summary of Heating System Type

Space Heating Type	***Percent of Respondents (n = 124)***	***Percent in Population***
Heat Pump	35%	25%
Electric Resistance	65%	75%

Table 14-14 Summary of Senior and Family Housing Types

Building Type	Percent of Respondents (n = 124)	Percent in Population
Senior Housing	18%	10%
Family Housing	82%	90%

* One property was considered senior housing because the name of the property referenced "senior community."

Forty-three percent of respondents reported that they did not have internet service from the installation date to the survey completion, as shown in Table 14-15. In addition, 37% reported that they did not have Wi-Fi access during that period. That fewer customers reported that they had any internet than those that reported they had Wi-Fi access suggests some may have misunderstood the survey questions or that they had access to publicly available Wi-Fi internet but did not personally have a subscription.

Table 14-15 Presence of Internet Service

Did this residence subscribe to internet service during the entire period between when the thermostat was installed in [INSTALL DATE] and today?	Response	Percentage of Respondents (n=106)
	Yes	44%
	No	43%
	Don’t know	12%

Table 14-16 Presence of Wi-Fi Access

During that period, did you have Wi-Fi internet access in your home?	Response	Percentage of Respondents (n=105)
	Yes	52%
	No	37%
	Don’t know	10%

Table 14-17 presents survey respondent household income. The results confirm that the respondents were largely low-income customers with 53% earning $20,000 or less. Two percent of customers reported household incomes greater than $75,000.

Table 14-17 Household Income

Household Income	Percentage of Respondents
Less than $10,000	32%
$10,000 to less than $20,000	21%
$20,000 to less than $30,000	8%
$30,000 to less than $40,000	5%

$40,000 to less than $50,000	2%
$50,000 to less than $75,000	1%
$75,000 to less than $100,000	1%
$100,000 to less than $150,000	1%
Don’t know / Prefer not to state	30%

Eighteen percent of respondents reported that they did not complete high school and 42% reported that they were high school graduates.

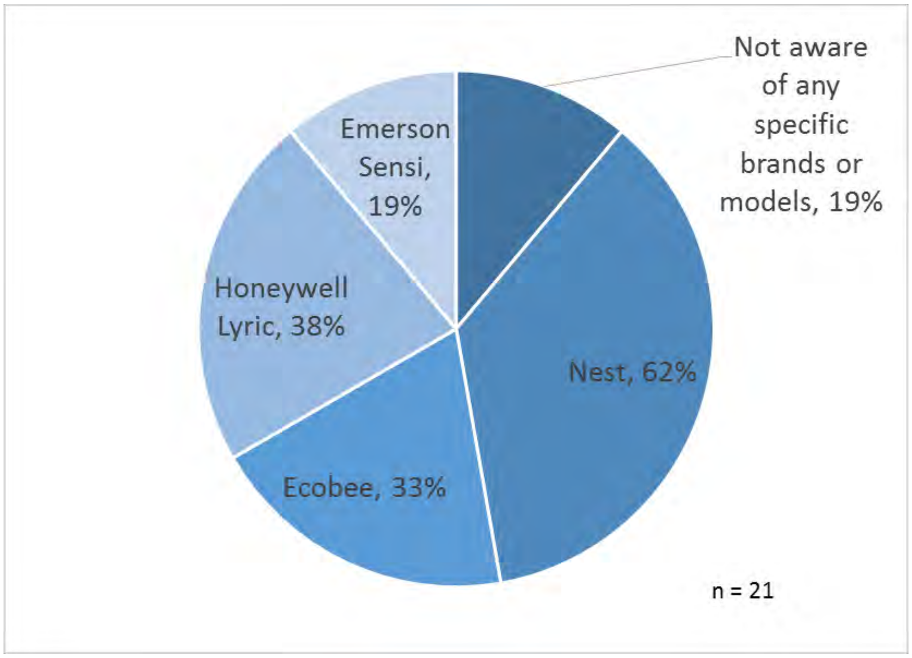
Table 14-18 Highest Level of Education

Highest Level of Education	***Percentage of Respondents***
Did not graduate high school	18%
High school graduate	42%
Associates degree, vocational/technical school, or some college	18%
Four-year college degree	7%
Graduate or professional degree	2%
Don’t know / Prefer not to state	14%

14.2.3.2 Previous Awareness of Thermostats

Relatively few of the participating customers, 21%, were aware of smart thermostats prior to their installation. The 21% of respondents who had heard of the technology were most frequently aware of Nest thermostats (62%), followed by Honeywell Lyric (38%) and Ecobee (33%).

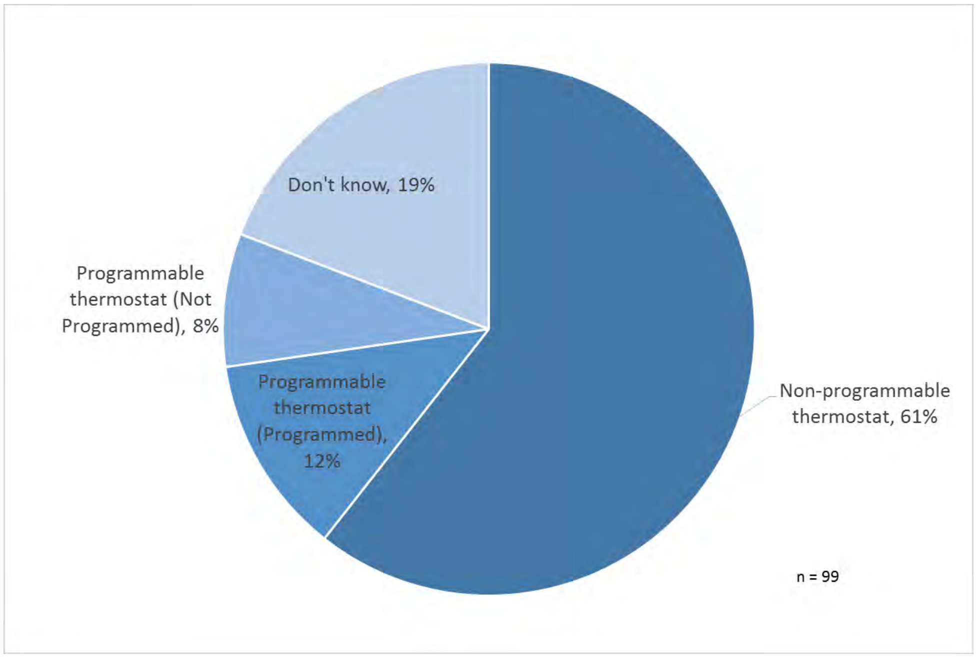
Figure 14-14 Thermostat Brand Prior Awareness



14.2.3.3 Type of Thermostat Replaced

The savings resulting from Nest thermostat are likely to be greater for customers using a manual thermostat or a programmable thermostat that is not programmed, than for customers who previously had a programmable thermostat that was programmed. Relatively few participants reported that they were using a programmable thermostat with programmed set points (12%) suggesting that the savings potential for this population may be relatively high.

Figure 14-15 Replaced Thermostat Disposition



14.2.3.4 Difficulties with Thermostat

Thirty-seven percent of customers reported that they had experienced problems with the Nest thermostat. The problems identified are summarized in Table 14-19. The most often reported issue was difficulty controlling or setting the temperature (70%). Other problems noted were that the home was too cold (8%), internet connection issues (8%), and that the home has been too warm (5%).

Table 14-19 Reported Difficulties with Thermostat

Response	***Percentage of Respondents (n=37)***
Difficulty controlling or setting the temperature	70%
Home has been too cold	8%
Internet connection issues	8%
Home has been too warm	5%
HVAC system needs replacement	3%
Doesn't understand the system	3%
Don't know	3%

14.2.3.5 Use of the Thermostat

Customers who had the Nest thermostat installed in their residences were asked questions about how they were interacting with the thermostat.

Twenty-four percent of the respondents stated that they had used the mobile app.

Table 14-20 Use of the Mobile App

Have you used the Nest mobile app on a smart phone or tablet?	***Response***	***Percentage of Respondents (n=108)***
	Yes	24%
	No	75%
	Don’t know	1%

Nineteen percent of respondents reported that they had disabled the auto-scheduling feature that sets a temperature schedule based on the customer’s temperature preferences. The reasons given for disabling auto-scheduling varied, but six customers reported issues related to the home temperature or HVAC equipment operating times. Another three customers referenced managements’ control of the unit as the reason for disabling auto-scheduling, but it was unclear from these responses if they were implying that the buildings management had disabled auto scheduling.

Table 14-21 Disabling of Auto-scheduling

Have you disabled the auto-scheduling feature?	***Response***	***Percentage of Respondents (n=108)***
	Yes	19%
	No	69%
	Don’t know	13%

Table 14-22 Reasons for Disabling Auto-scheduling

Reason	***Number of Respondents***
Management controls the setting	3
Too hot or too cold	2
Too hot	2
Came on at unusual times	2
Prefer manual control	1

A majority of respondents (72%) reported that they had adjusted the thermostat after the initial learning period. As shown in Table 14-24, the most commonly given reason (40%) for making these adjustments was to improve the home comfort, although a similar percentage (35%) reported making adjustments both to improve comfort and reduce energy use. Another 21% reported that they adjusted the temperature to reduce energy use.

Table 14-23 Manual Adjustments to Temperature

Have you manually adjusted the temperature setting after the initial learning period?	***Response***	***Percentage of Respondents (n=109)***
	Yes	72%
	No	20%
	Don't know	8%

Table 14-24 Reason for Manual Adjustments

Reason for Making Adjustments	***Percentage of Respondents (n=77)***
To improve home comfort	40%
To improve comfort and reduce energy use	35%
To reduce energy use	21%
Don't know	4%

14.2.3.6 Usefulness of Features

Table 14-25 summarizes customers' perceptions of the usefulness of various features of the Nest thermostat.

The features that customers reported most useful, as defined by the share that reported the feature was moderately useful or very useful, were Cool to Dry (81%), Auto-scheduling (75%), and Early-on (74%). With the exception of the Cool to Dry feature, the rates of use of these features were also higher than some of the other features (less than 20% reported not using them).

Filter reminders and the energy history were both used less frequently (they were not used by 31% and 27%, respectively) and considered relatively less useful by the participants that used them (69% said the filter reminders were moderately or very useful and 70% said the energy history was moderately or very useful). The perception that the filter were not as useful as other features may be because these are rental properties and property management is likely responsible for changing the air filter on the heating and cooling system.

Table 14-25 Usefulness of Nest Thermostat Features

Feature (Number of Respondents Who Used the	***Not at all useful***	***Slightly useful***	***Moderately useful***	***Very useful***	***Have not used***

Feature)					
Nest Leaf: Appears when you set it to a temperature that will save energy (n = 74)	22%	5%	8%	65%	14%
Early-On: The feature that turns on heating and cooling so that the desired temperature is reached at the scheduled time (n = 77)	13%	13%	19%	55%	15%
Auto-schedule: The feature that sets a schedule based on what temperatures you like (n = 73)	14%	11%	11%	64%	18%
My Energy History: See how much your system has run and energy used (n = 61)	20%	10%	16%	54%	27%
Filter reminders: Reminders to change your air filter (n = 58)	17%	14%	10%	59%	31%
Cool to Dry: The feature that reduces humidity in your home (n = 49)	16%	2%	24%	57%	38%
Adjusting the temperature with a smart phone (n = 55)	24%	5%	16%	55%	40%

14.2.3.7 User Friendliness

Table 14-26 summarizes customers' ease of use ratings for Nest thermostat features. The ease of use ratings were fairly homogenous with no particular feature standing. Overall, approximately 70% of respondents reported each feature was somewhat or very easy to use. On the other hand, between 17% and 27% customers reported that features were difficult to use.

Table 14-26 Ease-of-Use

Feature (Number of Respondents Who Used the Feature)	Very difficult	Somewhat difficult	Neither easy nor difficult	Somewhat easy	Very easy	Have not used this feature
Adjusting the temperature in your home (n = 93)	11%	10%	12%	13%	55%	6%
Setting up or changing the heating or cooling schedule (n = 84)	10%	7%	12%	15%	56%	10%
The thermostat user interface, overall (n = 83)	13%	14%	5%	19%	48%	11%
The mobile app user interface (n = 52)	15%	4%	12%	10%	60%	36%

14.2.3.8 Willingness to Pay and Interest in DR Program

Table 14-27 summarizes the amount of money that customers stated they would be willing to pay for a Nest thermostat. The average price stated, $62,52 (markedly less than full retail price), should be interpreted within the context that the program population was low-income customers.

Table 14-27 Willingness to Pay

Amount	Percent of Respondents (n = 84)
$0	29%
$1 - $25	13%
$26 -$50	15%
$51 -$75	7%
$76- 100	19%
$101-$150	8%
$151-$200	6%
$201+	2%
Average	$62.52

Survey respondents were asked three questions regarding their interest in participating in a direct load control program that would work with their Nest thermostat. The respondents were asked to rate the likelihood of participating in this program if it provided a monthly discount on their bill of $5, $10, and $15. Specifically, respondents were asked:

Entergy is considering offering a program that would provide a rebate for reducing the use of your air conditioner. Under this program, Entergy would communicate with your smart thermostat to turn off your air conditioner for short periods during the hottest summer weekday afternoons. In exchange, you would save [$5/$10/$15] a month off your summer electricity bills.

Using a scale of 0 – 10 where 0 means not at all interested and 10 means very interested, how interested are you in signing up for this program?

Figure 14-16 and Table 14-28 summarize the responses to the questions.

Figure 14-16 Likelihood of Participating in a Direct Load Control Program

The share of respondents who indicated that they would likely participate in the program at varying discount levels is shown below in Table 14-28. The percent of customers increased from 29% for a $5 discount to 55% for a $15 discount.

It should be noted that while these data are likely indicative of the participation level that could be expected under varying incentive levels, some customers that indicated they would be likely to participate would probably not participate when presented with a program offer. Moreover, program attrition or opting out of peak events is likely among customers that do sign-up.

Table 14-28 Likely Participants by Discount Amount

Discount Amount	***Percent of Survey Respondents that Rated Likelihood of Participating as Seven or Higher***
$5 discount (n =100)	29%
$10 discount (n =97)	46%
$15 discount (n =96)	55%

14.2.3.9 Benefits and Satisfaction

Fifty-three percent of customers that received the thermostat reported that their home was “a lot more” or “somewhat more comfortable” since the Nest thermostat was installed. In comparison, 23% said their home was somewhat or a lot less comfortable since the installation.

Table 14-29 Perceived Home Comfort since Nest was Installed

	Response	***Percentage of Respondents (n=103)***
Since the Nest thermostat was installed, do you think the temperature of your home is more or less comfortable than before it was installed?	A lot more comfortable now	25%
	Somewhat more comfortable now	28%
	The level of comfort is about the same	20%
	Somewhat less comfortable now	12%
	A lot less comfortable now	11%
	Don’t know / Moved in after	4%

As shown in Table 14-30, 42% of respondents reported that they had noticed a reduction in energy costs since the thermostat was installed, despite a small rate increase in July. The response to this question is to some degree conflated by the electric rate increase that occurred during the Pilot. The forty-two percent of respondents that noticed a decrease in their energy bills did so while simultaneously having their cost per kWh increased.

Table 14-30 Savings on Energy Costs

	Response	***Percentage of Respondents (n=103)***
Have you noticed any savings in your home energy costs since the thermostat was installed?	Yes	42%
	No	52%
	Not sure	6%

About two-thirds of customers were satisfied with the information provided about the thermostat, the installation of the thermostat, and the Nest thermostat overall (see Figure 14-17). In contrast, about one-fifth of the program participants were very or somewhat dissatisfied with these aspects of the Nest thermostat and its installation.

Figure 14-17 Satisfaction with the Nest Thermostat

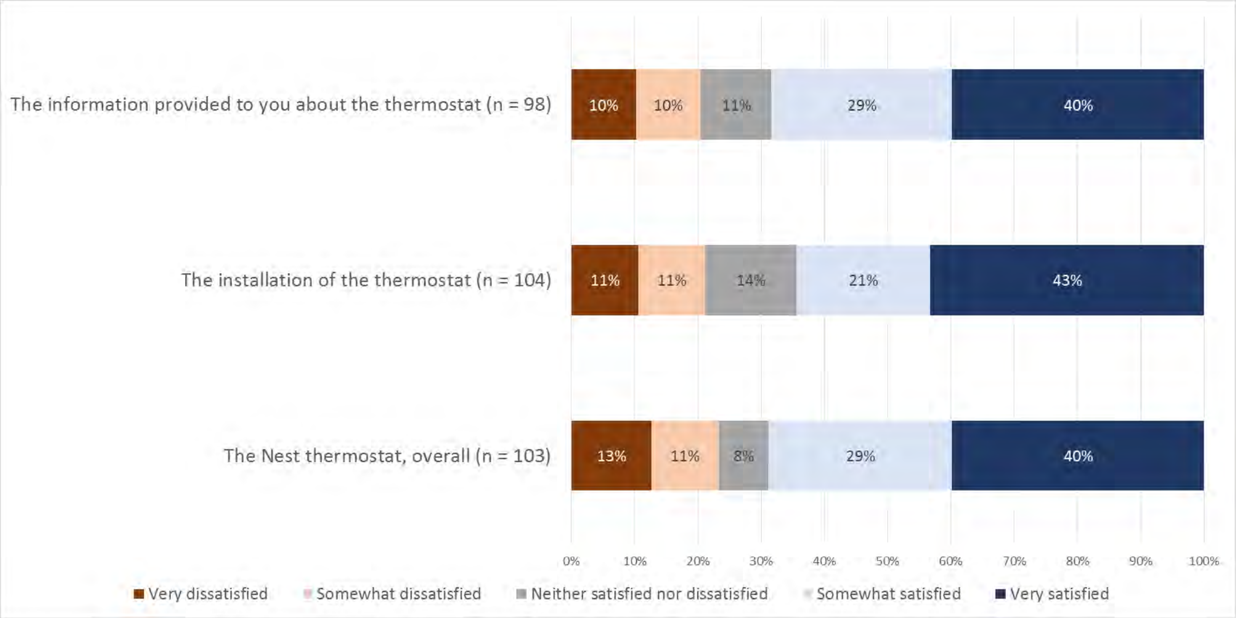


Table 14-31 summarizes the reasons customers gave for their dissatisfaction with the installation of the thermostat. As shown, an increase in the energy bill or that the energy bills were too high were the most commonly given reasons for dissatisfaction.

Table 14-31 Reasons for Dissatisfaction with Installation

Reason for Dissatisfaction with Installation	***Number of Respondents***
Bill has increased[57]	8
Bill is too high	3
Can't control the temperature	2
Preferred old thermostat	2
Home is too warm	1
Wouldn't respond to questions about the thermostat	1
Doesn't work right	1
Didn't have option to not get the thermostat	1

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[57] As noted prior, a rate increase occurred during the Pilot that may have affected this answer.

No information on how to use it	1
Difficult to use	1

Participant satisfaction was cross-analyzed by installation contractor and installation community to identify additional factors that may have impacted customer satisfaction. Although the contractor performed the installation, tenants across communities may have varied experiences with how their particular manager notified/handled the experience.

The share of participants noting installation satisfaction by installation contractor and community is displayed in

Table 14-32. As shown, customers at properties where the installation was performed by the contractor referred to as “Installer 2” were notably more satisfied with the installation, the information provided, and the Nest thermostat than customers at the other communities. Due to limitations of the sample, it is difficult to determine if this difference is a function of the installation contractor or the policies and procedures of the communities where the thermostats were installed. Nevertheless, customers appear to have a varied experience with the installation and the information provided, as well as the thermostat. The referenced contractors are anonymized for this report but the feedback pertaining to specific contractors was provided to program administrators to facilitate re-training of installers with lower satisfaction ratings.

Table 14-32 Percent Satisfied by Installer and Community

Installer	***Community***	***Number of Responses***	***Satisfied with Installation***	***Satisfied with Information Provided***	***Satisfied with Nest Thermostat***
Installer 1	Community 1	36	48%	48%	53%
Installer 1	Community 3	2	100%	100%	100%
Installer 1	Community 6	20	47%	61%	56%
Average for Installer 1		**58**	**50%**	**54%**	**55%**
Installer 2	Community 2	20	70%	78%	84%
Installer 2	Community 5	21	100%	90%	90%
Average for Installer 2		**41**	**85%**	**84%**	**87%**
Installer 3	Community 4	9	50%	63%	63%
Installer 3	Community 7	1	100%	100%	100%
Installer 3	Community 8	1	100%	100%	100%
Average for Installer 3		**11**	**59%**	**69%**	**69%**

Table 14-33 displays satisfaction with the thermostat by whether the customer reported having access to Wi-Fi internet. As shown, satisfaction was statistically significantly higher for customers that reported having Wi-Fi internet. It may be the case that satisfaction is higher for customers with Wi-Fi internet access because this gives them access to more features such as remotely controlling the temperature with the app.[58]

Table 14-33 Satisfaction with Nest Thermostat by Wi-Fi Access

Access to Wi-Fi Internet	***Percent Satisfied with Nest Thermostat***
Yes (n=55)	82%
No (n=39)	47%

* Chi-Square = 10.454, df = 1, p-value = 0.001

14.2.4 Findings

The findings from this pilot are as follows:

- **Finding 1: Statistically valid savings estimates accounted for 2.68% of annual use.** Program participants saved 343 kWh per year on average, accounting for approximately 2.68% of total annual electricity use (with 90% confidence between 249 and 438 kWh annual savings).
- **Finding 2: Statistically significant savings occurred solely among households that did not register their thermostat with Nest.** The thermostat has passive features that function with or without registration. Registration allows thermostat control via mobile app and use of Smart Home Away / Follow-me features. Participants that did not register their thermostat saved 443 kWh (3.60% annual savings) on average.
- **Finding 3: Use of Gen 2 refurbished models resulted in significant program expansion without marring program savings or customer satisfaction.** The Evaluators estimate that the use of refurbished Gen 2 models resulted in 40% more installations in comparison to what would have occurred if new Gen 2 models were used, and 55% more installations compared to new Gen 3 models. The features of the Gen 3 model do not provide additional energy saving features; its improvements are in aesthetic design (with a larger display and slimmer profile).
- **Finding 4: Satisfaction varied by installing contractor.** One of the three registered installing trade allies demonstrated satisfaction rates exceeding 84%, while the other two installing contractors had average satisfaction rates of 61%.

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[58] Survey results indicated that 91% of customers that had used the app were satisfied with the thermostat as opposed to 62% who had not (Chi-Square = 7.120, df = 1, p-value = 0.008).

- **Finding 5: Significant rates of difficulty with the units reported.** Twenty-nine percent of survey respondents reported having difficulties using their thermostat. Respondents reported that they generally did not receive sufficiently clear instructions on the operation of the thermostat from the installer. The program included leave-behind instructional guides, but respondents indicated an interest in a more detailed explanation at the outset.
- **Finding 6: Respondents were more likely to indicate that they noticed improved home comfort rather than energy savings.** Fifty-three percent of respondents noted improved comfort, while 42% noted energy savings.
- **Finding 7: Significant market interest was found in a potential demand response/load management program.** Fifty-five percent of respondents indicated high interest in a demand response program if offered a $15 per month bill deduction, while 46% reported interest in a $10 deduction.

14.2.5 Recommendations

Based on the billing impact analysis and process evaluation data collection, the Evaluators' recommendations are as follows:

- **Consider the risks of implementation, accounting for the impact on energy savings for registered and unregistered systems.** The Evaluators found that registered thermostats resulted in increased energy use, while unregistered thermostats provided energy savings. Although the registered group estimate is not statistically significant, the registered group's increased usage is statistically significantly different from the unregistered group's decreased usage. These findings should be considered when deciding whether to include the program as a measure going forward in low-income multifamily direct install. If the target market remains the same as those in the Pilot, then there should be similar average registration rates (and therefore, average aggregate energy savings). Conversely, program staff may take a more active approach in educating participants on how to ensure that their thermostat results in lower energy use.

The remaining recommendations are relevant should program staff elect to keep the measure as an offering to low-income multifamily customers.

- **Document the type of baseline thermostat unit and for programmable thermostats, whether or not the thermostat was programmed.** This information can be used to estimate program savings because the type of thermostat replaced will affect the savings resulting from the installation of the smart thermostat.
- **Document occurrences and reasons for non-installation.** Collection of this data will allow the program to develop a database that can provide information on

key barriers to installation that may potentially be addressed by the program in the future.

- **Provide an educational tip sheet in addition to the thermostat documentation to maximize energy savings.** These sheets could provide information on how to maximize energy savings through the thermostats, such as temperature settings to use during the learning period and the importance of not disabling features such as Auto-Away. Additionally the hand-out could include other energy saving tips such as closing binds and curtains to prevent solar heating in summer and heat loss in the winter.
- **Bundling the installation of thermostats with other program measures such as HVAC tune-ups or additional low cost direct install measures are cost- and time-efficient ways to increase savings through the program.** Smart thermostats can be used as a high-value entry point to multifamily properties that can provide an opportunity for a deeper retrofit.
- **Future program procedures should include processes for educating customers on key aspects of the thermostat, such as what the learning period is and what customers should expect and do during that period.** Additionally, the program should provide information to tenants to inform them of the installation and what to expect during the installation. Doing so may improve satisfaction with the thermostat and the installation process, as well as reduce disabling of the auto-scheduling feature.
- **Although it would limit the share of the low-income population that can participate in the Nest program, staff should consider limiting participation to customers that have internet access because survey results suggest that customers with Wi-Fi were more satisfied with the thermostat.**
- **Formally integrate this measure as part of the Multifamily Program.** The measure provides cost-effective kWh savings and would be a valuable addition to ENO's new multifamily program.
- **If launching a smart thermostat load control program,**
    - Begin with incentives ranging from $10-$15, to be paid in months where events occurred.
    - Organize a cost-sharing mechanism with the Multifamily program to parse program costs to the two benefit streams. This will allow the kWh savings from the Nest units to be credited to the direct install program while the demand reductions from load control events can be credited to the Direct Load Control program.

- **If measure eligibility is expanded, maintain a strict pre-allowed list.** Given that the cost-risk is entirely on program administrators, the eligibility list should include proven models (such as the EcoBee3 or Honeywell Lyric). These models have been evaluated in other studies and have brand recognition.
- **Track customer satisfaction metrics and trace them to installing contractor.** The Evaluators found a statistically significant difference in satisfaction rates by installing contractor; this should be tracked on an ongoing basis and used to guide contractor retraining until the satisfaction metrics for the lower-performing trade allies are improved.
- **Continue to use refurbished Gen 2 models so long as a reliable supply is available.** The refurbished Gen 2 models have the needed energy-saving features. Higher-cost Gen 3 models largely differ cosmetically and their minor expanded functionality, with esoteric heating system configurations, are not necessary for this program. Another alternative would be to use the lower-cost model Nest E, which includes the same core energy-saving functionality as the higher-cost models.

15.Appendix A: Site Reports

15.1 Small Business Program

Project Number SN7-002

Program Small Business

Project Background

The participant is a retail building that received incentives from Entergy New Orleans for retrofitting existing lighting with energy efficient lighting. On-site, the evaluators verified the participant had installed:

(32) 10W Led - Int. Ballasts Replaced (32) 60W 1-Lamp Halogens;

(8) 9W Led - Int. Ballasts Replaced (8) 40W Incandescent bulbs;

(5) 36W Led - Non-Int. Ballasts Replaced (5) 4' 4-Lamp T8S; and

(1) 9W Led - Int. Ballasts Replaced (1) 100W Incandescent bulbs.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Retail (Other)	ER	4,312	0.87	1.20	0.90

Savings Calculations

Lighting Retrofit kWh Savings Calculations

Measure	**Quantity**	**Wattage**	**Annual Operating**	**Expected kWh**	**Realized kWh**	**IEF_E**	**Realization**

	(Fixtures)				Hours	Savings	Savings		Rate
	Base	Post	Base	Post					
H60 to LEDINT10W	32	32	60	10	4,312	5,106	6,002	0.87	117.6%
I40/ES to LEDINT9W	8	8	29	9	4,312	511	600	0.87	117.5%
F32T8 to LED36W	5	5	112	36	4,312	1,213	1,426	0.87	117.5%
I100/ES to LEDINT9W	1	1	72	9	4,312	201	236	0.87	117.6%
Total						**7,031**	**8,264**		**117.5%**

Lighting Retrofit kW Savings Calculations

Measure	**Quantity (Fixtures)**		**Wattage**		**CF**	**Expected kW Savings**	**Realized kW Savings**	**IEF_D**	**Realization Rate**
	Base	**Post**	**Base**	**Post**					
H60 to LEDINT10W	32	32	60	10	0.90		1.73	1.20	-
I40 to LEDINT9W	8	8	29	9	0.90		0.17	1.20	-
F32T8 to LED36W	5	5	112	36	0.90		0.41	1.20	-
I100 to LEDINT9W	1	1	72	9	0.90		0.07	1.20	-
Total						**2.38**	**2.38**		**100.0%**

Results

The kWh and kW realization rates for project SN7-002 are 117.5% and 100.0% respectively. Ex ante calculations used 3,668 deemed annual operating hours, rather than the 4,312 specified in the New Orleans TRM for this space type.

Verified Gross Savings & Realization Rates

Measure	**Verified**			
	kWh Savings	**kW Savings**	**kWh Realization Rate**	**kW Realization Rate**
H60 to LEDINT10W	6,002	1.73	117.6%	
I40 to LEDINT9W	600	0.17	117.5%	
F32T8 to LED36W	1,426	0.41	117.5%	
I100 to LEDINT9W	236	0.07	117.6%	
Total	**8,264**	**2.38**	**117.5%**	**100.0%**

Project ID SN7-006

Program Small Business

Project Background

This site is a retail building that had replaced five (5) rooftop HVAC units. The savings for this project are 5,803 kWh and 1.11 kW.

Model	*Tonnage*	*Model Number*	*Baseline EER*	*Installed EER*
York	8.5	ZJ102N12D2H5GCB2A1	11.50	12.00
York	3	ZJ037N06DH5BCB2A1	11.18	12.20
York	7.5	ZR090N12D2H5GCB2A1	11.20	11.20
York	5	ZJ061N08D2H5GCB2A1	11.18	12.20
York	4	ZJ049N06B2H5BCB2A1	11.18	12.20

M&V Methodology

The evaluators confirmed installation of all equipment listed in the project application. Savings for the HVAC measures were calculated using methods and inputs described in section C.3.3. Air- and Water-Cooled Chillers of the New Orleans TRM.

Savings Calculations

Using the below TRM equations and the efficiency values from the table above, the evaluators calculated HVAC savings as follows:

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

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

Where:

CAP_c = Rated equipment cooling capacity of the new unit (in BTU)
EER_{base}= Baseline energy efficiency rating of the cooling equipment (EER)
EER_{Eff}= Nameplate energy efficiency rating of the installed cooling equipment (EER)
$SEER_{base}$= Baseline seasonal energy efficiency rating of the cooling equipment (SEER)
$SEER_{Eff}$= Nameplate seasonal energy efficiency rating of the installed cooling equipment (EER)

Note: If unit SEER or EER are not provided then use the following equation to estimate.
EER= -0.02 x SEER^2 + 1.12 x SEER

CF = Coincidence factor

$EFLH_C$ = Equivalent full-load hours for cooling

Results

The kWh realization rate for SN7-006 is 53.76% and the kW realization rate is 24.35%. The evaluators used the methods stated in the TRM and the unit values provided to calculate the energy savings. While ex-ante calculations used were hard-coded in project documents and approach methods not made clear, the Evaluators found several discrepancies in the materials provided:

- Baseline and installed EER values in the hardcoded savings do not match the values provided or the unit cutsheets. One unit had a verified base SEER equal to that of the efficient model, thus no savings could be attributed to it.
- Ex-ante EFLH was calculated using weather data and assumes the system is on 24/7 whenever the outdoor air temperature is greater than 49 degrees, resulting in $EFLH_c$ of 7,792. This is a low outdoor air temperature to switch from heating to cooling and the facility is not open 24/7. The evaluator used deemed EFLH for retail buildings, 3,191.
- The ex ante saving calculator included additional savings for VFD units were not installed, or part of the project.

Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
HVAC Replacement	5,803	1.11	53.76%	24.35%
Total	**5,803**	**1.11**	**53.76%**	**24.35%**

Project Number SN7-003

Program Small Business

Project Background

The participant is a pharmacy and convenience store that received incentives from Entergy New Orleans for implementing energy efficient lighting. On-site, the evaluators verified the participant had installed:

(226) 18W Led - Int. Ballasts Replaced (226) 4' 1-Lamp T8 HLOs.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Retail: Excluding Malls & Strip Centers	Electric	4,312	0.87	1.20	0.9
Retail: Excluding Malls & Strip Centers	Electric	8,760	0.87	1.20	1.0

Savings Calculations

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 LEDINT18W	113	113	31	18	4,312	14,027	5,511	0.87	39.3%

F32T8 to LEDINT18W	7	7	31	18	4,312	869	341	0.87	39.3%
F32T8 to LEDINT18W	32	32	31	18	4,312	3,972	1,561	0.87	39.3%
F32T8 to LEDINT18W	23	23	31	18	8,760	2,855	2,279	0.87	79.8%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	1	1	31	18	8,760	124	99	0.87	79.9%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	4	4	31	18	8,760	497	396	0.87	79.7%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	4	4	31	18	8,760	497	396	0.87	79.7%
F32T8 to LEDINT18W	12	12	31	18	8,760	1,490	1,189	0.87	79.8%
F32T8 to LEDINT18W	1	1	31	18	8,760	124	99	0.87	79.9%
F32T8 to LEDINT18W	3	3	31	18	8,760	372	297	0.87	79.9%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	5	5	31	18	8,760	621	495	0.87	79.8%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	2	2	31	18	8,760	248	198	0.87	79.9%
F32T8 to LEDINT18W	3	3	31	18	8,760	372	297	0.87	79.9%
					Total	**28,053**	**14,744**		**52.6%**

Lighting Retrofit kW Savings Calculations

Measure	**Quantity (Fixtures)**		**Wattage**		**CF**	**Expected kW Savings**	**Realized kW Savings**	**IEF$_D$**	**Realization Rate**
	Base	**Post**	**Base**	**Post**					

F32T8 to LEDINT18W	113	113	31	18	0.90	-	1.59	1.20	-
F32T8 to LEDINT18W	7	7	31	18	0.90	-	0.10	1.20	-
F32T8 to LEDINT18W	32	32	31	18	0.90	-	0.45	1.20	-
F32T8 to LEDINT18W	23	23	31	18	1.00	-	0.36	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	1	1	31	18	1.00	-	0.02	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	4	4	31	18	1.00	-	0.06	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	4	4	31	18	1.00	-	0.06	1.20	-
F32T8 to LEDINT18W	12	12	31	18	1.00	-	0.19	1.20	-
F32T8 to LEDINT18W	1	1	31	18	1.00	-	0.02	1.20	-
F32T8 to LEDINT18W	3	3	31	18	1.00	-	0.05	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	5	5	31	18	1.00	-	0.08	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	2	2	31	18	1.00	-	0.03	1.20	-
F32T8 to LEDINT18W	3	3	31	18	1.00	-	0.05	1.20	-
					Total	**2.43**	**3.30**		**135.8%**

Results

The kWh and kW realization rates for project SN7-003 are 52.6% and 135.2%, respectively. Ex ante calculations assumed gas heating with and interactive factor of 1.20, however on site the Evaluators found the site was heated via electrical resistance and applied and factor of 0.87 to ex ante calculations, lowering the kWh realization rate. The rate was further brought down when Evaluators found that some areas of the site did not use continuous lighting (8,760). Verified lighting operation in these areas was that of a conventional retail store, thus 4,312 AOH operating hours and a peak CF of 0.90 were used in ex ante calculations, further reducing the kWh realization rate and lowering the kW realization rate. Ex ante calculators did not show methods for calculating kW, thus it is not possible to comment further on the difference in kW realization.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LEDINT18W	5,511	1.59	39.3%	-
F32T8 to LEDINT18W	341	0.10	39.3%	-
F32T8 to LEDINT18W	1,561	0.45	39.3%	-
F32T8 to LEDINT18W	2,279	0.36	79.8%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	99	0.02	79.9%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	396	0.06	79.7%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	396	0.06	79.7%	-

F32T8 to LEDINT18W	1,189	0.19	79.8%	-
F32T8 to LEDINT18W	99	0.02	79.9%	-
F32T8 to LEDINT18W	297	0.05	79.9%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	495	0.08	79.8%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	198	0.03	79.9%	-
F32T8 to LEDINT18W	297	0.05	79.9%	-
Total	**14,744**	**3.30**	**52.6%**	**135.8%**

Project Number SN7-008

Program Small Business

Project Background

The participant is a pharmacy and convenience store that received incentives from Entergy New Orleans for implementing energy efficient lighting. On-site, the evaluators verified the participant had installed:

(36) 18W LED - Int. Ballasts Replaced (36) 4' 1-Lamp T8 HLOs; and

(155) 18W LED - Int. Ballasts Replaced (155) 4' 2-Lamp T8 28Ws.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations this report. Savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Retail: Excluding Malls & Strip Centers	Electric	5,110[59]	0.87	1.20	0.69[1]

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[59] Lighting hours based upon custom calculations in project application, verified during on-site visit.

Savings Calculations

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 LEDINT18W	10	10	49	18	5,110	1,727	1,378	0.87	79.8%
F32T8-28W to LEDINT18W	66	66	49	18	5,110	11,396	9,096	0.87	79.8%
F32T8-28W to LEDINT18W	4	4	49	18	5,110	691	551	0.87	79.8%
F32T8-28W to LEDINT18W	7	7	49	18	5,110	1,209	965	0.87	79.8%
F32T8 to LEDINT18W	5	5	31	18	5,110	362	289	0.87	79.8%
F32T8 to LEDINT18W	31	31	31	18	5,110	2,245	1,792	0.87	79.8%
F32T8-28W to LEDINT18W	6	6	49	18	5,110	1,036	827	0.87	79.8%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	4	4	49	18	5,110	691	551	0.87	79.8%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	4	4	49	18	5,110	691	551	0.87	79.8%
F32T8-28W to LEDINT18W	2	2	49	18	5,110	345	276	0.87	79.9%
F32T8-28W to LEDINT18W	23	23	49	18	5,110	3,971	3,170	0.87	79.8%
F32T8-28W to LEDINT18W	2	2	49	18	5,110	345	276	0.87	79.9%
F32T8-28W to LEDINT18W	2	2	49	18	5,110	345	276	0.87	79.9%
F32T8-28W to LEDINT18W	14	14	49	18	5,110	2,417	1,929	0.87	79.8%
F32T8-28W to LEDINT18W	2	2	49	18	5,110	345	276	0.87	79.9%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%

F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
					Total	**29,373**	**23,442**		**79.8%**

Lighting Retrofit kW Savings Calculations

Measure	**Quantity (Fixtures)**		**Wattage**		**CF**	**Expected kW Savings**	**Realized kW Savings**	**IEF$_D$**	**Realization Rate**
	Base	**Post**	**Base**	**Post**					
F32T8-28W to LEDINT18W	10	10	49	18	0.69	0.26	0.26	1.20	100.0%
F32T8-28W to LEDINT18W	66	66	49	18	0.69	1.69	1.69	1.20	100.0%
F32T8-28W to LEDINT18W	4	4	49	18	0.69	0.10	0.10	1.20	100.0%
F32T8-28W to LEDINT18W	7	7	49	18	0.69	0.18	0.18	1.20	100.0%
F32T8 to LEDINT18W	5	5	31	18	0.69	0.05	0.05	1.20	100.0%
F32T8 to LEDINT18W	31	31	31	18	0.69	0.33	0.33	1.20	100.0%
F32T8-28W to LEDINT18W	6	6	49	18	0.69	0.15	0.15	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	4	4	49	18	0.69	0.10	0.10	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	4	4	49	18	0.69	0.10	0.10	1.20	100.0%
F32T8-28W to LEDINT18W	2	2	49	18	0.69	0.05	0.05	1.20	100.0%
F32T8-28W to LEDINT18W	23	23	49	18	0.69	0.59	0.59	1.20	100.0%
F32T8-28W to LEDINT18W	2	2	49	18	0.69	0.05	0.05	1.20	100.0%

F32T8-28W to LEDINT18W	2	2	49	18	0.69	0.05	0.05	1.20	100.0%
F32T8-28W to LEDINT18W	14	14	49	18	0.69	0.36	0.36	1.20	100.0%
F32T8-28W to LEDINT18W	2	2	49	18	0.69	0.05	0.05	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
					Total	**4.37**	**4.37**		**100.0%**

Results

The kWh realization rate for project SN7-008 is 79.8% and the kW realization rate is 100.0%. Ex ante calculations assumed gas heating with and interactive factor of 1.20, however on site the Evaluators found the site was heated via electrical resistance and applied and factor of 0.87 to ex ante calculations, lowering the kWh realization rate.

Verified Gross Savings & Realization Rates

Measure	**Verified**			
	kWh Savings	**kW Savings**	**kWh Realization Rate**	**kW Realization Rate**
F32T8-28W to LEDINT18W	1,378	0.26	79.8%	100.0%
F32T8-28W to LEDINT18W	9,096	1.69	79.8%	100.0%
F32T8-28W to LEDINT18W	551	0.10	79.8%	100.0%
F32T8-28W to LEDINT18W	965	0.18	79.8%	100.0%
F32T8 to LEDINT18W	289	0.05	79.8%	100.0%
F32T8 to LEDINT18W	1,792	0.33	79.8%	100.0%
F32T8-28W to LEDINT18W	827	0.15	79.8%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%

F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	551	0.10	79.8%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	551	0.10	79.8%	100.0%
F32T8-28W to LEDINT18W	276	0.05	79.9%	100.0%
F32T8-28W to LEDINT18W	3,170	0.59	79.8%	100.0%
F32T8-28W to LEDINT18W	276	0.05	79.9%	100.0%
F32T8-28W to LEDINT18W	276	0.05	79.9%	100.0%
F32T8-28W to LEDINT18W	1,929	0.36	79.8%	100.0%
F32T8-28W to LEDINT18W	276	0.05	79.9%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
Total	**23,442**	**4.37**	**79.8%**	**100.0%**

Project Number SN7-001

Program Small Business

Project Background

The participant is a convenience store that received incentives from Entergy New Orleans for implementing energy efficient lighting indoors and outdoors. On-site, the evaluators verified the participant had installed:

(16) 130W Led - Non-Int. Ballasts Replaced (11) 320W Metal Halides;

(1) 100W Led - Non-Int. Ballasts Replaced (1) 250W Metal Halides;

(5) 135W Led - Non-Int. Ballasts Replaced (5) 400W Metal Halides;

(4) 150W Led - Non-Int. Ballasts Replaced (4) 400W Metal Halides;

(6) 15W Led - Int. Ballasts Replaced (6) 23W CFLs;

(23) 36W Led - Non-Int. Ballasts Replaced (24) 4' 4-Lamp T8S;

(5) 36W Led - Non-Int. Ballasts Replaced (5) 4' 2-Lamp T8S;

(11) 30W Led - Non-Int. Ballasts Replaced (11) 4' 2-Lamp T8 30W HLOs;

(1) 9W Led - Int. Ballasts Replaced (1) 100W Incandescent fixtures; and

(4) 15W Led - Int. Ballasts Replaced (4) 90W 1-Lamp Halogens.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	IEF_E	IEF_D	***CF***
Outdoor	(none)	4,319	1.00	1.00	0.0
Non-24 hr Grocery	Gas	4,706	0.87	1.20	0.95

Non-24 hr Grocery	(none)	4,706	1.25	1.25	0.95

Savings Calculations

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					
MH320 to LED130W	16	11	362	130	4,319	17,431	18,839	1.00	108.1%
MH250 to LED100W	1	1	288	100	4,319	751	812	1.00	108.1%
MH400 to LED135W	3	3	453	135	4,319	3,812	4,120	1.00	108.1%
MH400 to LED135W	2	2	453	135	4,319	2,541	2,747	1.00	108.1%
MH400 to LED150W	4	4	453	150	4,319	4,843	5,235	1.00	108.1%
CF23W to LEDINT15W	6	6	23	15	4,319	192	207	1.00	108.0%
F32T8 to LED36W	16	16	112	36	4,706	4,979	6,238	1.09	125.3%
F32T8 to LED36W	3	3	58	36	4,706	270	339	1.09	125.4%
F32T8 to LED36W	2	3	112	36	4,706	475	595	1.09	125.3%
F32T8 to LED36W	2	2	58	36	4,706	180	226	1.09	125.4%
F32T8 to LED36W	3	3	112	36	4,706	933	1,170	1.09	125.4%
F32T8-30W to LED30W	11	11	70	30	4,706	2,588	2,588	1.25	100.0%
F32T8 to LED36W	2	2	112	36	4,706	622	780	1.09	125.4%
I100/ES to LEDINT9W	1	1	72	9	4,706	371	371	1.25	99.9%
H90 to LEDINT15W	4	4	90	15	4,319	1,199	1,296	1.00	108.1%
					Total	**41,187**	**45,561**		**110.6%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity	Wattage	CF	Expected kW	Realized kW	IEF$_D$	Realization

	(Fixtures)					Savings	Savings		Rate
	Base	Post	Base	Post					
MH320 to LED130W	16	11	362	130	0.00		0.00	1.00	-
MH250 to LED100W	1	1	288	100	0.00		0.00	1.00	-
MH400 to LED135W	3	3	453	135	0.00		0.00	1.00	-
MH400 to LED135W	2	2	453	135	0.00		0.00	1.00	-
MH400 to LED150W	4	4	453	150	0.00		0.00	1.00	-
CF23W to LEDINT15W	6	6	23	15	0.00		0.00	1.00	-
F32T8 to LED36W	16	16	112	36	0.95		1.39	1.20	-
F32T8 to LED36W	3	3	58	36	0.95		0.08	1.20	-
F32T8 to LED36W	2	3	112	36	0.95		0.13	1.20	-
F32T8 to LED36W	2	2	58	36	0.95		0.05	1.20	-
F32T8 to LED36W	3	3	112	36	0.95		0.26	1.20	-
F32T8-30W to LED30W	11	11	70	30	0.95		0.52	1.25	-
F32T8 to LED36W	2	2	112	36	0.95		0.17	1.20	-
I100 to LEDINT9W	1	1	72	9	0.95		0.07	1.25	-
H90 to LEDINT15W	4	4	90	15	0.00		0.00	1.00	-
					Total	**4.68**	**2.67**		**57.1%**

Results

The kWh realization rate for project SN7-001 is 110.6% and the kW realization rate is 57.1%. Ex ante calculations assumed electric resistance heating with and interactive factor of 0.87 in certain areas of the facility, however on site the Evaluators found the site was heated via gas and applied and factor of 1.20 to ex ante calculations, raising the kWh realization rate.

Verified Gross Savings & Realization Rates

Measure	Verified

	kWh Savings	**kW Savings**	**kWh Realization Rate**	**kW Realization Rate**
MH320 to LED130W	18,839	0.00	108.1%	-
MH250 to LED100W	812	0.00	108.1%	-
MH400 to LED135W	4,120	0.00	108.1%	-
MH400 to LED135W	2,747	0.00	108.1%	-
MH400 to LED150W	5,235	0.00	108.1%	-
CF23W to LEDINT15W	207	0.00	108.0%	-
F32T8 to LED36W	6,238	1.39	125.3%	-
F32T8 to LED36W	339	0.08	125.4%	-
F32T8 to LED36W	595	0.13	125.3%	-
F32T8 to LED36W	226	0.05	125.4%	-
F32T8 to LED36W	1,170	0.26	125.4%	-
F32T8-30W to LED30W	2,588	0.52	100.0%	-
F32T8 to LED36W	780	0.17	125.4%	-
I100/ES to LEDINT9W	371	0.07	99.9%	-
H90 to LEDINT15W	1,296	0.00	108.1%	-
Total	**45,561**	**2.67**	**110.6%**	**57.2%**

Project Number SN7-007

Program Small Business

Project Background

The participant is a pharmacy and convenience store that received incentives from Entergy New Orleans for implementing energy efficient lighting indoors. On-site, the evaluators verified the participant had installed:

(81) 18W Led - Int. Ballasts Replaced (81) 4' 2-Lamp T8 28Ws;

(100) 18W Led - Int. Ballasts Replaced (100) 4' 4-Lamp T8S;

(13) 18W Led - Int. Ballasts Replaced (13) 4' 1-Lamp T8 HLOs; and

(6) 25W Led - Int. Ballasts Replaced (6) 4' 1-Lamp T8S.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Retail: Excluding Malls & Strip Centers	Electric	5,110[60]	0.87	1.20	0.69[1]
Retail: Excluding Malls & Strip Centers	(none)	5,110[1]	1.25	1.25	0.69[1]

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[60] Lighting hours based upon custom calculations in project application, verified during on-site visit.

Savings Calculations

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 LEDINT18W	24	24	49	18	5,110	4,144	3,307	0.87	79.8%
F32T8-28W to LEDINT18W	5	5	49	18	5,110	863	689	0.87	79.8%
F32T8 to LEDINT18W	98	98	115	18	5,110	52,946	42,259	0.87	79.8%
F32T8-28W to LEDINT18W	9	9	49	18	5,110	1,554	1,240	0.87	79.8%
F32T8-28W to LEDINT18W	9	9	49	18	5,110	1,554	1,240	0.87	79.8%
F32T8-28W to LEDINT18W	17	17	49	18	5,110	2,935	2,343	0.87	79.8%
F32T8 to LEDINT18W	13	13	31	18	5,110	941	751	0.87	79.8%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	3	3	49	18	5,110	518	413	0.87	79.8%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%
F32T8-28W to LEDINT18W	2	2	49	18	5,110	345	276	0.87	79.9%
F32T8 to LEDINT18W	1	1	115	18	5,110	540	431	0.87	79.9%
F32T8-28W to LEDINT18W	9	9	49	18	5,110	1,554	1,240	0.87	79.8%
F32T8-28W to LEDINT18W	1	1	49	18	5,110	173	138	0.87	79.7%

F32T8 to LEDINT18W	1	1	115	18	5,110	540	431	0.87	79.9%
F32T8 to LEDINT25W	1	1	31	25	5,110	38	38	1.25	100.9%
F32T8 to LEDINT25W	1	1	31	25	5,110	38	38	1.25	100.9%
F32T8 to LEDINT25W	1	1	31	25	5,110	38	38	1.25	100.9%
F32T8 to LEDINT25W	1	1	31	25	5,110	38	38	1.25	100.9%
F32T8 to LEDINT25W	1	1	31	25	5,110	38	38	1.25	100.9%
F32T8 to LEDINT25W	1	1	31	25	5,110	38	38	1.25	100.9%
					Total	**69,181**	**55,266**		**79.9%**

Lighting Retrofit kW Savings Calculations

Measure	**Quantity (Fixtures)**		**Wattage**		**CF**	**Expected kW Savings**	**Realized kW Savings**	**IEFD**	**Realization Rate**
	Base	**Post**	**Base**	**Post**					
F32T8-28W to LEDINT18W	24	24	49	18	0.69	0.62	0.62	1.20	100.0%
F32T8-28W to LEDINT18W	5	5	49	18	0.69	0.13	0.13	1.20	100.0%
F32T8 to LEDINT18W	98	98	115	18	0.69	7.87	7.87	1.20	100.0%
F32T8-28W to LEDINT18W	9	9	49	18	0.69	0.23	0.23	1.20	100.0%
F32T8-28W to LEDINT18W	9	9	49	18	0.69	0.23	0.23	1.20	100.0%
F32T8-28W to LEDINT18W	17	17	49	18	0.69	0.44	0.44	1.20	100.0%
F32T8 to LEDINT18W	13	13	31	18	0.69	0.14	0.14	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	3	3	49	18	0.69	0.08	0.08	1.20	100.0%
F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8-28W to LEDINT18W	2	2	49	18	0.69	0.05	0.05	1.20	100.0%
F32T8 to LEDINT18W	1	1	115	18	0.69	0.08	0.08	1.20	100.0%
F32T8-28W to LEDINT18W	9	9	49	18	0.69	0.23	0.23	1.20	100.0%

F32T8-28W to LEDINT18W	1	1	49	18	0.69	0.03	0.03	1.20	100.0%
F32T8 to LEDINT18W	1	1	115	18	0.69	0.08	0.08	1.20	100.0%
F32T8 to LEDINT25W	1	1	31	25	0.69	0.01	0.01	1.25	100.0%
F32T8 to LEDINT25W	1	1	31	25	0.69	0.01	0.01	1.25	100.0%
F32T8 to LEDINT25W	1	1	31	25	0.69	0.01	0.01	1.25	100.0%
F32T8 to LEDINT25W	1	1	31	25	0.69	0.01	0.01	1.25	100.0%
F32T8 to LEDINT25W	1	1	31	25	0.69	0.01	0.01	1.25	100.0%
F32T8 to LEDINT25W	1	1	31	25	0.69	0.01	0.01	1.25	100.0%
					Total	**10.28**	**10.28**		**100.0%**

Results

The kWh realization rate for project SN7-007 is 79.9% and the kW realization rate is 100.0%. Ex ante calculations assumed gas heating with and interactive factor of 1.20, however on site the Evaluators found the site was heated via electrical resistance and applied and factor of 0.87 to ex ante calculations, lowering the kWh realization rate. This factor has also been applied to medium temperature refrigerated spaces, which the Evaluators corrected to 1.25.

Verified Gross Savings & Realization Rates

Measure	**Verified**			
	kWh Savings	**kW Savings**	**kWh Realization Rate**	**kW Realization Rate**
F32T8-28W to LEDINT18W	3,307	0.62	79.8%	100.0%
F32T8-28W to LEDINT18W	689	0.13	79.8%	100.0%
F32T8 to LEDINT18W	42,259	7.87	79.8%	100.0%
F32T8-28W to LEDINT18W	1,240	0.23	79.8%	100.0%
F32T8-28W to LEDINT18W	1,240	0.23	79.8%	100.0%
F32T8-28W to LEDINT18W	2,343	0.44	79.8%	100.0%

F32T8 to LEDINT18W	751	0.14	79.8%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	413	0.08	79.8%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8-28W to LEDINT18W	276	0.05	79.9%	100.0%
F32T8 to LEDINT18W	431	0.08	79.9%	100.0%
F32T8-28W to LEDINT18W	1,240	0.23	79.8%	100.0%
F32T8-28W to LEDINT18W	138	0.03	79.7%	100.0%
F32T8 to LEDINT18W	431	0.08	79.9%	100.0%
F32T8 to LEDINT25W	38	0.01	100.9%	100.0%
F32T8 to LEDINT25W	38	0.01	100.9%	100.0%
F32T8 to LEDINT25W	38	0.01	100.9%	100.0%
F32T8 to LEDINT25W	38	0.01	100.9%	100.0%
F32T8 to LEDINT25W	38	0.01	100.9%	100.0%
F32T8 to LEDINT25W	38	0.01	100.9%	100.0%
Total	**55,266**	**10.28**	**79.9%**	**100.0%**

Project Number SN7-001

Program Small Business

Project Background

The participant is a grocery store that received incentives from Entergy New Orleans for implementing energy efficient lighting in the parking lot. On-site, the evaluators verified the participant had installed:

(35) 300W LED fixtures replaced (35) 1000W Metal Halides;

(2) 200W LED fixtures replaced (2) 1000W Metal Halides;

(4) 300W LED fixtures replaced (4) 400W Metal Halides; and

(3) 90W LED fixtures replaced (3) 400W Metal Halides.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Outdoor	None	4,319	1.00	1.00	0.0

Savings Calculations

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 LED300W	29	29	1,078	300	4,319	90,158	97,445	1.00	108.1%

MH1000 to LED200W	2	2	1,078	200	4,319	7,017	7,584	1.00	108.1%
MH1000 to LED300W	6	6	1,078	300	4,319	18,653	20,161	1.00	108.1%
MH400 to LED300W	4	4	453	300	4,319	2,446	2,643	1.00	108.1%
MH400 to LED90W	3	3	453	90	4,319	4,352	4,703	1.00	108.1%
					Total	**122,626**	**132,537**		**108.1%**

Lighting Retrofit kW Savings Calculations

Measure	**Quantity (Fixtures)**		**Wattage**		**CF**	**Expected kW Savings**	**Realized kW Savings**	**IEF$_D$**	**Realization Rate**
	Base	**Post**	**Base**	**Post**					
MH1000 to LED300W	29	29	1,078	300	0.00	-	0.00	1.00	-
MH1000 to LED200W	2	2	1,078	200	0.00	-	0.00	1.00	-
MH1000 to LED300W	6	6	1,078	300	0.00	-	0.00	1.00	-
MH400 to LED300W	4	4	453	300	0.00	-	0.00	1.00	-
MH400 to LED90W	3	3	453	90	0.00	-	0.00	1.00	-
					Total	**7.98**	**0.00**		**0.0%**

Results

The kWh and kW realization rates for project SA7-001 are 108.1% and 0.0% respectively. Ex ante calculations used 3,996 deemed annual operating hours, rather than the 4,319 specified in the New Orleans TRM for exterior lighting.

Verified Gross Savings & Realization Rates

Measure	**Verified**			
	kWh Savings	**kW Savings**	**kWh Realization Rate**	**kW Realization Rate**
MH1000 to LED300W	97,445	0.00	108.1%	-
MH1000 to LED200W	7,584	0.00	108.1%	-
MH1000 to LED300W	20,161	0.00	108.1%	-
MH400 to LED300W	2,643	0.00	108.1%	-
MH400 to LED90W	4,703	0.00	108.1%	-
Total	**132,537**	**0.00**	**108.1%**	**0.0%**

Project Number	SN7-014
Program	Small Business

Project Background

The participant is a convenience store that received incentives from Entergy New Orleans for implementing energy efficient lighting indoors and outdoors. On-site, the evaluators verified the participant had installed:

(56) 114W Led - Non-Int. Ballasts Replaced (40) 320W Metal Halides;

(1) 150W Led - Non-Int. Ballasts Replaced (1) 250W Metal Halides;

(1) 45W Led - Non-Int. Ballasts Replaced (1) 4' 2-Lamp T12s;

(18) 61W Led - Non-Int. Ballasts Replaced (18) 320W Metal Halides;

(2) 36W Led - Non-Int. Ballasts Replaced (2) 4' 2-Lamp T12s;

(2) 50W Led - Non-Int. Ballasts Replaced (1) 4' 2-Lamp T12s;

(29) 2W Led - Non-Int. Ballasts Replaced (1) 8' 2-Lamp T12s;

(7) 9W Led - Int. Ballasts Replaced (7) 23W CFLs;

(3) 135W Led - Non-Int. Ballasts Replaced (3) 400W Metal Halides;

(3) 40W Led - Non-Int. Ballasts Replaced (3) 4' 4-Lamp T8s;

(30) 54W Led - Non-Int. Ballasts Replaced (30) 4' 4-Lamp T8s;

(4) 9W Led - Int. Ballasts Replaced (4) 60W Incandescent fixtures;

(9) 9W Led - Int. Ballasts Replaced (9) 26W CFLs;

(8) 150W Led - Non-Int. Ballasts Replaced (8) 1000W Metal Halides; and

(22) 50W Led - Non-Int. Ballasts Replaced (22) 4' 4-Lamp T8s.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Outdoor	(none)	4,319	1.00	1.00	0.00
24 hr Grocery	ER	6,900	0.87	1.20	0.95
24 hr Grocery	(none)	6,900	1.25	1.25	0.95
24 hr Grocery	(none)	6,900	1.30	1.30	0.95

Savings Calculations

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**					
MH320 to LED114W	56	40	362	114	4,319	62,785	67,860	1.00	108.1%
MH1000 to LED150W	7	7	1,078	150	4,319	25,958	28,056	1.00	108.1%
MH320 to LED61W	18	18	362	61	4,319	21,650	23,400	1.00	108.1%
F32T8 to LED54W	30	30	112	54	6,900	10,445	10,445	0.87	100.0%
F96T12 to LED2W	29	1	110	2	6,900	19,138	19,138	0.87	100.0%
F32T8 to LED50W	12	12	112	50	6,900	4,466	4,466	0.87	100.0%
F40T12/ES to LED50W	2	1	72	50	6,900	396	564	0.87	142.4%
I60/ES to LEDINT9W	2	2	43	9	6,900	408	408	0.87	100.0%
MH1000 to LED150W	1	1	1,078	150	4,319	3,708	4,008	1.00	108.1%
MH250 to LED150W	1	1	288	150	4,319	551	596	1.00	108.1%
MH400 to LED135W	3	3	453	135	4,319	3,812	4,120	1.00	108.1%
F40T12/ES to LED36W	2	2	72	36	6,900	264	432	0.87	163.6%
I60/ES to LEDINT9W	2	2	43	9	6,900	408	408	0.87	100.0%

CF23W to LEDINT9W	7	7	23	9	6,900	588	588	0.87	100.0%
F32T8 to LED50W	5	5	112	50	6,900	1,861	1,861	0.87	100.0%
CF26W to LEDINT9W	6	6	26	9	6,900	880	880	1.25	100.0%
F32T8 to LED40W	3	3	112	40	6,900	1,297	1,297	0.87	100.0%
F32T8 to LED50W	1	1	112	50	6,900	372	372	0.87	100.0%
F32T8 to LED50W	2	2	112	50	6,900	744	744	0.87	100.0%
F32T8 to LED50W	2	2	112	50	6,900	744	744	0.87	100.0%
F40T12/ES to LED45W	1	1	72	45	6,900	78	162	0.87	207.7%
CF26W to LEDINT9W	3	3	26	9	6,900	457	457	1.30	100.0%
					Total	**161,013**	**171,009**		**106.2%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF$_D$	Realization Rate
	Base	Post	Base	Post					
MH320 to LED114W	56	40	362	114	-	-	0.00	1.00	-
MH1000 to LED150W	7	7	1,078	150	-	-	0.00	1.00	-
MH320 to LED61W	18	18	362	61	-	-	0.00	1.00	-
F32T8 to LED54W	30	30	112	54	0.95	-	1.98	1.20	-
F96T12 to LED2W	29	1	110	2	0.95	-	3.63	1.20	-
F32T8 to LED50W	12	12	112	50	0.95	-	0.85	1.20	-
F40T12/ES to LED50W	2	1	72	50	0.95	-	0.11	1.20	-
I60/ES to LEDINT9W	2	2	43	9	0.95	-	0.08	1.20	-
MH1000 to LED150W	1	1	1,078	150	-	-	0.00	1.00	-
MH250 to LED150W	1	1	288	150	-	-	0.00	1.00	-
MH400 to LED135W	3	3	453	135	-	-	0.00	1.00	-

F40T12/ES to LED36W	2	2	72	36	0.95	-	0.08	1.20	-
I60/ES to LEDINT9W	2	2	43	9	0.95	-	0.08	1.20	-
CF23W to LEDINT9W	7	7	23	9	0.95	-	0.11	1.20	-
F32T8 to LED50W	5	5	112	50	0.95	-	0.35	1.20	-
CF26W to LEDINT9W	6	6	26	9	0.95	-	0.12	1.25	-
F32T8 to LED40W	3	3	112	40	0.95	-	0.25	1.20	-
F32T8 to LED50W	1	1	112	50	0.95	-	0.07	1.20	-
F32T8 to LED50W	2	2	112	50	0.95	-	0.14	1.20	-
F32T8 to LED50W	2	2	112	50	0.95	-	0.14	1.20	-
F40T12/ES to LED45W	1	1	72	45	0.95	-	0.03	1.20	-
CF26W to LEDINT9W	3	3	26	9	0.95	-	0.06	1.30	-
					Total	**15.72**	**8.08**		**51.4%**

Results

The kWh realization rate for project SN7-014 is 106.2% and the kW realization rate is 51.4%. Ex ante calculations used 3,996 deemed annual operating hours, rather than the 4,319 specified in the New Orleans TRM for exterior lighting.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH320 to LED114W	67,860	0.00	108.1%	-
MH1000 to LED150W	28,056	0.00	108.1%	-
MH320 to LED61W	23,400	0.00	108.1%	-
F32T8 to LED54W	10,445	1.98	100.0%	-
F96T12 to LED2W	19,138	3.63	100.0%	-

F32T8 to LED50W	4,466	0.85	100.0%	-
F40T12/ES to LED50W	564	0.11	142.4%	-
I60/ES to LEDINT9W	408	0.08	100.0%	-
MH1000 to LED150W	4,008	0.00	108.1%	-
MH250 to LED150W	596	0.00	108.1%	-
MH400 to LED135W	4,120	0.00	108.1%	-
F40T12/ES to LED36W	432	0.08	163.6%	-
I60/ES to LEDINT9W	408	0.08	100.0%	-
CF23W to LEDINT9W	588	0.11	100.0%	-
F32T8 to LED50W	1,861	0.35	100.0%	-
CF26W to LEDINT9W	880	0.12	100.0%	-
F32T8 to LED40W	1,297	0.25	100.0%	-
F32T8 to LED50W	372	0.07	100.0%	-
F32T8 to LED50W	744	0.14	100.0%	-
F32T8 to LED50W	744	0.14	100.0%	-
F40T12/ES to LED45W	162	0.03	207.7%	-
CF26W to LEDINT9W	457	0.06	100.0%	-
Total	**171,009**	**8.08**	**106.2%**	**51.4%**

Project Number SN7-044

Program Small Business

Project Background

The participant is a warehouse that received incentives from Entergy New Orleans for implementing energy efficient lighting indoors. On-site, the evaluators verified the participant had installed:

(116) 115W LED fixtures replaced (116) 400W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Warehouse: Non-Refrigerated	None	8,760	1.00	1.00	1.00

Savings Calculations

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**					
MH400 to LED115W	116	116	453	115	8,760	343,462	343,462	1.00	100.0%
					Total	**343,462**	**343,462**		**100.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF$_D$	Realization Rate
	Base	Post	Base	Post					
MH400 to LED115W	116	116	453	115	1.00	30.19	39.21	1.00	129.9%
					Total	**30.19**	**39.21**		**129.9%**

Results

The kWh realization rate for project SN7-044 is 100% and the kWh realization rate is 129.9%. The ex ante calculations used a coincidence factor of 0.77 to reflect the warehouse space type; because this site operates 8,760 hours annually, ex post calculations used a coincidence factor of 1.00, resulting a higher peak demand savings.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH400 to LED115W	343,462	39.21	100.0%	129.9%
Total	**343,462**	**39.21**	**100.0%**	**129.9%**

Project Number SN7-046

Program Small Business

Project Background

The participant is a warehouse that received incentives from Entergy New Orleans for implementing energy efficient lighting indoors and outdoors. On-site, the evaluators verified the participant had installed:

(112) 115W LED fixtures replaced (112) 400W Metal Halides; and

(8) 115W LED fixtures replaced (8) 400W HPS bulbs.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Warehouse: Non-Refrigerated	None	8,760	1.00	1.00	1.00
Outdoor	None	4,319	1.00	1.00	0

Savings Calculations

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**					
MH400 to LED115W	112	112	453	115	8,760	331,619	331,619	1.00	100.0%
HPS400 to LED115W	8	8	465	115	4,319	12,093	12,093	1.00	100.0%

Total	**343,712**	**343,712**		**100.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF$_D$	Realization Rate
	Base	Post	Base	Post					
MH400 to LED115W	112	112	453	115	1.00	29.15	37.86	1.00	129.9%
HPS400 to LED115W	8	8	465	115	0.00	0.00	0.00	1.00	N/A
Total						**29.15**	**37.86**		**129.9%**

Results

The kWh realization rate for project SN7-046 is 100% and the kW realization rate is 129.9%. The ex ante calculations used a coincidence factor of 0.77 to reflect the warehouse space type; because this site operates 8,760 hours annually, ex post calculations used a coincidence factor of 1.00, resulting a higher peak demand savings.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH400 to LED115W	331,619	37.86	100.0%	129.9%
HPS400 to LED115W	12,093	0.00	100.0%	N/A
Total	**343,712**	**37.86**	**100.0%**	**129.9%**

15.2Large Commercial and Industrial Program

Project Number LN7-001

Program Large CI

Project Background

The participant is an office building that received incentives from Entergy New Orleans for replacing the AHU 25 HP motor with a 20 HP motor with VFD controls. On-site, the evaluators verified the participant had installed:

- A 20 HP VFD controlled AHU fan motor

Calculation Parameters

The motor VFD replacement will save energy in two ways. One the new motor is smaller and will use less energy and two the new motor has a VFD allowing it to operate more efficiently at lower speeds. Savings are calculated using the motor HP, occupancy hours, motor efficiency, motor Load Factor (LF), and motor percent speed. These parameters are shown in Table A below.

Table A, Savings Parameters

Measure	***Baseline Motor HP***	***Installed Motor HP***	***Hours***	***Load Factor***	***Motor Efficiency***	***Percent Speed***
Motor VFD	25	20	3654	90%	91%	Varies See Table B

Savings Calculations

Savings are calculated using the following formulas:

$$kW_{Full,Motor} = \frac{HP\ x\ 0.746\ x\ LF}{Eff}$$

$$kW_{Part,Motor} = kW_{Full,Motor}\ x\ \%kW_{Factor}$$

$$kWh_{Savings} = \sum (kW_{Part,Motor,Base} - \ kW_{Part,Motor,Base})\ x\ Hours_{TempBin}$$

$$kW_{Savings} = \frac{kWh_{Savings}}{EFLH}$$

The above calculations require the total operating hours split into temperature bins based on the outside air temperature. These bins are made of 5 degree ranges as shown in Table B.

Table B, Temperature Bin Data

Outdoor Air Temperature	***CFM/ CFMmax***	***Baseline %kW***	***Installed %kW***	***Baseline kW***	***Installed kW***	***Hours***	***kW Savings***	***kWh Savings***
20-25	0.50	47%	20%	8.68	2.97	0	5.71	0
25-30	0.50	47%	20%	8.68	2.97	8	5.71	46
30-35	0.50	47%	20%	8.68	2.97	11	5.71	63
35-40	0.50	47%	20%	8.68	2.97	77	5.71	439
40-45	0.50	47%	20%	8.68	2.97	122	5.71	696
45-50	0.50	47%	20%	8.68	2.97	172	5.71	982
50-55	0.50	47%	20%	8.68	2.97	195	5.71	1113
55-60	0.56	51%	24%	9.45	3.63	245	5.82	1427
60-65	0.61	56%	29%	10.27	4.41	390	5.86	2285
65-70	0.67	60%	35%	11.13	5.31	325	5.82	1890
70-75	0.72	65%	42%	12.04	6.35	395	5.69	2248
75-80	0.78	70%	49%	12.99	7.50	610	5.49	3348
80-85	0.83	76%	58%	13.99	8.79	631	5.21	3286
85-90	0.89	82%	67%	15.04	10.20	368	4.85	1783
90-95	0.94	87%	77%	16.13	11.73	97	4.40	427
95+	1.00	100%	100%	18.46	15.18	8	3.28	26.3
Total						**3,654**	**5.49**	**20,059**

Table C, Motor VFD Savings Calculations

Measure	***Hours***	***Expected kW Savings***	***Realized kW Savings***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
Motor VFD	3654	5.49	5.49	20,059	20,059	100.0%
			Total	**20,059**	**20,059**	**100.0%**

Results

The kWh realization rate for project LN7-001 is 100% and the kW realization rate is 100%. The Evaluator reviewed and verified the calculator and assumptions made. The calculator uses TMY3 weather data and standard motor power curves to calculate the estimated motor power for each weather bin. The bin analysis assumes a linear fan airspeed change between 100% at 95 degrees Fahrenheit and 50% airflow at 50 degrees Fahrenheit. This assumption seems reasonable but was not verified with trending or actual flow and power measurements.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Motor VFD	20,059	5.49	100.0%	100.0%
Total	**20,059**	**5.49**	**100.0%**	**100.0%**

Project Number LN7-045

Program Large Commercial

Project Background

The participant is a restaurant that received incentives from Entergy New Orleans for implementing energy efficient lighting. On-site, the evaluators verified the participant had installed:

- (23) 30w led - non-int. ballasts replaced (23) 2-lamp t8 u-tubes;
- (35) 43w led - non-int. ballasts replaced (35) 4' 2-lamp t8s;
- (6) 45w led - non-int. ballasts replaced (6) 4' 3-lamp t8s;
- (2) 14w led - non-int. ballasts replaced (6) 4' 3-lamp t8s;
- (1) 12w led - non-int. ballasts replaced (1) 2' 2-lamp t8s; and
- (79) 45w led - non-int. ballasts replaced (79) 4' 4-lamp t8s.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Exterior	None	4,319	1.00	1.00	0%
Food Service: Sit-Down Restaurant	Electric Resistance	8,760[61]	0.87	1.20	100%

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[61] Based on verified lighting hours operation.

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*AOH*	*Expected kWh Savings*	*Realized kWh Savings*	IEF_E	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED45W	7	7	112	45	8,760	3,574	4,478	1.09	125.3%
FU31T8/6 to LED30W	4	4	60	30	8,760	915	1,146	1.09	125.2%
F32T8 to LED45W	3	3	112	45	8,760	1,532	1,919	1.09	125.3%
FU31T8/6 to LED30W	3	3	60	30	8,760	686	859	1.09	125.3%
F32T8 to LED45W	8	8	112	45	8,760	4,085	5,118	1.09	125.3%
FU31T8/6 to LED30W	1	1	60	30	8,760	229	286	1.09	125.1%
F32T8 to LED45W	6	6	112	45	8,760	3,064	3,838	1.09	125.3%
F32T8 to LED45W	11	11	112	45	8,760	5,617	7,037	1.09	125.3%
FU31T8/6 to LED30W	2	2	60	30	8,760	457	573	1.09	125.4%
F32T8 to LED45W	13	13	112	45	8,760	6,638	8,317	1.09	125.3%
FU31T8/6 to LED30W	1	1	60	30	8,760	229	286	1.09	125.1%
FU31T8/6 to LED30W	11	11	60	30	8,760	2,515	3,151	1.09	125.3%
F32T8 to LED45W	4	4	112	45	8,760	2,042	2,559	1.09	125.3%
F32T8 to LED45W	1	1	112	45	8,760	511	640	1.09	125.2%
F32T8 to LED45W	3	3	112	45	8,760	1,146	1,919	1.09	167.5%
FU31T8/6 to LED30W	1	1	60	30	8,760	229	286	1.09	125.1%
F32T8 to LED45W	1	1	112	45	8,760	276	640	1.09	231.8%
F32T8 to LED45W	2	2	85	45	8,760	329	764	1.09	232.2%
F32T8 to LED45W	2	2	112	45	8,760	552	1,279	1.09	231.8%
F32T8 to LED45W	1	1	112	45	8,760	382	640	1.09	167.5%
F32T8 to LED45W	9	9	112	45	8,760	3,437	5,758	1.09	167.5%

F32T8 to LED45W	1	1	112	45	8,760	511	640	1.09	125.2%
F32T8 to LED45W	2	2	112	45	8,760	764	1,279	1.09	167.5%
F32T8 to LED45W	2	2	112	45	8,760	764	1,279	1.09	167.5%
F32T8 to LED43W	1	1	58	43	8,760	114	143	1.09	125.6%
F32T8 to LED43W	2	2	58	43	8,760	229	286	1.09	125.1%
F32T8 to LED43W	1	1	58	43	8,760	114	143	1.09	125.6%
F32T8 to LED43W	1	1	58	43	8,760	114	143	1.09	125.6%
F32T8 to LED43W	5	5	58	43	4,319	324	324	1.00	100.0%
F32T8 to LED43W	3	3	58	43	8,760	185	430	1.09	232.3%
F32T8 to LED45W	4	4	112	45	8,760	1,103	2,559	1.09	232.0%
F32T8 to LED45W	1	1	112	45	8,760	276	640	1.09	231.8%
F32T8 to LED43W	2	2	58	43	8,760	123	286	1.09	232.9%
F32T8 to LED45W	4	4	85	45	8,760	659	1,528	1.09	231.8%
F32T8 to LED43W	1	1	58	43	8,760	62	143	1.09	231.0%
F32T8 to LED14W	2	6	85	14	8,760	354	821	1.09	232.0%
F32T8 to LED43W	4	4	58	43	8,760	457	573	1.09	125.4%
F32T8 to LED43W	2	2	58	43	8,760	229	286	1.09	125.1%
F32T8 to LED43W	13	13	58	43	8,760	1,486	1,862	1.09	125.3%
F17T8 to LED12W	1	1	33	12	8,760	160	201	1.09	125.3%
					Total	**46,473**	**65,062**		**140.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Realized kW Savings***	***IEF_D***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED45W	7	7	112	45	1.00	0.46	0.56	1.20	122.8%

FU31T8/6 to LED30W	4	4	60	30	1.00	0.12	0.14	1.20	119.7%
F32T8 to LED45W	3	3	112	45	1.00	0.20	0.24	1.20	123.1%
FU31T8/6 to LED30W	3	3	60	30	1.00	0.09	0.11	1.20	126.4%
F32T8 to LED45W	8	8	112	45	1.00	0.52	0.64	1.20	122.8%
FU31T8/6 to LED30W	1	1	60	30	1.00	0.03	0.04	1.20	137.9%
F32T8 to LED45W	6	6	112	45	1.00	0.39	0.48	1.20	122.8%
F32T8 to LED45W	11	11	112	45	1.00	0.72	0.88	1.20	121.5%
FU31T8/6 to LED30W	2	2	60	30	1.00	0.06	0.07	1.20	120.7%
F32T8 to LED45W	13	13	112	45	1.00	0.85	1.05	1.20	124.0%
FU31T8/6 to LED30W	1	1	60	30	1.00	0.03	0.04	1.20	137.9%
FU31T8/6 to LED30W	11	11	60	30	1.00	0.32	0.40	1.20	123.5%
F32T8 to LED45W	4	4	112	45	1.00	0.26	0.32	1.20	123.1%
F32T8 to LED45W	1	1	112	45	1.00	0.07	0.08	1.20	123.1%
F32T8 to LED45W	3	3	112	45	1.00	0.20	0.24	1.20	123.1%
FU31T8/6 to LED30W	1	1	60	30	1.00	0.03	0.04	1.20	137.9%
F32T8 to LED45W	1	1	112	45	1.00	0.07	0.08	1.20	123.1%
F32T8 to LED45W	2	2	85	45	1.00	0.08	0.10	1.20	128.2%
F32T8 to LED45W	2	2	112	45	1.00	0.13	0.16	1.20	123.1%
F32T8 to LED45W	1	1	112	45	1.00	0.07	0.08	1.20	123.1%
F32T8 to LED45W	9	9	112	45	1.00	0.59	0.72	1.20	121.2%
F32T8 to LED45W	1	1	112	45	1.00	0.07	0.08	1.20	123.1%
F32T8 to LED45W	2	2	112	45	1.00	0.13	0.16	1.20	123.1%
F32T8 to LED45W	2	2	112	45	1.00	0.13	0.16	1.20	123.1%
F32T8 to LED43W	1	1	58	43	1.00	0.02	0.02	1.20	133.3%
F32T8 to LED43W	2	2	58	43	1.00	0.03	0.04	1.20	137.9%
F32T8 to LED43W	1	1	58	43	1.00	0.02	0.02	1.20	133.3%

F32T8 to LED43W	1	1	58	43	1.00	0.02	0.02	1.20	133.3%
F32T8 to LED43W	5	5	58	43	0.00	0.00	0.00	1.00	-
F32T8 to LED43W	3	3	58	43	1.00	0.04	0.05	1.20	113.6%
F32T8 to LED45W	4	4	112	45	1.00	0.26	0.32	1.20	123.1%
F32T8 to LED45W	1	1	112	45	1.00	0.07	0.08	1.20	123.1%
F32T8 to LED43W	2	2	58	43	1.00	0.03	0.04	1.20	137.9%
F32T8 to LED45W	4	4	85	45	1.00	0.16	0.19	1.20	121.8%
F32T8 to LED43W	1	1	58	43	1.00	0.02	0.02	1.20	133.3%
F32T8 to LED14W	2	6	85	14	1.00	0.08	0.10	1.20	119.0%
F32T8 to LED43W	4	4	58	43	1.00	0.06	0.07	1.20	120.7%
F32T8 to LED43W	2	2	58	43	1.00	0.03	0.04	1.20	137.9%
F32T8 to LED43W	13	13	58	43	1.00	0.19	0.23	1.20	121.1%
F17T8 to LED12W	1	1	33	12	1.00	0.02	0.03	1.20	150.0%
					Total	**6.61**	**8.14**		**123.2%**

Results

The kWh realization rate for project LN7-045 is 140.0% and the kW realization rate is 123.2%. Ex ante calculations assumed electric resistance heating, but it was confirmed on site that the building is heated by gas, resulting in a 25.1% increase in savings. Some areas that were estimated to operate 4,731 hours annually in ex ante calculations, however in site the Evaluators found that they operate continuously (8,760), increasing the savings by 14.9%.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED45W	4,478	0.56	125.3%	122.8%
FU31T8/6 to LED30W	1,146	0.14	125.2%	119.7%

F32T8 to LED45W	1,919	0.24	125.3%	123.1%
FU31T8/6 to LED30W	859	0.11	125.3%	126.4%
F32T8 to LED45W	5,118	0.64	125.3%	122.8%
FU31T8/6 to LED30W	286	0.04	125.1%	137.9%
F32T8 to LED45W	3,838	0.48	125.3%	122.8%
F32T8 to LED45W	7,037	0.88	125.3%	121.5%
FU31T8/6 to LED30W	573	0.07	125.4%	120.7%
F32T8 to LED45W	8,317	1.05	125.3%	124.0%
FU31T8/6 to LED30W	286	0.04	125.1%	137.9%
FU31T8/6 to LED30W	3,151	0.40	125.3%	123.5%
F32T8 to LED45W	2,559	0.32	125.3%	123.1%
F32T8 to LED45W	640	0.08	125.2%	123.1%
F32T8 to LED45W	1,919	0.24	167.5%	123.1%
FU31T8/6 to LED30W	286	0.04	125.1%	137.9%
F32T8 to LED45W	640	0.08	231.8%	123.1%
F32T8 to LED45W	764	0.10	232.2%	128.2%
F32T8 to LED45W	1,279	0.16	231.8%	123.1%
F32T8 to LED45W	640	0.08	167.5%	123.1%
F32T8 to LED45W	5,758	0.72	167.5%	121.2%
F32T8 to LED45W	640	0.08	125.2%	123.1%
F32T8 to LED45W	1,279	0.16	167.5%	123.1%
F32T8 to LED45W	1,279	0.16	167.5%	123.1%
F32T8 to LED43W	143	0.02	125.6%	133.3%
F32T8 to LED43W	286	0.04	125.1%	137.9%
F32T8 to LED43W	143	0.02	125.6%	133.3%
F32T8 to LED43W	143	0.02	125.6%	133.3%

F32T8 to LED43W	324	0.00	100.0%	-
F32T8 to LED43W	430	0.05	232.3%	113.6%
F32T8 to LED45W	2,559	0.32	232.0%	123.1%
F32T8 to LED45W	640	0.08	231.8%	123.1%
F32T8 to LED43W	286	0.04	232.9%	137.9%
F32T8 to LED45W	1,528	0.19	231.8%	121.8%
F32T8 to LED43W	143	0.02	231.0%	133.3%
F32T8 to LED14W	821	0.10	232.0%	119.0%
F32T8 to LED43W	573	0.07	125.4%	120.7%
F32T8 to LED43W	286	0.04	125.1%	137.9%
F32T8 to LED43W	1,862	0.23	125.3%	121.1%
F17T8 to LED12W	201	0.03	125.3%	150.0%
Total	**65,062**	**8.14**	**140.0%**	**123.2%**

Project Number LN7-035

Program Large C&I

Project Background

The participant is a grocery store that received incentives from Entergy New Orleans for implementing energy efficient lighting indoors and outdoors. On-site, the evaluators verified the participant had installed:

- (9) 45W Led - Non-Int. Ballasts Replaced (9) 4' 3-Lamp T8s;
- (8) 7W Led - Int. Ballasts Replaced (8) 50W 1-Lamp Halogens;
- (8) 15W Led - Non-Int. Ballasts Replaced (8) 4' 1-Lamp T8s;
- (75) 30W Led - Non-Int. Ballasts Replaced (75) 3-Lamp 40W CFL Long Twins;
- (6) 40W Led - Non-Int. Ballasts Replaced (6) 3-Lamp 40W CFL Long Twins;
- (6) 14W Led - Non-Int. Ballasts Replaced (6) 1-Lamp 22W CFL Twins;
- (5) 30W Led - Non-Int. Ballasts Replaced (5) 8' 2-Lamp T8s;
- (5) 15W Led - Int. Ballasts Replaced (5) 90W 1-Lamp Halogens;
- (30) 36W Led - Non-Int. Ballasts Replaced (32) 4' 2-Lamp T8s;
- (2) 50W Led - Non-Int. Ballasts Replaced (2) 300W 1-Lamp Halogens;
- (2) 30W Led - Non-Int. Ballasts Replaced (2) 3' 2-Lamp T8s;
- (13) 60W Led - Non-Int. Ballasts Replaced (13) 4' 4-Lamp T8s;
- (12) 18W Led - Non-Int. Ballasts Replaced (12) 4' 1-Lamp T8s;
- (11) 30W Led - Non-Int. Ballasts Replaced (11) 4' 2-Lamp T8s;
- (10) 15W Led - Int. Ballasts Replaced (10) 2-Lamp 40W CFL Long Twins;
- (1) 50W Led - Non-Int. Ballasts Replaced (1) 70W Metal Halides;
- (1) 50W Led - Non-Int. Ballasts Replaced (1) 400W Metal Halides;
- (1) 45W Led - Non-Int. Ballasts Replaced (1) 250W Metal Halides;
- (1) 20W Led - Non-Int. Ballasts Replaced (1) 2' 2-Lamp T8s; and
- (1) 18W Led - Non-Int. Ballasts Replaced (1) 4' 1-Lamp T8s.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Outdoor	None	3,996	1.00	1.00	0%
Non-24 hr Grocery	None	4,706	1.25	1.00	95%
Non-24 hr Grovery	Electric Resistance with AC	4,706	1.20	0.87	95%

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**					
MH250 to LED45W	1	1	288	45	4,319	971	1,050	1.00	108.1%
CFT22W to LED14W	6	6	27	14	4,319	312	337	1.00	108.0%
MH400 to LED50W	1	1	453	50	4,319	1,610	1,741	1.00	108.1%
H300 to LED50W	2	2	300	50	4,319	1,998	2,160	1.00	108.1%
MH70 to LED50W	1	1	91	50	4,319	164	177	1.00	108.0%
F32T8 to LED36W	2	4	58	36	5,460	-191	-191	1.25	100.1%
F32T8 to LED36W	1	1	58	36	5,460	150	150	1.25	100.1%
F32T8 to LED15W	8	8	31	15	5,460	874	874	1.25	100.0%
F32T8 to LED36W	1	1	58	36	5,460	150	150	1.25	100.1%
F32T8 to LED36W	3	3	58	36	5,460	450	450	1.25	100.1%
F32T8 to LED18W	12	12	31	18	5,460	1,065	1,065	1.25	100.0%
F32T8 to LED36W	4	4	58	36	5,460	601	601	1.25	99.9%
F32T8 to LED36W	9	9	58	36	5,460	1,351	1,351	1.25	100.0%

F32T8 to LED36W	6	6	58	36	5,460	901	901	1.25	100.0%
F32T8 to LED18W	1	1	31	18	5,460	71	71	1.00	100.0%
F32T8 to LED36W	3	3	58	36	5,460	450	450	1.25	100.1%
H90 to LEDINT15W	5	5	90	15	5,460	1,781	1,781	0.87	100.0%
CFT40W to LEDINT15W	3	3	85	15	5,460	998	998	0.87	100.0%
CFT40W to LEDINT15W	7	7	85	15	5,460	2,328	2,328	0.87	100.0%
F32T8 to LED60W	13	13	112	60	5,460	3,211	3,211	0.87	100.0%
CFT40W to LED40W	6	6	133	40	5,460	2,651	2,651	0.87	100.0%
F96T8 to LED30W	5	5	110	30	5,460	1,900	1,900	0.87	100.0%
F32T8 to LED30W	7	7	58	30	5,460	931	931	0.87	100.0%
F17T8 to LED20W	1	1	33	20	5,460	62	62	0.87	99.6%
F32T8 to LED30W	4	4	58	30	5,460	532	532	0.87	100.0%
F32T8 to LED45W	9	9	85	45	5,460	1,710	1,710	0.87	100.0%
H50 to LEDINT7W	8	8	50	7	5,460	1,634	1,634	0.87	100.0%
CFT40W to LED30W	75	75	133	30	5,460	36,695	36,695	0.87	100.0%
F25T8 to LED30W	2	2	46	30	5,460	218	218	1.25	100.2%
F32T8 to LED36W	1	1	58	36	5,460	150	150	1.25	100.1%
					Total	**65,728**	**66,137**		**100.6%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF_D	Realization Rate
	Base	Post	Base	Post					
MH250 to LED45W	1	1	288	45	-	-	0.00	1.00	-
CFT22W to LED14W	6	6	27	14	-	-	0.00	1.00	-
MH400 to LED50W	1	1	453	50	-	-	0.00	1.00	-

H300 to LED50W	2	2	300	50	-	-	0.00	1.00	-
MH70 to LED50W	1	1	91	50	-	-	0.00	1.00	-
F32T8 to LED36W	2	4	58	36	0.95	-	-0.03	1.25	-
F32T8 to LED36W	1	1	58	36	0.95	-	0.03	1.25	-
F32T8 to LED15W	8	8	31	15	0.95	-	0.15	1.25	-
F32T8 to LED36W	1	1	58	36	0.95	-	0.03	1.25	-
F32T8 to LED36W	3	3	58	36	0.95	-	0.08	1.25	-
F32T8 to LED18W	12	12	31	18	0.95	-	0.19	1.25	-
F32T8 to LED36W	4	4	58	36	0.95	-	0.10	1.25	-
F32T8 to LED36W	9	9	58	36	0.95	-	0.24	1.25	-
F32T8 to LED36W	6	6	58	36	0.95	-	0.16	1.25	-
F32T8 to LED18W	1	1	31	18	0.95	-	0.01	1.00	-
F32T8 to LED36W	3	3	58	36	0.95	-	0.08	1.25	-
H90 to LEDINT15W	5	5	90	15	0.95	-	0.43	1.20	-
CFT40W to LEDINT15W	3	3	85	15	0.95	-	0.24	1.20	-
CFT40W to LEDINT15W	7	7	85	15	0.95	-	0.56	1.20	-
F32T8 to LED60W	13	13	112	60	0.95	-	0.77	1.20	-
CFT40W to LED40W	6	6	133	40	0.95	-	0.64	1.20	-
F96T8 to LED30W	5	5	110	30	0.95	-	0.46	1.20	-
F32T8 to LED30W	7	7	58	30	0.95	-	0.22	1.20	-
F17T8 to LED20W	1	1	33	20	0.95	-	0.01	1.20	-
F32T8 to LED30W	4	4	58	30	0.95	-	0.13	1.20	-
F32T8 to LED45W	9	9	85	45	0.95	-	0.41	1.20	-
H50 to LEDINT7W	8	8	50	7	0.95	-	0.39	1.20	-
CFT40W to LED30W	75	75	133	30	0.95	-	8.81	1.20	-
F25T8 to LED30W	2	2	46	30	0.95	-	0.04	1.25	-

F32T8 to LED36W	1	1	58	36	0.95	-	0.03	1.25	-
					Total	**14.18**	**14.18**		**100.0%**

Results

The kWh realization rate for project LN7-035 is 100.6% and the kW realization rate is 100.0%. Ex ante calculations which used AR TRM exterior hours (3,996) which the Evaluators updated to 4,319 from the New Orleans TRM, slightly increasing the kWh realization rate.

Table D, Verified Gross Savings & Realization Rates

Measure	**Verified**			
	kWh Savings	**kW Savings**	**kWh Realization Rate**	**kW Realization Rate**
MH250 to LED45W	1,050	0.00	108.1%	-
CFT22W to LED14W	337	0.00	108.0%	-
MH400 to LED50W	1,741	0.00	108.1%	-
H300 to LED50W	2,160	0.00	108.1%	-
MH70 to LED50W	177	0.00	108.0%	-
F32T8 to LED36W	-191	-0.03	100.1%	-
F32T8 to LED36W	150	0.03	100.1%	-
F32T8 to LED15W	874	0.15	100.0%	-
F32T8 to LED36W	150	0.03	100.1%	-
F32T8 to LED36W	450	0.08	100.1%	-
F32T8 to LED18W	1,065	0.19	100.0%	-
F32T8 to LED36W	601	0.10	99.9%	-
F32T8 to LED36W	1,351	0.24	100.0%	-
F32T8 to LED36W	901	0.16	100.0%	-
F32T8 to LED18W	71	0.01	100.0%	-

F32T8 to LED36W	450	0.08	100.1%	-
H90 to LEDINT15W	1,781	0.43	100.0%	-
CFT40W to LEDINT15W	998	0.24	100.0%	-
CFT40W to LEDINT15W	2,328	0.56	100.0%	-
F32T8 to LED60W	3,211	0.77	100.0%	-
CFT40W to LED40W	2,651	0.64	100.0%	-
F96T8 to LED30W	1,900	0.46	100.0%	-
F32T8 to LED30W	931	0.22	100.0%	-
F17T8 to LED20W	62	0.01	99.6%	-
F32T8 to LED30W	532	0.13	100.0%	-
F32T8 to LED45W	1,710	0.41	100.0%	-
H50 to LEDINT7W	1,634	0.39	100.0%	-
CFT40W to LED30W	36,695	8.81	100.0%	-
F25T8 to LED30W	218	0.04	100.2%	-
F32T8 to LED36W	150	0.03	100.1%	-
Total	**66,137**	**14.18**	**100.6%**	**N/A**

Project Number LN7-028

Program Large C&I

Project Background

The participant is an office building that received incentives from Entergy New Orleans for implementing energy efficient lighting throughout the facility. On-site, the evaluators verified the participant had installed:

- (2) 150W LED fixtures Replaced (2) 400W Metal Halides;
- (7) 8W LED fixtures Replaced (7) 23W CFLs;
- (6) 9W LED fixtures Replaced (6) 23W CFLs;
- (6) 30W LED fixtures Replaced (6) 1-Lamp T12 U-Tube fixtures with Electric Start Ballast;
- (5) 9W LED fixtures Replaced (5) 13W CFLs;
- (4) 9W LED fixtures Replaced (4) 60W Incandescent fixtures;
- (4) 70W LED fixtures Replaced (4) 250W Metal Halides;
- (4) 15W LED fixtures Replaced (4) 4' 1-Lamp T12 with Electric Start Ballast;
- (343) 30W LED fixtures Replaced (341) 4' 4-Lamp T12 with Instant Start Ballast;
- (2) 30W LED fixtures Replaced (2) 4' 2-Lamp T12 with Electric Start Ballast;
- (1) 9W LED fixtures Replaced (1) 60W Incandescent fixtures; and
- (1) 9W LED fixtures Replaced (1) 13W CFLs.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Outdoor	None	4,319	1.00	1.00	0%

Office	Electric Resistance Heating w/ AC	3,214[62]	0.87	1.20	77%
Storage (generic)	Electric Resistance Heating w/ AC	4,207	0.87	1.20	77%
Restrooms (generic)	Electric Resistance Heating w/ AC	3,516	0.87	1.20	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					
MH400 to LED150W	2	2	453	147	4,319	2,422	2,643	1.00	109.2%
MH250 to LED70W	4	4	288	70	4,319	3,485	3,766	1.00	108.1%
F48T12/ES to LED30W	8	8	112	30	3,214	4,983	1,833	0.87	36.8%
F48T12/ES to LED30W	12	12	112	30	3,214	2,761	2,750	0.87	99.6%
F48T12/ES to LED30W	6	4	112	30	3,214	1,549	1,543	0.87	99.6%
F48T12/ES to LED30W	4	4	112	30	3,214	920	917	0.87	99.6%
F48T12/ES to LED30W	19	19	112	30	3,214	4,372	4,354	0.87	99.6%
FU40T12/ES to LED30W	1	1	60	30	3,214	84	84	0.87	99.6%
F48T12/ES to LED30W	8	8	112	30	3,214	1,841	1,833	0.87	99.6%
F48T12/ES to LED30W	6	6	112	30	3,214	1,381	1,375	0.87	99.6%
F48T12/ES to LED30W	32	32	112	30	3,214	7,363	7,334	0.87	99.6%
F48T12/ES to LED30W	11	11	112	30	3,214	2,531	2,521	0.87	99.6%
F48T12/ES to LED15W	2	2	31	15	3,516	90	98	0.87	109.0%

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[62] Calculated based on verified lighting hours operation gathered during site visit/

F48T12/ES to LED30W	1	1	112	30	3,516	230	251	0.87	109.0%
F48T12/ES to LED30W	2	2	112	30	3,516	460	501	0.87	109.0%
F40T12/ES to LED30W	1	1	58	30	4,207	79	102	0.87	130.4%
I60/ES to LEDINT9W	1	1	43	9	4,207	95	124	0.87	130.4%
F48T12/ES to LED30W	10	10	112	30	3,214	6,229	2,292	0.87	36.8%
F48T12/ES to LED30W	10	10	112	30	3,214	2,301	2,292	0.87	99.6%
F48T12/ES to LED30W	9	9	112	30	3,214	2,071	2,063	0.87	99.6%
F48T12/ES to LED30W	12	12	112	30	3,214	2,761	2,750	0.87	99.6%
F48T12/ES to LED30W	21	21	112	30	3,214	4,832	4,813	0.87	99.6%
FU40T12/ES to LED30W	1	1	60	30	3,214	84	84	0.87	99.6%
F48T12/ES to LED30W	6	6	112	30	3,214	1,381	1,375	0.87	99.6%
FU40T12/ES to LED30W	1	1	60	30	3,214	84	84	0.87	99.6%
F48T12/ES to LED30W	2	2	112	30	3,214	460	458	0.87	99.6%
F40T12/ES to LED30W	1	1	58	30	3,214	79	78	0.87	99.6%
F48T12/ES to LED30W	23	23	112	30	3,214	5,292	5,271	0.87	99.6%
CF23W to LEDINT8W	7	7	23	8	3,214	295	294	0.87	99.6%
F48T12/ES to LED30W	11	11	112	30	3,214	2,531	2,521	0.87	99.6%
FU40T12/ES to LED30W	2	2	60	30	3,214	168	168	0.87	99.6%
F48T12/ES to LED30W	4	4	112	30	3,516	920	1,003	0.87	109.0%
F48T12/ES to LED30W	8	8	112	30	3,214	4,983	1,833	0.87	36.8%
F48T12/ES to LED30W	17	17	112	30	3,214	3,912	3,896	0.87	99.6%
F48T12/ES to LED30W	10	10	112	30	3,214	2,301	2,292	0.87	99.6%
FU40T12/ES to LED30W	1	1	60	30	3,214	84	84	0.87	99.6%
F48T12/ES to LED30W	24	24	112	30	3,214	5,522	5,500	0.87	99.6%
F48T12/ES to LED30W	9	9	112	30	3,214	2,071	2,063	0.87	99.6%
F48T12/ES to LED30W	15	15	112	30	3,214	3,451	3,438	0.87	99.6%

I60/ES to LEDINT9W	2	2	43	9	3,214	191	190	0.87	99.6%
F48T12/ES to LED30W	3	3	112	30	3,214	690	688	0.87	99.6%
F48T12/ES to LED30W	2	2	112	30	3,214	460	458	0.87	99.6%
F48T12/ES to LED30W	4	4	112	30	3,516	920	1,003	0.87	109.0%
CF13W to LEDINT9W	1	1	13	9	4,207	11	15	0.87	130.4%
CF23W to LEDINT9W	6	6	23	9	4,319	336	363	1.00	108.1%
F48T12/ES to LED30W	1	1	112	30	8,760	623	625	0.87	100.3%
F48T12/ES to LED30W	1	1	112	30	8,760	623	625	0.87	100.3%
F48T12/ES to LED15W	1	1	31	15	8,760	122	122	0.87	100.3%
CF13W to LEDINT9W	3	3	13	9	8,760	91	91	0.87	100.3%
I60/ES to LEDINT9W	2	2	43	9	4,207	191	249	0.87	130.4%
CF13W to LEDINT9W	2	2	13	9	4,207	22	29	0.87	130.4%
F40T12/ES to LED15W	1	1	31	15	4,207	45	59	0.87	130.4%
					Total	**90,782**	**81,198**		**89.4%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEF$_D$	Realization Rate
	Base	Post	Base	Post					
MH400 to LED150W	2	2	453	147	0.00	0.16	0.00	1.00	0.0%
MH250 to LED70W	4	4	288	70	0.00	0.23	0.00	1.00	0.0%
F48T12/ES to LED30W	8	8	112	30	0.77	0.42	0.61	1.20	142.6%
F48T12/ES to LED30W	12	12	112	30	0.77	0.64	0.91	1.20	142.6%
F48T12/ES to LED30W	6	4	112	30	0.77	0.36	0.51	1.20	142.6%

F48T12/ES to LED30W	4	4	112	30	0.77	0.21	0.30	1.20	142.6%
F48T12/ES to LED30W	19	19	112	30	0.77	1.01	1.44	1.20	142.6%
FU40T12/ES to LED30W	1	1	60	30	0.77	0.02	0.03	1.20	142.6%
F48T12/ES to LED30W	8	8	112	30	0.77	0.42	0.61	1.20	142.6%
F48T12/ES to LED30W	6	6	112	30	0.77	0.32	0.45	1.20	142.6%
F48T12/ES to LED30W	32	32	112	30	0.77	1.70	2.42	1.20	142.6%
F48T12/ES to LED30W	11	11	112	30	0.77	0.58	0.83	1.20	142.6%
F48T12/ES to LED15W	2	2	31	15	0.90	0.02	0.03	1.20	166.7%
F48T12/ES to LED30W	1	1	112	30	0.90	0.05	0.09	1.20	166.7%
F48T12/ES to LED30W	2	2	112	30	0.90	0.11	0.18	1.20	166.7%
F40T12/ES to LED30W	1	1	58	30	0.77	0.02	0.03	1.20	142.6%
I60/ES to LEDINT9W	1	1	43	9	0.77	0.02	0.03	1.20	142.6%
F48T12/ES to LED30W	10	10	112	30	0.77	0.53	0.76	1.20	142.6%
F48T12/ES to LED30W	10	10	112	30	0.77	0.53	0.76	1.20	142.6%
F48T12/ES to LED30W	9	9	112	30	0.77	0.48	0.68	1.20	142.6%
F48T12/ES to LED30W	12	12	112	30	0.77	0.64	0.91	1.20	142.6%
F48T12/ES to LED30W	21	21	112	30	0.77	1.12	1.59	1.20	142.6%
FU40T12/ES to	1	1	60	30	0.77	0.02	0.03	1.20	142.6%

LED30W									
F48T12/ES to LED30W	6	6	112	30	0.77	0.32	0.45	1.20	142.6%
FU40T12/ES to LED30W	1	1	60	30	0.77	0.02	0.03	1.20	142.6%
F48T12/ES to LED30W	2	2	112	30	0.77	0.11	0.15	1.20	142.6%
F40T12/ES to LED30W	1	1	58	30	0.77	0.02	0.03	1.20	142.6%
F48T12/ES to LED30W	23	23	112	30	0.77	1.22	1.74	1.20	142.6%
CF23W to LEDINT8W	7	7	23	8	0.77	0.07	0.10	1.20	142.6%
F48T12/ES to LED30W	11	11	112	30	0.77	0.58	0.83	1.20	142.6%
FU40T12/ES to LED30W	2	2	60	30	0.77	0.04	0.06	1.20	142.6%
F48T12/ES to LED30W	4	4	112	30	0.90	0.21	0.35	1.20	166.7%
F48T12/ES to LED30W	8	8	112	30	0.77	0.42	0.61	1.20	142.6%
F48T12/ES to LED30W	17	17	112	30	0.77	0.90	1.29	1.20	142.6%
F48T12/ES to LED30W	10	10	112	30	0.77	0.53	0.76	1.20	142.6%
FU40T12/ES to LED30W	1	1	60	30	0.77	0.02	0.03	1.20	142.6%
F48T12/ES to LED30W	24	24	112	30	0.77	1.27	1.82	1.20	142.6%
F48T12/ES to LED30W	9	9	112	30	0.77	0.48	0.68	1.20	142.6%
F48T12/ES to LED30W	15	15	112	30	0.77	0.80	1.14	1.20	142.6%
I60/ES to LEDINT9W	2	2	43	9	0.77	0.04	0.06	1.20	142.6%

F48T12/ES to LED30W	3	3	112	30	0.77	0.16	0.23	1.20	142.6%
F48T12/ES to LED30W	2	2	112	30	0.77	0.11	0.15	1.20	142.6%
F48T12/ES to LED30W	4	4	112	30	0.90	0.21	0.35	1.20	166.7%
CF13W to LEDINT9W	1	1	13	9	0.77	0.00	0.00	1.20	142.6%
CF23W to LEDINT9W	6	6	23	9	0.00	0.02	0.00	1.00	0.0%
F48T12/ES to LED30W	1	1	112	30	0.77	0.05	0.08	1.20	142.6%
F48T12/ES to LED30W	1	1	112	30	0.77	0.05	0.08	1.20	142.6%
F48T12/ES to LED15W	1	1	31	15	0.77	0.01	0.01	1.20	142.6%
CF13W to LEDINT9W	3	3	13	9	0.77	0.01	0.01	1.20	142.6%
I60/ES to LEDINT9W	2	2	43	9	0.77	0.04	0.06	1.20	142.6%
CF13W to LEDINT9W	2	2	13	9	0.77	0.01	0.01	1.20	142.6%
F40T12/ES to LED15W	1	1	31	15	0.77	0.01	0.01	1.20	142.6%
					Total	**17.35**	**24.31**		**140.1%**

Results

The kWh realization rate for project LN7-028 is 89.4% and the kW realization rate is 140.1%. Ex ante calculations used deemed ‘office’ hours of operation (3,227) from the AR TRM. On site the Evaluators recorded lighting hours of operation for all spaces with retrofitted lighting. From this, verified AOH of 3,214 were calculated and used for most spaces in ex post calculations. The Evaluators used deemed hours from the New Orleans TRM for restrooms and storage areas, as well as updated calculations with exterior hours from 3,996 to 4,319. The majority of the expected savings came from spaces assuming 3,227 AOH, so realized kWh savings is lower than expected.

However, the deemed peak CF for restroom areas increased from 0.77 in ex ante calculations to .90 in ex post, resulting in a high kW realization rate.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH400 to LED150W	2,643	0.00	109.2%	0.0%
MH250 to LED70W	3,766	0.00	108.1%	0.0%
F48T12/ES to LED30W	1,833	0.61	36.8%	142.6%
F48T12/ES to LED30W	2,750	0.91	99.6%	142.6%
F48T12/ES to LED30W	1,543	0.51	99.6%	142.6%
F48T12/ES to LED30W	917	0.30	99.6%	142.6%
F48T12/ES to LED30W	4,354	1.44	99.6%	142.6%
FU40T12/ES to LED30W	84	0.03	99.6%	142.6%
F48T12/ES to LED30W	1,833	0.61	99.6%	142.6%
F48T12/ES to LED30W	1,375	0.45	99.6%	142.6%
F48T12/ES to LED30W	7,334	2.42	99.6%	142.6%
F48T12/ES to LED30W	2,521	0.83	99.6%	142.6%
F48T12/ES to LED15W	98	0.03	109.0%	166.7%
F48T12/ES to LED30W	251	0.09	109.0%	166.7%
F48T12/ES to LED30W	501	0.18	109.0%	166.7%
F40T12/ES to LED30W	102	0.03	130.4%	142.6%
I60/ES to LEDINT9W	124	0.03	130.4%	142.6%
F48T12/ES to LED30W	2,292	0.76	36.8%	142.6%
F48T12/ES to LED30W	2,292	0.76	99.6%	142.6%
F48T12/ES to LED30W	2,063	0.68	99.6%	142.6%

F48T12/ES to LED30W	2,750	0.91	99.6%	142.6%
F48T12/ES to LED30W	4,813	1.59	99.6%	142.6%
FU40T12/ES to LED30W	84	0.03	99.6%	142.6%
F48T12/ES to LED30W	1,375	0.45	99.6%	142.6%
FU40T12/ES to LED30W	84	0.03	99.6%	142.6%
F48T12/ES to LED30W	458	0.15	99.6%	142.6%
F40T12/ES to LED30W	78	0.03	99.6%	142.6%
F48T12/ES to LED30W	5,271	1.74	99.6%	142.6%
CF23W to LEDINT8W	294	0.10	99.6%	142.6%
F48T12/ES to LED30W	2,521	0.83	99.6%	142.6%
FU40T12/ES to LED30W	168	0.06	99.6%	142.6%
F48T12/ES to LED30W	1,003	0.35	109.0%	166.7%
F48T12/ES to LED30W	1,833	0.61	36.8%	142.6%
F48T12/ES to LED30W	3,896	1.29	99.6%	142.6%
F48T12/ES to LED30W	2,292	0.76	99.6%	142.6%
FU40T12/ES to LED30W	84	0.03	99.6%	142.6%
F48T12/ES to LED30W	5,500	1.82	99.6%	142.6%
F48T12/ES to LED30W	2,063	0.68	99.6%	142.6%
F48T12/ES to LED30W	3,438	1.14	99.6%	142.6%
I60/ES to LEDINT9W	190	0.06	99.6%	142.6%
F48T12/ES to LED30W	688	0.23	99.6%	142.6%
F48T12/ES to LED30W	458	0.15	99.6%	142.6%
F48T12/ES to LED30W	1,003	0.35	109.0%	166.7%
CF13W to LEDINT9W	15	0.00	130.4%	142.6%
CF23W to LEDINT9W	363	0.00	108.1%	0.0%
F48T12/ES to LED30W	625	0.08	100.3%	142.6%

F48T12/ES to LED30W	625	0.08	100.3%	142.6%
F48T12/ES to LED15W	122	0.01	100.3%	142.6%
CF13W to LEDINT9W	91	0.01	100.3%	142.6%
I60/ES to LEDINT9W	249	0.06	130.4%	142.6%
CF13W to LEDINT9W	29	0.01	130.4%	142.6%
F40T12/ES to LED15W	59	0.01	130.4%	142.6%
Total	**81,198**	**24.31**	**89.4%**	**140.1%**

Project Number LA7-001

Program Large CI

Project Background

The participant is a high school which received incentives from Entergy New Orleans for commissioning their facility. Most measures implemented during the commissioning process do not directly correlate to energy savings and therefore are not part of the incentive program. During the commissioning the only measure that is counted is fixing the BAS schedule so that the AHU does not run 24/7. On-site, the evaluators verified the participant had implemented:

- AHU BAS schedule control is operational

Calculation Parameters

Savings were calculated using an energy model to predict the savings associated with implementing an AHU schedule. The energy model results are shown in Table A below.

Table A, Energy Model Results

Measure	***Baseline Energy (Btu/yr)***	***Proposed Energy (BTU/yr)***	***Savings (Btu/yr)***	***Savings (kWh/yr)***
AHU Schedule	2,003.2 x 10^6	1,343.6x 10^6	395.3 x 10^6	115,900

Savings Calculations

Savings are calculated using the following formulas:

$$kWh_{Savings} = Baseline\ Energy\ Usage - Proposed\ Energy\ Usage$$

$$\frac{kWh}{yr} = \left(\frac{Btu}{yr}\right) * \left(\frac{2.93}{10000}\right)$$

Table B,, Savings Calculations

Measure	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
AHU Schedule	115,900	115,900	100.0%
Total	**115,900**	**115,900**	**100.0%**

Results

The kWh realization rate for project LA7-001 is 100%. The Evaluator was not provided with the energy model or trending data to verify the proposed savings. The energy model savings are less than the estimate 5% savings stated in the pre-installation application. Energy model outputs were verified for abnormalities versus a typical building.

Table C, Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
AHU Schedule	115,900	-	100.0%	-
Total	**115,900**	**-**	**100.0%**	**-**

Project Number LN7-005

Program Large CI

Project Background

The participant is a hotel that received incentives from Entergy New Orleans for implementing a Guest Room Energy Management (GREM) controls on 250 rooms. On-site, the evaluators verified the participant had installed:

- GREM controls on 250 rooms

Calculation Parameters

Savings are calculated using a deemed savings value from the New Orleans Energy Smart Technical Reference Manual section C.3.5. The deemed savings value is shown in Table A below.

Table A, Savings Parameters

Measure	***Deemed Savings (kWh/room)***	***# of Rooms***
GREM	355	250

Savings Calculations

Savings are calculated using the following formulas:

$$kWh_{Savings} = kWh, room\ x\ \#\ of\ rooms$$

Table B, Deemed Savings Calculations

Measure	***Deemed savings (kWh/room)***	***# of Rooms***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
GREM	355	250	117,180	88,750	75.7%
		Total	**117,180**	**88,750**	**75.7%**

Results

The kWh realization rate for project LN7-005 is 75.7%. Ex ante calculations use the prescriptive calculator from Arkansas TRM, which the Evaluators updated to the New Orleans TRM in ex post calculations.

Table C, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Cooling Tower	88,750	-	75.7%	-
Total	**88,750**	**-**	**75.7%**	**-**

Project Number LN7-022c

Program Large Commercial

Project Background

The participant is a hotel that received incentives from Entergy New Orleans for implementing energy efficient lighting. On-site, the evaluators verified the participant had installed:

- (158) 7W LED fixtures replaced (158) 50W 1-lamp Halogen;
- (95) 13W LED fixtures replaced (95) 4' 1-lamp T8 fixtures;
- (16) 52W LED fixtures replaced (16) 175W Metal Halides;
- (8) 40W LED fixtures replaced (8) 175W Metal Halides;
- (2) 40W LED fixtures replaced (2) 250W Metal Halides;
- (87) 39W LED fixtures replaced (87) 4' 3-lamp T8 fixtures; and
- (387) 26W LED fixtures replaced (387) 4' 2-lamp T8 fixtures.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Exterior	None	4,319	1.00	1.00	0%
Lodging (Hotel/Motel/Dorm) 63	Electric Resistance	8,760	0.87	1.20	100%

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[63] The facility is a hotel but has common, dining, office and storage areas. All interior areas operate continuously unless otherwise noted.

Lodging (Hotel/Motel/Dorm) with occupancy sensor	Electric Resistance	6,132[64]	0.87	1.20	87%

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*AOH*	*Expected kWh Savings*	*Realized kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
H50 to LEDINT7W	74	74	50	7	8,760	24,251	24,251	0.87	100.0%
H50 to LEDINT7W	84	84	50	7	8,760	20,834	27,528	0.87	132.1%
F32T8 to LED13W	71	71	30	13	8,760	9,199	9,199	0.87	100.0%
H50 to LEDINT12W	16	16	50	12	4,319	9,974	2,626	1.00	26.3%
MH175 to LED40W	4	4	208	40	8,760	5,887	5,887	1.00	100.0%
MH250 to LED40W	2	2	288	40	4,319	1,982	2,142	1.00	108.1%
MH175 to LED40W	4	4	208	40	4,319	2,685	2,902	1.00	108.1%
F32T8 to LED39W	33	33	88	39	8,760	12,323	12,323	0.87	100.0%
F32T8 to LED26W	13	13	59	26	8,760	1,204	3,269	0.87	271.5%
F32T8 to LED39W	26	26	88	39	8,760	3,577	9,709	0.87	271.5%
F32T8 to LED26W	27	27	59	26	8,760	2,501	6,790	0.87	271.5%
F32T8 to LED26W	5	5	59	26	4,207	659	694	1.00	105.3%
F32T8 to LED26W	16	16	59	26	8,760	3,046	4,024	0.87	132.1%
F32T8 to LED26W	7	7	59	26	6,132	1,760	1,232	0.87	70.0%

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[64] Continuous lighting on occupancy sensor. 0.70 adjustment factor applied to 8,760 to account for occ. Sensors, resulting in 6,132 AOH.

F32T8 to LED26W	65	65	59	26	8,760	18,790	18,790	1.00	100.0%
F32T8 to LED13W	24	24	30	13	8,760	3,574	3,574	1.00	100.0%
F32T8 to LED26W	23	23	59	26	8,760	5,784	5,784	0.87	100.0%
F32T8 to LED13W	2	2	30	13	8,760	259	259	0.87	100.0%
F32T8 to LED26W	24	24	59	26	8,760	4,568	6,036	0.87	132.1%
F32T8 to LED39W	2	2	88	39	8,760	275	747	0.87	271.5%
F32T8 to LED26W	2	2	59	26	6,132	381	352	0.87	92.5%
F32T8 to LED26W	21	21	59	26	8,760	3,997	5,281	0.87	132.1%
F32T8 to LED39W	26	26	88	39	8,760	9,709	9,709	0.87	100.0%
F32T8 to LED26W	34	34	59	26	8,760	8,551	8,551	0.87	100.0%
F32T8 to LED26W	136	136	59	26	8,760	39,315	39,315	1.00	100.0%
F32T8 to LED26W	12	12	59	26	8,760	3,018	3,018	0.87	100.0%
					Total	**198,106**	**213,995**		**108.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Realized kW Savings***	***IEF_D***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
H50 to LEDINT7W	74	74	50	7	1.00	3.09	3.82	1.20	123.5%
H50 to LEDINT7W	84	84	50	7	0.82	3.55	3.55	1.20	99.9%
F32T8 to LED13W	71	71	30	13	1.00	1.19	1.45	1.20	122.1%
H50 to LEDINT12W	16	16	50	12	0.00	0.00	0.00	1.00	#DIV/0!
MH175 to LED40W	4	4	208	40	1.00	0.00	0.67	1.00	#DIV/0!
MH250 to LED40W	2	2	288	40	0.00	0.00	0.00	1.00	#DIV/0!
MH175 to LED40W	4	4	208	40	0.00	0.00	0.00	1.00	#DIV/0!
F32T8 to LED39W	33	33	88	39	1.00	1.59	1.94	1.20	121.9%

F32T8 to LED26W	13	13	59	26	0.77	0.28	0.40	1.20	143.9%
F32T8 to LED39W	26	26	88	39	0.77	0.83	1.18	1.20	142.9%
F32T8 to LED26W	27	27	59	26	0.77	0.58	0.82	1.20	142.0%
F32T8 to LED26W	5	5	59	26	0.77	0.00	0.13	1.00	#DIV/0!
F32T8 to LED26W	16	16	59	26	0.82	0.52	0.52	1.20	100.1%
F32T8 to LED26W	7	7	59	26	0.82	0.23	0.23	1.20	101.2%
F32T8 to LED26W	65	65	59	26	1.00	1.76	2.15	1.00	122.2%
F32T8 to LED13W	24	24	30	13	1.00	0.33	0.41	1.00	122.5%
F32T8 to LED26W	23	23	59	26	1.00	0.75	0.91	1.20	121.8%
F32T8 to LED13W	2	2	30	13	0.82	0.03	0.03	1.20	89.7%
F32T8 to LED26W	24	24	59	26	0.82	0.78	0.78	1.20	100.1%
F32T8 to LED39W	2	2	88	39	0.77	0.06	0.09	1.20	141.7%
F32T8 to LED26W	2	2	59	26	0.54	0.06	0.04	1.20	61.6%
F32T8 to LED26W	21	21	59	26	0.82	0.68	0.68	1.20	99.7%
F32T8 to LED39W	26	26	88	39	1.00	1.25	1.53	1.20	122.0%
F32T8 to LED26W	34	34	59	26	1.00	1.10	1.35	1.20	122.3%
F32T8 to LED26W	136	136	59	26	1.00	3.68	4.49	1.00	122.0%
F32T8 to LED26W	12	12	59	26	1.00	0.39	0.48	1.20	123.2%
					Total	**22.75**	**27.65**		**121.6%**

Results

The kWh realization rate for project LN7-022c is 108.8% and the kW realization rate is 121.6%. Ex ante savings calculations included 16 13W LED downlamps replacing 175W metal halide lamps under the front canopy on the exterior of the building. On site the Evaluators found that previous fixtures were 50E halogen lamps and new fixtures were 12W LED. These fixtures were corrected in ex post calculations, partly reducing the kWh realization rate. The Evaluators also adjusted lighting hours of operation from

(6,630) to continuous (8,760) operation to reflect on-site findings. This raised both the kWh and kW realization rates. Three areas were controlled by occupancy sensors and in these areas the Evaluators applied a 0.77 adjustment factor to the hours. Ex ante calculations for exterior spaces used 3,990 AOH, a deemed value from the AR TRM. The Evaluators updated these with 4,319 to reflect the New Orleans latitude, further increasing the kWh realization rate.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
H50 to LEDINT7W	24,251	3.82	100.0%	123.5%
H50 to LEDINT7W	27,528	3.55	132.1%	99.9%
F32T8 to LED13W	9,199	1.45	100.0%	122.1%
H50 to LEDINT12W	2,626	0.00	26.3%	N/A
MH175 to LED40W	5,887	0.67	100.0%	N/A
MH250 to LED40W	2,142	0.00	108.1%	N/A
MH175 to LED40W	2,902	0.00	108.1%	N/A
F32T8 to LED39W	12,323	1.94	100.0%	121.9%
F32T8 to LED26W	3,269	0.40	271.5%	143.9%
F32T8 to LED39W	9,709	1.18	271.5%	142.9%
F32T8 to LED26W	6,790	0.82	271.5%	142.0%
F32T8 to LED26W	694	0.13	105.3%	N/A
F32T8 to LED26W	4,024	0.52	132.1%	100.1%
F32T8 to LED26W	1,232	0.23	70.0%	101.2%
F32T8 to LED26W	18,790	2.15	100.0%	122.2%
F32T8 to LED13W	3,574	0.41	100.0%	122.5%
F32T8 to LED26W	5,784	0.91	100.0%	121.8%

F32T8 to LED13W	259	0.03	100.0%	89.7%
F32T8 to LED26W	6,036	0.78	132.1%	100.1%
F32T8 to LED39W	747	0.09	271.5%	141.7%
F32T8 to LED26W	352	0.04	92.5%	61.6%
F32T8 to LED26W	5,281	0.68	132.1%	99.7%
F32T8 to LED39W	9,709	1.53	100.0%	122.0%
F32T8 to LED26W	8,551	1.35	100.0%	122.3%
F32T8 to LED26W	39,315	4.49	100.0%	122.0%
F32T8 to LED26W	3,018	0.48	100.0%	123.2%
Total	**213,995**	**27.65**	**108.0%**	**121.6%**

Project Number LN7-027

Program Large CI

Project Background

The participant is a high rise apartment complex that received incentives from Entergy New Orleans for implementing energy efficient lighting for updating its common areas and parking garage. On-site, the evaluators verified the participant had installed:

- (42) 13W LED fixtures replaced (42) 4' 1-lamp T12 fixtures;
- (90) 45W LED fixtures replaced (90) 175w Metal Halides;
- (84) 26W LED fixtures replaced (84) 4' 2-lamp T8 fixtures;
- (8) 2W LED fixtures replaced (1) 4' 4-lamp T8 fixtures;
- (47) 65W LED fixtures replaced (15) 8' 2-lamp T12 fixtures;
- (3) 9W LED fixtures replaced (3) 60w Incandescent fixtures;
- (3) 9W LED fixtures replaced (3) 12w CFLs;
- (262) 12W LED fixtures replaced (262) 2-lamp 26W CFL multi 4-pins;
- (2) 52W LED fixtures replaced (2) 4' 4-lamp T8 fixtures;
- (16) 26W LED fixtures replaced (16) 4' 3-lamp T8 fixtures; and
- (6) 39W LED fixtures replaced (6) 4' 3-lamp T8 fixtures.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Parking Structure	None	8,760[65]	1.00	1.00	100%
Common Areas	Electric Resistance	8,760	0.87	1.20	100%

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[65] Based on verified continuous hours of operation.

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*AOH*	*Expected kWh Savings*	*Realized kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F40T12/ES to LED13W	24	24	31	13	8,760	3,292	3,292	0.87	100.0%
F40T12/ES to LED13W	18	18	31	13	8,760	2,469	2,469	0.87	100.0%
CFM26W to LED12W	6	6	51	12	8,760	1,783	1,783	0.87	100.0%
CFM26W to LED12W	88	88	51	12	8,760	26,156	26,156	0.87	100.0%
CFM26W to LED12W	84	84	51	12	8,760	24,967	24,967	0.87	100.0%
F32T8 to LED26W	12	12	85	26	8,760	4,084	5,396	0.87	132.1%
F32T8 to LED26W	4	4	85	26	8,760	1,361	1,799	0.87	132.2%
F32T8 to LED26W	84	84	58	26	8,760	20,486	20,486	0.87	100.0%
CFM26W to LED12W	78	78	51	12	8,760	23,184	23,184	0.87	100.0%
F96T12/ES to LED65W	47	15	110	65	8,760	33,073	36,748	1.00	111.1%
MH175 to LED45W	90	90	208	45	8,760	115,658	128,509	1.00	111.1%
F32T8 to LED52W	2	2	112	52	8,760	946	1,051	1.00	111.1%
F32T8 to LED2W	8	1	112	2	8,760	7,048	7,831	1.00	111.1%
CFM26W to LED12W	6	6	51	12	8,760	1,350	1,783	0.87	132.1%
CF12W to LEDINT9W	3	3	12	9	8,760	52	69	0.87	131.9%
I60/ES to LEDINT9W	3	3	43	9	8,760	588	777	0.87	132.2%
F32T8 to LED39W	6	6	85	39	8,760	1,592	2,103	0.87	132.1%
					Total	**268,091**	**288,405**		**107.6%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	**Quantity (Fixtures)**		**Wattage**		**CF**	**Expected kW Savings**	**Realized kW Savings**	**IEF$_D$**	**Realization Rate**
	Base	**Post**	**Base**	**Post**					
F40T12/ES to LED13W	24	24	31	13	1.00	0.43	0.52	1.20	120.9%
F40T12/ES to LED13W	18	18	31	13	1.00	0.32	0.39	1.20	121.9%
CFM26W to LED12W	6	6	51	12	1.00	0.23	0.28	1.20	121.7%
CFM26W to LED12W	88	88	51	12	1.00	3.38	4.12	1.20	121.9%
CFM26W to LED12W	84	84	51	12	1.00	3.22	3.93	1.20	122.0%
F32T8 to LED26W	12	12	85	26	1.00	0.70	0.85	1.20	121.4%
F32T8 to LED26W	4	4	85	26	1.00	0.23	0.28	1.20	121.7%
F32T8 to LED26W	84	84	58	26	1.00	2.64	3.23	1.20	122.3%
CFM26W to LED12W	78	78	51	12	1.00	2.99	3.65	1.20	122.1%
F96T12/ES to LED65W	47	15	110	65	1.00	4.20	4.20	1.00	100.0%
MH175 to LED45W	90	90	208	45	1.00	14.67	14.67	1.00	100.0%
F32T8 to LED52W	2	2	112	52	1.00	0.12	0.12	1.00	100.0%
F32T8 to LED2W	8	1	112	2	1.00	0.89	0.89	1.00	100.0%
CFM26W to LED12W	6	6	51	12	1.00	0.23	0.28	1.20	121.7%
CF12W to LEDINT9W	3	3	12	9	1.00	0.01	0.01	1.20	100.0%
I60/ES to LEDINT9W	3	3	43	9	1.00	0.10	0.12	1.20	120.0%
F32T8 to LED39W	6	6	85	39	1.00	0.27	0.33	1.20	122.2%
					Total	**34.63**	**37.87**		**109.4%**

Results

The kWh realization rate for project LN7-027 is 107.6% and the kW realization rate is 109.4%. The kWh realization rate is high because it was confirmed on site that all areas operate 24/7. The ex ante calculations estimated only some areas operated 8,760 while most areas operated 6,630 or 7,884 hours annually. Ex post calculations reflect 8,760 operation in all areas which were verified to operate continually. The high kW realization rate is due to the coincidence factor adjustment to 1.0 to reflect the hours of operation.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F40T12/ES to LED13W	3,292	0.52	100.0%	120.9%
F40T12/ES to LED13W	2,469	0.39	100.0%	121.9%
CFM26W to LED12W	1,783	0.28	100.0%	121.7%
CFM26W to LED12W	26,156	4.12	100.0%	121.9%
CFM26W to LED12W	24,967	3.93	100.0%	122.0%
F32T8 to LED26W	5,396	0.85	132.1%	121.4%
F32T8 to LED26W	1,799	0.28	132.2%	121.7%
F32T8 to LED26W	20,486	3.23	100.0%	122.3%
CFM26W to LED12W	23,184	3.65	100.0%	122.1%
F96T12/ES to LED65W	36,748	4.20	111.1%	100.0%
MH175 to LED45W	128,509	14.67	111.1%	100.0%
F32T8 to LED52W	1,051	0.12	111.1%	100.0%
F32T8 to LED2W	7,831	0.89	111.1%	100.0%
CFM26W to LED12W	1,783	0.28	132.1%	121.7%
CF12W to LEDINT9W	69	0.01	131.9%	100.0%
I60/ES to LEDINT9W	777	0.12	132.2%	120.0%
F32T8 to LED39W	2,103	0.33	132.1%	122.2%
Total	**288,405**	**37.87**	**107.6%**	**109.4%**

Project Number LN7-030

Program Large CI

Project Background

The participant is a supermarket which received incentives from Entergy New Orleans for: recommissioning the condenser racks, ventilating the parking garage with exhaust VFDs, turn off the AHU and close outside air dampers when unoccupied, optimized sequence of operations and replacing the DX coil with a chilled water coil. On-site, the evaluators verified the participant had installed and implemented the following list of measures:

- Recommissioned the condenser racks
- VFD fans on the parking garage exhaust
- Turn off AHU and outside air dampers when unoccupied
- Optimized sequence of operations
- Replace the DX coils with chilled water coils

Calculation Parameters

Savings for several individual measures would be difficult to quantize so savings are estimated using the building billing data. The savings calculator uses the baseline billing data and cooling degree days to create a two variable linear regression. The regression results are documented in Table A below.

Table A, Savings Parameters

Equipment	***CDD Coefficient***	***Days Coefficient***	***R squared***	***T-stat***
Building renovations	201.7	8796.8	0.9811	22.8

Savings Calculations

Savings from these measures are calculated using the building billed energy usage and the actual cooling degree days. The actual billed energy for one year is subtracted from the modeled energy savings to get an estimated difference between the actual year and the potential energy savings. The change in energy usage is then adjusted to remove the energy reduction associated with the heating fuel switch. Savings are calculated using the following formulas:

$$kWh_{Savings} = Annual\ Billed\ kWh - Calculated\ Annual\ kWh$$

$$Calculated\ Annual\ kWh = Coeff_{CDD}\ x\ CDD + \ Coeff_{Days}\ x\ \#\ of\ days$$

Entergy New Orleans does not provide incentives for fuel switching so the reduced energy usage associated with the heating switching to natural gas was calculated via engineering algorithm, then removed from the savings results of the billing regression.

Results

The kWh realization rate for project LN7-030 is 100%. The Evaluator verified the billing regression using the pre and post billing data provided. The regression showed a high correlation to the variables, days and CDD, so a billing regression is a viable option to estimate savings.

Table C, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Building Renovations	288,347	0	100%	-
Total	**288,347**	**0**	**100%**	**-**

Project Number LN7-037

Program Large CI

Project Background

The participant is a sports complex that received incentives from Entergy New Orleans for rebuilding an existing four (4) cell cooling towers.

Calculation Parameters

Cooling tower savings were calculated using the total chiller capacity, the plant Equivalent Full Load Hours (EFLH), Cooling Tower efficiency, and Coincidence Factor (CF). These parameters are shown in Table A below.

Table A, Savings Parameters

Measure	***Total Capacity (Tons)***	***EFLH***	***Base Eff***	***Proposed Eff***	***Coincidence Factor (CF)***
Cooling Tower	8,454	1,900	0.07	0.05	0.4

Savings Calculations

Savings are calculated using the following formulas:

$$kWh_{Savings} = Capacity\ x\ EFLH\ x\ (Eff_{Base} - \ Eff_{Proposed})$$

$$kW_{Savings} = \frac{kWh_{Savings}}{EFLH\ x\ CF}$$

Table B, Cooling Tower Savings Calculations

Measure	***Capacity***	***EFLH***	***Base Eff***	***Proposed Eff***	***CF***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
Cooling Tower	8,454	1,900	0.07	0.05	0.4	321,252	321,252	100.0%

Total	**321,252**	**321,252**	**100.0%**

Results

The kWh realization rate for project LN7-037 is 100% and the kW realization rate is 100%. The Evaluators verified the calculations provided using the equipment installed, and the equipment and parameters stated above. The Evaluators were not provided with any trending or power measurements to verify the baseline cooling tower efficiency stated.

Table C, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Cooling Tower	321,252	67.63	100.0%	100.0%
Total	**321,252**	**67.63**	**100.0%**	**100.0%**

Project Number LN7-002

Program Large C&I

Project Background

The participant is casino that received incentives from Entergy New Orleans for implementing energy efficient lighting in its parking lot area. On-site, the evaluators verified the participant had installed:

- (2,151) 39W Led - Int. Ballasts Replaced (2,151) 4' 3-Lamp T8 25Ws.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Parking Structure	None	8,760[66]	1.00	1.00	1.0

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**					
F32T8-25W to LEDINT39W	938	938	66	39	8,760	199,670	221,856	1.00	111.1%

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[66] Based on verified continuous hours of operation.

F32T8-25W to LEDINT39W	430	430	66	39	8,760	91,533	101,704	1.00	111.1%
F32T8-25W to LEDINT39W	783	783	66	39	8,760	166,676	185,195	1.00	111.1%
					Total	**457,879**	**508,755**		**111.1%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	**Quantity (Fixtures)**		**Wattage**		**CF**	**Expected kW Savings**	**Realized kW Savings**	**IEFD**	**Realization Rate**
	Base	**Post**	**Base**	**Post**					
F32T8-25W to LEDINT39W	938	938	66	39	1.00	25.33	25.33	1.00	100.0%
F32T8-25W to LEDINT39W	430	430	66	39	1.00	11.61	11.61	1.00	100.0%
F32T8-25W to LEDINT39W	783	783	66	39	1.00	21.14	21.14	1.00	100.0%
					Total	**58.08**	**58.08**		**100.0%**

Results

The kWh realization rate for project LN7-002 is 111.1% and the peak coincidence kW realization rate is 100%. Ex ante calculations used deemed hours of operation of 7,884, however onsite the Evaluators found that all retrofitted fixtures operated continuously so ex post calculations used AOH of 8,760, resulting in the high kWh realization rate.

Table D, Verified Gross Savings & Realization Rates

Measure	**Verified**			
	kWh Savings	**kW Savings**	**kWh Realization Rate**	**kW Realization Rate**
F32T8-25W to LEDINT39W	221,856	25.33	111.1%	100.0%
F32T8-25W to LEDINT39W	101,704	11.61	111.1%	100.0%

F32T8-25W to LEDINT39W	185,195	21.14	111.1%	100.0%
Total	**508,755**	**58.08**	**111.1%**	**100.0%**

Project Number LN7-008

Program Large CI

Project Background

The participant received incentives from Entergy New Orleans for installing a 166 ton chiller to operate during periods of partial cooling such that the main 300 ton unit can shutdown. On-site, the evaluators verified the participant had installed:

- Installation of a 166 ton chiller

Calculation Parameters

Chiller savings were calculated using the reduced chiller capacity, the chiller Equivalent Full Load Hours (EFLH), chiller load, total fan HP, and fan motor efficiency. These parameters are shown in Table A below.

Table A, Savings Parameters

Equipment	***Capacity***	***EFLH***	***Efficiency***	***Coincidence Factor (CF)***
Chiller	166	6250	50%	0.0
HVAC	160	6250	91%	0.0

Savings Calculations

Savings from installing the chiller are realized in two ways. One, reducing the energy usage from run a smaller chiller. Two, turning off several air handling units that were running to produce a false load on the other chiller. Several air handling units were required to run during the partial cooling time periods to create a false load on the chiller to keep it from damaging the chiller. This measure will have zero demand savings since the change will only happen at night and on weekend. Savings are calculated using the following formulas:

$$\text{Chiller: } kWh_{Savings} = Capacity\ x\ EFLH\ x\ Capacity\ Reduction\ Percentage$$

$$\text{HVAC: } kWh_{Savings} = \frac{Capacity}{Eff} \ x \ EFLH$$

Table B, Calculation Parameters

Equipment	***Full Capacity***	***EFLH***	***Eff***	***Capacity Reduction***	***CF***
Chiller	334 (tons)	6,250	0	50%	0.0
HVAC	160 (HP)	6,250	91%	-	0.0

Hours are estimated to be weekdays from 6 pm to 6 am and all day on holidays and weekend. Chiller and AHUs operate at full capacity November through February and at half capacity March through October. At the time these projects were implemented, a third project involving fuel switching from electric to gas also took place at the facility. Entergy New Orleans does not provide incentives for fuel switching, so the portion the savings associated with fuel switching was removed from the total savings.

Results

The kWh realization rate for project LN7-008 is 100%. The Evaluator verified the calculations and parameters provided using the stated installed equipment and the equations stated above. Trending data or power measurements were not provided to verify the chiller pre and post actual energy usage.

Table C, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Chiller	109,664	131.16	100%	100%
HVAC	545,646	56.28	100%	100%
Total	**655,310**	**187.44**	**100%**	**100%**

Project Number LN7-050

Program Large CI

Project Background

The participant is a hotel facility that received incentives from Entergy New Orleans for installing seven (7) AHU motor VFDs and optimizing the BAS strategies on nine (9) other units. On-site, the evaluators verified the participant had installed:

- 7 VFDs on AHU fan motors
- Optimized the BAS strategies on 9 AHU units

Calculation Parameters

The motor VFD replacement will save energy by allowing the motor to decrease the speed depending on the fan load. Savings are calculated using the motor HP, occupancy hours, TMY3 weather data, motor efficiency, motor Load Factor (LF), and motor percent speed. These parameters are shown in Table A below.

Table A, Savings Parameters

Unit Label	*Installed Motor HP*	*Hours*	*Baseline Minimum CFM*	*Proposed Minimum CFM*	*Schedule*
MN1	20	8760	100%	50%	24/7
MN10	20	8760	81%	50%	24/7
MS1	20	8760	81%	50%	24/7
MS5	30	8760	100%	50%	24/7
MS8	20	4535	81%	50%	S-Th 8-19, Fri-Sat 8-0000
BR5	25	8760	81%	50%	24/7
BR6	15	8760	60%	50%	24/7
BR8	40	8760	81%	50%	24/7
BR11	40	8760	100%	50%	24/7

MS2	10	8760	100%	50%	24/7
EN1	7.5	8760	100%	50%	24/7
EN2	5	4745	100%	50%	0800-2100 Daily
ES2	15	8760	100%	50%	24/7
MN2	7.5	8760	100%	50%	24/7
GS1	20	8760	100%	50%	24/7
LR5	5	8760	100%	50%	24/7

Savings Calculations

Savings are calculated using the following formulas:

$$kW_{Full,Motor} = \frac{HP\ x\ 0.746\ x\ LF}{Eff}$$

$$kW_{Part,Motor} = kW_{Full,Motor}\ x\ FanLoad^{2.7}$$

$$kWh_{Savings} = \sum (kW_{Part,Motor,Base} - \ kW_{Part,Motor,Base})\ x\ Hours_{TempBin}$$

$$kW_{Savings} = \frac{kWh_{Savings}}{EFLH}$$

The above calculations require the total operating hours split into temperature bins based on the outside air temperature. These bins are made of 3 degree ranges as shown in Table B. The hours are calculated using the TMY3 Weather data for New Orleans and the three different schedules stated in the savings calculations provided. The Fan Load % is based on the baseline maximum fan load and then varies linear from the maximum temperature bin down to a minimum at the middle temperature bin and then linearly back up to the maximum fan load at the lowest temperature bin.

Table B, Temperature Bin Data

Outdoor Air Temperature	***Hours 24/7***	***Hours MS8***	***Hours EN2***	***Fan Load 100%***	***Fan Load 81%***	***Fan Load 60%***
96 to 98	1	1	1	100.00%	81.00%	60.00%
94 to 96	11	11	11	97.22%	79.28%	59.44%
92 to 94	26	26	26	94.44%	77.56%	58.89%
90 to 92	94	94	94	91.67%	75.83%	58.33%
88 to 90	169	168	169	88.89%	74.11%	57.78%
86 to 88	254	252	253	86.11%	72.39%	57.22%
84 to 86	297	277	285	83.33%	70.67%	56.67%
82 to 84	364	287	296	80.56%	68.94%	56.11%
80 to 82	473	316	329	77.78%	67.22%	55.56%
78 to 80	624	334	344	75.00%	65.50%	55.00%
76 to 78	784	325	350	72.22%	63.78%	54.44%
74 to 76	620	268	293	69.44%	62.06%	53.89%
72 to 74	525	234	247	66.67%	60.33%	53.33%
70 to 72	438	220	248	63.89%	58.61%	52.78%
68 to 70	360	173	201	61.11%	56.89%	52.22%
66 to 68	370	153	173	58.33%	55.17%	51.67%
64 to 66	349	168	166	55.56%	53.44%	51.11%
62 to 64	389	175	176	52.78%	51.72%	50.56%
60 to 62	345	144	148	50.00%	50.00%	50.00%
58 to 60	277	105	115	52.78%	51.72%	50.56%
56 to 58	255	100	102	55.56%	53.44%	51.11%
54 to 56	232	80	89	58.33%	55.17%	51.67%

52 to 54	238	121	117	61.11%	56.89%	52.22%
50 to 52	192	89	83	63.89%	58.61%	52.78%
48 to 50	205	97	98	66.67%	60.33%	53.33%
46 to 48	156	74	68	69.44%	62.06%	53.89%
44 to 46	171	74	79	72.22%	63.78%	54.44%
42 to 44	131	48	58	75.00%	65.50%	55.00%
40 to 42	83	37	35	77.78%	67.22%	55.56%
38 to 40	77	22	24	80.56%	68.94%	56.11%
36 to 38	97	32	37	83.33%	70.67%	56.67%
34 to 36	63	17	15	86.11%	72.39%	57.22%
32 to 34	36	8	8	88.89%	74.11%	57.78%
30 to 32	19	4	5	91.67%	75.83%	58.33%
28 to 30	18	1	1	94.44%	77.56%	58.89%
26 to 28	15	0	1	97.22%	79.28%	59.44%
24 to 26	2	0	0	100.00%	81.00%	60.00%

Savings for each motor VFD upgrade are shown in Table C as well as comparing the calculated savings versus the excepted savings and realization rate.

Table C, Motor VFD Savings Calculations

Unit Label	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
MN1	74,047	70,708	95.49%
MN10	48,343	48,801	100.95%
MS1	48,343	48,801	100.95%

MS5	83,481	84,850	101.64%
MS8	25,746	24,430	94.89%
BR5	60,429	61,001	100.95%
BR6	28,226	28,311	100.30%
BR8	96,686	97,602	100.95%
BR11	111,308	113,133	101.64%
MS2	27,827	28,283	101.64%
EN1	27,827	28,283	101.64%
EN2	22,516	21,752	96.61%
ES2	41,741	42,425	101.64%
MN2	20,870	21,213	101.64%
GS1	55,654	56,567	101.64%
LR5	15,460	14,142	91.47%
Total	**788,504**	**790,304**	**100.23%**

Results

The kWh realization rate for project LN7-050 is 100.23%. The realization rate is slightly off because the Evaluators used TMY3 weather data for New Orleans to calculate the hours for each temperature bin which was slightly different from the weather data used in the provided calculator. Additionally, a few units had a large discrepancy since the ex-ante calculations had a few calculator mistakes. One, the fan load for the upper half of the temperature bins was not calculated linearly as stated. The calculated post fan HP was lower than what the Evaluators calculated using the equations provided. The ex-ante calculations did not provide the formulas used to obtain their numbers so an exact explanation for the difference is not possible.

The Evaluator verified all the calculations provided using the above equations and installed equipment information. The Evaluator was not able to verify the fan power versus outdoor air temperature assumption because no trending was provided, however, the assumption does seem to be a conservative approach to savings.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Motor VFD	790,304	-	100.23%	-
Total	**790,304**	**-**	**100.23%**	**-**

Project Number LN7-025

Program Large CI

Project Background

The participant is a sports complex that received incentives from Entergy New Orleans for implementing energy efficient lighting. On-site, the evaluators verified the participant had installed:

- (384) 300W LED fixtures replaced (192) 1000W Metal Halides; and
- (480) 300W LED fixtures replaced (84) 500W 1-lamp Halogens.

Calculation Parameters

Savings calculations were performed using savings methodology described in section C.6.3 of the New Orleans TRM, which is discussed in detail in section 10.2.1 Lighting Savings Calculations of this report. Deemed savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Public Assembly	Gas	2,638	1.09	1.20	56%

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*AOH*	*Expected kWh Savings*	*Realized kWh Savings*	*IEF_E*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1000 to LED300W	384	192	1,078	300	2,638	817,849	1,024,662	1.09	125.3%
H500 to LED300W	480	84	500	300	2,638	492,979	617,640	1.09	125.3%
					Total	**1,310,828**	**1,642,302**		**125.3%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***Expected kW Savings***	***Realized kW Savings***	***IEF_D***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
MH1000 to LED300W	384	192	1,078	300	0.56	239.47	239.47	1.20	100.0%
H500 to LED300W	480	84	500	300	0.56	144.35	144.35	1.20	100.0%
					Total	**383.82**	**383.82**		**100.0%**

Results

The kWh realization rate for project LN7-025 is 125.3% and the kW realization rate is 100.0%. Ex ante calculations assumed electric resistance heating (kWh factor = 0.87), however on site the Evaluators found the facility was heated by natural gas kWh factor = 1.09). Using the gas kWh factor in ex post calculations lead to 25.3% higher kWh savings.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH1000 to LED300W	1,024,662	239.47	125.3%	100.0%
H500 to LED300W	617,640	144.35	125.3%	100.0%
Total	**1,642,302**	**383.82**	**125.3%**	**100.0%**

16.Appendix B: Survey Instruments & Interview Guides

This appendix contains the survey instruments and interview guides used in this evaluation.

Large Commercial and Publicly Funded Participant Survey

Overview:

Interviewer instructions are shown in all caps enclosed in parentheses, e.g., (INTERVIEWER INSTRUCTION)

Prepopulated variables are shown in all caps enclosed in brackets,e.g., [PREPOPULATED VARIABLE]

Programming instructions are shown in all caps, bold-type, enclosed in brackets, e.g., **[PROGRAMMING INSTRUCTION]**

Predefined Variables:

Variable	**Definition**
CONTACT NAME	Customer contact first and last name
UTILITY_FULL	Full name of utility implementing program
UTILITY_SHORT	Short name of utility implementing program
PROGRAM_NAME	Name of program
LOCATION	Address in form of "street in city"
MEASURE	Measure installed stated as efficient equipment, e.g., energy efficient lighting.
IMPLEMENT	Verb describing the installation
IMPLEMENTED	Verb describing the installation
IMPLEMENTING	Verb describing the installation
MEASURE2	Description of measure that does not reference energy efficiency
MEAS_QUANT	Count of measures installed
ENERGY_USING	1 if measure is energy consuming equipment (e.g. lighting), 0 if not (e.g., control system)

Survey instrument

Hello. May I please speak with [CONTACT NAME]: _____________________)?

Hello. My name is _____ and I am calling on behalf of UTILITY_ FULL. Through this program, your facility received incentives for the installation of energy saving equipment.

This is not a sales call. We are conducting a study on behalf of [UTILITY_FULL] to help them improve their programs that service their customers.

Are you the person who is most familiar with your facility's participation in this program?

(IF NOT RIGHT PERSON) *May I have the name and telephone number for the person who would know the most about your facility's participation in this program?*

Name:

Telephone:

(IF RIGHT PERSON)

May I ask you a few questions?

Thank you. During the remainder of the interview I will refer to [UTILITY_FULL] as [UTILITY_SHORT].

1. **Just to confirm, did your organization receive an incentive or discount for [IMPLEMENTING] [MEASURE] through [UTILITY_SHORT]'s [PROGRAM_NAME] Program at [LOCATION]**
    1. Yes
    2. No (THANK AND TERMINATE CALL)
    98. DON'T KNOW (THANK AND TERMINATE CALL)
    99. REFUSED (THANK AND TERMINATE CALL)
2. **How did you first learn about [UTILITY_SHORT]'s [PROGRAM_NAME] Program incentives for efficient equipment or upgrades? (DO NOT READ LIST)**
    1. From an [UTILITY_SHORT] Account Representative
    2. From a contractor
    3. Friends or colleagues
    4. From [UTILITY_SHORT]'s website
    5. Social media post (e.g., Facebook, Twitter, Flickr)
    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. Other (please explain)
    98. DON'T KNOW
    99. REFUSED

3. **Did you receive any technical services such as a facility assessment or other assistance with identifying and selecting equipment from an APTIM program representative?**

   1. Yes
   2. No
   98. DON'T KNOW
   99. REFUSED

Project Decision Making

4. **Not including the [MEASURE] project that your 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
   99. REFUSED

[DISPLAY Q5 IF Q4 = 1]

5. **Did you complete any of those projects without receiving a program incentive or rebate?**

   1. Yes
   2. No
   98. DON'T KNOW
   99. REFUSED

[DISPLAY Q6 IF Q4 = 1]

6. **Which of the following financial methods, if any, does your organization typically use to evaluate energy efficiency improvements? [MULTI SELECT] (READ LIST)**

   1. Initial Cost
   2. Simple payback
   3. Internal rate of return
   4. Life cycle cost
   5. DO NOT TYPICALLY USE FINANCIAL METHODS
   98. DON'T KNOW
   99. REFUSED

[DISPLAY Q7 IF Q6 = 2]

7. **What payback time do you typically target when assessing energy efficiency projects?**

1. (VERBATIM)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q8 IF Q6 = 3]

8. **What rate of return do you typically target when assessing energy efficiency projects?**

   1. (VERBATIM)
   98. DON'T KNOW
   99. REFUSED

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. In your own words, can you tell me why this project was implemented? (IF NEEDED: Were there any other reasons? MULTIPLE RESPONSE. UP TO THREE.) (DO NOT READ LIST)

   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 (VERBATIM)
   98. Don't know
   99. (Refused)

10. **Before participating in the [PROGRAM_NAME] Program had you implemented any energy efficient equipment or project similar to the [MEASURE] at your facility located at [ADDRESS]?**

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

11. **Did you have plans to [IMPLEMENT] the [MEASURE] at the facility before deciding to participate in the [PROGRAM_NAME] Program?**

    1. Yes
    2. No
    98. DON’T KNOW
    99. REFUSED

12. **Would you have completed the [MEASURE] project even if you had not received a rebate through [UTILITY_SHORT]'s program?**

    1. Yes
    2. No
    98. DON’T KNOW
    99. REFUSED

13. **Did you have previous experience with the [PROGRAM_NAME] Program prior to [IMPLEMENTING] the [MEASURE]?**

    1. Yes
    2. No
    98. DON’T KNOW
    99. REFUSED

[DISPLAY Q14 IF Q13 = 1]

14. **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
    99. REFUSED

15. **Did a [PROGRAM_NAME] Program representative or other [UTILITY_SHORT] representative recommend that you [IMPLEMENT] the [MEASURE] at your facility?**

    1. Yes
    2. No
    98. DON’T KNOW
    99. REFUSED

[DISPLAY Q16 IF Q3 = 1]

16. **Did an APTIM program representative recommend the [MEASURE] through the technical support or facility assessment that you received?**

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q17 IF [Q15 = 1 OR Q16=1]

17. **If the [PROGRAM_NAME] Program representative had not recommended [IMPLEMENTING] the [MEASURE], how likely is it that you would have [IMPLEMENTED] it 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
99. REFUSED

18. **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
99. REFUSED

[DISPLAY Q19 IF Q18 = 2]

19. **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 Q20 IF Q19 = 2]

20. **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?**

21. **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
99. REFUSED

[DISPLAY Q22 IF MEAS_QUANT >1]

22. **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
99. REFUSED

[DISPLAY Q23 IF ENERGY_USING = 1]

23. **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
99. REFUSED

[DISPLAY Q24 IF Q23 =1]

24. **What type of equipment, if any, would you have installed if you had not participated in the program?**

1. (VERBATIM):
98. DON'T KNOW
99. REFUSED

25. **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 [MEAURE] earlier than you otherwise would have without the program?

1. Yes
2. No
98. DON’T KNOW
99. REFUSED

[DISPLAY Q26 IF Q25 = 1]

26. **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
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 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
99. REFUSED

[DISPLAY Q28 if Q27 = 1]

28. **What additional equipment have you installed? [MULTI SELECT] (READ LIST)**

1 Lighting
2 Lighting controls or occupancy sensors
3 Unitary or split air conditioning System or chiller
4 Room air conditioners
5 Efficient motors

6 Refrigeration equipment
7 Something else (VERBATIM)
96 Didn't implement any measures **[SKIP TO Q62]**
98. DON'T KNOW
99. REFUSED

[DISPLAY Q29 if Q27 = 1]

29. **Can you briefly describe why you decided to install this equipment without receiving a program incentive?**

1. (VERBATIM)
2. DID RECEIVE AN INCENTIVE FOR **[SKIP TO Q62]**
98. DON'T KNOW
99. REFUSED

[DISPLAY Q30 IF Q28 = 1]

30. **What type of lighting did you install? [MULTI-SELECT] (READ LIST)**

1 T8 lamps
2 T5 lamps
3 Highbay Fixtures
4 CFLs
5 LED lamps
98 DON'T KNOW
99 REFUSED

[REPEAT Q31 - Q36 FOR EACH TYPE SELECTED IN Q30]

[DISPLAY Q31 IF Q30 = 1-5]

31. **How many [Q30 RESPONSE] did you install?**

1. (RECORD NUMBER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q32 IF Q30 = 1-5]

32. **What was the average wattage of the [Q30 RESPONSE]?**

1. (RECORD NUMBER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q33 IF Q30 = 1-5]

33. **Were they installed inside or outside?**

    1. Inside
    2. Outside
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q34 IF Q30 = 1-5]

34. **Is the inside space heated, cooled, or both?**

    1. Heated
    2. Cooled
    3. Both
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q35 IF Q30 = 1-5]

35. **What type of lighting did the [Q30 RESPONSE] replace?**

    1. T12s (IF NEEDED: LINEAR FLOURESCENTS)
    2. T8s (IF NEEDED: LINEAR FLOURESCENTS)
    3. Something else (VERBATIM)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q36 IF Q30 = 1-5]

36. **How many of the old lamps or bulbs did you remove?**

    1. (RECORD NUMBER)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q37 IF Q28 = 2]

37. **How many fixtures are being controlled by the lighting controls?**

    1. (RECORD NUMBER)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q38 IF Q28 = 2]

38. **On average, how many lamps or bulbs does each fixture contain?**

    1. (RECORD NUMBER)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q39 IF Q28 = 2]

39. **What is the average wattage of these lamps?**

    1. (RECORD NUMBER)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q40 IF Q28 = 3]

40. **What types of energy efficient equipment did you install as part of the HVAC project? [MULTI SELECT] (READ LIST)**

    1. Split air conditioning system (IF NEEDED: An A/C system that has an evaporator indoors and the compressor and condenser outdoors.)
    2. Packaged air conditioning system (IF NEEDED: 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 (IF NEEDED: An electric heating and cooling system)
    4. Air cooled chiller (IF NEEDED: A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
    5. Water cooled chiller (IF NEEDED: A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
    6. Other
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q41 IF Q28 = 3]

41. **Can you tell me more about what type of unitary, split system, or chiller equipment you installed? How many units were installed? What was the rated efficiency?**

    1. (RECORD QUANTITY AND EFFICENCY FOR EACH TYPE MENTIONED)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q42 IF Q28 = 4]

42. **How many room air conditioners did you install?**

1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q43 IF Q28 = 5]

43. **How many motors did you install?**

1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q44 IF Q28 = 5]

44. **What is the approximate average horsepower of the new motors? (IF NEEDED: WHAT IS THE AVERAGE ACROSS ALL OF THE MOTORS YOU INSTALLED WITHOuT AN INCENTIVE)**

1. (RECORD HORSEPOWER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q45 IF Q28 = 5]

45. **What is the approximate average efficiency of the new motors? (IF NEEDED: WHAT IS THE AVERAGE EFFICIENCY ACROSS ALL OF THE NEW MOTORS)**

1. (RECORD 0 -100%)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q46 IF Q28 = 5]

46. **On average, how many hours per day do the motors operate? (IF NEEDED: WHAT IS THE AVERAGE NUMBER OF HOURS THE MOTORS OPERATE ACROSS ALL OF THE MOTORS YOU INSTALLED)**

1. (RECORD HOURS)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q47 IF Q28 = 6]

47. **What types of energy efficient refrigeration equipment did you install? [MULTISELECT]**

1. ENERGY STAR Commercial freezer
2. ENERGY STAR Commercial refrigerator

3. Anti-sweat heater controls
4. None of these
98. DON'T KNOW
99. REFUSED

[DISPLAY Q48 IF Q47 = 1]

48. **How many ENERGY STAR commercial freezers did you install?**

1. [RECORD QUANTITY]
98. Don't know

[**DISPLAY Q49 IF Q48 = 1, REPEAT FOR EACH UP TO THREE TIMES]**

49. **What is the volume of the first freezer?**

1. [RECORD QUANTITY]
98. Don't know

[**DISPLAY Q50 IF Q48 = 1, REPEAT FOR EACH UP TO THREE TIMES]**

50. **Does this freezer have a solid door or a glass door?**

1. Solid door
2. Glass door
98. Don't know

[**DISPLAY Q51 IF Q48 = 1, REPEAT FOR EACH UP TO THREE TIMES]**

51. **Is this a vertical freezer or a chest type freezer?**

1. Vertical
2. Chest
98. Don't know

[DISPLAY Q52 IF Q47 = 2]

52. **How many ENERGY STAR commercial refrigerators did you install?**

1. [RECORD QUANTITY]
98. Don't know

[**DISPLAY Q53 IF Q52 = 2, REPEAT FOR EACH UP TO THREE TIMES]**

53. **What is the volume of the first refrigerator?**

1. [RECORD QUANTITY]
98. Don't know

[**DISPLAY Q54 IF Q52 = 2, REPEAT FOR EACH UP TO THREE TIMES]**

54. **Does this refrigerator have a solid door or a glass door?**

1. Solid door
2. Glass door
98. Don’t know

[**DISPLAY Q55 IF Q52 = 2, REPEAT FOR EACH UP TO THREE TIMES]**

55. **Is this a vertical refrigerator or a chest type refrigerator?**

1. Vertical
2. Chest
98. Don’t know

[DISPLAY Q56 IF Q47 = 3]

56. **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 Q57 IF Q56= 1 OR 3]

57. **How many humidity-based controls did you install?**

1. [RECORD QUANTITY]
98. Don’t know

[DISPLAY Q58 IF Q56= 1 OR 3]

58. **What is the total number of freezer or refrigerator doors controlled by the humidity-based controls?**

1. [RECORD QUANTITY]
98. Don’t know

[DISPLAY Q59 IF Q28 = 7]

59. **What other types of energy efficient equipment did you install?**

1. (VERBATIM)

98. DON'T KNOW
99. REFUSED

[DISPLAY Q60 if Q27 = 1]

60. **How important was your experience with the [PROGRAM_NAME] Program in your decision to install this equipment, using a scale of 0 to 10, where 0 is not at all important and 10 is extremely important?"**

[RECORD 0 – 10]
98. DON'T KNOW
99. REFUSED

[DISPLAY Q61 if Q27 = 1]

61. **If you had not participated in the [PROGRAM_NAME] Program, how likely is it that your organization would still have installed this equipment, using a 0 to 10 scale, where 0 means you definitely WOULD NOT have installed this equipment and 10 means you definitely WOULD have installed this equipment?**

[RECORD 0 – 10]
98. DON'T KNOW
99. REFUSED

Customer Satisfaction

62. **In the course of doing this project did you contact program staff from [UTILITY_SHORT] or APTIM with questions about the program or the participation process?**

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q63 IF Q62=1]

63. **Did you speak with a [UTILITY_SHORT] employee or an APTIM staff member, or staff from both [UTILITY_SHORT] and APTIM?**

1. [UTILITY_SHORT] staff
2. APTIM staff
3. Both
98. DON'T KNOW
99. REFUSED

64. **Using a scale of one to five, where one is "very dissatisfied", five is "very satisfied", and a 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
99. REFUSED

a. **[DISPLAY IF Q62 =1]** …how long it took program staff to address your questions or concerns
b. **[DISPLAY IF Q62 =1]** … how thoroughly they addressed your question or concern
c. **[DISPLAY IF Q3=1]** …the facility assessment or other technical services receive from APTIM
d. …the amount of time it took to get the rebate or incentive
e. …the range of equipment that qualifies for the program
f. …the steps you had to take to get through the program
g. …the program overall
h. …[UTILITY_SHORT] as your electrical service provider

[DISPLAY Q65 IF ANY IN Q64 <3]

65. **You indicated some dissatisfaction. Why were you dissatisfied?**

1. (VERBATIM)
98. DON'T KNOW
99. REFUSED

66. **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
99. REFUSED

67. **Do you have any suggestions for improving the program?**

1. (VERBATIM)
98. DON'T KNOW
99. REFUSED

FIRMOGRAPHIC [DO NOT DISPLAY]

Thank you for your responses. I have just a few more questions about your facility.

68. **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
    99. REFUSED

69. **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
    99. REFUSED

70. **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
    99. REFUSED

71. **What type of business is at this location? (DO NOT READ)**

    1. College / University
    2. Grocery or convenience store
    3. Hotel/Motel
    4. Industrial/Manufacturing
    5. K-12 School
    6. Medical / healthcare
    7. Office
    8. Religious worship
    9. Restaurant
    10. Retail
    11. Warehouse
    12. Other (Specify)
    98. DON'T KNOW
    99. REFUSED

72. **Do you have any other comments that you would like to relay to [UTILITY_SHORT] about energy efficiency in the commercial and industrial sector or about their programs?**

    1. (VERBATIM)
    98. DON'T KNOW
    99. REFUSED

Small Business Participant Survey

Overview:

Interviewer instructions are shown in all caps enclosed in parentheses, e.g., (INTERVIEWER INSTRUCTION)

Prepopulated variables are shown in all caps enclosed in brackets,e.g., [PREPOPULATED VARIABLE]

Programming instructions are shown in all caps, bold-type, enclosed in brackets, e.g., **[PROGRAMMING INSTRUCTION]**

Predefined Variables:

Variable	**Definition**
CONTACT NAME	Customer contact first and last name
UTILITY_FULL	Full name of utility implementing program
UTILITY_SHORT	Short name of utility implementing program
PROGRAM NAME	Name of program
COMPANY	Customer company name
LOCATION	Location description
TRADE ALLY NAME	Name of contractor customer worked with
MEASURE	Measure description referencing energy efficiency
IMPLEMENT	
IMPLEMENTED	
IMPLEMENTING	
MEASURE2	Measure description without reference to efficiency
ENERGY_USING	Yes if equipment is energy consuming and can be more efficient or standard
MEAS_QUANT	Number of units installed

Survey instrument

Hello. May I please speak with [CONTACT NAME]: ______________________)?

Hello. My name is _____ and I am calling on behalf of [UTILITY_FULL] about the [PROGRAM NAME] Program. Through this program, your facility received an onsite assessment and incentives for the installation of energy saving equipment.

This is not a sales call. We are conducting a study on behalf of [UTILITY_FULL] to help them improve their programs that service their customers.

Are you the person who is most familiar with your facility's participation in this program?

(IF NOT RIGHT PERSON) *May I have the name and telephone number for the person who would know the most about your facility's participation in this program?*

Name:

Telephone:

(IF RIGHT PERSON) *During the remainder of the interview I will refer to [UTILITY_FULL] as [UTILITY_SHORT].*

The interview will take approximately 10 minutes.

May I ask you a few questions? (IF NO, SCHEDULE CALL BACK)

Thank you.

1. Just to confirm, did your organization receive discounted energy efficiency improvements through [UTILITY_SHORT]'s [PROGRAM NAME] Program at [LOCATION]?

   1. Yes
   2. No (THANK AND TERMINATE CALL)
   98. DON'T KNOW (THANK AND TERMINATE CALL)
   99. REFUSED (THANK AND TERMINATE CALL)

2. **How did you first learn about [UTILITY_SHORT]'s [PROGRAM NAME] Program incentives for efficient equipment or upgrades? (DO NOT READ LIST)**

   1. From an [UTILITY_SHORT] Program Representative
   2. From a contractor
   3. Friends or colleagues
   4. Bill insert
   5. Email from [UTILITY_SHORT]
   6. From [UTILITY_SHORT]'s website
   7. Social media post (e.g., Facebook, Twitter, Flickr)
   8. From a [UTILITY_SHORT]'s customer service representative / employee
   9. Through an internet search (e.g., Google search)
   10. Through an internet advertisement

11. Other (please explain)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q3 IF Q2 = 2]

3. **Was it the same contractor that performed the energy assessment at your facility?**

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

Project Decision Making

4. **Not including the [MEASURE] project that your business received a discount for, has your business completed any significant energy efficiency projects in the last three years?**

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q5 IF Q4 = 1]

5. **Did you complete any of those projects without receiving a program discount or rebate?**

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q6 IF Q4 = 1]

6. **Which of the following financial methods, if any, does your organization typically use to evaluate energy efficiency improvements? [MULTI SELECT] (READ LIST)**

1. Initial Cost
2. Simple payback
3. Internal rate of return
4. Life cycle cost
5. DO NOT TYPICALLY USE FINANCIAL METHODS
98. DON'T KNOW
99. REFUSED

[DISPLAY Q7 if Q6 = 2]

7. **What payback time do you typically use when assessing energy efficiency projects?**

   1. (VERBATIM)
   98. DON'T KNOW
   99. REFUSED

[DISPLAY Q8 if Q6 = 3]

8. **What rate of return do you typically use when assessing energy efficiency projects?**

   1. (VERBATIM)
   98. DON'T KNOW
   99. REFUSED

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. In your own words, can you tell me why this project was implemented? [MULTI SELECT] (IF NEEDED: Were there any other reasons?) (UP TO THREE.) (DO NOT READ LIST)

   1. Participation was easy
   2. Because the contractor recommended it
   3. The maintenance downtime and associated expenses for the old equipment were too high
   4. To improve equipment performance
   5. To get a discount from the program
   6. To protect the environment
   7. To reduce energy costs
   8. To reduce energy use/power outages
   9. To update to the latest technology
   10. Other [RECORD VERBATIM]
   98. Don't know
   99. (Refused)

10. **Before participating in the [PROGRAM NAME] Program had you [IMPLEMENTED] any energy efficient equipment similar to the [MEASURE] at your facility located at [ADDRESS]?**

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

11. **Did you have plans to [IMPLEMENT] the [MEASURE] at the facility before deciding to participate in the [PROGRAM NAME] Program and receiving the energy assessment?**

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

12. **Would you have completed the [MEASURE] project even if you had not received the energy assessment and the program discount?**

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

13. **Did you have previous experience with the [PROGRAM NAME] Program prior to [IMPLEMENTING] the [MEASURE]?**

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q14 IF Q13 = 1]

14. **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
    99. REFUSED

15. **If the program contractor that provided the energy assessment of your facility had not recommended [IMPLEMENTING] the [MEASURE], how likely is it that you would have [IMPLEMENTED] it 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
    99. REFUSED

16. **Would you have been financially able to [IMPLEMENT] the [MEASURE] at your facility if the program discount had not been available?**

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q19 IF Q18 = 2]

17. **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 Q20 IF Q19 = 2]

18. **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?**

19. **If the discount 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
99. REFUSED

[DISPLAY Q22 IF MEAS_QUANT >1]

20. **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

99. REFUSED

[DISPLAY Q23 IF ENERGY_USING = 1]

21. **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
    99. REFUSED

[DISPLAY Q24 IF Q23 =1]

22. **What type of equipment, if any, would you have installed if you had not participated in the program?**

    1. (VERBATIM):
    98. DON'T KNOW
    99. REFUSED

23. **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 [MEAURE] earlier than you otherwise would have without the program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q26 IF Q25 = 1]

24. **When would you otherwise have [IMPLEMENTED] the [MEASURE]? Would you have done it in…**

    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

99 REFUSED

25. **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 from Entergy.**

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
99. REFUSED

[DISPLAY Q28 if Q27 = 1]

26. **What additional equipment have you installed? [MULTI SELECT] (READ LIST)**

1 Lighting
2 Lighting controls or occupancy sensors
3 Unitary or split air conditioning System or chiller
4 Room air conditioners
5 Efficient motors
6 Refrigeration equipment
7 Something else (VERBATIM)
96 Didn't implement any measures **[SKIP TO Q62]**
98. DON'T KNOW
99. REFUSED

[DISPLAY Q27 if Q27 = 1]

27. **Can you briefly describe why you decided to install this equipment without receiving a program incentive?**

1. (VERBATIM)
2. DID RECEIVE AN INCENTIVE FOR **[SKIP TO Q62]**
98. DON'T KNOW
99. REFUSED
99. REFUSED

[DISPLAY Q30 IF Q28 = 1]

28. **What type of lighting did you install? [MULTI-SELECT] (READ LIST)**

1 T8 lamps
2 T5 lamps
3 Highbay Fixtures
4 CFLs
5 LED lamps
98 DON'T KNOW
99 REFUSED

[REPEAT Q31 - Q36 FOR EACH TYPE SELECTED IN Q30]

[DISPLAY Q31 IF Q30 = 1-5]

29. **How many [Q30 RESPONSE] did you install?**

1. (RECORD NUMBER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q32 IF Q30 = 1-5]

30. **What was the average wattage of the [Q30 RESPONSE]?**

1. (RECORD NUMBER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q33 IF Q30 = 1-5]

31. **Were they installed inside or outside?**

1. Inside
2. Outside
98. DON'T KNOW
99. REFUSED

[DISPLAY Q34 IF Q30 = 1-5]

32. **Is the inside space heated, cooled, or both?**

1. Heated
2. Cooled
3. Both
98. DON'T KNOW
99. REFUSED

[DISPLAY Q35 IF Q30 = 1-5]

33. **What type of lighting did the [Q30 RESPONSE] replace?**

1. T12s (IF NEEDED: LINEAR FLOURESCENTS)
2. T8s (IF NEEDED: LINEAR FLOURESCENTS)
3. Something else (VERBATIM)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q36 IF Q30 = 1-5]

34. **How many of the old lamps or bulbs did you remove?**

1. (RECORD NUMBER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q37 IF Q28 = 2]

35. **How many fixtures are being controlled by the lighting controls?**

1. (RECORD NUMBER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q38 IF Q28 = 2]

36. **On average, how many lamps or bulbs does each fixture contain?**

1. (RECORD NUMBER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q39 IF Q28 = 2]

37. **What is the average wattage of these lamps?**

1. (RECORD NUMBER)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q40 IF Q28 = 3]

38. **What types of energy efficient equipment did you install as part of the HVAC project? [MULTI SELECT] (READ LIST)**

    1. Split air conditioning system (IF NEEDED: An A/C system that has an evaporator indoors and the compressor and condenser outdoors.)
    2. Packaged air conditioning system (IF NEEDED: 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 (IF NEEDED: An electric heating and cooling system)
    4. Air cooled chiller (IF NEEDED: A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
    5. Water cooled chiller (IF NEEDED: A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
    6. Other
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q41 IF Q28 = 3]

39. **Can you tell me how many units of that equipment you installed and what the efficiency rating is?**

    1. (RECORD QUANTITY AND EFFICENCY FOR EACH TYPE MENTIONED)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q42 IF Q28 = 4]

40. **How many room air conditioners did you install?**

    1. (RECORD QUANTITY)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q43 IF Q28 = 5]

41. **How many motors did you install?**

    1. (RECORD QUANTITY)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q44 IF Q28 = 5]

42. **What is the approximate average horsepower of the new motors? (IF NEEDED: WHAT IS THE AVERAGE ACROSS ALL OF THE MOTORS YOU INSTALLED WITHOUT AN INCENTIVE)**

    1. (RECORD HORSEPOWER)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q45 IF Q28 = 5]

43. **What is the approximate average efficiency of the new motors? (IF NEEDED: WHAT IS THE AVERAGE EFFICIENCY ACROSS ALL OF THE NEW MOTORS)**

    1. (RECORD 0 -100%)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q46 IF Q28 = 5]

44. **On average, how many hours per day do the motors operate? (IF NEEDED: WHAT IS THE AVERAGE NUMBER OF HOURS THE MOTORS OPERATE ACROSS ALL OF THE MOTORS YOU INSTALLED)**

    1. (RECORD HOURS)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q47 IF Q28 = 6]

45. **What types of energy efficient refrigeration equipment did you install?**

    1. (VERBATIM)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q59 IF Q28 = 7]

46. **What other types of energy efficient equipment did you install?**

    1. (VERBATIM)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q60 if Q27 = 1]

47. **How important was your experience with the [PROGRAM_NAME] Program in your decision to install this equipment, using a scale of 0 to 10, where 0 is not at all important and 10 is extremely important?"**

    [RECORD 0 – 10]

98. DON'T KNOW
99. REFUSED

[DISPLAY Q61 if Q27 = 1]

48. **If you had not participated in the [PROGRAM_NAME] Program, how likely is it that your organization would still have installed this equipment, using a 0 to 10 scale, where 0 means you definitely WOULD NOT have installed this equipment and 10 means you definitely WOULD have installed this equipment?**

[RECORD 0 – 10]
98. DON'T KNOW
99. REFUSED

[DISPLAY Q49 if Q27 = 1]

49. **How important was your experience with the [PROGRAM_NAME] Program in your decision to install this equipment, using a scale of 0 to 10, where 0 is not at all important and 10 is extremely important?"**

[RECORD 0 – 10]
98. DON'T KNOW
99. REFUSED

Customer Satisfaction

50. **In the course of doing this project did you contact program staff from [UTILITY_SHORT] or APTIM with questions about the program or the participation process?**

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

51. **Using a scale of one to five, where one means "very dissatisfied" and five means "very satisfied", how dissatisfied or satisfied were you with: [ASK A AND B FIRST, ASK C- F IN RANDOM ORDER, ASK G AND H LAST]**

[RECORD 1 – 5]
98. DON'T KNOW
99. REFUSED

a. [DISPLAY IF **Q62 = 1]** how long it took program staff to address your questions or concerns

b. [DISPLAY IF **Q62 = 1]** how thoroughly they addressed your question or concern

c. …the amount of time between the audit and the installation of the equipment

d. …the range of equipment that qualifies for the program
e. …the equipment that was installed
f. … the quality of the installation
g. …the program overall
h. …[UTILITY_SHORT] as your electrical service provider

[DISPLAY Q65 IF ANY IN Q51 <3]

52. **You indicated some dissatisfaction. Why were you dissatisfied?**

    1. (VERBATIM)
    98. DON'T KNOW
    99. REFUSED

53. **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
    99. REFUSED

FIRMOGRAPHIC

Thank you for your responses. I have just a few more questions about your facility.

54. **Which best describes your facility located 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
    99. REFUSED

55. **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

99. REFUSED

56. **What is the primary water heating fuel type for the facility located at [LOCATION]?**

1. Natural gas
2. Electricity
3. Propane
4. Oil
5. Other (Please specify)
98. DON’T KNOW
99. REFUSED

57. **What is the primary space heating fuel type for the facility located at [LOCATION]?**

1. Natural gas
2. Electricity
3. Propane
4. Oil
5. Other (Please specify)
98. DON’T KNOW
99. REFUSED

58. **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
99. REFUSED

59. **What type of business is at this location? (DO NOT READ)**

1. Grocery or convenience store
2. Hotel / motel
3. K-12 school
4. Medical / healthcare
5. Office
6. Religious worship
7. Restaurant
8. Retail
9. Other (Please specify)
98. DON’T KNOW
99. REFUSED

Entergy Energy Smart Residential Program Participant Survey

Overview:

Interviewer instructions are shown in all caps enclosed in parentheses, e.g., (INTERVIEWER INSTRUCTION)
Do not read response options in ALL CAPS
Prepopulated variables are shown in all caps enclosed in brackets,e.g., [PREPOPULATED VARIABLE]
Programming instructions are shown in all caps, bold-type, enclosed in brackets, e.g., **[PROGRAMMING INSTRUCTION]**

Predefined Variables:

Variable	**Definition**
CONTACT_NAME	Customer contact first and last name
PHONE	
UTILITY_FULL	Full name of utility implementing program
UTILITY_SHORT	Abbreviated name of utility
PROGRAM_NAME	Name of program
PROGRAM	1 = HPwES 2 = IQW 3 = RLA 4 = AC TUNE UP 5 = MultiFamily Air Duct Sealing
PROJECT_DATE	Date of measures installation
MEASURE_1_EFF	First selected incentivized measure, referencing efficiency
MEASURE_2_EFF	Second selected incentivized measure, referencing efficiency
MEASURE_1_NOEFF	First selected incentivized measure, not referencing efficiency
MEASURE_2_NOEFF	Second selected incentivized measure, not referencing efficiency

MEASURE_1_COUNT	Number of measure types installed, 0 if CFLs direct install
MEASURE_2_COUNT	Number of measure types installed, 0 if CFLs direct install
LOCATION	Site street address
PROJECT_DESCRIPTION	Description of project.
PROGRAM_YEAR	Program year
CFL_TOTAL	Total number of CFLs installed
INSTALL_COMPLETE_1	
INSTALLED_COMPLETED_1	
INSTALL_COMPLETE_2	
INSTALLED_COMPLETED_2	
LIA&Wx	1 if LIA&Wx participant, else 0
STAND_1_OPT	1 if installed equipment for which there is a standard efficiency option, else = 0.
STAND_2_OPT	1 if installed equipment for which there is a standard efficiency option, else = 0.
CONTRACTOR_PROJ	1 if contractor implemented project
TUNEUP_UNITS	Number of AC units that were tuned-up
CONTRACTOR	Contractor firm
RECRUIT_VERI	1 to recruit customers who had either/both air sealing and duct sealing, else 0.

Survey instrument
Hello. May I please speak with [CONTACT_NAME]: ______________________)?

[DISPLAY IF CFL_TOTAL = 0]

Hello. My name is _____ and I am calling on behalf of [UTILITY_FULL] about the [PROGRAM NAME] Program. Through this program, you received a discount or rebate on [PROJECT DESCRIPTION].

[DISPLAY IF CFL_TOTAL > 0]

Hello. My name is _____ and I am calling on behalf of Entergy about the Green Light New Orleans Light Bulb Program. Through this program, you received some compact fluorescent lights or CFLs. This program received funding through Entergy's Energy Smart Program.

[DISPLAY ALL]

This is not a sales call. We are conducting a study on behalf of [UTILITY_FULL] to help them improve their programs that service their customers.

Are you the person who is most familiar with participating in this program?

(NOTE: SOME PARTICIPANTS MAY NOTE THAT THEY HAVE PARTICIPATED IN MULTIPLE PROGRAMS. IN THESE CASES, STATE THAT THE SURVEY IS ABOUT THEIR PARTICIPATION IN THE PROGRAM IDENTIFIED ABOVE)

(IF NOT RIGHT PERSON) *May I have the name and telephone number for the person who would know the most about the participation in the program?*

Name:

Telephone:

(IF RIGHT PERSON)

The interview will take approximately 10 minutes.

May I ask you a few questions? (IF NO, SCHEDULE CALL BACK)

Thank you. During the remainder of the interview I will refer to [UTILITY_FULL] as [UTILITY_SHORT].

[DISPLAY Q1 IF PROGRAM = 1 OR 2]

1. Just to confirm, did you receive a home energy assessment through [UTILITY_SHORT]'s [PROGRAM_NAME] Program at [LOCATION] in [PROGRAM _YEAR]? (IF RESPONDENT INDICATES PARTICIPATING IN ANOTHER PROGRAM, CONFIRM PARTICIPATION IN THE PROGRAM ASKED ABOUT IN THE QUESTION)

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q2 IF MEASURE_COUNT > 0]

2. **Our records indicate that you installed [PROJECT_DESCRIPTION] through [UTILITY_SHORT]'s [PROGRAM_NAME] in [PROGRAM_YEAR]. Is that correct? (IF RESPONDENT INDICATES PARTICIPATING IN ANOTHER PROGRAM, CONFIRM PARTICIPATION IN THE PROGRAM ASKED ABOUT IN THE QUESTION)**

   1. Yes
   2. No (THANK AND TERMINATE CALL)
   98. DON'T KNOW (THANK AND TERMINATE CALL)
   99. REFUSED (THANK AND TERMINATE CALL)

[DIPLAY Q3 IF CFL_TOTAL > 0]

3. **Just to confirm, were some compact fluorescent light bulbs, or CFLs, installed in your home located at [LOCATION] through the Green Light New Orleans Program? (IF RESPONDENT INDICATES PARTICIPATING IN ANOTHER PROGRAM, CONFIRM PARTICIPATION IN THE PROGRAM ASKED ABOUT IN THE QUESTION)**

   1. Yes
   2. No (THANK AND TERMINATE CALL)
   98. DON'T KNOW (THANK AND TERMINATE CALL)
   99. REFUSED (THANK AND TERMINATE CALL)

CFL VERIFICATION AND IN-SERVICE RATE

[DIPLAY Q4 IF CFL_TOTAL > 0]

4. **Thanks for confirming my information. Now I would like to verify the quantity of CFLs that were installed in your home.**

According to our records, [CFL_TOTAL] CFLs were installed in your home. Does that sound about right?

   1. Yes
   2. No
   98. DON'T KNOW
   99. REFUSED

[DISPLAY Q5 IF Q4 = 2]

5. **How many CFLs were installed in your home?**

   1. (RECORD QUANTITY) **[RECORD AS CFL_TOTAL FOR USE IN LATER QUESTIONS]**

98. DON’T KNOW
99. REFUSED

[DIPLAY Q6 IF CFL_TOTAL > 0]

6. We would like to know what type of bulbs the new CFLs replaced. Did any of the [CFL_TOTAL] CFLs that were installed replace existing CFLs or LEDs that were installed in your home?

1.Yes
2.No
98.DON’T KNOW
99.REFUSED

[DISPLAY Q7 IF Q6 =1]

7. Just to make sure that I understand, some of the light bulbs that were removed when the new bulbs were installed were CFLs. Is that correct?

1.Yes
2.No
98.DON’T KNOW
99.REFUSED

[DISPLAY Q8 IF Q7= 1]

8. How many of the [CFL_TOTAL] replaced CFLs or LEDs?

1. (NUMBER OF CFLS OR LEDS REPLACED)
98. DON’T KNOW
99. REFUSED

[DISPLAY Q9 IF Q4 = 1 OR [Q4 = 2 AND Q5 <> 98, 99]]

9. Have you removed any of the [CFL_TOTAL] CFLs that were installed since they were installed?

1. Yes
2. No
98. DON’T KNOW
99. REFUSED

[DISPLAY Q10 IF Q9 = 1]

10. How many of the [CFL_TOTAL] have you removed?

1. (NUMBER REMOVED)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q11 IF Q9 = 1]

11. Why did you remove the CFLs?

Program Awareness and Project Decision Making

I have a few questions about how you learned of the program and your decision to participate in the [PROGRAM_NAME].

12. How did you first learn first learn of the program? (DO NOT READ LIST)

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. From [UTILITY_SHORT]'s website
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. Through a retailer
15. Other (please explain)
98. DON'T KNOW
99. REFUSED

13. Why did you decide to participate in the program? [MULTI-SELECT] (DO NOT READ)

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 discount/rebate
8. Get the free CFLs
9. Other (VERBATIM)
98. DON'T KNOW

99. REFUSED

[DISPLAY Q14 IF TUNEUP_UNITS >0]

14. Had you had air conditioner tune-ups completed at this location before you participated in [UTILITY_SHORT]'s program?

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q15 IF Q14 = 1]

15. When was the last tune-up completed? Was it…

1. 0-6 months ago
2. 7-12 months ago
3. 1 to 2 years ago
4. 2 to 3 years ago
5. 3 to 5 years ago
6. More than 5 years ago
98. DON'T KNOW
99. REFUSED

FREE-RIDERSHIP

[**DISPLAY Q16 IF CFL_TOTAL > 0]**

16. Before you requested the free CFLs, did you have specific plans to purchase CFLs for your home?

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q17 IF Q16 = 1]

17. How many CFLs were you planning to purchase before you heard of the program?

1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q18 IF Q16 = 1]

18. When do you think you would have purchased those CFLs if they had not been provided for free through the program? Would you say…

1. Within 6 months of when you requested the free CFLs
2. Between 6 and 12 months
3. In more than a year
98. DON'T KNOW
99. REFUSED

[**DISPLAY Q19 IF CFL_TOTAL > 0]**

19. Overall, how likely or unlikely would you have been to purchase CFLs within one year of when you received them if you had not received them for free? 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

[DISPLAY Q20 IF Q1 = 1 AND PROGRAM <> 2]]

20. Prior to learning about the program, did you have plans to have an energy assessment of your home performed?
1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q21 IF PROGRAM <> 2 AND MEASURE_COUNT_1 = 1 OR MEASURE_COUNT_2 = 1]

21. Prior to learning about the program, did you have plans to [INSTALL_COMPLETE_1] the [MEASURE_1_EFF] that you received a discount or rebate for?

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q22 IF Q21 = 1 AND MEASURE_1_STANDOPT = 1]

22. Just to be clear, did you have plans to specifically [INSTALL_COMPLETE_1] an [MEASURE_1_EFF] as opposed to a standard efficiency [MEASURE_1_NOEFF]?

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q23 IF PROGRAM <> 2 AND MEASURE_COUNT_1 = 1 OR MEASURE_COUNT_2 = 1]

23. Would you have been financially able to [INSTALL_COMPLETE_1] the [MEASURE_1_EFF] if a discount or rebate had not been provided through the program?
1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q24 IF PROGRAM <> 2 AND MEASURE_COUNT_1 = 1 OR MEASURE_COUNT_2 = 1]

24. How likely is it that you would have [INSTALLED_COMPLETED_1] the same [MEASURE_1_EFF] that you [INSTALLED_COMPLETED_1] through the program if the discount or rebate was not available? 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

[DISPLAY Q25 IF Q1 = 1 AND MEASURE_COUNT_1 = 1 OR MEASURE_COUNT_2 = 1]

25. How likely is that you would have [INSTALLED_COMPLETED_1] the same [MEASURE_1_EFF] had it not been recommended through the energy assessment of your home? 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

[DISPLAY Q26 IF PROGRAM <> 2 AND MEASURE_COUNT_1 = 1 OR MEASURE_COUNT_2 = 1 AND Q25 = 1, 2, 3, or 4 OR Q24 = 1, 2, 3, or 4]]

26. When might you have [INSTALLED_COMPLETED_1] the same [MEASURE_1_EFF] if you had not participated in the program? Would you say in…
    1 0 to 6 months
    2 6 months to 1 year
    3 1 to 2 years
    4 2 to 3 years
    5 More than 3 years
    6 NEVER
    98 DON'T KNOW
    99 REFUSED

[DISPLAY Q27 IF PROGRAM <> 2 AND MEAS_COUNT_2 = 1]

27. **Prior to learning about the program, did you have plans to [INSTALL_COMPLETE_2] the [MEASURE_2_EFF] that you received a discount or rebate for?**

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q28 IF Q27 = 1 AND MEASURE_2_STANDOPT = 1]

28. **Just to be clear, did you have plans to specifically [INSTALL_COMPLETE_2] an [MEASURE_2_EFF] as opposed to a standard efficiency [MEASURE_2_NOEFF]?**

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q29 IF PROGRAM <> 2 AND MEASURE_COUNT_2 = 1]

29. Would you have been financially able to [INSTALL_COMPLETE_2] the [MEASURE_2_EFF] if a discount or rebate had not been provided through the program?
    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q30 IF PROGRAM <> 2 AND MEASURE_COUNT_2 = 1]

30. How likely is it that you would have [INSTALLED_COMPLETED_2] the same [MEASURE_2_EFF] that you [INSTALLED_COMPLETED_2] through the program if the discount or rebate was not available? 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

[DISPLAY Q31 IF Q1 = 1 AND IF MEASURE_COUNT_2 = 1]

31. How likely is that you would have [INSTALLED_COMPLETED_2] the same [MEASURE_2_EFF] had it not been recommended through the energy assessment of your home? 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

[DISPLAY Q32 IF PROGRAM <> 2 AND MEASURE_COUNT_2 = 1 AND [Q30= 1, 2, 3, or 4 OR Q31 = 1, 2, 3, or 4]]

32. When might you have [INSTALLED_COMPLETED_2] the same [MEASURE_2_EFF] if you had not participated in the program? Would you say in…
    1 0 to 6 months
    2 6 months to 1 year
    3 1 to 2 years
    4 2 to 3 years
    5 More than 3 years
    6 NEVER
    98 DON'T KNOW
    99 REFUSED

SPILLOVER

[DISPLAY Q33 IF PROGRAM <> 2 AND CFL_TOTAL = 0]

33. Because of your experience with the [PROGRAM_NAME] Program, have you bought and installed any additional energy efficient items on your own without a rebate or discount from Entergy?
    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q34 IF Q33 =1]

34. We would like to know what you purchased and installed because of your experience with the program and for which you DID NOT get a rebate or discount from Entergy.

For each of the following items, please tell me if you purchased and installed them WITHOUT GETTING a rebate or discount. (READ LIST)

1. CFLs (Compact Fluorescent Light bulbs)
2. LED Light Bulbs
3. An energy efficient appliance such as a refrigerator, dishwasher, clothes washer, or clothes dryer.
4. Water Heater Pipe Insulation
5. Water Heater Jacket/Blanket/Insulation
6. Low Flow Faucet Aerators
7. Low Flow Showerhead
8. Something else
98. DON'T KNOW
99. REFUSED

[DISPLAY Q35 IF Q34= 1]

35. How many CFLs did you purchase and install?
1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q36 IF Q34= 2]

36. How many LEDs did you purchase and install?
1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q37 IF Q34= 3]

37. What kind of appliance did you purchase?

1. (VERBATIM)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q38 IF Q34= 3]

38. How do you know it is an energy efficient appliance?

1. (VERBATIM)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q39 IF Q34= 4]

39. Do you know about how many feet of water heater pipe insulation you purchased and installed?
1. (RECORD QUANTITY IN FEET)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q40 IF Q34= 6]

40. How many low flow faucet aerators did you install in bathroom sinks?
1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q41 IF Q34= 6]

41. How many low flow faucet aerators did you install in kitchen sinks?
1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q42 IF Q34= 7]

42. How many low flow shower heads did you install?
1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q43 IF Q34= 8]

43. What other energy efficient items did you install?

1. (VERBATIM)
98. DON'T KNOW
99. REFUSED

[DISPLAY Q44 IF Q33 = 1]

44. 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?
    [RECORD 0-10]
    98. DON’T KNOW
    99. REFUSED

[DISPLAY Q45 IF Q44 > 4]

45. Could you briefly tell me how your experience with the program influenced your decision to purchase and install the additional energy efficient items?

    (VERBATIM)

[DISPLAY Q46 IF Q33 = 1]

46. 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?
    [RECORD 0-10]
    98. DON’T KNOW
    99. REFUSED

Customer Satisfaction

[DISPLAY Q47 IF CFL_TOTAL = 0]

47. Not counting any contractors or energy consultants that you hired, in the course of completing the project, did you contact program staff from [UTILITY_SHORT] or Aptim with questions about completing your project?

    1. Yes
    2. No
    98. DON’T KNOW
    99. REFUSED

48. Using a scale of one to five, where one is “very dissatisfied” and five is “very satisfied”, please rate how dissatisfied or satisfied you are with each of the following … [ASK A AND B FIRST, RANDOMIZE ORDER OF C - I, ASK J AND K LAST]

    [RECORD 1-5]
    98. DON’T KNOW
    99. REFUSED

i. **[DISPLAY IF Q47 =1]** how long it took program staff to address your questions or concerns

j. **[DISPLAY IF Q47=1]** how thoroughly they addressed your question or concern

k. **[DISPLAY IF CONTRACTOR_PROJ = 1]** the quality of the work performed by your contractor

l. [**DISPLAY IF CFL_TOTAL > 0]** The process of having the CFLs installed in your home

m. the energy savings on your utility bill

n. **[DISPLAY IF MEASURE_COUNT_1 = 1 OR MEASURE_COUNT_2 = 1]** the energy efficiency improvements made through the program

o. [**DISPLAY IF CFL_TOTAL > 0]** the CFLs installed in your home

p. the program participation process

q. **[DISPLAY IF PROGRAM <> 2 AND MEASURE_COUNT_1 = 1 OR MEASURE_COUNT_2 = 1]** the rebate or discount amount for the [MEASURE]

r. the program overall

s. [UTILITY_SHORT] as your electrical service provider

[DISPLAY Q65 IF ANY IN Q48 <3]

49. You indicated some dissatisfaction. Why were you dissatisfied?

VERBATIM)

50. Using the same scale of one to five, where one is “very dissatisfied” and five is “very satisfied”, how satisfied would you say you are with [UTILITY_SHORT] as your electrical service provider?

[RECORD 1-5]

98. DON’T KNOW
99. REFUSED

51. 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
99. REFUSED

DEMOGRAPHIC

I now have a couple of 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.

52. Which of the following best describes this residence? (READ LIST)

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. REFUSED

53. When was this residence 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

54. What is the approximate square footage of this residence? (IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF SIZE RANGES UNTIL RESPONDENT INDICATES ONE)

1. (VERBATIM)
2. Less than 1,000
3. 1,001-1,500
4. 1,501-2,000
5. 2,001-2,500
6. Greater than 2,500
98. DON'T KNOW
99. REFUSED

55. What type of heating system does this residence have?

1. Natural gas heating
2. Electric heating
3. Combination of types (VERBATIM)
4. Other (VERBATIM)

98. DON'T KNOW
99. REFUSED

56. What type of water heater does this residence have?

1. Natural gas water heater
2. Electric water heater
3. Other (VERBATIM)
98. DON'T KNOW
99. REFUSED

57. 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. REFUSED

58. Including yourself, how many people currently live in this residence year-round?

1. (RECORD QUANTITY)
98. DON'T KNOW
99. REFUSED

59. I'm going to read off a list of income ranges, please indicate which range your total household income falls into. Is the total annual income of your household:

1. Less than $25,000
2. $25,000 - $50,000
3. $51,000 - $75,000
4. $76,000 – $100,000
5. Greater than $100,000
98. DON'T KNOW
99. REFUSED

60. What's the highest level of education you've completed? (DON'T READ)

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
99. REFUSED

[DISPLAY Q61 IF RECRUIT_VERI = 1]

61. As part of our evaluation of [UTILITY_SHORT] ‘s programs, we’ve been performing site visits to participating homes to gather more information about the measures installed as a result of the program. If selected, you can expect this visit to take approximately one to two hours and you will receive $50 gift card to Rouse’s for your participation. Would you be interested in this?

1. Yes

(Thank you. We will be selecting customers at random and may contact you in the next couple of weeks to set up a time and day for a visit.)

2. No

PROGRAM: Energy Smart Nest Pilot Program

GROUP: Participants of the Energy Smart Nest Pilot Program

MODE OF ADMINISTRATION: Paper

This survey is about the Nest smart thermostat installed in your residence.

Please mark your answer to the questions with an **X**.

When you have completed the survey, please mail it using the included stamped and addressed envelope.

1. According to our records, a Nest Smart Thermostat was installed in this residence through the Entergy Program.

   Is the Nest Thermostat currently installed?
   ( ) Yes
   ( ) No
   ( ) Not sure

2. Did you live at this location when the Nest Thermostat was installed?
.
   ( ) Yes
   ( ) No → **Go to Q6**
   ( ) Not sure → **Go to Q6**

3. Have you noticed any savings in your home energy costs since the thermostat was installed?
   ( ) Yes
   ( ) No
   ( ) Don't know

4. How satisfied were you with the thermostat installation process?
   ( ) Very satisfied → **Go to Q6**
   ( ) Somewhat satisfied → **Go to Q6**
   ( ) Neither satisfied nor dissatisfied → **Go to Q6**
   ( ) Somewhat dissatisfied
   ( ) Very dissatisfied
   ( ) Don't know → **Go to Q6**

5. Why were you dissatisfied with the installation?

____

____

→ **Go to Page 2**

6. Had you heard of smart thermostats before using the one in installed in your residence?
   ( ) Yes
   ( ) No → **Go to Q8**

7. Which brands or models of thermostats had you heard of?

   Please mark as many as apply
   ( ) Not aware of any specific brands or models
   ( ) Nest
   ( ) Ecobee
   ( ) Honeywell Lyric
   ( ) Emerson Sensi
   ( ) Another type of thermostat (Please specify) ___________________________________
   ( ) Don't know

8. Which of the following best describes the type of thermostat that was installed at this residence before the new thermostat was installed?
   ( ) A simple on/off switch → **Go to Q10**
   ( ) A thermostat that allowed you to set the temperature but DID NOT let you schedule different temperatures at different times → **Go to Q10**
   ( ) A thermostat that allowed you to program a schedule with different temperature settings at different times
   ( ) Other → **Go to Q10**
   ( ) Don't know → **Go to Q10**

9. Was your old thermostat programmed at the time it was replaced with the new one?
   ( ) Yes
   ( ) No
   ( ) Don't know

10. Have you had any problems with the Nest thermostat?
    ( ) Yes
    ( ) No→ **Go to Q12**
    ( ) Don't know→ **Go to Q12**

11. What type of problem have you had?
    ( ) Home has been too cold
    ( ) Home has been too warm
    ( ) Difficulty controlling or setting the temperature
    ( ) Internet connection issues
    ( ) Other (specify) ______________________________________
    ( ) Don't know

→ Go to Page 3

12. Have you used the Nest mobile app on a smart phone or tablet?
    ( ) Yes
    ( ) No
    ( ) Don't know

13. The Nest thermostat automatically sets a heating and cooling schedule based on your temperature settings during the learning period.

    Have you disabled the auto-scheduling feature?
    ( ) Yes
    ( ) No→ **Go to Q15**
    ( ) Don't know→ **Go to Q15**

14. Why did you disable auto-scheduling?

    ____

    ____

15. Have you manually adjusted the temperature setting after the initial learning period?
    ( ) Yes
    ( ) No→ **Go to Q17**
    ( ) Don't know→ **Go to Q17**

16. Did you make these adjustments to reduce energy use or improve the comfort of your home?
    ( ) To reduce energy use
    ( ) To improve home comfort
    ( ) Made adjustments for both reasons
    ( ) Don't know

→ Go to Page 4

17. How useful are the following features of the Nest smart thermostat?

	Not at all useful	Slightly useful	Moderately useful	Very useful	Have not used	Don't know
Adjusting the temperature with a smart phone	( )	( )	( )	( )	( )	( )
Early-On: The feature that turns on heating and cooling so that the desired temperature is reached at the scheduled time	( )	( )	( )	( )	( )	( )

Cool to Dry: The feature that reduces humidity in your home	( )	( )	( )	( )	( )	( )
Filter reminders: Reminders to change your air filter	( )	( )	( )	( )	( )	( )
Autoschedule: The feature that sets a schedule based on what temperatures you like	( )	( )	( )	( )	( )	( )
My Energy History: See how much your system has run and energy used	( )	( )	( )	( )	( )	( )
Nest Leaf: Appears when you set it to a temperature that will save energy	( )	( )	( )	( )	( )	( )

→ Go to Page 5

18. How easy or difficult to use are the following aspects of the Nest smart thermostat?

	Very difficult	Somewhat difficult	Neither easy nor difficult	Somewhat easy	Very easy	Have not used this feature	Don’t know
The thermostat user interface, overall	( )	( )	( )	( )	( )	( )	( )
Adjusting the temperature in your home	( )	( )	( )	( )	( )	( )	( )
Setting up or changing the heating or cooling schedule	( )	( )	( )	( )	( )	( )	( )
The mobile app user interface	( )	( )	( )	( )	( )	( )	( )

19. Since the Nest thermostat was installed, do you think the temperature of your home is more or less comfortable than before it was installed? Would you say the temperature is…

( ) A lot more comfortable now
( ) Somewhat more comfortable now
( ) The level of comfort is about the same

( ) Somewhat less comfortable now
( ) A lot less comfortable now
( ) Don’t know / Moved in after [INSTALL DATE]

20. If you were to purchase a Nest smart thermostat on your own, how much would you be willing to pay for the Nest smart thermostat?

$ ___________

→ **Go to Page 6**

21. Entergy is considering offering a program that would provide a rebate for reducing the use of your air conditioner. Under this program, Entergy would communicate with your smart thermostat to turn off your air conditioner for short periods during the hottest summer weekday afternoons. In exchange, you would save **$5 a month** off your summer electricity bills.

    Using a scale of 0 – 10 where 0 means not at all interested and 10 means very interested, how interested are you in signing up for this program?

0 - Not at all interested	1	2	3	4	5	6	7	8	9	10 – Very interested	Don’t know
( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

22. Now consider the same program but in exchange for participating you would receive **$10 a month** off of your summer electricity bills?

    Using the same 0 – 10 scale, how interested are you in signing up for this program?

0 - Not at all interested	1	2	3	4	5	6	7	8	9	10 – Very interested	Don’t know
( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

23. Now consider the same program but in exchange for participating you would receive **$15 a month** off of your summer electricity bills?

    Using the same 0 – 10 scale, how interested are you in signing up for this program?

0 - Not at all interested	1	2	3	4	5	6	7	8	9	10 – Very interested	Don’t know
( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

→ Go to Page 7

24. Please rate how dissatisfied or satisfied you are with each of the following …

	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied	Not applicable	Don’t know
the Nest thermostat, overall	( )	( )	( )	( )	( )	( )	( )
the information provided to you about the thermostat	( )	( )	( )	( )	( )	( )	( )
Entergy as your electrical service provider	( )	( )	( )	( )	( )	( )	( )

The next few questions are about your home and the people that live there questions about your residence. These are anonymous and will be used solely for the purpose of combining different customers’ responses. You may choose to not answer any or all of these questions.

25. About how many square feet is your home? Your best estimate is fine.

____

26. Did this residence subscribe to internet service during the entire period between when the thermostat was installed in [INSTALL DATE] and today?

( ) Yes
( ) No
( ) Don’t know / Moved in after [INSTALL DATE]

27. During that period, did you have wi-fi internet access in your home?
( ) Yes
( ) No
( ) Don’t know / Moved in after [INSTALL DATE]

28. Including yourself, how many people currently live in this residence year-round?

____

→ **Go to Page 8**

29. 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 2016?
( ) Less than $10,000
( ) $10,000 to less than $20,000
( ) $20,000 to less than $30,000
( ) $30,000 to less than $40,000
( ) $40,000 to less than $50,000
( ) $50,000 to less than $75,000
( ) $75,000 to less than $100,000
( ) $100,000 to less than $150,000
( ) $150,000 to less than $200,000
( ) $200,000 or more
( ) Don't know / Prefer not to state

30. What's the highest level of education you've completed?

( ) Did not graduate high school
( ) High school graduate
( ) Associates degree, vocational/technical school, or some college
( ) Four-year college degree
( ) Graduate or professional degree
( ) Don't know / Prefer not to state

Thank You!

Please use the included stamped and addressed envelope to return the survey

ENO Nest Smart Thermostat Pilot Contractor Interview Guide

1. To begin with can you briefly tell me about your role and responsibilities at [INSERT COMPANY] and what role you played while your company took part in the Nest Smart Thermostat Program?

2. How many staff from your company provided services through the program?

3. Prior to your work with this program, did your company have experience installing the Nest thermostat?

    a. Familiarity with Nest Thermostats
    b. Familiarity with Smart Thermostats in General.
    c. Would you typically install Nest Thermostats (or any smart thermostat) as part of a new HVAC installation?

Installation process

4. Now I have a few questions about the installation process. Can you tell me about the process through which work is scheduled for your company to perform?
    a. How do you learn of the work?
    b. Are you assigned a date to complete the work on? How much notice do you get?
    c. Did you get a statement of work?
    d. Did your firm notify tenants of the installations? Who was responsible for that? Did you have any cases where tenants were not aware the thermostats were to be installed?
    e. Did you install the thermostats in occupied and unoccupied units?
    f. Overall, is there anything that you think could have been improved about the process of scheduling work for your company?

5. What information did you record about the installation?
    a. Type of thermostat replaced?
    b. Programmable thermostat set points?
    c. HVAC system characteristics (e.g., heat pump, gas or electric heat)
    d. How was this recorded? Paper form, electronic, etc.

6. About what share of installs replaced a programmable thermostat that was programmed?

7. Did you speak with tenants about how to use and operate the thermostat?
    a. What topics did you talk about?
    b. Did you have any handouts or leave behind materials provided by the program?
    c. What kinds of questions or issues did they raise about operating the thermostat?
    d. Did you provide any information on who to contact if they have a problem with the thermostat? Who did you tell them to contact?
    e. About how much time did you typically spend with a resident discussing the operations of the thermostat?

8. Did your firm encounter any challenges in completing the installations? How were these handled?
    a. Getting access to tenant units / Tenants refusing to have it installed?
    b. Wiring problems?
    c. HVAC system problems?

9. About how long did a typical installation in a tenant unit take?
    a. Where there any factors that could result an installation taking a particularly long time? If so, what where they?

10. Have any tenants contacted you regarding a problem with their thermostat since it was installed?
    a. Does your firm address the issue or do you refer them to someone else? Who?
    b. What type of issues have been raised?

Training

11. Did you receive training from CLEAResult or another program partner related to the installation of the Nest thermostats?
    a. What topics were covered?
    b. Was the information presented clearly?
    c. Was there any aspect of the installation process that wasn't covered or could have been covered more clearly?
    d. Is there anything about the training that you received that could be improved?
    e. Is there any additional training that you think your company would benefit from?

12. How many of your company's staff attended this training?

Final Questions

13. Did you get any feedback from tenants regarding whether or not they generally liked the thermostats?

14. One of the goals of the program is to help customers save energy on their heating and cooling bills. Do you have any suggested changes to the smart thermostat programs to maximize the energy savings realized by customers?

15. Do you have any suggestions for how the program, scheduling, or installation process could be improved?

16.1Customer Contact Letters

16.1.1Introductory Letter

ENERGY RESEARCH
AND EVALUATION

[DATE]

Dear Entergy Customer,

Entergy has hired ADM Associates, an independent research team, to evaluate its pilot program that installed Nest smart thermostats in customer's residences. As part of this evaluation, ADM is asking customers like you who have the Nest thermostat installed in their homes to complete the attached survey.

Your feedback will help Entergy to improve programs that help consumers save energy.

We are offering a $10 Rouse's gift card to customers that complete the attached survey. To receive the $10 gift card, you must either complete the survey online by [FINAL DATE], or mail the printed survey so that it is postmarked by [FINAL DATE].

We have enclosed a copy of the survey, along with a self-addressed, stamped envelope for you to mail once it is completed. Or if you prefer, you may instead complete the survey online. To complete the survey online, go to the web address listed below and enter your password.

Survey web address: [WEBSITE]

Survey password: [PASSWORD]

We appreciate your support of Entergy's energy efficiency efforts, and we are grateful for your participation in this research. All data collected during this research will remain confidential and will be used to improve Entergy's energy efficiency programs.

Thank you in advance for your participation. If you have any questions regarding this survey, please contact [NAME REDACTED] at ADM Associates. If you would like to speak with an Entergy representative you may contact:

[NAME REDACTED]
Entergy New Orleans, Inc.
[PHONE REDACTED]
[EMAIL REDACTED]

Sincerely,

[NAME REDACTED]
ADM Associates, Inc.
[PHONE REDACTED]
[EMAIL REDACTED]

16.1.2Thank-you Letter

[DATE]

Dear Entergy Customer,

Thank you for completing the survey regarding the Energy Smart Nest Thermostat Program. The information you provided will help us to evaluate and improve the program.

To thank you for your participation, we have included a $10 Rouses' gift card.

Thank you for your input.

Sincerely,

[NAME REDACTED]
ADM Associates, Inc.
[PHONE REDACTED]
[EMAIL REDACTED]

17.Appendix C: Smart Thermostats Appendices

17.1Registered vs Unregistered Analysis

17.1.1Registered Nest Thermostats kWh Savings Analysis

Of the 253 raw customers found to register their Nest smart thermostat, 213 were validated as unique customers. A separate analysis was conducted on these customers. Figure 17-1 and Figure 17-2 display the control and registered treatment group propensity score distribution before and after Propensity Score Matching. Figure 17-3 displays the control and registered treatment group average kWh per day values before and after matching.

Figure 17-1 Unmatched Groups Histogram – Registered

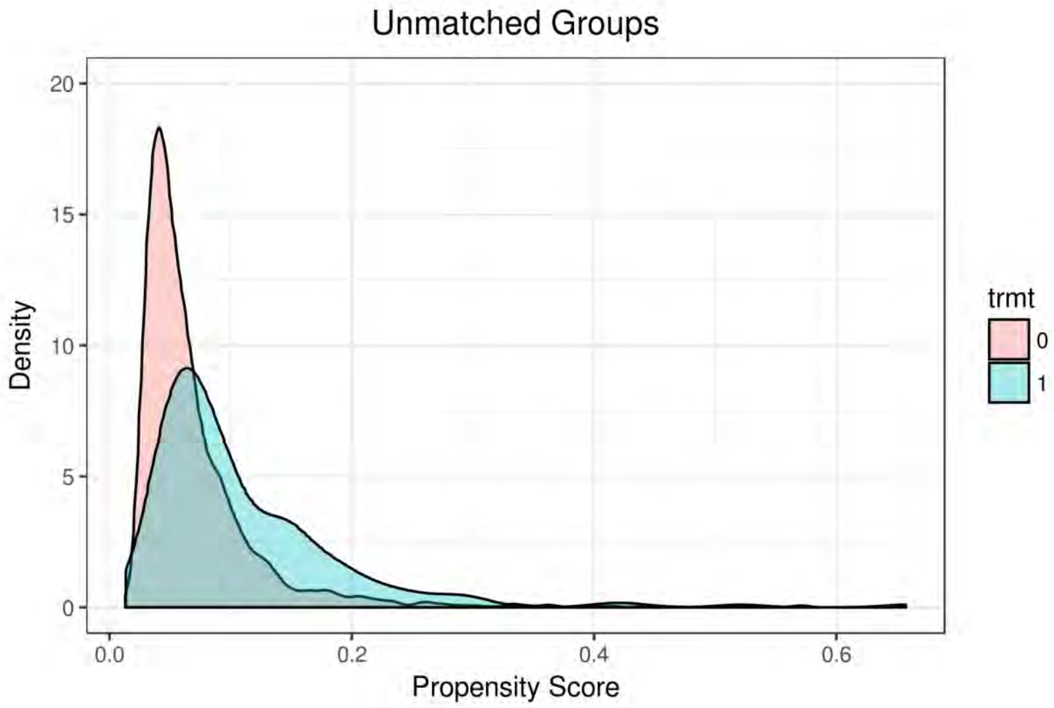


Figure 17-2 Matched Groups Histogram – Registered

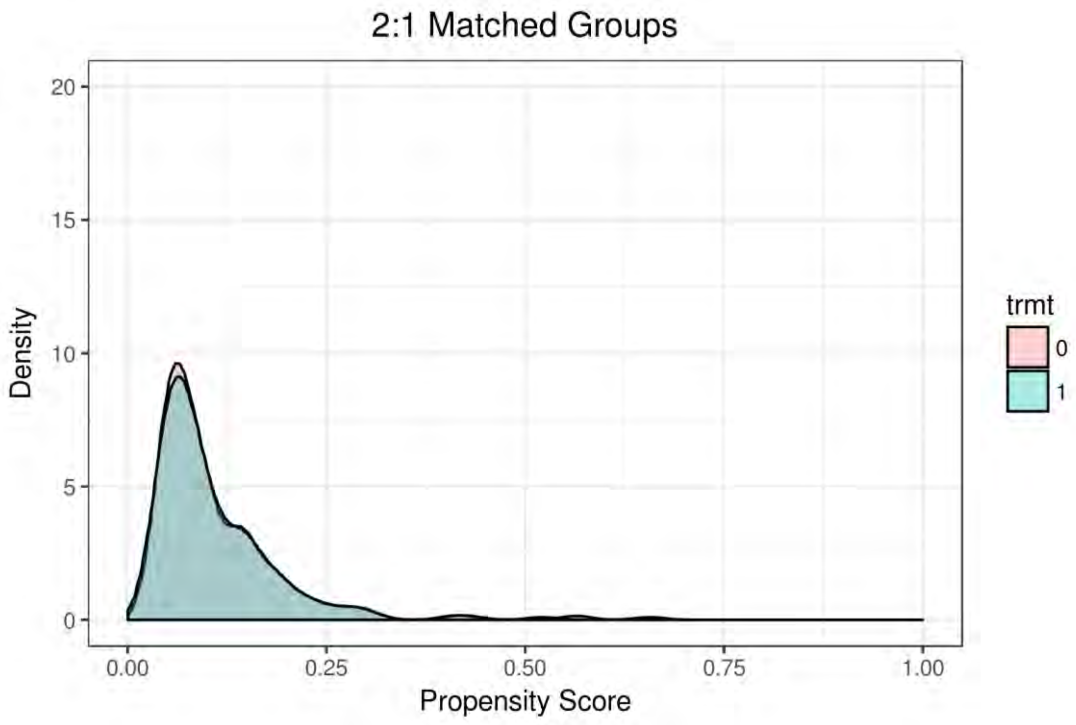


Figure 17-3 Daily kWh Pre- & Post-Retrofit – Registered

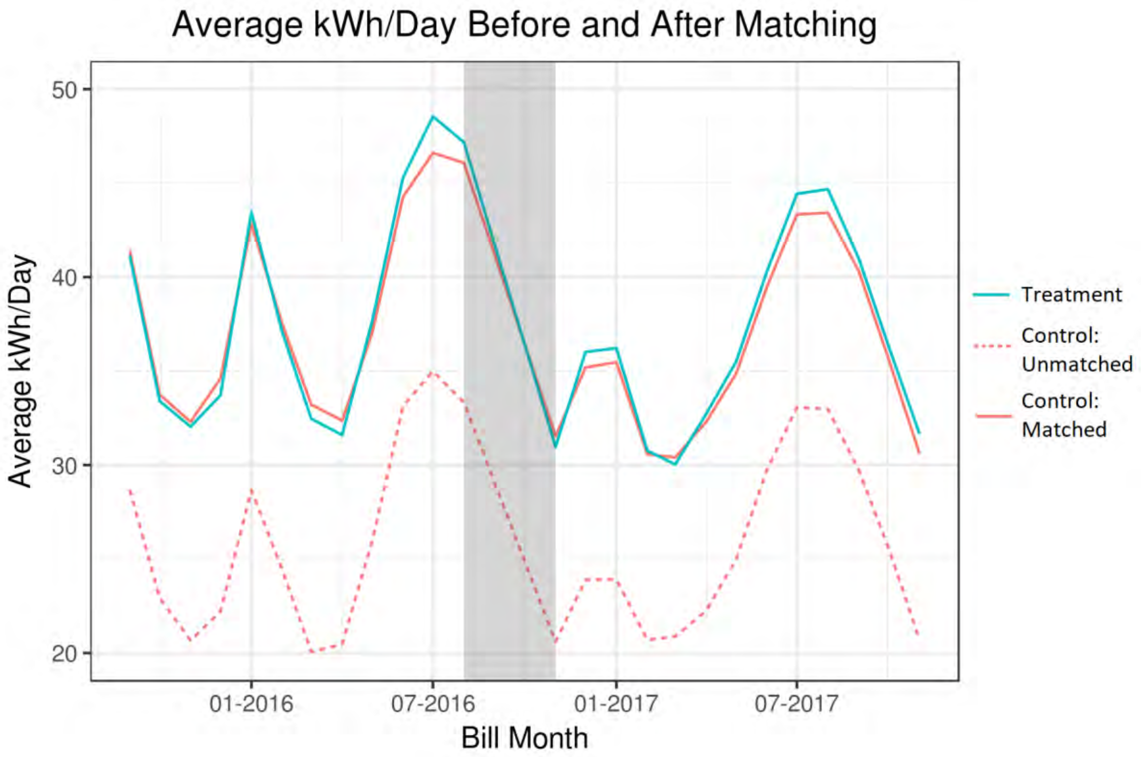


Table 17-1 displays the mean differences in kWh day values between the two groups before and after matching.

Table 17-1 Average kWh/day After Propensity Score Matching – Registered

Billing Month	Treatment Mean kWh/day Usage	Before Matching		After Matching	
		Control Mean kWh/day Usage	Mean Difference in kWh/day Usage	Control Mean kWh/day Usage	Mean Difference in kWh/day Usage
# of Customers	**213**	**2,710**		**426**	
September 2015	33.41	23.07	10.34	33.75	-0.34
October 2015	32.04	21.51	10.53	32.30	-0.26
November 2015	33.72	22.88	10.84	34.61	-0.89
December 2015	43.46	30.19	13.27	42.81	0.65
January 2016	37.06	25.00	12.06	37.50	-0.44
February 2016	32.47	21.18	11.29	33.22	-0.75
March 2016	31.60	21.56	10.04	32.36	-0.76
April 2016	37.63	25.99	11.65	37.01	0.62
May 2016	45.30	32.77	12.52	44.26	1.04
June 2016	48.55	34.44	14.11	46.61	1.94
July 2016	47.18	33.32	13.86	46.07	1.10
August 2016	41.16	29.13	12.03	41.43	-0.27

The results of the fixed effects regression using the treatment group and matched control group are shown in Table 17-2. The coefficient for the "Post*Treatment" variable (0.53) indicates that, net of any pre-post differences in the control group and controlling for the effect of monthly weather differences, customers in the treatment group used 0.53 more kWh per day in the post-period. The coefficient for the "Post*Treatment*February" variable (-0.41) indicates that customers in the treatment group used 0.41 fewer kWh per day than its control counterpart during the post-period in February (in relation to the "Post*Treatment" variable). Aggregating the monthly savings results in the predicted annual savings for participants in the post-period.

Table 17-2 Model Coefficient Summary – Registered

Model Term		Coefficient	Standard Error	t	P>t
α_0	Intercept	52.83	4.65	11.35	9.77E-30
β_1	Post	-7.44	0.94	-7.88	3.43E-15
β_2	Post*Treatment	0.53	1.07	0.49	6.22E-01
β_3	February	-5.68	0.86	-6.56	5.38E-11
β_3	March	-10.06	0.81	-12.45	2.12E-35
β_3	April	-10.92	0.81	-13.45	5.35E-41
β_3	May	-5.81	0.79	-7.38	1.65E-13
β_3	June	1.58	0.85	1.86	6.33E-02
β_3	July	4.23	0.87	4.84	1.34E-06
β_3	August	3.41	0.86	3.95	7.83E-05

β_3	September	-1.69	0.85	-2.00	4.57E-02
β_3	October	-9.39	0.79	-11.82	4.36E-32
β_3	November	-10.81	0.80	-13.47	4.19E-41
β_3	December	-8.72	0.82	-10.67	1.68E-26
β_4	Post*February	0.65	1.20	0.54	5.89E-01
β_4	Post*March	4.87	1.15	4.24	2.20E-05
β_4	Post*April	7.70	1.14	6.73	1.74E-11
β_4	Post*May	5.14	1.15	4.47	8.03E-06
β_4	Post*June	2.43	1.23	1.97	4.91E-02
β_4	Post*July	3.59	1.30	2.77	5.68E-03
β_4	Post*August	4.41	1.33	3.32	8.94E-4
β_4	Post*September	6.47	1.26	5.15	2.68E-07
β_4	Post*October	9.46	1.17	8.10	6.10E-16
β_4	Post*November	6.36	1.10	5.76	8.40E-09
β_4	Post*December	8.32	1.22	6.80	1.09E-11
β_5	Post*Treatment*February	-0.41	1.35	-0.30	7.62E-01
β_5	Post*Treatment*March	-1.03	1.38	-0.74	4.58E-01
β_5	Post*Treatment*April	-0.34	1.42	-0.24	8.11E-01
β_5	Post*Treatment*May	-0.36	1.43	-0.25	7.99E-01
β_5	Post*Treatment*June	-0.08	1.54	-0.05	9.57E-01
β_5	Post*Treatment*July	0.41	1.61	0.26	7.98E-01
β_5	Post*Treatment*August	0.56	1.60	0.35	7.28E-01
β_5	Post*Treatment*September	-0.08	1.57	-0.05	9.61E-01
β_5	Post*Treatment*October	-0.12	1.52	-0.08	9.38E-01
β_5	Post*Treatment*November	-0.50	1.24	-0.40	6.88E-01
β_5	Post*Treatment*December	0.20	1.42	0.14	8.89E-01
Adjusted R-Squared: 0.6860					

The average annual kWh usage from the pre-retrofit interval of control and treatment customers is 14,109 kWh per year. While the model predicts mean annual savings of -141 kWh[67], 1.00% of annual use, there is a wide confidence interval which includes the possibility of energy saving, and thus the Evaluators cannot make a conclusive inference that customers who registered their Nest thermostats used on average 141 more kWh annually than their control counterparts. Table 17-3Table 17-3 shows the average kWh usage and kWh savings per month in the post period based on the average monthly usage from the pre-retrofit control and registered treatment group. Figure 17-4 displays the monthly savings estimate for each month along with the 90% confidence boundaries.

Table 17-3 Monthly and Annual Average kWh Usage and Savings – Registered

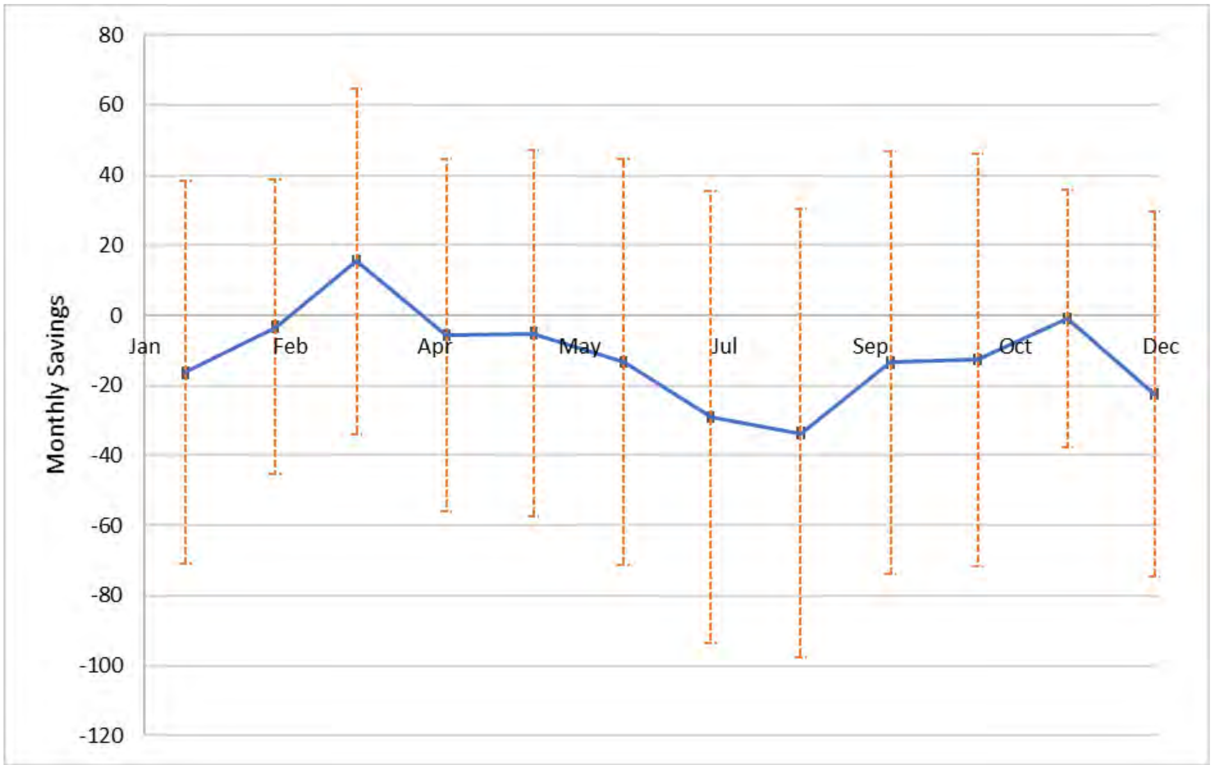
Period	**Average**	**Monthly kWh**	**kWh Savings**	**Monthly**	**Error**	**90% Confidence**

---

[67] CI [-329, 47]

	Monthly Usage (kWh)	***Savings (kWh)***	***(%)***	***kWh Savings Variance***		***Interval***
January	1,347.25	-16.38	-1.22%	1,103.14	54.64	(-71.01, 38.26)
February	1,037.67	-3.34	-0.32%	656.39	42.15	(-45.49, 38.8)
March	1,006.49	15.44	1.53%	899.43	49.33	(-33.89, 64.78)
April	947.98	-5.66	-0.60%	934.30	50.28	(-55.94, 44.62)
May	1,166.66	-5.12	-0.44%	1,013.33	52.36	(-57.48, 47.25)
June	1,358.88	-13.38	-0.98%	1,242.10	57.98	(-71.36, 44.59)
July	1,505.01	-29.12	-1.93%	1,543.61	64.63	(-93.75, 35.51)
August	1,462.46	-33.64	-2.30%	1,515.01	64.03	(-97.67, 30.38)
September	1,234.83	-13.52	-1.09%	1,344.37	60.32	(-73.83, 46.8)
October	1,035.61	-12.71	-1.23%	1,281.39	58.89	(-71.6, 46.18)
November	961.24	-0.95	-0.10%	497.79	36.70	(-37.66, 35.75)
December	1,045.32	-22.54	-2.16%	1,004.54	52.14	(-74.68, 29.6)
Annual	**14,109.40**	**-140.92**	**-1.00%**	**13,035.41**	**187.81**	**(-328.73, 46.9)**

Figure 17-4 Monthly Savings Estimate with 90% Confidence Boundaries - Registered



The confidence interval surrounding this savings estimate is very wide (ranging from a savings of 47 kWh to an increase of 329 kWh annually). Given this range in the confidence interval, the Evaluators cannot confidently assert whether registered units provide savings or result in increased energy use. The differences between the registered and aggregate savings estimates, however, statistically significant at the 90% confidence level.

The estimates of cooling and heating use are as follows:

- Cooling kWh: 4,447;
- Heating kWh: 1,327;
- HVAC is 43% of annual use.

There is significant uncertainty surrounding heating and cooling loads in shoulder months, as New Orleans will demonstrate both heating and cooling loads occurring to significant degrees in these months. The Evaluators nonetheless present the savings as a percent of heating and cooling use, though there is also a value for percent reduction in annual HVAC use. The annual reduction percentage values are negative, which means that there was an increase in annual HVAC use for customers with registered smart thermostats.

- Annual reduction in cooling use: -2.20%;
- Annual reduction in heating use: -3.26%;
- Annual reduction in aggregate HVAC use: -2.44%.

17.1.2Unregistered Nest Thermostats kWh Savings Analysis

A total of 536 customers from the 749 aggregate customers did not register their smart thermostat with Nest. A separate analysis was run on these customers. Figure 17-5 and Figure 17-6 display the control and unregistered treatment group propensity score distribution before and after matching.

Figure 17-5 Unmatched Groups Histogram – Unregistered

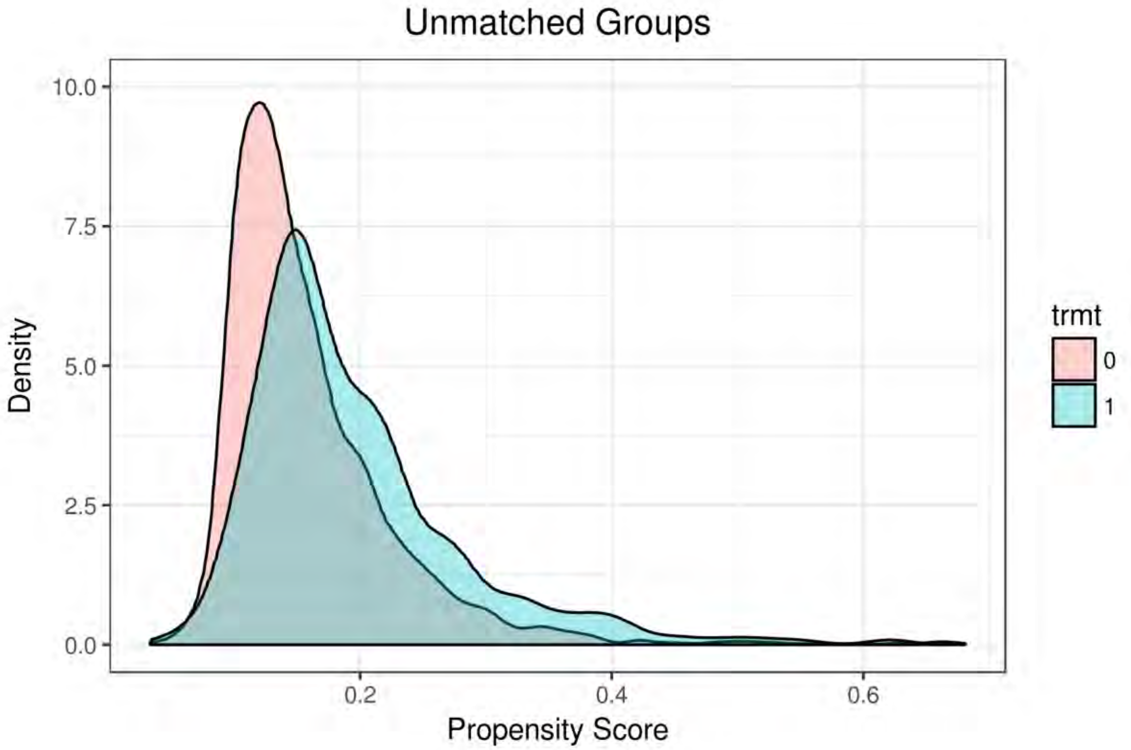


Figure 17-6 Matched Groups Histogram – Unregistered Thermostats

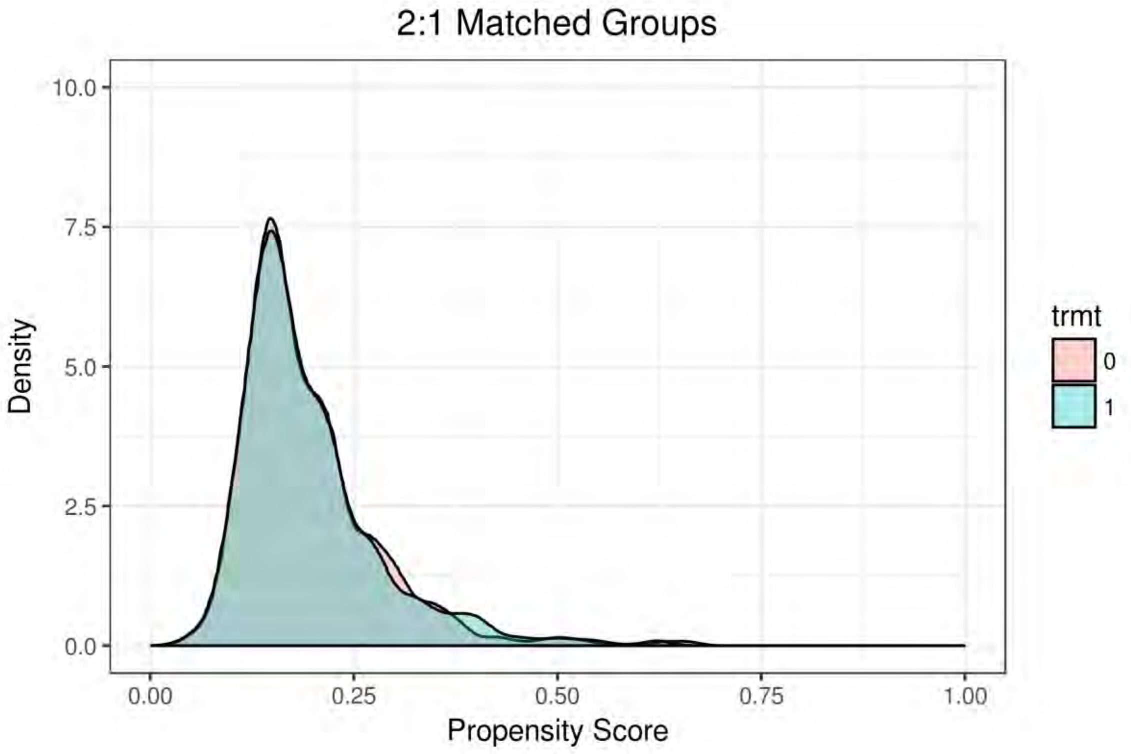


Figure 17-7 Daily kWh Pre- & Post-Retrofit - UnregisteredFigure 17-7 displays the control and unregistered treatment group average kWh per day values before and after matching.

Table 17-4 displays the mean differences in kWh day values between the two groups before and after matching.

Figure 17-7 Daily kWh Pre- & Post-Retrofit - Unregistered

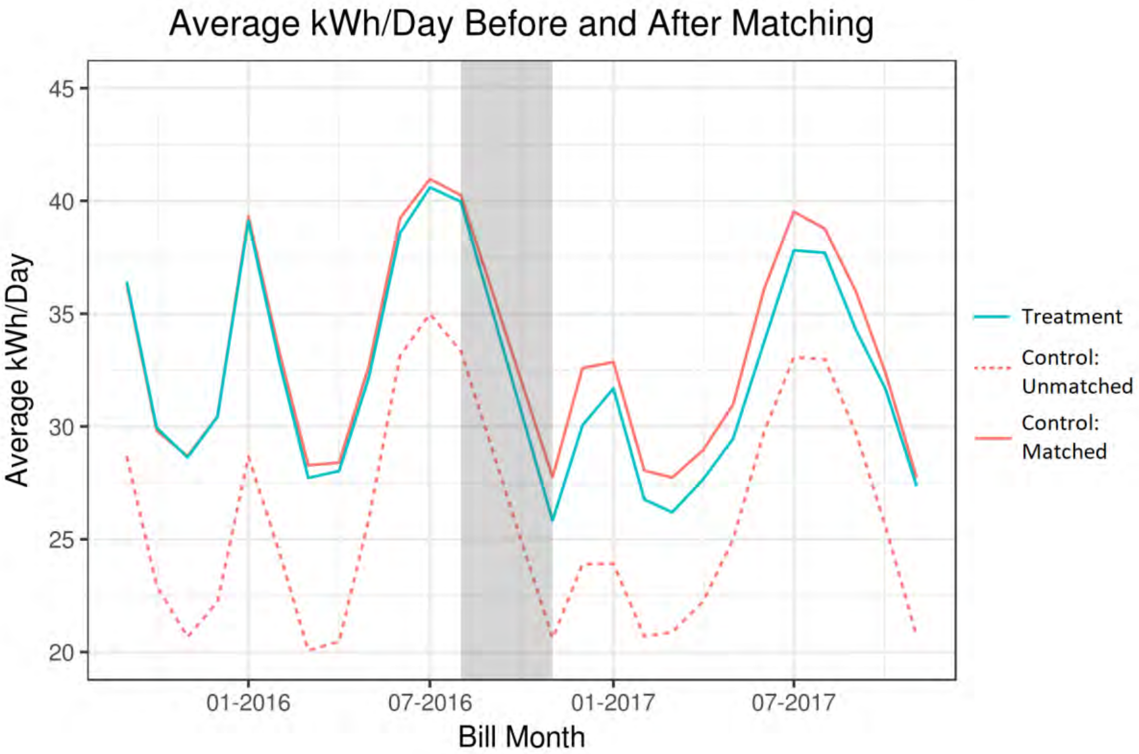


Table 17-4 Average kWh/day After Propensity Score Matching – Unregistered

Billing Month	**Treatment Mean kWh/day Usage**	**Before Matching**		**After Matching**	
		Control Mean kWh/day Usage	**Mean Difference in kWh/day Usage**	**Control Mean kWh/day Usage**	**Mean Difference in kWh/day Usage**
Total Number of Customers	**536**	**2,710**		**1,072**	
September 2015	36.43	29.13	7.30	36.32	0.11
October 2015	29.94	23.07	6.87	29.81	0.14
November 2015	28.63	21.51	7.12	28.68	-0.05
December 2015	30.43	22.88	7.55	30.46	-0.02
January 2016	39.12	30.19	8.92	39.31	-0.19
February 2016	32.87	25.00	7.87	33.30	-0.43
March 2016	27.72	21.18	6.54	28.28	-0.56
April 2016	28.03	21.56	6.47	28.40	-0.37
May 2016	32.21	25.99	6.22	32.71	-0.51
June 2016	38.58	32.77	5.80	39.23	-0.65
July 2016	40.60	34.44	6.16	40.97	-0.37
August 2016	39.97	33.32	6.65	40.26	0.29

17.1.2.1Savings Analysis

The results of the fixed effects regression using the unregistered treatment group and matched control group are shown in Table 17-5. The coefficient for the "Post*Treatment" variable (-0.77) indicates that, net of any pre-post differences in the control group and controlling for the effect of monthly weather differences, customers in the unregistered treatment group used 0.77 fewer kWh per day in the post-period. The coefficient for the "Post*Treatment*February" variable (-0.13) indicates that customers in the unregistered treatment group used 0.13 less kWh per day than its control counterpart during the post-period in February (in relation to the "Post*Treatment" variable). Aggregating the monthly savings results in the predicted annual savings for participants in the post-period.

Table 17-5 Model Coefficient Summary – Unregistered

Model Term		**Coefficient**	**Standard Error**	**t**	**P>t**
α_0	Intercept	53.10	4.55	11.68	1.82E-31
β_1	Post	-6.45	0.58	-11.17	6.19E-29
β_2	Post*Treatment	-0.77	0.65	-1.18	2.36E-01
β_3	February	-6.09	0.53	-11.57	6.30E-01
β_3	March	-11.15	0.48	-23.02	1.74E-116
β_3	April	-10.97	0.49	-22.24	6.62E-109
β_3	May	-6.70	0.49	-13.63	3.43E-42
β_3	June	-0.23	0.53	-0.44	6.58E-01
β_3	July	1.60	0.54	2.96	3.06E-03
β_3	August	0.92	0.53	1.72	8.55E-02

β_3	September	-2.89	0.53	-5.47	4.46E-08
β_3	October	-9.39	0.50	-18.94	1.23E-79
β_3	November	-10.58	0.50	-21.37	9.05E-01
β_3	December	-8.80	0.50	-17.55	1.06E-68
β_4	Post*February	1.26	0.72	1.75	8.08E-02
β_4	Post*March	5.96	0.68	8.78	1.69E-18
β_4	Post*April	7.06	0.69	10.22	1.80E-24
β_4	Post*May	4.86	0.69	7.01	2.35E-12
β_4	Post*June	3.46	0.75	4.64	3.45E-06
β_4	Post*July	4.99	0.78	6.39	1.67E-10
β_4	Post*August	4.93	0.78	6.36	2.02E-10
β_4	Post*September	6.01	0.76	7.95	1.85E-15
β_4	Post*October	8.83	0.72	12.31	9.73E-35
β_4	Post*November	5.49	0.67	8.22	2.14E-16
β_4	Post*December	8.47	0.73	11.62	3.62E-31
β_5	Post*Treatment*February	-0.13	0.85	-0.15	8.77E-01
β_5	Post*Treatment*March	-0.51	0.82	-0.62	5.33E-01
β_5	Post*Treatment*April	-0.24	0.81	-0.29	7.70E-01
β_5	Post*Treatment*May	-0.58	0.84	-0.69	4.88E-01
β_5	Post*Treatment*June	-1.48	0.88	-1.69	9.20E-02
β_5	Post*Treatment*July	-0.72	0.97	-0.74	4.57E-01
β_5	Post*Treatment*August	0.08	0.98	0.09	9.32E-01
β_5	Post*Treatment*September	-0.53	0.93	-0.57	5.71E-01
β_5	Post*Treatment*October	0.46	0.91	0.51	6.12E-01
β_5	Post*Treatment*November	-0.14	0.75	-0.19	8.52E-01
β_5	Post*Treatment*December	-1.51	0.88	-1.71	8.76E-02
Adjusted R-Squared: 0.6775					

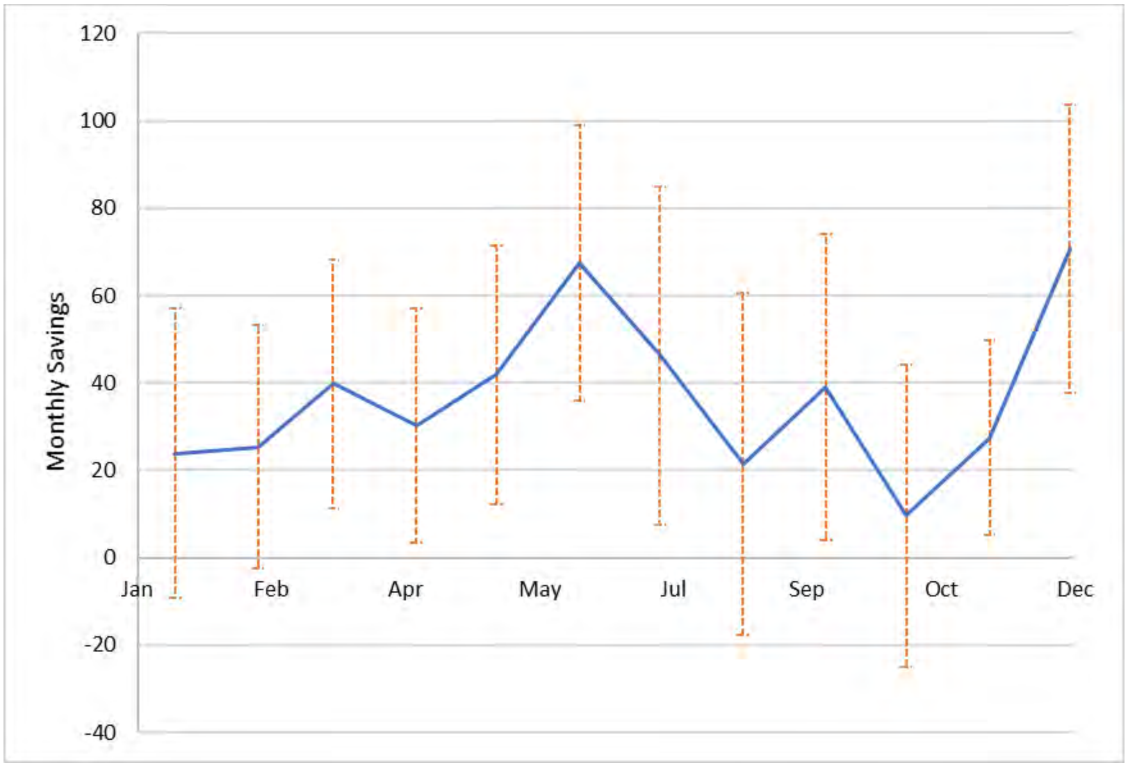
The average annual kWh usage from the pre-retrofit interval of control and unregistered treatment customers is 12,310 kWh per year. The model predicts, with statistical significance, a mean annual savings of 443 kWh, 3.60% of annual use in the unregistered group. This means customers who did not register their Nest thermostats used on average 443 fewer kWh than their control counterparts. Table 17-6 shows the average kWh usage and savings per month in the post-period based on the average monthly usage from the pre-retrofit control and unregistered treatment group. Figure 17-8 displays the monthly savings estimate for each month along with the 90% confidence boundaries.

Table 17-6 Monthly and Annual Average kWh Usage and Savings – Unregistered

Period	***Average Monthly Usage (kWh)***	***Monthly kWh Savings (kWh)***	***kWh Savings (%)***	***Monthly kWh Savings Variance***	***Error***	***90% Confidence Interval***
January	1,212.60	23.93	1.97%	408.00	33.23	(-9.3, 57.15)
February	920.35	25.29	2.75%	286.36	27.84	(-2.55, 53.13)
March	859.29	39.79	4.63%	300.36	28.51	(11.28, 68.3)
April	840.79	30.24	3.60%	264.23	26.74	(3.5, 56.98)
May	998.48	41.88	4.19%	323.15	29.57	(12.31, 71.46)

June	1,157.32	67.53	5.83%	366.85	31.51	(36.02, 99.03)
July	1,258.54	46.26	3.68%	555.63	38.78	(7.49, 85.04)
August	1,239.00	21.34	1.72%	566.21	39.14	(-17.8, 60.48)
September	1,092.89	38.97	3.57%	454.80	35.08	(3.89, 74.05)
October	928.29	9.65	1.04%	442.23	34.59	(-24.95, 44.24)
November	858.82	27.38	3.19%	182.62	22.23	(5.15, 49.61)
December	943.44	70.71	7.49%	404.51	33.09	(37.62, 103.79)
Annual	**12,309.82**	**442.96**	**3.60%**	**4,554.94**	**111.02**	**(331.94, 553.99)**

Figure 17-8 Monthly Savings Estimate with 90% Confidence Boundaries – Unregistered



The confidence boundaries for this model's savings estimates are ±25.0% of the unregistered savings estimate, largely similar to that of the aggregate population (±27.5% of the aggregate savings estimate). The savings are higher than observed in the model of the whole program population, though the differences between the two are not statistically significant at the 90% confidence level.

The estimates of cooling and heating use are as follows:

- Cooling kWh: 3,197;
- Heating kWh: 893;
- HVAC is 36% of annual use.

There is significant uncertainty surrounding heating and cooling loads in shoulder months, as New Orleans will demonstrate both heating and cooling loads occurring to significant degrees in these months. The Evaluators nonetheless present the savings as a percent of heating and cooling use, though there is also a value for percent reduction annual HVAC use.

- Annual reduction in cooling use: 9.25%;
- Annual reduction in heating use: 16.49%;
- Annual reduction in aggregate HVAC use: 10.83%.

17.2Variance and Error Bound Methodology

17.2.1Variance

Table 17-7 below shows coefficients from the model relating to the treatment effects (i.e. savings) in the post period. The first coefficient (Post*Treatment) is the estimated daily kWh savings for a treated customer in the post period. The other coefficients are similar to the first coefficient, but they are applied only to their respective month when estimating savings. For instance, to estimate average daily savings for a single customer in January, we would use the estimate for Post*Treatment alone, or 0.680 kWh saved per day. However, to compute the estimate for February, we would sum Post*Treatment and Post*Treatment*February to get 0.781 kWh saved per day (0.680+0.101).

Table 17-7 Treatment Coefficients

Model Term	*Coefficient*	*Standard Error (SE)*	*t*	*P>t*
Post*Treatment	-0.680404	0.548919	-1.239536	0.215153
Post*Treatment*February	-0.101034	0.710283	-0.142245	0.886887
Post*Treatment*March	-0.758636	0.696500	-1.089212	0.276065
Post*Treatment*April	-0.380759	0.697227	-0.546106	0.584996
Post*Treatment*May	-0.642708	0.715922	-0.897735	0.369331
Post*Treatment*June	-1.117584	0.757070	-1.476197	0.139897
Post*Treatment*July	-0.444435	0.820507	-0.541659	0.588056
Post*Treatment*August	0.221571	0.823195	0.269159	0.787808
Post*Treatment*September	0.161580	0.789383	0.204691	0.837814
Post*Treatment*October	0.819979	0.768683	1.066733	0.286097
Post*Treatment*November	0.032593	0.632937	0.051495	0.958931
Post*Treatment*December	-0.900043	0.737160	-1.220961	0.222106

A typical 90% error bound is equal to 1.645*Standard Error. However, because savings in all months except January are a linear combination of two estimates (i.e. Equation 14-2), the Evaluators computed the variance and standard error for a linear combination of estimates. The following shows the method for calculating the variance for a linear combination of two estimates:

Equation 17-1 Variance of Linear Combinations

$$Variance(B0 + B1) = Variance(B0) + Vaiance(B1) + (2 * Covariate(B0, B1)).$$

The Evaluators obtained the variances and covariances for the estimates from the variance-covariance matrix and calculated the variances for each month using Equation 17-1. Table 17-8 below displays the daily variances and daily estimated savings computed for each month. Note that because the savings estimates for January are not a linear combination of estimates, the variance is equal to the variance of the "Post*Treatment" coefficient (which is equal to SE^2).

The next step was to estimate monthly and annual savings estimates and error bounds, which was accomplished using the following equations. The calculation of the monthly savings estimate is shown in

Equation 17-2. The monthly variance estimate is shown in Equation 17-3. The monthly 90% error bound is shown in Equation 17-4. The annual savings estimate is the sum of the monthly savings estimates. The calculation of the annual savings 90% error bound estimate is shown in Equation 17-5.

Equation 17-2 Monthly Savings

$$Savings\ Estimate(Month)_i = Estimate(Daily)_i * Number\ of\ Days\ in\ Month_i$$

Equation 17-3 Monthly Variance

$$Variance(Month)_i = Variance(Daily)_i * (Number\ of\ Days\ in\ Month_i)^2$$

Equation 17-4 Monthly 90% Error Bound

$$\begin{aligned} &90\%\ Error\ Bound\ (Monthly\ Savings)_i \\ &\qquad = Savings\ Estimate(Month)_i\ \pm 1.645 * \sqrt{Variance(Month)_i} \end{aligned}$$

Equation 17-5 Annual Savings Error Bound

$$\begin{aligned} &90\%\ Error\ Bound\ (Annual\ Savings) \\ &\qquad = Annual\ Savings\ \pm\ 1.645 * \sqrt{\sum_{i=1}^{12} Variance(Month)_i} \end{aligned}$$

Table 17-8 Monthly and Annual Savings and Confidence Intervals

Month	**Number of Days**	**Savings Estimate (Daily)**	**Savings Estimate (Monthly)**	**Variance (Daily)**	**Variance (Monthly)**	**SE (Daily)**	**SE (Monthly)**	**90% Lower Bound**	**90% Upper Bound**
January	31	0.68	21.09	0.30	289.56	0.55	27.99	-6.9	49.08
February	28	0.10	21.88	0.25	194.01	0.71	22.91	-1.03	44.79
March	31	0.76	44.61	0.23	219.68	0.70	24.38	20.23	68.99
April	30	0.38	31.84	0.23	206.36	0.70	23.63	8.2	55.47
May	31	0.64	41.02	0.26	246.32	0.72	25.82	15.2	66.83
June	30	1.12	53.94	0.32	284.46	0.76	27.74	26.2	81.68
July	31	0.44	34.87	0.42	400.81	0.82	32.93	1.94	67.8
August	31	-0.22	14.22	0.42	403.94	0.82	33.06	-18.84	47.29
September	30	-0.16	15.57	0.37	329.03	0.79	29.84	-14.27	45.4
October	31	-0.82	-4.33	0.33	320.05	0.77	29.43	-33.76	25.1
November	30	-0.03	19.43	0.14	129.24	0.63	18.70	0.73	38.14
December	31	0.90	48.99	0.29	276.72	0.74	27.36	21.63	76.36
Annual	**365**		**343.13**		**3,300.19**		**94.50**	**248.63**	**437.63**

17.2.2Robust Standard Error

The standard errors from the variance-covariance matrix are robust standard errors, which account for possible autocorrelation and heteroskedasticity in the time series data. The code used to produce these robust standard errors in R is as follows (similar to Stata's *robust* option):

```
library(sandwich)
library(lmtest)
reg = lm(kwh.day ~ independent variables, data= df)
coeftest(lmAPI, vcov = vcovHC(reg, "HC1"))
```

18.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.

18.1Cost Effectiveness Summary

This appendix covers all verified electricity and peak demand savings, and associated program costs incurred in the implementation of the Companies' PY7 energy efficiency portfolio.

The cost-effectiveness of the Companies' PY7 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.[68]

The demand reduction (kW) and energy savings (kWh) presented throughout this appendix represent savings at the generator by adjusting for line losses.

In order 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.

The tables below each program included in this analysis, along with the final verified savings estimates, total expenditures, Utility Cost Test (UCT)[69] results, and Total Resource Cost Test (TRC) results.

In addition to UCT and TRC results, results from the Ratepayer Impact Measure (RIM), Participant Cost Test (PCT) and Societal Cost Test (SCT) are included in the body of this appendix.

Based on verified program impacts and spending during PY7, the Companies' overall portfolio is cost-effective based on both the UCT and TRC.

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[68] 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

[69] The UCT is also referred to as the Program Administrator Cost Test (PACT).

Table 18-1 Cost-Effectiveness by Program – New Orleans

Program	*Net Peak Demand Reduction (kW)*	*Net Annual Energy Savings (kWh)*	*Total Program Expenditures*	*TRC (b/c ratio)*	*UCT (b/c ratio)*
HPwES	216.25	872,375	$ 1,311,757	1.34	1.29
LIA&Wx	225.05	880,394			
Multifamily	62.31	341,939			
Green Light New Orleans	18.18	87,775			
Consumer Products	387.78	1,849,985	$ 367,727	3.89	3.91
Residential Heating & Cooling	443.03	1,192,194	$ 344,535	3.23	3.08
Energy Smart School Kits	25.22	212,813	$ 293,105	0.33	0.33
Small Commercial Solutions	244.91	1,847,496	$ 680,949	1.36	1.55
Large C&I	1397.86	10,248,920	$ 1,794,829	2.96	3.91
Publicly Funded Institutions	-	683,133	$ 247,888	1.57	6.00
Direct Load Control	168.8	-	$ 203,341	0.03	0.02
Total	**3,189.39**	**18,217,024**	**$ 5,244,130**	**2.18**	**2.44**

Table 18-2 Cost-Effectiveness by Program - Algiers

Program	*Net Peak Demand Reduction (kW)*	*Net Annual Energy Savings (kWh)*	*Total Program Expenditures*	*TRC (b/c ratio)*	*UCT (b/c ratio)*
HPwES	23.56	90,115	$ 136,816	1.73	1.67
LIA&Wx	39.57	158,874			
Multifamily	0.99	6,064			
Green Light New Orleans	2.4	11,581			
Consumer Products	15.6	73,685	$ 14,350	2.50	4.06
Residential Heating & Cooling	27.64	72,321	$ 24,202	3.27	3.26
Energy Smart School Kits	4.52	38,146	$ 71,090	0.25	0.25
Small Commercial Solutions	20.79	277,330	$ 71,372	1.71	2.04
Large C&I	-	115,900	$ 96,012	0.63	0.66
Publicly Funded Institutions	-	-	$ 11,749	-	-
Direct Load Control			$ 23,890	-	-
Total	**135.07**	**844,016**	**$ 449,480**	**1.25**	**1.32**

18.2Energy Efficiency Program Results

The Companies' energy efficiency portfolio in PY7 consisted of eleven programs. Total spending in PY7 equaled $5,244,130 for ENO and $449,480 for Algiers ($5,693,610 overall).

18.2.1Home Performance with ENERGY STAR / LIA&Wx / Multifamily/Green Light NOLA

These programs are filed in aggregate and are combined for cost-effectiveness testing.

Table 18-3 HPwES Benefit/Cost Tests – New Orleans

Metric	*Utility Cost Test*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Societal Cost test*	*Participant Cost Test*
Benefit/Cost Ratio	1.29	1.34	0.65	1.72	3.86
Total Benefits	$1,693,258	$1,693,258	$1,693,258	$2,176,443	$1,944,304
Total Costs	$1,311,757	$1,266,320	$2,588,995	$1,266,320	$503,982

Table 18-4 HPwES Benefit/Cost Tests - Algiers

Metric	*Utility Cost Test*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Societal Cost test*	*Participant Cost Test*
Benefit/Cost Ratio	1.67	1.73	0.75	2.26	3.82
Total Benefits	$228,938	$228,938	$228,938	$299,130	$255,559
Total Costs	$136,816	$132,420	$304,499	$132,420	$66,846

18.2.2Residential Heating & Cooling

Table 18-5 RH&C Benefit/Cost Tests – New Orleans

Metric	*Utility Cost Test*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Societal Cost test*	*Participant Cost Test*
Benefit/Cost Ratio	3.08	3.23	1.01	4.13	5.16
Total Benefits	$1,061,436	$1,061,436	$1,061,436	$1,354,240	$969,288
Total Costs	$344,535	$328,280	$1,046,404	$328,280	$187,715

Table 18-6 RH&C Benefit/Cost Tests - Algiers

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost test	Participant Cost Test
Benefit/Cost Ratio	3.26	3.27	1.09	4.35	5.29
Total Benefits	$78,923	$78,923	$78,923	$105,064	$65,633
Total Costs	$24,202	$24,159	$72,292	$24,159	$12,410

18.2.3Lighting & Appliances

Table 18-7 Lighting & Appliances Benefit/Cost Tests – New Orleans

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost test	Participant Cost Test
Benefit/Cost Ratio	3.91	3.89	0.96	4.94	6.75
Total Benefits	$1,438,344	$1,438,344	$1,438,344	$1,827,561	$1,450,524
Total Costs	$367,727	$370,163	$1,502,324	$370,163	$214,736

Table 18-8 Lighting & Appliances Benefit/Cost Tests - Algiers

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost test	Participant Cost Test
Benefit/Cost Ratio	4.06	2.50	0.97	3.20	4.97
Total Benefits	$58,219	$58,219	$58,219	$74,376	$51,390
Total Costs	$14,350	$23,245	$60,029	$23,245	$10,345

18.2.4School Kits & Education

Table 18-9 SE&K Benefit/Cost Tests – New Orleans

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost test	Participant Cost Test
Benefit/Cost Ratio	0.33	0.33	0.25	0.39	3.89
Total Benefits	$97,761	$97,761	$97,761	$112,752	$140,485
Total Costs	$293,105	$291,932	$390,735	$291,932	$36,109

Table 18-10 SE&K Benefit/Cost Tests - Algiers

Metric	***Utility Cost Test***	***Total Resource Cost Test***	***Ratepayer Impact Measure***	***Societal Cost test***	***Participant Cost Test***
Benefit/Cost Ratio	0.25	0.25	0.20	0.29	3.89
Total Benefits	$17,525	$17,525	$17,525	$20,212	$25,181
Total Costs	$71,090	$70,879	$88,589	$70,879	$6,472

18.2.5Small Commercial Solutions

Table 18-11 SCS Benefit/Cost Tests – New Orleans

Metric	***Utility Cost Test***	***Total Resource Cost Test***	***Ratepayer Impact Measure***	***Societal Cost test***	***Participant Cost Test***
Benefit/Cost Ratio	1.55	1.36	0.63	1.63	3.91
Total Benefits	$1,058,388	$1,058,388	$1,058,388	$1,271,493	$1,287,569
Total Costs	$680,949	$779,750	$1,666,852	$779,750	$329,337

Table 18-12 SCS Benefit/Cost Tests - Algiers

Metric	***Utility Cost Test***	***Total Resource Cost Test***	***Ratepayer Impact Measure***	***Societal Cost test***	***Participant Cost Test***
Benefit/Cost Ratio	2.04	1.71	0.66	2.05	4.25
Total Benefits	$145,371	$145,371	$145,371	$174,066	$189,926
Total Costs	$71,372	$84,766	$219,367	$84,766	$44,648

18.2.6Large Commercial & Industrial Solutions

Table 18-13 LCI Benefit/Cost Tests – New Orleans

Metric	***Utility Cost Test***	***Total Resource Cost Test***	***Ratepayer Impact Measure***	***Societal Cost test***	***Participant Cost Test***
Benefit/Cost Ratio	3.91	2.96	0.88	3.72	5.28
Total Benefits	$7,019,969	$7,019,969	$7,019,969	$8,826,279	$7,600,256
Total Costs	$1,794,829	$2,370,501	$7,982,584	$2,370,501	$1,439,178

Table 18-14 LCI Benefit/Cost Tests - Algiers

Metric	*Utility Cost Test*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Societal Cost test*	*Participant Cost Test*
Benefit/Cost Ratio	0.46	0.38	0.31	0.47	1.56
Total Benefits	0.66	0.63	0.38	0.78	7.04
Total Costs	$63,007	$63,007	$63,007	$78,509	$83,283

18.2.7Publicly Funded Institutions

Table 18-15 PFI Benefit/Cost Tests – New Orleans

Metric	*Utility Cost Test*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Societal Cost test*	*Participant Cost Test*
Benefit/Cost Ratio	1.79	1.57	0.60	1.96	6.95
Total Benefits	$442,686	$442,686	$442,686	$551,610	$585,824
Total Costs	$247,888	$281,596	$739,529	$281,596	$84,272

Table 18-16 PFI Benefit/Cost Tests - Algiers[70]

Metric	*Utility Cost Test*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Societal Cost test*	*Participant Cost Test*
Benefit/Cost Ratio	0.00	0.00	0.00	0.00	N/A
Total Benefits	$0	$0	$0	$0	$0
Total Costs	$11,749	$11,749	$11,749	$11,749	$0

18.2.8Direct Load Control

Table 18-17 DLC Pilot Benefit/Cost Tests – New Orleans

Metric	*Utility Cost Test*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Societal Cost test*	*Participant Cost Test*
Benefit/Cost Ratio	0.02	0.03	0.02	0.03	N/A
Total Benefits	$5,065	$5,065	$5,065	$5,065	$12,240
Total Costs	$203,341	$191,101	$203,341	$191,101	$0

---

[70] Admin costs for Algiers PFI were $11,749, though no savings were realized.

Table 18-18 DLC Pilot Benefit/Cost Tests - Algiers

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost test	Participant Cost Test
Benefit/Cost Ratio	NA	NA	NA	NA	NA
Total Benefits	$0	$0	$0	$0	$0
Total Costs	$0	$0	$0	$0	$0

18.2.9Whole-Portfolio

Table 18-19 Whole-Portfolio Benefit/Cost Tests – New Orleans

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost test	Participant Cost Test
Benefit/Cost Ratio	2.44	2.18	0.80	2.74	5.00
Total Benefits	$12,816,906	$12,816,906	$12,816,906	$16,125,444	$13,990,490
Total Costs	$5,244,130	$5,879,643	$16,120,765	$5,879,643	$2,795,330

Table 18-20 Whole-Portfolio Benefit/Cost Tests - Algiers

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost test	Participant Cost Test
Benefit/Cost Ratio	1.32	1.25	0.63	1.59	4.40
Total Benefits	$591,982	$591,982	$591,982	$751,357	$670,972
Total Costs	$449,480	$471,854	$946,402	$471,854	$152,555