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July 31, 2020

VIA HAND DELIVERY
Ms. Lora W. Johnson, CMC, LMMC
Clerk of Council
City Hall, Room 1E09
1300 Perdido Street
New Orleans, Louisiana 70112

RE: of Entergy New Orleans, LLC's Energy Smart Program Year 9 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, R-19-516; 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 and ADM Associates, Inc. ("ADM") as the third party evaluator. On December 19, 2019, the Council adopted Resolution R-19-516 extending Energy Smart Program Year 9 ("PY9") by three months through March 31, 2020, and required Entergy New Orleans, LLC to file an Annual Report on results of PY9 for the entire 15 month Program Year.

On behalf of APTIM and ADM, Entergy New Orleans, LLC submits the Energy Smart Annual Program Report and Annual Evaluation, Measurement and Verification Report for the period of January 1, 2019 to March 31, 2020. As a result of the remote operations of the Council's office related to COVID-19, ENO submits this filing electronically and will submit the requisite original and number of hard copies once the Council resumes normal operations, or as you direct. Entergy New Orleans, LLC requests that you file this submission in accordance with Council regulations as modified for the present circumstances. 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,

Brian L. Guillot

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

Evaluation of PY9 Energy Efficiency Programs Portfolio

Submitted to:

Entergy New Orleans

July 2020

Submitted by:

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1. Executive Summary

1.1 Executive Summary

This report provides a summary of the evaluation effort of the Program Year 9 (PY9) Energy Efficiency (EE) portfolio by Energy New Orleans (ENO) and Entergy New Orleans-Algiers (Algiers). The program was administered between January 1, 2019 and December 31, 2019, plus a three-month extension period between January 1, 2020 and March 31, 2020. This evaluation was led by ADM Associates Inc. (herein known as ADM, or the Evaluators).

1.2 Summary of ENO Energy Efficiency Programs

In PY9, the ENO EE portfolio contained the following programs:

- Home Performance with Energy Star Program (HPwES);
- Low Income Audit and Weatherization Program (LIA&Wx);
- Multifamily Program;
- Green Light Direct Install Program (GLDI);
- Residential Lighting and Appliances Program (RLA);
- High Efficiency AC Tune-Up (HETU);
- School Kits and Education Program (SK&E);
- Scorecard Behavioral Program;
- EasyCool Direct Load Control Program (DLC);
- Small Commercial Solutions Program (SCS);
- Large Commercial and Industrial Solutions Program (Large C&I) and
- Publicly Funded Institutions Program (PFI).

In PY9, APTIM served as the Third Party Administrator (TPA) 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. The Scorecard Behavioral program was administered by Accelerated Innovations.

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.

1.3 Evaluation Objectives

The goals of the PY9 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 utility staff, implementation contractor staff and brief surveys of program participants.

1.4 Summary of Data Collection

The Evaluators completed surveys of 512 customers as part of the PY9 evaluation to collect information for use in verifying participation, assessing net savings, assessing the customer experience and satisfaction with programs, and levels of program awareness.

Table 1-1 Summary of Customer Surveys Completed

Survey Group	***Mode***	***Survey Fielding Time Frame***	***Number of Contacts****	***Number of Completions***
HPwES Participant	Online / Telephone	Sept 2019 / Jan 2020	503	90
Multifamily Participant	Online	Apr 2020	24	7
HPwES Kits	Online	Sept / Oct 2019	2,118	178
Behavioral Program Treatment Group	Online	January 2019	6,000	145
C&I Participant	Online / Telephone	Sept 2019 / Jan 2020 / Apr 2020	194	46
Large C&I Participant			90	21
Small Business Participant			100	25

PFI Participant			4	0
Total			**9,033**	**512**

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

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

Table 1-2 Summary of Staff Interviews

Programs	***Organizational Role***	***Interviewed Staff Roles***	***Number of Staff Interviewed***
Portfolio	Entergy	DSM Manager	1
Portfolio	Entergy	Project Manager	1
Portfolio	Implementation Contractor	Program Director	1
EnergySmart Behavioral Program	Implementation Contractor	Vice President of Marketing	1
RLA	Implementation Contractor	National Program Retail Manager	1
C&I Incentive Programs	Implementation Contractor	Project Lead	1
Residential Incentive Programs	Implementation Contractor	Program Manager	1
Residential Incentive Programs	Implementation Contractor	Project Manager – Data Quality	1
Publicly Funded Institutions	Program Partner	Chief Operating Officer	1
Total			**9**

1.5 Impact Findings

1.5.1 Verified Gross Savings

Table 1-3 through Table 1-7 present verified impacts by program, territory and year. 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 1-3 Gross Impact Summary – Overall, by Program, Territory and Year.

Program	***Territory***	***Time Period***	***Expected kWh Savings***	***Verified kWh Savings***	***kWh Realization Rate***	***Expected kW Savings***	***Verified kW Savings***	***kW Realization Rate***
HPwES	ENO	2019	2,090,056	2,298,962	110.00%	539.74	489.56	90.70%
		2020	598,961	645,380	107.75%	165.28	167.46	101.32%
	ENO Subtotal	**Both**	**2,689,017**	**2,944,342**	**109.50%**	**705.02**	**657.02**	**93.19%**

Program	Territory	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
	Algiers	2019	375,520	422,322	112.46%	97.94	94.51	96.50%
		2020	111,402	124,322	111.60%	29.30	30.80	105.12%
	Algiers Subtotal	**Both**	**486,922**	**546,644**	**112.27%**	**127.24**	**125.31**	**98.48%**
	Overall Total	**Both**	**3,175,939**	**3,490,986**	**109.92%**	**832.26**	**782.33**	**94.00%**
LIA&Wx	ENO	2019	1,191,024	1,581,622	132.80%	554.41	434.59	78.39%
		2020	408,215	524,162	128.40%	175.29	126.38	72.10%
	ENO Subtotal	**Both**	**1,599,239**	**2,105,784**	**131.67%**	**729.70**	**560.97**	**76.88%**
	Algiers	2019	86,873	109,832	126.43%	31.10	34.25	110.13%
		2020	61,686	93,518	151.60%	42.42	25.12	59.22%
	Algiers Subtotal	**Both**	**148,559**	**203,350**	**136.88%**	**73.52**	**59.37**	**80.75%**
	Overall Total	**Both**	**1,747,798**	**2,309,134**	**132.12%**	**803.22**	**620.34**	**77.23%**
Multifamily	ENO	2019	1,188,361	1,220,182	102.68%	258.45	291.92	112.95%
		2020	80,652	95,452	118.35%	27.65	26.92	97.36%
	ENO Subtotal	**Both**	**1,269,013**	**1,315,634**	**103.67%**	**286.10**	**318.84**	**111.44%**
	Algiers	2019	56,108	64,299	114.60%	11.23	12.74	113.45%
		2020	4,162	4,215	101.27%	0.91	0.92	101.10%
	Algiers Subtotal	**Both**	**60,270**	**68,514**	**113.68%**	**12.14**	**13.66**	**112.52%**
	Overall Total	**Both**	**1,329,283**	**1,384,148**	**104.13%**	**298.24**	**332.50**	**111.49%**
Green Lights Direct Install	ENO	2019	21,583	22,516	104.32%	4.47	4.65	104.03%
		2020	16,709	17,422	104.27%	3.45	3.60	104.35%
	ENO Subtotal	**Both**	**38,292**	**39,938**	**104.30%**	**7.92**	**8.25**	**104.17%**
	Algiers	2019	2,347	2,395	102.05%	0.49	0.50	102.04%
		2020	4,067	4,316	106.12%	0.84	0.89	105.95%
	Algiers Subtotal	**Both**	**6,414**	**6,711**	**104.63%**	**1.33**	**1.39**	**104.51%**
	Overall Total	**Both**	**44,706**	**46,649**	**104.35%**	**9.25**	**9.64**	**104.22%**
Residential Lighting & Appliances	ENO	2019	5,139,107	4,871,705	94.80%	1,071.13	1,011.92	94.47%
		2020	2,349,288	2,287,351	97.36%	485.55	472.83	97.38%
	ENO Subtotal	**Both**	**7,488,395**	**7,159,056**	**95.60%**	**1,556.68**	**1,484.75**	**95.38%**
	Algiers	2019	223,605	202,803	90.70%	43.97	41.87	95.22%
		2020	185,718	184,903	99.56%	38.36	38.38	100.05%
	Algiers Subtotal	**Both**	**409,323**	**387,706**	**94.72%**	**82.33**	**80.25**	**97.47%**
	Overall Total	**Both**	**7,897,718**	**7,546,762**	**95.56%**	**1,639.01**	**1,565.00**	**95.48%**
HE Tune Up	ENO	2019	2,035,853	2,386,070	117.20%	654.73	850.65	129.92%
		2020	6,491	6,431	99.08%	2.01	1.34	66.67%
	ENO Subtotal	**Both**	**2,042,344**	**2,392,501**	**117.14%**	**656.74**	**851.99**	**129.73%**
	Algiers	2019	251,751	300,383	119.32%	83.66	111.50	133.28%
		2020	0	0	N/A	0.00	0.00	N/A
	Algiers Subtotal	**Both**	**251,751**	**300,383**	**119.32%**	**83.66**	**111.50**	**133.28%**
	Overall Total	**Both**	**2,294,095**	**2,692,884**	**117.38%**	**740.40**	**963.49**	**130.13%**
School Kits & Education	ENO	2019	733,647	700,448	95.47%	86.83	115.46	132.97%
		2020	226,671	216,413	95.47%	26.83	35.67	132.95%

Program	Territory	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
		Both	**960,318**	**916,861**	**95.47%**	**113.66**	**151.13**	**132.97%**
	Algiers	2019	82,553	78,817	95.47%	9.77	12.99	132.96%
		2020	115,900	110,656	95.48%	13.72	18.24	132.94%
		Both	**198,453**	**189,473**	**95.47%**	**23.49**	**31.23**	**132.95%**
	Overall Total	**Both**	**1,158,771**	**1,106,334**	**95.47%**	**137.15**	**182.36**	**132.96%**
Scorecard Behavioral	ENO	2019		7,991,401	N/A		1,520.00	N/A
		2020		1,857,069	N/A		336.83	N/A
	ENO Subtotal	**Both**		**9,848,470**	**N/A**		**1,856.83**	**N/A**
	Algiers	2019		1,379,817	N/A		255.74	N/A
		2020		218,249	N/A		56.67	N/A
	Algiers Subtotal	**Both**		**1,598,066**	**N/A**		**312.41**	**N/A**
	Overall Total	**Both**		**11,466,536**	**N/A**		**2,169.24**	**N/A**
Easycool DLC	ENO	2019	No expected or verified kWh savings			No expected kW reductions		N/A
		2020						
	ENO Subtotal	**Both**					**3,699.77**	
	Algiers	2019						
		2020						
	Algiers Subtotal	**Both**					**374.53**	
	Overall Total	**Both**					**4,074.30**	
Small Commercial Solutions	ENO	2019	6,198,327	6,172,504	99.60%	711.81	697.26	98.00%
		2020	1,576,856	1,569,735	99.50%	195.52	194.85	99.70%
	ENO Subtotal	**Both**	**7,775,183**	**7,742,239**	**99.60%**	**907.33**	**892.11**	**98.30%**
	Algiers	2019	378,935	376,269	99.30%	51.80	51.35	99.10%
		2020	104,145	104,007	99.90%	8.26	8.24	99.80%
	Algiers Subtotal	**Both**	**483,080**	**480,276**	**99.40%**	**60.06**	**59.59**	**99.20%**
	Overall Total	**Both**	**8,258,263**	**8,222,515**	**99.60%**	**967.39**	**951.70**	**98.40%**
Large C&I	ENO	2019	15,960,835	15,929,360	99.80%	1,295.68	1,321.30	102.00%
		2020	10,168,703	10,179,019	100.10%	822.60	820.42	99.70%
	ENO Subtotal	**Both**	**26,129,538**	**26,108,379**	**99.90%**	**2,118.28**	**2,141.72**	**101.10%**
	Algiers	2019	1,117,468	1,117,025	100.00%	54.70	54.68	100.00%
		2020	0	0	N/A	0.00	0.00	N/A
	Algiers Subtotal	**Both**	**1,117,468**	**1,117,025**	**100.00%**	**54.70**	**54.68**	**100.00%**
	Overall Total	**Both**	**27,247,006**	**27,225,404**	**99.90%**	**2,172.98**	**2,196.40**	**101.10%**
Publicly Funded Institutions	ENO	2019	1,176,067	1,176,066	100.00%	36.75	34.73	94.50%
		2020	2,028,600	2,041,377	100.63%	45.13	21.86	48.44%
	ENO Subtotal	**Both**	**3,204,667**	**3,217,443**	**100.40%**	**81.88**	**56.59**	**69.11%**
	Algiers	2019	244,869	244,868	100.00%	8.40	7.29	86.79%
		2020	0	0	N/A	0.00	0.00	N/A
	Algiers Subtotal	**Both**	**244,869**	**244,868**	**100.00%**	**8.40**	**7.29**	**86.79%**
	Overall Total	**Both**	**3,449,536**	**3,462,311**	**100.37%**	**90.28**	**63.88**	**70.76%**

Below, Table 1-4 presents the overall expected and verified savings by territory and by year.

Table 1-4 Gross Impact Summary – Overall, by Territory and Year

Program	Territory	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
Overall	ENO	2019	35,734,860	44,350,836	124.11%	5,214.00	10,471.81	200.84%
		2020	17,461,146	19,439,811	111.33%	1,949.31	2,208.16	113.28%
	ENO Subtotal	**Both**	**53,196,006**	**63,790,647**	**119.92%**	**7,163.31**	**12,679.97**	**177.01%**
	Algiers	2019	2,820,029	4,298,830	152.44%	393.06	1,051.95	267.63%
		2020	587,080	844,186	143.79%	133.81	179.26	133.97%
	Algiers Subtotal	**Both**	**3,407,109**	**5,143,016**	**150.95%**	**526.87**	**1,231.21**	**233.68%**
	Overall Total	**Both**	**56,603,115**	**68,933,663**	**121.78%**	**7,690.18**	**13,911.18**	**180.90%**

Table 1-5 presents expected and verified savings by year.

Table 1-5 Gross Impact Summary – Overall, Year

Territory	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
Overall (by year)	2019	38,554,889	48,649,666	126.18%	5,607.06	11,523.76	205.52%
	2020	18,048,226	20,283,997	112.39%	2,083.12	2,387.42	114.61%
	Both	**56,603,115**	**68,933,663**	**121.78%**	**7,690.18**	**13,911.18**	**180.90%**

The portfolio overall achieved 68,933,663 kWh, or 121.78% of expected kWh savings, and 13,911.18 kW, or 180.90% of expected kW reductions. These achievements include savings from the Scorecard Behavioral Program, who did not have kWh or kW expectations (only savings goals) and whose verified savings contribute 19.95% of realized savings. Below, Table 1-6 and Table 1-7 show expected and verified kWh savings and kW reductions without the Scorecard program results.

Table 1-6 Gross Impact Summary – Overall, by Territory and Year (Scorecard Behavioral omitted)

Program	Territory	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
Overall (no Behavioral)	ENO	2019	35,734,860	36,359,435	101.75%	5,214.00	8,951.81	171.69%
		2020	17,461,146	17,582,742	100.70%	1,949.31	1,871.33	96.00%
	ENO Subtotal	**Both**	**53,196,006**	**53,942,177**	**101.40%**	**7,163.31**	**10,823.14**	**151.09%**
	Algiers	2019	2,820,029	2,919,013	103.51%	393.06	796.21	202.57%
		2020	587,080	625,937	106.62%	133.81	122.59	91.61%
	Algiers	**Both**	**3,407,109**	**3,544,950**	**104.05%**	**526.87**	**918.80**	**174.39%**
	Overall Total	**Both**	**56,603,115**	**57,487,127**	**101.56%**	**7,690.18**	**11,741.94**	**152.69%**

Table 1-7 Gross Impact Summary – Overall, by Year (Scorecard Behavioral omitted)

Territory	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
Overall (by year) (no Behavioral)	2019	38,554,889	39,278,448	101.88%	5,607.06	9,748.02	173.85%
	2020	18,048,226	18,208,679	100.89%	2,083.12	1,993.92	95.72%
	Both	**56,603,115**	**57,487,127**	**101.56%**	**7,690.18**	**11,741.94**	**152.69%**

Accounting for all programs except the Scorecard Behavioral Program, the portfolio overall achieved 57,487,127 kWh, or 101.56% of expected kWh savings, and 11,71.94 kW, or 152.69% of expected kW reductions.

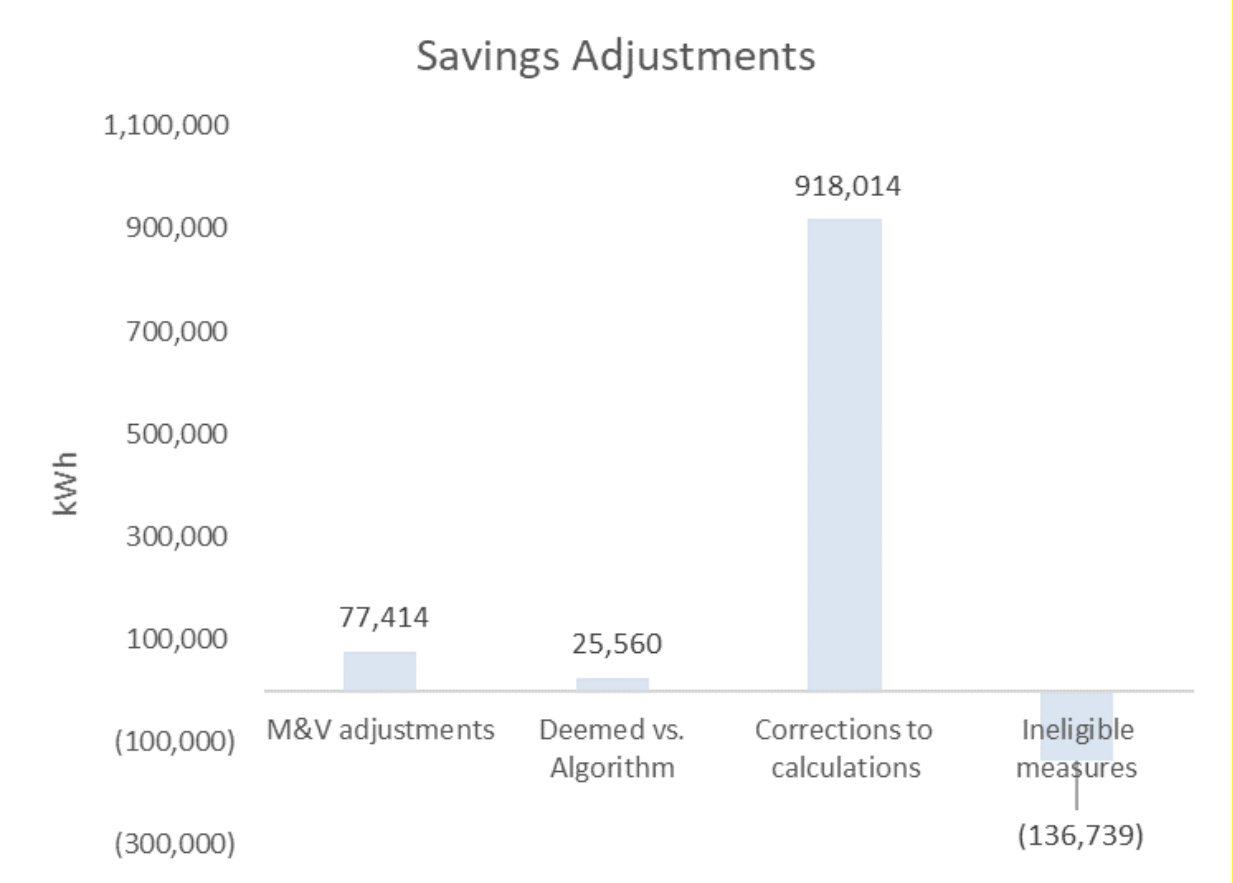
1.5.2 Summary of Program Adjustments

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

- **Measurement and Verification Adjustment:** These adjustments include changes made based upon field data collection findings but does not include a change to deemed savings. 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 as well as in-service rates for HESKs.
- **Deemed vs TRM Algorithm:** These adjustments are differences between deemed per-unit savings estimates and calculated savings using TRM algorithms and inputs specific to the measure installation. Examples include: Performance improvements from AC tune-ups and heating type-specific interactive factors for residential lighting.
- **Corrections to Calculations:** These adjustments are revisions to ex ante calculations which have used either an incorrect method to calculate expected savings or incorrect inputs in said calculations. Examples include: Incorrect ceiling insulation multipliers and PreDL adjustments to duct sealing.

- **Ineligible Measures:** These adjustments exclude savings from measures not eligible for program savings. Examples include: Programmable thermostats.

Figure 1-1 Savings Adjustments



1.5.3 Verified Net Savings

In addition to gross savings, 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 1-8 through Table 1-13. 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 1-8 Net kWh and kW Impacts – Overall, by Program, Territory and Year.

Program	*Territory*	*Time Period*	*Verified Gross kWh Savings*	*Net kWh Savings*	*kWh NTGR*	*Verified Gross kW Reductions*	*Net kW Reductions*	*kW NTGR*
HPwES	ENO	2019	2,298,962	1,939,369	84.36%	489.56	429.84	87.80%
		2020	645,380	599,087	92.83%	167.46	160.52	95.86%
	ENO Subtotal	**Both**	**2,944,342**	**2,538,456**	**86.21%**	**657.02**	**590.36**	**89.85%**

Program	Territory	Time Period	Verified Gross kWh Savings	Net kWh Savings	kWh NTGR	Verified Gross kW Reductions	Net kW Reductions	kW NTGR
	Algiers	2019	422,322	367,858	87.10%	94.51	85.40	90.36%
		2020	124,322	117,949	94.87%	30.80	29.79	96.72%
	Algiers Subtotal	**Both**	**546,644**	**485,807**	**88.87%**	**125.31**	**115.19**	**91.92%**
	Overall Total	**Both**	**3,490,986**	**3,024,263**	**86.63%**	**782.33**	**705.55**	**90.19%**
LIA&Wx	ENO	2019	1,581,622	1,581,622	100.00%	434.59	434.59	100.00%
		2020	524,162	524,162	100.00%	126.38	126.38	100.00%
	ENO Subtotal	**Both**	**2,105,784**	**2,105,784**	**100.00%**	**560.97**	**560.97**	**100.00%**
	Algiers	2019	109,832	109,832	100.00%	34.25	34.25	100.00%
		2020	93,518	93,518	100.00%	25.12	25.12	100.00%
	Algiers Subtotal	**Both**	**203,350**	**203,350**	**100.00%**	**59.37**	**59.37**	**100.00%**
	Overall Total	**Both**	**2,309,134**	**2,309,134**	**100.00%**	**620.34**	**620.34**	**100.00%**
Multifamily	ENO	2019	1,220,182	1,094,624	89.71%	291.92	268.97	92.14%
		2020	95,452	89,902	94.19%	26.92	25.58	95.02%
	ENO Subtotal	**Both**	**1,315,634**	**1,184,526**	**90.03%**	**318.84**	**294.55**	**92.38%**
	Algiers	2019	64,299	55,867	86.89%	12.74	11.43	89.72%
		2020	4,215	4,117	97.67%	0.92	0.89	96.74%
	Algiers Subtotal	**Both**	**68,514**	**59,984**	**87.55%**	**13.66**	**12.32**	**90.19%**
	Overall Total	**Both**	**1,384,148**	**1,244,510**	**89.91%**	**332.50**	**306.87**	**92.29%**
Green Lights Direct Install	ENO	2019	22,516	20,264	90.00%	4.65	4.19	90.11%
		2020	17,422	15,679	90.00%	3.60	3.24	90.00%
	ENO Subtotal	**Both**	**39,938**	**35,944**	**90.00%**	**8.25**	**7.43**	**90.06%**
	Algiers	2019	2,395	2,156	90.02%	0.50	0.45	90.00%
		2020	4,316	3,885	90.01%	0.89	0.80	89.89%
	Algiers Subtotal	**Both**	**6,711**	**6,041**	**90.02%**	**1.39**	**1.25**	**89.93%**
	Overall Total	**Both**	**46,649**	**41,984**	**90.00%**	**9.64**	**8.68**	**90.04%**
Residential Lighting & Appliances	ENO	2019	4,871,705	3,338,174	68.52%	1,011.92	691.17	68.30%
		2020	2,287,351	1,381,307	60.39%	472.83	285.65	60.41%
	ENO Subtotal	**Both**	**7,159,056**	**4,719,481**	**65.92%**	**1,484.75**	**976.82**	**65.79%**
	Algiers	2019	202,803	171,261	84.45%	41.87	35.48	84.74%
		2020	184,903	84,073	45.47%	38.38	17.45	45.47%
	Algiers Subtotal	**Both**	**387,706**	**255,334**	**65.86%**	**80.25**	**52.93**	**65.96%**
	Overall Total	**Both**	**7,546,762**	**4,974,815**	**65.92%**	**1,565.00**	**1,029.75**	**65.80%**
HE Tune Up	ENO	2019	2,386,070	2,152,692	90.22%	850.65	752.89	88.51%
		2020	6,431	5,803	90.23%	1.34	1.21	90.30%
	ENO Subtotal	**Both**	**2,392,501**	**2,158,495**	**90.22%**	**851.99**	**754.10**	**88.51%**
	Algiers	2019	300,383	269,790	89.82%	111.50	98.40	88.25%
		2020	0	0	N/A	0.00	0.00	N/A
	Algiers Subtotal	**Both**	**300,383**	**269,790**	**89.82%**	**111.50**	**98.40**	**88.25%**
	Overall Total	**Both**	**2,692,884**	**2,428,285**	**90.17%**	**963.49**	**852.50**	**88.48%**
School Kits & Education	ENO	2019	700,448	552,381	78.86%	115.46	88.17	76.36%
		2020	216,413	170,666	78.86%	35.67	27.24	76.37%

Program	Territory	Time Period	Verified Gross kWh Savings	Net kWh Savings	kWh NTGR	Verified Gross kW Reductions	Net kW Reductions	kW NTGR
		Both	**916,861**	**723,047**	**78.86%**	**151.13**	**115.41**	**76.36%**
	Algiers	2019	78,817	62,156	78.86%	12.99	9.92	76.37%
		2020	110,656	87,264	78.86%	18.24	13.93	76.37%
		Both	**189,473**	**149,420**	**78.86%**	**31.23**	**23.85**	**76.37%**
	Overall Total	**Both**	**1,106,334**	**872,467**	**78.86%**	**182.36**	**139.26**	**76.37%**
Scorecard Behavioral	ENO	2019	7,991,401	7,991,401	100.00%	1,520.00	1,520.00	100.00%
		2020	1,857,069	1,857,069	100.00%	336.83	336.83	100.00%
	ENO Subtotal	**Both**	**9,848,470**	**9,848,470**	**100.00%**	**1,856.83**	**1,856.83**	**100.00%**
	Algiers	2019	1,379,817	1,379,817	100.00%	255.74	255.74	100.00%
		2020	218,249	218,249	100.00%	56.67	56.67	100.00%
	Algiers Subtotal	**Both**	**1,598,066**	**1,598,066**	**100.00%**	**312.41**	**312.41**	**100.00%**
	Overall Total	**Both**	**11,466,536**	**11,466,536**	**100.00%**	**2,169.24**	**2,169.24**	**100.00%**
Easycool DLC	ENO	2019	No expected or verified kWh savings			3,699.77	3,699.77	100.00%
		2020						
	ENO Subtotal	**Both**				**3,699.77**	**3,699.77**	**100.00%**
	Algiers	2019				374.53	374.53	100.00%
		2020						
	Algiers Subtotal	**Both**				**374.53**	**374.53**	**100.00%**
	Overall Total	**Both**				**4,074.30**	**4,074.30**	**100.00%**
Small Commercial Solutions	ENO	2019	6,172,504	5,897,210	95.54%	697.26	654.87	93.92%
		2020	1,569,735	1,499,725	95.54%	194.85	183.00	93.92%
	ENO Subtotal	**Both**	**7,742,239**	**7,396,935**	**95.54%**	**892.11**	**837.87**	**93.92%**
	Algiers	2019	376,269	359,487	95.54%	51.35	48.23	93.92%
		2020	104,007	99,368	95.54%	8.24	7.74	93.93%
	Algiers Subtotal	**Both**	**480,276**	**458,855**	**95.54%**	**59.59**	**55.97**	**93.93%**
	Overall Total	**Both**	**8,222,515**	**7,855,790**	**95.54%**	**951.70**	**893.84**	**93.92%**
Large C&I	ENO	2019	15,929,360	14,134,121	88.73%	1,321.30	1,233.96	93.39%
		2020	10,179,019	9,031,844	88.73%	820.42	766.19	93.39%
	ENO Subtotal	**Both**	**26,108,379**	**23,165,965**	**88.73%**	**2,141.72**	**2,000.15**	**93.39%**
	Algiers	2019	1,117,025	991,136	88.73%	54.68	51.07	93.40%
		2020	0	0	N/A	0.00	0.00	N/A
	Algiers Subtotal	**Both**	**1,117,025**	**991,136**	**88.73%**	**54.68**	**51.07**	**93.40%**
	Overall Total	**Both**	**27,225,404**	**24,157,101**	**88.73%**	**2,196.40**	**2,051.22**	**93.39%**
Publicly Funded Institutions	ENO	2019	1,176,066	1,111,911	94.54%	34.73	32.62	93.92%
		2020	2,041,377	1,930,019	94.54%	21.86	20.53	93.92%
	ENO Subtotal	**Both**	**3,217,443**	**3,041,930**	**94.54%**	**56.59**	**53.15**	**93.92%**
	Algiers	2019	244,868	231,510	94.54%	7.29	6.85	93.96%
		2020	0	0	N/A	0.00	0.00	N/A
	Algiers Subtotal	**Both**	**244,868**	**231,510**	**94.54%**	**7.29**	**6.85**	**93.96%**
	Overall Total	**Both**	**3,462,311**	**3,273,440**	**94.54%**	**63.88**	**60.00**	**93.93%**

Table 1-9 Net kWh and kW Impacts – Overall, by Territory and Year.

Program	Territory	Time Period	Verified Gross kWh Savings	Net kWh Savings	kWh NTGR	Verified Gross kW Reductions	Net kW Reductions	kW NTGR
Overall	ENO	2019	44,350,836	39,813,769	89.77%	10,471.81	9,811.04	93.69%
		2020	19,439,811	17,105,263	87.99%	2,208.16	1,936.37	87.69%
	ENO Subtotal	**Both**	**63,790,647**	**56,919,032**	**89.23%**	**12,679.97**	**11,747.41**	**92.65%**
	Algiers	2019	4,298,830	4,000,870	93.07%	1,051.95	1,011.75	96.18%
		2020	844,186	708,423	83.92%	179.26	152.39	85.01%
	Algiers Subtotal	**Both**	**5,143,016**	**4,709,293**	**91.57%**	**1,231.21**	**1,164.14**	**94.55%**
	Overall Total	**Both**	**68,933,663**	**61,628,325**	**89.40%**	**13,911.18**	**12,911.55**	**92.81%**

Table 1-10 Net kWh and kW Impacts – Overall, by Year.

Territory	Time Period	Verified Gross kWh Savings	Net kWh Savings	kWh NTGR	Verified Gross kW Reductions	Net kW Reductions	kW NTGR
Overall (by year)	2019	48,649,666	43,814,639	90.06%	11,523.76	10,822.79	93.92%
	2020	20,283,997	17,813,686	87.82%	2,387.42	2,088.76	87.49%
	Both	**68,933,663**	**61,628,325**	**89.40%**	**13,911.18**	**12,911.55**	**92.81%**

The portfolio overall achieved 61,628,325 net kWh, or 89.40% of gross, and 12,911.55 kW, or 92.81% of gross. These achievements include savings from the Scorecard Behavioral Program, who did not have kWh or kW expectations (only savings goals) and whose verified savings contribute 19.95% of realized savings. Below, Table 1-11 and Table 1-12 show expected and verified kWh savings and kW reductions without including the Scorecard program results.

Table 1-11 Gross Impact Summary – Overall, by Territory and Year (Scorecard Behavioral omitted)

Program	Territory	Time Period	Verified Gross kWh Savings	Net kWh Savings	kWh NTGR	Verified Gross kW Reductions	Net kW Reductions	kW NTGR
Overall (no Behavioral)	ENO	2019	36,359,435	31,822,368	87.52%	8,951.81	8,291.04	92.62%
		2020	17,582,742	15,248,194	86.72%	1,871.33	1,599.54	85.48%
	ENO Subtotal	**Both**	**53,942,177**	**47,070,562**	**87.26%**	**10,823.14**	**9,890.58**	**91.38%**
	Algiers	2019	2,919,013	2,621,053	89.79%	796.21	756.01	94.95%
		2020	625,937	490,174	78.31%	122.59	95.72	78.08%
	Algiers	**Both**	**3,544,950**	**3,111,227**	**87.77%**	**918.80**	**851.73**	**92.70%**
	Overall Total	**Both**	**57,487,127**	**50,181,789**	**87.29%**	**11,741.94**	**10,742.31**	**91.49%**

Table 1-12 Gross Impact Summary – Overall, by Year (Scorecard Behavioral omitted)

Territory	Time Period	Verified Gross kWh Savings	Net kWh Savings	kWh NTGR	Verified Gross kW Reductions	Net kW Reductions	kW NTGR
Overall (by year) (no Behavioral)	2019	39,278,448	34,443,421	87.69%	9,748.02	9,047.05	92.81%
	2020	18,208,679	15,738,368	86.43%	1,993.92	1,695.26	85.02%
	Both	**57,487,127**	**50,181,789**	**87.29%**	**11,741.94**	**10,742.31**	**91.49%**

Accounting for all programs except the Scorecard Behavioral Program, the portfolio overall achieved 50,181,789 kWh, or 87.29% of gross kWh, and 10,742.31 kW, or 91.49% of expected kW reductions.

1.5.4 Goal Achievement

Table 1-13 Summary of Goal Achievement – Overall, by Program, Territory and Year.

Program	Territory	Time Period	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
HPwES	ENO	2019	2,863,506	2,298,962	80.28%	571.84	657.02	114.90%
		2020	390,000	645,380	165.48%			
	ENO Subtotal	**Both**	**3,253,506**	**2,944,342**	**90.50%**	**571.84**	**657.02**	**114.90%**
	Algiers	2019	214,789	422,322	196.62%	42.70	125.31	293.47%
		2020	64,000	124,322	194.25%			
	Algiers Subtotal	**Both**	**278,789**	**546,644**	**196.08%**	**42.70**	**125.31**	**293.47%**
	Overall Total	**Both**	**3,532,295**	**3,490,986**	**98.83%**	**614.54**	**782.33**	**127.30%**
LIA&Wx	ENO	2019	1,316,362	1,581,622	120.15%	285.11	560.97	196.76%
		2020	240,000	524,162	218.40%			
	ENO Subtotal	**Both**	**1,556,362**	**2,105,784**	**135.30%**	**285.11**	**560.97**	**196.76%**
	Algiers	2019	98,072	109,832	111.99%	21.10	59.37	281.37%
		2020	20,500	93,518	456.19%			
	Algiers Subtotal	**Both**	**118,572**	**203,350**	**171.50%**	**21.10**	**59.37**	**281.37%**
	Overall Total	**Both**	**1,674,934**	**2,309,134**	**137.86%**	**306.21**	**620.34**	**202.59%**
Multifamily	ENO	2019	717,509	1,221,970	170.31%	138.03	319.68	231.60%
		2020	350,000	95,452	27.27%			
	ENO Subtotal	**Both**	**1,067,509**	**1,317,422**	**123.41%**	**138.03**	**319.68**	**231.60%**
	Algiers	2019	53,717	64,299	119.70%	10.30	13.66	132.62%
		2020	23,000	4,215	18.33%			
	Algiers Subtotal	**Both**	**76,717**	**68,514**	**89.31%**	**10.30**	**13.66**	**132.62%**
	Overall Total	**Both**	**1,144,226**	**1,385,936**	**121.12%**	**148.33**	**333.34**	**224.73%**
Green Light	No PY9 goals.							
Residential Lighting & Appliances	ENO	2019	3,357,145	4,871,705	145.11%	711.45	1,484.75	208.69%
		2020	2,500,000	2,287,351	91.49%			
	ENO Subtotal	**Both**	**5,857,145**	**7,159,056**	**122.23%**	**711.45**	**1,484.75**	**208.69%**
	Algiers	2019	250,986	202,803	80.80%	53.40	80.25	150.28%
		2020	175,000	184,903	105.66%			

Program	Territory	Time Period	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
	Algiers Subtotal	**Both**	**425,986**	**387,706**	**91.01%**	**53.40**	**80.25**	**150.28%**
	Overall Total	**Both**	**6,283,131**	**7,546,762**	**120.11%**	**764.85**	**1,565.00**	**204.62%**
HE Tune Up	ENO	2019	1,727,139	2,386,070	138.15%	541.09	851.99	157.46%
		2020	75,000	6,431	8.57%			
	ENO Subtotal	**Both**	**1,802,139**	**2,392,501**	**132.76%**	**541.09**	**851.99**	**157.46%**
	Algiers	2019	134,413	300,383	223.48%	40.40	111.50	275.99%
		2020	8,500	0	0.00%			
	Algiers Subtotal	**Both**	**142,913**	**300,383**	**210.19%**	**40.40**	**111.50**	**275.99%**
	Overall Total	**Both**	**1,945,052**	**2,692,884**	**138.45%**	**581.49**	**963.49**	**165.69%**
School Kits & Education	ENO	2019	546,782	700,448	128.10%	74.50	151.13	202.86%
		2020	347,468	216,413	62.28%			
		Both	**894,250**	**916,861**	**102.53%**	**74.50**	**151.13**	**202.86%**
	Algiers	2019	136,695	78,817	57.66%	18.60	31.23	167.90%
		2020	48,972	110,656	225.96%			
		Both	**185,667**	**189,473**	**102.05%**	**18.60**	**31.23**	**167.90%**
	Overall Total	**Both**	**1,079,917**	**1,106,334**	**102.45%**	**93.10**	**182.36**	**195.88%**
Scorecard Behavioral	ENO	2019	6,844,121	7,991,401	116.75%	5,817.50	1,520.00	26.13%
		2020	1,711,030	1,857,069	108.54%			
	ENO Subtotal	**Both**	**8,555,151**	**9,848,470**	**116.76%**	**5,817.50**	**1,856.83**	**31.92%**
	Algiers	2019	1,155,879	1,379,817	119.37%	982.50	255.74	26.03%
		2020	288,970	218,249	75.53%			
	Algiers Subtotal	**Both**	**1,444,849**	**1,598,066**	**110.60%**	**982.50**	**312.41**	**31.80%**
	Overall Total	**Both**	**10,000,000**	**11,466,536**	**114.47%**	**6,800.00**	**2,169.24**	**31.90%**
Easycool DLC	ENO	2019	No kWh Goals			1,106.23	3,699.77	334.45%
		2020						
	ENO Subtotal	**Both**				**1,106.23**	**3,699.77**	**334.45%**
	Algiers	2019				83.27	374.53	449.78%
		2020						
	Algiers Subtotal	**Both**				**1,106.23**	**3,699.77**	**334.45%**
	Overall Total	**Both**				**1,189.50**	**4,074.30**	**342.52%**
Small Commercial Solutions	ENO	2019	5,760,033	6,172,504	107.16%	1,098.10	892.11	81.24%
		2020	470,930	1,569,735	333.33%			
	ENO Subtotal	**Both**	**6,230,963**	**7,742,239**	**124.25%**	**1,098.10**	**892.11**	**81.24%**
	Algiers	2019	535,678	376,269	70.24%	107.60	59.59	55.38%
		2020	134,359	104,007	77.41%			
	Algiers Subtotal	**Both**	**670,037**	**480,276**	**71.68%**	**107.60**	**59.59**	**55.38%**
	Overall Total	**Both**	**6,901,000**	**8,222,515**	**119.15%**	**1,205.70**	**951.70**	**78.93%**
Large C&I	ENO	2019	24,205,586	15,929,360	65.81%	3,914.80	2,141.72	54.71%
		2020	600,000	10,179,019	N/A			
	ENO Subtotal	**Both**	**24,805,586**	**26,108,379**	**105.25%**	**3,914.80**	**2,141.72**	**54.71%**
	Algiers	2019	797,046	1,117,025	140.15%	117.40	54.68	46.58%

Program	Territory	Time Period	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
		2020	0	0	N/A			
	Algiers Subtotal	**Both**	**797,046**	**1,117,025**	**140.15%**	**117.40**	**54.68**	**46.58%**
	Overall Total	**Both**	**25,602,632**	**27,225,404**	**106.34%**	**4,032.20**	**2,196.40**	**54.47%**
Publicly Funded Institutions	ENO	2019	2,927,922	1,176,066	40.17%	430.20	56.59	13.15%
		2020	0	2,041,377	N/A			
	ENO Subtotal	**Both**	**2,927,922**	**3,217,443**	**109.89%**	**430.20**	**56.59**	**13.15%**
	Algiers	2019	251,013	244,868	97.55%	38.50	7.29	18.94%
		2020	0	0	N/A			
	Algiers Subtotal	**Both**	**251,013**	**244,868**	**97.55%**	**38.50**	**7.29**	**18.94%**
	Overall Total	**Both**	**3,178,935**	**3,462,311**	**108.91%**	**468.70**	**63.88**	**13.63%**

Table 1-14 Summary of Goal Achievement – Overall, by Territory and Year

Program	Territory	Time Period	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
Overall	ENO	2019	50,266,105	44,330,108	88.19%	14,688.85	12,335.73	83.98%
		2020	6,684,428	19,422,389	290.56%			
	ENO Subtotal	**Both**	**56,950,533**	**63,752,497**	**111.94%**	**14,688.85**	**12,335.73**	**83.98%**
	Algiers	2019	3,628,288	4,296,435	118.41%	1,515.77	1,173.15	77.40%
		2020	763,301	839,870	110.03%			
	Algiers Subtotal	**Both**	**4,391,589**	**5,136,305**	**116.96%**	**1,515.77**	**1,173.15**	**77.40%**
	Overall Total	**Both**	**61,342,122**	**68,888,802**	**112.30%**	**16,204.62**	**13,508.88**	**83.36%**

For the New Orleans territory, the portfolio overall achieved 63,752,497 kWh, or 111.94% of the kWh goal and 12,335.73 kW, or 83.98% of the kW goal.

For the Algiers territory, the portfolio overall achieved 5,136,305 kWh, or 116.94% of the kWh goal and 1,173.15 kW, or 77.40% of the kW goal.

Table 1-15 Summary of Goal Achievement – Overall, Year

Territory	Time Period	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
Overall (by year)	2019	53,894,393	48,626,543	90.23%	16,204.62	13,508.88	83.36%
	2020	7,447,729	20,262,259	272.06%			
	Both	**61,342,122**	**68,888,802**	**112.30%**	**16,204.62**	**13,508.88**	**83.36%**

The portfolio overall achieved 68,888,802 kWh, or 112.30% of the kWh goal and 13,508.88 kW, or 83.36% of the kW goal.

1.5.5 Cost-Benefit Results

Table 1-16 and Table 1-17 present cost-benefit summary results.

Table 1-16 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	590.36	2,538,456	$2,485,123	2.24	2.06
LIA&Wx	560.97	2,105,784			
Multifamily	294.55	1,184,526			
Green Light Direct Install	7.43	35,943			
Retail Lighting and Appliances	976.82	4,719,481	$578,297	6.98	4.48
High Efficiency Tune-Up	754.10	2,158,495	$517,370	4.65	4.12
Energy Smart School Kits	115.41	723,047	$430,052	0.79	0.73
Scorecard Behavioral	1,856.83	9,848,470	$305,344	2.07	2.07
Direct Load Control	3,699.77	0	$853,033	0.26	0.21
Small Commercial Solutions	837.87	7,396,935	$1,842,329	1.91	2.27
Large C&I	2,000.15	23,165,965	$5,419,306	1.89	2.27
Publicly Funded Institutions	53.15	3,041,930	$909,328	1.18	1.46
Total	**11,747.41**	**56,919,032**	**$13,340,182**	**2.01**	**2.16**

Table 1-17 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	115.19	485,807	$199,812	3.65	3.37
LIA&Wx	59.37	203,350			
Multifamily	12.32	59,984			
Green Light Direct Install	1.25	6,041			
Retail Lighting and Appliances	52.93	255,334	$45,418	4.15	2.72
High Efficiency Tune-Up	98.40	269,790	$46,166	6.49	5.83
Energy Smart School Kits	23.85	149,420	$107,512	0.66	0.60
Scorecard Behavioral	312.41	1,598,066	$44,118	2.34	2.34
Direct Load Control	374.53	0	$65,107	0.34	0.28
Small Commercial Solutions	55.97	458,855	$189,481	1.19	1.39
Large C&I	51.07	991,136	$292,397	1.51	1.69
Publicly Funded Institutions	6.85	231,510	$83,527	1.01	1.24
Total	**1,164.14**	**4,709,293**	**$1,073,538**	**1.92**	**1.97**

All programs passed the TRC and UCT cost tests except for Energy Smart School Kits and Direct Load Control.

1.6 Process Findings and Recommendations

The following subsections summarize findings of the PY9 process evaluation.

1.6.1 Residential Portfolio Findings and Recommendations

1.6.1.1 Cross-Cutting Residential Portfolio Findings

The key findings related to the portfolio of residential programs are:

- **The marketing approach has remained consistent from previous program years, with increased outreach efforts in Algiers.** Implementation staff pointed to increased outreach efforts by Energy Wise in Algiers. Energy Wise has found new events to participate in and coordinates with Entergy when they are sponsoring or attending events. Program staff pointed to a marketing blitz at the end of PY8 that may have impacted PY9 by increasing awareness and interest in the residential programs. Staff attempted to effectively market and connect with customers while balancing not "over-saturating" them with communications. They also indicated that word-of mouth marketing helped increase participation among the residential programs.
- **The program utilized more "nurture" campaigns to promote residential programs.** If a customer participated in one offering, they were contacted to participate in other offerings.
- **Staff is seeking additional funding from the city council to meet goals in Algiers.** Algiers is a small territory with its own savings and budget goals independent from New Orleans, which made it a challenge to stay within the financial range. Algiers is currently at a standstill due to funding limitations. One staff member believes that due to the savings generated by the program, they will need to find creative strategies to sustain and budget the program for the future.
- **The program increased communication with the Vietnamese community.** Entergy is attempting to increase engagement with the Vietnamese community in New Orleans. The biggest challenge is to build trust within the community and overcome cultural differences and language barriers.
- **Communication between Entergy New Orleans and implementation staff has remained consistent in PY9.** Meetings and communication structure have remained largely the same from the previous year. Implementation staff indicated there has been an increased engagement between all parties and that they are all working more closely to stay aligned with Entergy.
- **New data systems implemented in PY9. APTIM implemented and launched a new tracking system.** APTIM indicated they migrated away from their old system to a more "robust and user-friendly" tracking system. All Entergy partners and allies have access to the data. The tool allows program staff to check program data in

real-time, clarify data, forecast patterns, and securely transfer documents. In addition, Franklin shifted to a new version of sales forces in PY9.

- **Prescriptive measures were defined for residential new construction and major renovations.** The program is targeting historical homes as well as new construction. The prescriptive incentives for major renovations and new construction will be offered during the new cycle that begins in 2020.

The key recommendations related to the portfolio of residential programs are:

- **Build case studies highlighting Energy Smart's positive impact on the community.** The development of case studies will promote program awareness while communicating the value of the programs to Entergy customers. Additionally, case studies on program impacts may be readily used in press releases.
- **Provide training to residential trade allies to increase engagement and develop the workforce to support energy efficiency.** Providing trade allies with training opportunities on new program practices or technologies can increase engagement and enthusiasm for Energy Smart programs, as well as prepare regional service providers to make energy efficiency improvements in New Orleans.
- **Utilize segment target marketing to promote measures for new construction or renovations to historic homes.** In addition to builder and contractor promotion, direct to customer promotion through lifestyle advertisements for Instagram and other social media platforms may also drive customer interest in efficiency new construction and renovation.
- **Identify and correct systematic errors in tracking databases.** There appear to be systematic issues in program tracking data as described above. The source of these should be identified and corrected.

1.6.1.2 Home Performance with ENERGY STAR®

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

- **Participants experiences with the HPwES program participation process were mostly positive.**
  - Ninety percent of participants reported that the scheduling the home energy assessment was easy or very easy.
  - Eighty-four percent of participants reported that the home energy report was helpful or very helpful.
  - Ninety-four percent of participants were satisfied with the application process.

- Ninety-three percent of participants were satisfied with the program overall.

- **The program exceeded all kW goals and most kWh goals.** All goals were met except the 2019 kWh goal for the New Orleans territory, causing the Program to fall short of the overall kWh goal. Overall goal achievement is 98.33% of kWh and 125.97% of kW.
- **Initial program tracking data did not contain all data points necessary for evaluation.** Large portions of customers receiving major measures, such as AC tune ups, duct sealing and air sealings were missing heating type, test-in and test-out values as well as AC tonnage. These issues were brought to the Implementors and the missing data was provided promptly.
- **Participants experiences with the HPwES program participation process were mostly positive.**
  - Ninety percent of participants reported that the scheduling the home energy assessment was easy or very easy.
  - Eighty-four percent of participants reported that the home energy report was helpful or very helpful.
  - Ninety-four percent of participants were satisfied with the application process.
  - Ninety-three percent of participants were satisfied with the program overall.
- **A significant share of participants would have met the requirements for the Low Income Audit and Weatherization Program.** The 39% of participants with income of less than $20,000 would have met the 200% federal poverty level requirement for all sizes of household.
- **A modest share of customers participated in an Entergy Energy Smart program after receiving the kit.** Twelve percent of respondents reported that they participated in an Entergy energy efficiency program after receiving the kit.
- **The primary reasons for not installing low-flow devices were that the devices did not fit the faucet or shower or because the person did not have time or needed additional assistance installing the devices.**
- **Most respondents reported they did not install the LED light bulbs because their old bulbs were not burnt out yet.**
- **Lack of eligible measures for a gas-heated home may be contributing to low energy savings**. Natural gas-heated homes do not qualify for all available measures in HPwES. Because gas homes do not qualify for air sealing and attic insulation, many customers have been excluded from the service, thus potentially impacting the program.

The Evaluators' recommendations are as follows:

- **Review data collection and tracking procedures to fully capture program activity including assessments performed.** Also review data import/transfer procedures. Implementation staff indicated that the omissions mentioned in the 'Key Findings and Conclusions' section were incurred during this process.
- **Explore adding more program-eligible measures for gas-heated homes.** Staff reported that some of the initial program modeling was based on data from northern regions of the United States. Staff should model envelope measures using regional weather sensitive inputs to determine if envelope measures are cost effective. Attic insulation and air sealing are not currently eligible for gas homes and could be included in the next cycle to increase customer participation and savings in the program.
- **Explore electronic data collection for use in performing audits.** Providing more efficient ways for trade allies to upload their information could improve data collection and save time. For example, use of tablet-based data collection can streamline the process.
- **Explore providing low-flow adapters in efficiency kits to increase installation rates.** Staff should review information gathered through performing direct installations of low-flow devices to understand what types of adapters could be provided to increase installation of low-flow devices.
- **Emphasize the benefits of immediate replacement of inefficient light bulbs with LEDs in the kits.** Waiting for light bulbs to burn out was the most common reason for not installing the kit LEDs. Additional educational material on the benefits of replacing efficient bulbs may help improve the installation rate.
- **Proactively ask participants if they qualify for the Low Income Audit and Weatherization program during the enrollment and assessment process.** The significant share of participants who reported income that would qualify them for the low income program suggests that staff may need to be more assertive in channeling these customers into the low-income program.
- **Adjust Duct Sealing savings algorithms' PreDL from 35% to 40%.** Current savings assumed a 35% PreDL adjustment, though the New Orleans TRM 2.0 and the AR TRM specify 40% instead. Engineering calculations show that the interior temperature in those settings that exceed 40 percent total leakage would be above the thermally acceptable comfort levels published by ASHRAE in its 2009 Fundamentals publication.

1.6.1.3 Low Income Audit and Weatherization

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

- **All savings goals were exceeded.** The programs exceed its kWh savings goals, averaging 162.9% of kWh goals and 266.3% of kW goals.
- **Duct Sealing and Insulation accounted for most of the expected kWh savings.** Seventy-three percent of the expected savings came from duct sealing and insulation.

The Evaluators' recommendations are as follows:

- **Consider exploring partnership opportunities with local health authorities (LHA) to expand reach and cultivate unique funding streams as a way to enhance low income program offerings.** Weatherization programs that target low-income residents have additional non-energy benefits, like improving indoor air quality and reducing the burden of chronic conditions (e.g., COPD and asthma). Partnering with LHAs may result in new funding streams and identify new customers to expand the reach and impact of the program.
- **Adjust Duct Sealing savings algorithms' PreDL from 35% to 40%.** Current savings assumed a 35% Pre DL adjustment, though the New Orleans TRM 2.0 and the AR TRM specify 40% instead. Engineering calculations show that the interior temperature in those settings that exceed 40 percent total leakage would be above the thermally acceptable comfort levels published by ASHRAE in its 2009 *Fundamentals* publication.
- **Remove Programmable Thermostats from measure offerings** Programmable thermostats are not included in the New Orleans TRM 2.0, nor are they included in the Arkansas TRM as they are outdated technology for the residential sector. Without an appropriate measure study, the savings are speculative and unreliable, and measure studies have historically found that the savings are highly-dependent upon idiosyncratic program factors such as installation quality by the trade ally and preexisting customer behavior surrounding the management of their thermostat, with there being a possible risk of increased energy use if participants have low home occupancy.

1.6.1.4 EnergySmart for Multifamily

- **The program included a large complex in PY9.** In PY8, most projects were completed at duplexes and triplexes, but the program has focused expanding the participation of larger complexes in PY9. As of the time of the interview, the program completed a project at a large complex of a mix of multifamily and single-

family homes. Implementation staff indicated they are seeking to evolve this program to focus on buildings of five or more units.

- **Council resolution allowed Entergy to receive whole-building data for use in benchmarking to develop energy efficiency projects.** Multifamily benchmarking data will be released to identify potential energy efficiency projects. The program is working to create an energy advisor role who would drive these projects. After a building receives a portfolio manager score, the energy advisor will work closely with the owner to identify and implement projects.
- **Participants satisfaction was high.** All of the survey respondents reported that they were satisfied with the program overall.

The Evaluators' recommendations are as follows:

- **Identify new program-qualifying measures to target past multifamily participants.** Implementation staff stated that many of the multifamily complexes received measures through the program when CLEAResult was the implementer, but there may be additional measures that could now be available. Outreach to past participants should frame the program as promoting relationship building between customer and utility.
- **Adjust Duct Sealing savings algorithms' PreDL from 35% to 40%.** Current savings assumed a 35% PreDL adjustment, though the New Orleans TRM 2.0 and the AR TRM specify 40% instead. Engineering calculations show that the interior temperature in those settings that exceed 40 percent total leakage would be above the thermally acceptable comfort levels published by ASHRAE in its 2009 *Fundamentals* publication.
- **Remove Programmable Thermostats from measure offerings** Programmable thermostats are not included in the New Orleans TRM 2.0, nor are they included in the Arkansas TRM as they are outdated technology for the residential sector. Without an appropriate measure study, the savings are speculative and unreliable, and measure studies have historically found that the savings are highly-dependent upon idiosyncratic program factors such as installation quality by the trade ally and preexisting customer behavior surrounding the management of their thermostat, with there being a possible risk of increased energy use if participants have low home occupancy.

1.6.1.5 Green Light Direct Install

No process evaluation was performed for the Green Light Direct Install program for PY9.

1.6.1.6 Residential Lighting and Appliances

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

- **Overall goals were surpassed.** The Program exceeded the 2019 New Orleans and 2020 Algiers kWh goals but did not meet kWh goals in New Orleans for 2020 or Algiers for 2019. Both kW goals were surpassed.
- **Five stores were added in PY9.** Among these, a drugstore chain and discount store chain signed an agreement to participate in the program. The drugstore agreement supports seasonal promotion. The discount store contract provides funding for discounts in the Algiers' territory but not in the New Orleans territory. The agreement with membership store was discontinued in the beginning of the year when staff determined that the retailer would be unable to provide the volume of lamps discounted through the agreement.
- **Signed agreement with a new manufacturing partner with a big box retail chain.** The agreement is exclusive to the Algiers territory.
- **In-store outreach is still a primary channel to increase customer awareness of rebates.** Implementation staff indicated that training retail staff are one of their primary outreach activities. This training increases retail staff's awareness of the discounts and engagement with the program and indirectly facilitates customer awareness of the discounts. There are also field staff members who aid customers in retail locations when they are onsite performing quality control activities.
- **Staff is considering adding new measures.** The program is looking to add additional measures including more specialty lighting and additional appliances (e.g., dehumidifiers, ceiling fans, power strips).
- **Proposing an online marketplace.** Staff is currently proposing to offer their programs on a digital platform. The online market would provide easier access to customers looking for information on products and program.

The Evaluators' recommendations are as follows:

- **Utilize more signage in retail stores and clearly label which products offer discounts.** In retail stores, not every product has a label discount on it even though there may be signage announcing discounts on LED products. Increasing the in-store signage will also help increase customer attribution of rebates to Entergy.
- **Examine strategies to launch an online marketplace.** If an online market is launched, complement it with more social media presence and promotion. Research ways to educate customers who utilize the online marketplace and who

may have questions about specific items (e.g., offer a pop-up chat box that can answer customer questions). Additionally, in other jurisdictions, ADM has found that limited time promotions are effective means of driving sales through online marketplaces.

1.6.1.7 Residential Heating and Cooling

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

- **Overall kWh and kW goals were surpassed.** The program did not meet extension goals for either territory, however all other goals were exceeded, achieving 138.3% of the overall kWh goal and 165.6% of the overall kW goal.
- **There are few early replacements of HVAC systems.** System costs are still a barrier. Staff indicated there were approximately six replacements at the time of the interview.
- **HVAC tune-ups are now recommended during home energy audits performed through HPwES in PY9.**
- **Staff exploring to evolve into an AC solutions program.** Staff mentioned they would like to make the program more comprehensive by adding a smart thermostat measure to the program. They also noted that trade allies could do a tune-up, replacement, and/or install a smart thermostat.

The Evaluators' recommendations are as follows:

- **Pilot a midstream offering to increase AC replacements.** Develop a partnership with HVAC manufacturing companies to negotiate prices and installation costs for certain population segments or industries during next year's cycle. Midstream program designs can increase stocking of efficient units, making them more available to customers when their existing unit fails.

1.6.1.8 School Kits and Education

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

- **The program met all goals.** Overall ENO goal attainment is 102.5% and 202.9% for kWh and kW, respectively, and Algiers goal attainment is 102.5% and 195.9%.

The Evaluators' recommendations are as follows:

- **Update savings estimates based on averaged in-service rates.** Program planners should use in-service rates that are based on three-year averages from program data collection:

Table 1-18 Averaged ISRs

Item	*Three-year Average*
9W LED	70.1%
15W LED	71.2%
Bathroom Aerator 1.5	45.3%
Kitchen Aerator 1.5	44.8%
Showerhead	62.1%
Electric Water heating	55.4%

- **Update overall savings estimates based on TRM 3.0.** Starting in PY10, Energy Smart programs will be evaluated using the TRM 3.0, which includes changes to lighting and water sections from the previous version, thus affecting savings for school kits. Per-unit and per-kit gross savings, including averaged ISRs, are as follows:

Table 1-19 PY Savings Comparisons

Measure	PY9		PY10	
	kWh	*kW*	*kWh*	*kW*
9W LED[1]	71.1	0.0147	75.6	0.0128
15W LED[2]	60.6	0.0125	64.4	0.0109
Kitchen Aerator	6.7	0.0007	6.7	0.0007
Bathroom Aerator	6.6	0.0007	6.6	0.0007
Showerhead	77.7	0.0081	78.4	0.0082
Total	**222.6**	**0.037**	**231.7**	**0.033**

1.6.1.9 Scorecard Behavioral Program

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

- **Overall kWh goals were exceeded, but kW goals were not met.** Extension (2020) goals were met only in the New Orleans territory, though 2019 goals were exceeded in both territories. Overall goals achievement was 116.76% and 110.60% for the New Orleans and Algiers territories, respectively. Overall goal achievement for both territories was 114.47%. The program did not meet kW goals, at a total achievement of 31.90% for both territories combined.
- **The Evaluators were unable to create a valid post-hoc control group via quasi-experimental methods.** Many matching methods were employed to attempt to create a post-hoc control group with statistically similar pre-period average daily usage between participant and nonparticipant households. The

[1] Assumes (4) lamps
[2] Assumes (2) lamps

Evaluators found all matched groups to still differ in pre-period usage per month. The treatment groups seem to be inherently different in behavior to the nonparticipant households provided.

- **The post-program regression (PPR) model and treatment-only model provides the verified savings for the 2019 evaluation.** It was chosen as the best-fit model for each group due to the data restraints and model results. The savings coefficients are all statistically significant.
- **The Initial group comprised all the PY9 and extended PY9 savings.** Although the Second and Third groups displayed positive gross savings, after accounting for double counting from other program savings in PY8 and PY9, the net savings reduced to zero.
- **The results of this analysis are typical in the Initial group but are considerably lower for the Second and Third group.** Typical savings for behavioral programs of this design is about 2% of household pre-energy use. However, these results are premised on the lack of a control group, and therefore do not parse out changes between the pre- and post-periods that may have affected consumption in the treatment group unrelated to the Scorecards.
- **Behavioral changes take time to materialize.** Savings resulting from these programs is not immediate and is very likely to increase as time progresses and people adjust their behaviors in response to the program.
- **Program forecasted savings has been trending ahead of savings.** At the time of the interview, the program implementer was not sure if they would meet their goal but was pleased with the level of participation. On average, participants saved 0.66% off their bill, which amounts to 9.4 million annual kWh savings.
- **AMI meters were launched, providing additional data for the Scorecard.** Staff characterized the integration of AMI meter data for use in delivering Scorecards as seamless. The goal is to have AMI meters installed for all residential customers by 2020. As more customers receive their AMI meter, they will also be sent more correspondence with information through ENO's new Customer Engagement Platform ("CEP"). A challenge will be to not oversaturate the customer with messages.
- **Program has increased enrolments in PY9.** There are now 150,000 customers enrolled and receiving Scorecards.
- **Content and delivery of Scorecards remained consistent from the previous program year.** Accelerated Innovations (AI) continues to provide a similar scorecard to what was given in PY8, although the tips and messaging varies from year-to-year as tips and messaging are cycled out.

- **Open rates increased significantly from the previous program year and opt-out rates have remained low.** In Q1, the open rates were 15 – 20%, then they spiked to about 35%, and the last month they increased to 42%. The initial surge occurred around Memorial Day weekend. Opt-out rates average 0.05% per send-out.
- **Scorecard will end at the end of PY9 as the Customer Engagement Platform ramps up.** AI is providing the AMI-metered customers with the same version of Scorecard they had previously been receiving through the end of the program year. AI has received instruction that the Scorecard program will be winding down by the end of this program year.
- **Scorecard recipients found the scorecard to energy use graphics to be useful and helpful.** Approximately 70% of customers thought that the graphics on home energy use comparisons to other homes, home energy use for heating and cooling, and home energy use in relation to weather trends was clear and helpful.
- **A majority of scorecard recipients are satisfied with it.** Sixty-nine percent of recipients reported that they were somewhat or very satisfied with the scorecard and a minority (6%) reported that they were somewhat or very dissatisfied with it.
- **The scorecard is reaching homeowners and renters.** Thirty-eight percent of customers reported that they rent their home and 61% own it. Very few, 1%, own the home but rent to someone else – an important finding because behavioral program interventions that do not reach the occupant will not be effective.

The Evaluators' recommendations are as follows:

- **Design randomized controlled trials for each implemented group before sending out Scorecards.** The availability of a valid, randomly assigned control group provides the ability to estimate verified savings.
- **Develop and incorporate contests (gamification) or other incentives to continue to engage customers with the Scorecard.** For example, asking customers to complete or make commitments to complete actions to get points toward gift cards.
- **Incorporate data from customer's profiles to improve the accuracy of the Scorecards.** Currently if a customer fills out their home profile through the portal, the data is not incorporated into their Scorecard. Increasing accuracy of the Scorecard may increase engagement through improved credibility of the reported information.

- **Conduct a study to investigate the increase in open rates.** Understanding the increase in open rates can help program staff replicate the strategy if open rates fall again.

1.6.1.10 EasyCool Direct Load Control

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

- **The Program exceeded goals in both territories**. The Program only had peak kW reduction goals and surpassed goals in both territories, achieved 342.5% of goal overall.
- **Investing time in educating the public about EasyCool laid the groundwork for program success.** Teaching people about demand response with regards to direct load control proved challenging. Customers needed to trust Entergy before accepting the program.
- **Usage of social media platform has increased participation in a different segment of customers.** Staff used Facebook since late of 2018 and early 2019 and has been successful in reaching new participants.
- **Business reply cards were used to market and promote the program.** This activity helped to drive more participation in the program. The reply cards continue to be good publicity for the energy kit program.

The Evaluators' recommendations are as follows:

- **Continue to promote the program through various channels.** Utilize social media and other avenues through paid advertising. Cross-promote the program to other program participants, thus increasing program awareness and greater participation.

1.6.2 Commercial Portfolio Findings and Recommendations

1.6.2.1 Cross-Cutting Commercial Portfolio Findings

- **Non-lighting measures incentive caps increased**. Prior to Program Year 9 incentives were capped at $100,000, with $50,000 for non-lighting and $50,000 for lighting projects. Now, for non-lighting, the cap is up to $200,000. Lighting projects are still capped at $50,000.
- **Increased energy savings have resulted from targeting large projects as well as increased marketing and outreach.**
- **Trade allies are increasingly engaged with the program. There** are many trade allies active in the program relative to its size. Contractors are joining the program

through customers or by signing program trade ally agreements. Thirty-six trade allies completed projects during PY8, and savings were widely distributed across them. A trade ally newsletter was developed to communicate with the network.

- **Increased marketing that targeted Algiers customers.** Direct customer outreach staff was brought on in the Spring, however staff noted that funding for Algiers will be running out before the end of the year.
- **Staff is seeking additional funding from the city council to meet goals in Algiers.** Algiers is a small territory with its own savings and budget goals independent from New Orleans, which made it a challenge to stay within the financial range. Algiers is at a standstill due, in part, to funding limitations.
- **Ramped up email communications to identify new participants.** The program has worked to identify professional associations (e.g., hotels and hospital associations) to continue outreach and engage new customers.
- **Trade allies are offered training and workforce development.** The program brought on a dedicated staff member to provide a training opportunity for the trade ally network. Understanding the program is usually the biggest obstacle trade allies must overcome to be successful during program implementation.
- **Launched a trade ally searchable database.** The online database includes a tier system which was added to increase trade ally engagement with the program (lighting and non-lighting) and can be found on the Energy Smart website (https://www.energysmartnola.info/search-companies/). The number of tiers is associated with indicators, such as the number of projects completed with Energy Smart, and they can be adjusted periodically. There is also a query for diversity categories (e.g., minority-owned business, veteran-owned business, women-owned business, LGBT-owned business). There are plans to add tiers for the residential programs next year.
- **The number of inspections of small lighting projects was reduced.** Implementation staff indicated they have reduced basic lighting inspections, stating they do not need to go to all project sites and can rely on photos.
- **A new savings and incentive calculator can be used across all three programs.** The tool includes a method to measure prescriptive, custom lighting and custom non-lighting. The tool allows to track data, offer easy access to documents, and collaborate with other industry partners.

1.6.2.2 Small Commercial Solutions

- **The program met kWh savings goals for New Orleans, but not Algiers.** The program met its kWh savings goals in the New Orleans territory in both periods,

achieving 107.2% and 333.3% of goal in 2019 and 2020, respectively. The program did not meet savings goals for either period in the Algiers territory: 70.2% in 2019 and 77.4% in 2020. No peak kW reduction goals were met, with 81.2% achievement in New Orleans and 55.4% achievement in Algiers. Overall, the program achieved 119.2% of the kWh savings goal and 78.9% of the peak kW reduction goal.

- **Development of a new calculator.** A new global incentives and measure calculator was developed for commercial programs. Implementation staff described the calculator as a "one-stop-shop" for the application. The calculator produces a summary report and integrates with APTIM's new tracking system.
- **Preapproval for smaller project removed in PY9.** Projects that are less than $5,000 no longer require preapproval.
- **The program will offer a small business direct install component in PY10.** This component will include direct installation, at no cost to the customer, of screw in lamps and water savings measures.
- **The program is exploring additional program opportunities.** Program staff indicated they are looking into adding small business kits, smart thermostats, and a commercial real estate offering aimed at class A and B office space.
- **Satisfaction with the program remains high.** Ninety-two percent of respondents reported that they were somewhat or very satisfied with the program.
- **Firmographic responses suggest the program is effectively targeting small businesses facing common barriers to making energy efficiency improvements.** Seventy-one percent of those surveyed stated that the facility was the company's only location, and 50% of respondents stated that they rent the property. These findings indicate that the program is not primarily getting participant through chain stores with more resources to available to assess and make energy efficiency improvements and that many of the participants are making upgrades to facilities they do not own.

The Evaluators' recommendations are as follows:

- **Leverage past small business program participants to promote the value of the program to other business owners.** Approaches to this include developing case studies to show case example projects and encouraging participants to co-present to relevant business associations.
- **Peak kW reductions should not be attributed to fixtures which only operate during non-daylight hours.** This operating schedule precludes operation during peak times and thus peak reductions cannot be realized for these fixtures.

1.6.2.3 Large Commercial Solutions

- **Overall kWh savings goal was met, but kW reduction goals were not met.** The program exceeded its kWh savings goal in the New Orleans territory for the 2020 period, attaining 105.3% of its goal. The Algiers territory had a single kWh goal, which was met and exceed, with verified net kWh reaching 140.15% of its kWh goal. Overall, the program attained 106.3% of the combined kWh savings goals, but did not meet any kW reductions goals.
- **Public sector entities completed projects through the Large C&I program.** The Evaluator identified a few projects completed by publicly funded entities including a university, schools, and a city park in the Large C&I Program records.
- **Retro-commissioning was launched in late PY8 but has experienced a slow start.** There has been an effort to get the program launched in PY9, but because this type of offer takes time to gain traction in the market, complete the energy studies, and implement the measures, no projects had been completed at the time of the interviews.
- **The program has increased the proportion of non-lighting projects.** Staff indicated the program has historically relied on lighting savings, but they have been actively working to increase non-lighting projects. Training trade allies has helped the program increase the number of non-lighting projects.
- **The program has proposed to move most lighting measures from custom to prescriptive.** Program staff indicated they are focused on streamlining their program by moving some lighting measures from custom to prescriptive.
- **Participants are satisfied with the program.** Ninety-five percent of respondents reported that they were satisfied with the program overall. Additionally, 90% had either already recommended the program to someone else or stated that they were very likely to recommend it.

The Evaluators' recommendations are as follows:

- **Clarify assignment of projects to either the Publicly Funded Institutions or Large C&I program.** To improve tracking of program budgets and goals achievement, staff should develop procedures for consistent assignment of projects to one of the two programs.
- **Adjust calculators so that peak kW reductions are not attributed to fixtures which only operate during non-daylight hours.** This operating schedule precludes operation during peak times and thus peak reductions cannot be verified for these fixtures.

- **The program is exploring additional program opportunities.** Program staff plan to launch a Commercial Real Estate and dedicated New Construction programs in PY10.
- **Adjust calculators so that interactive effects are not applied to exterior fixtures.** In one sampled site the Evaluators found that interactive factors had been applied to exterior fixtures. Since exterior fixtures are not in conditioned areas these interactive factors do not apply. Implementors should adjust calculators to set interactive factors to 1.00 for all exterior fixtures.
- **Adjust calculators so that screw-in lamp baselines conform to EISA lumen equivalence baselines.** In one sampled site the Evaluators found screw-in incandescent calculations used the nominal 90W baseline in savings and peak kW reduction assumptions. These lamps are subject to EISA legislation and should have used a 73W baseline based on lumen equivalence. The Evaluators recommend that program implementors update program calculators with lumen equivalence baselines for lamps subject to EISA legislation.

1.6.2.4 Publicly Funded Institutions

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

- **The overall kWh goal was met.** The combined New Orleans goal and overall kWh goal were exceeded. No kW goals were met. Overall goal achievement is 108.9% for kWh and 13.6% for kW. Staff indicated that projects in the pipeline and increased word-of-mouth referrals contributed to the increase in program activity. That said, the program implementation team has been active in developing projects and working with the City of New Orleans, local universities, and charter schools. These services include benchmarking, assistance with planning, and assistance with the bid process.
- **The program has a good working relationship with the City of New Orleans' property management department.** Implementation staff indicated they have established better contact at the City property management office, and this has resulted in a more robust pipeline of projects. As the program has evolved and public entities understand how to use it, projects have moved through the program easier.
- **PFI projects and the government entities who participated varied in PY9.** Some of the projects for PY9 include the lighting with the City of New Orleans, HVACs for the New Orleans Recreation Department, assessments done in public libraries, and recovery projects for the school district. Implementation staff indicated there is an inventory of local government buildings for future potential projects. Due to the size of the territory, however, there are not many government entities that could qualify to enter the program. Green Coast indicated that most

projects are mainly lighting and that HVAC projects are more challenging because the approval time can take longer.

  - **Engagement with higher education institutions.** The program challenged the higher education cohort with a 5 million kWh goal. The challenge created substantial participation among higher education institutions and motivated non-higher education institutions to also partake in the program.

- **A new data system provides billing data to Green Coast prior to building walkthroughs.** Green Coast staff now have access to customer utility bills before going on-site, which they indicated has been very helpful. This provides engineers more information on how the building is functioning and seasonal data, which gives them insight into how the HVAC system is operating.
- **The PFI program has a significant inventory of potential projects left in the territory.** Program staff stated the PFI program has the potential for projects due to the number of buildings available to cover including: 110 buildings from the property management department, 60-70 buildings that are part of the school district, 12 libraries, and 15 recreation centers with their parking garages and fields. The program has the potential to save city assets and lower utility costs.
- **Marketing and outreach efforts included lunch and learn events and individual outreach to public organizations.**
- **Government procurement processes create a barrier to participation.** Both program staff and trade allies noted that procurement process requirements present a barrier to participation. Responses from interviewed trade allies suggest that because of these types of barriers, they are reluctant to pursue working with government entities.
- **Erroneous reduction in peak coincidence of 0.26 for lighting controls.** For five sampled sites, ex ante kW calculations assumed additional sensor savings for any item that had lighting controls associated with it. For example: Assume an exterior lighting project, whose fixtures were previously controlled by photosensors and thus operating 4,319 hours annually. NLD operation precludes operation during peak times. However, when “Photosensor” controls were indicated in the ex ante calculator for said line item, a 0.26 reduction in PCF would automatically be included in ex ante savings calculations.

  The Evaluators believe that this is an oversight from developing calculators to comply with TRM v1.0 section C.6.2.5.: Lighting Controls, Calculation of Deemed Savings. When applied in that scenario calculations are carried our correctly. The Evaluators recommend this error be fixed in implementor lighting calculators to prevent overestimation of savings.

- **Peak coincidence factors do not correspond to default-overridden custom hours of operation.** When deemed hours are overridden in ex ante calculators said hours are used in ex ante calculations, however the deemed peak coincidence factor is still applied. In Project PN8-009 a total of 17 lines items had lighting which were located in an "Education: College/university" deemed space. Deemed hours of operation had been overridden from 3,577 to 8,760, however the peak CF remained .69, when it should have been 1.00 to reflect the continuous lighting operation.

The Evaluators' recommendations are as follows:

- **Develop case studies to showcase community benefits of publicly funded projects.** The PFI program is a valuable to the community and staff should identify projects that highlight positive impacts.
- **Seek out media opportunities to increase awareness the program and of completed projects.** Market program success in the media emphasizing how its completed projects reflect the mission of the program.
- **Adjust calculators so that peak kW reductions are not attributed to fixtures which only operate during non-daylight hours (0%) and so that reductions for spaces with continuous operate continuously use 100%.** Non daylight operating schedule precludes operation during peak times and thus peak reductions cannot be verified for these fixtures, conversely continuous operation means that lighting has a 100% chance of operating during peak times.

1.7 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 Multifamily Program (MF);
- Chapter 6 provides results for the Green Light Direct Install Program (GLDI);
- Chapter 7 provides results for the Residential Lighting and Appliances Program (RLA);
- Chapter 8 provides results for the High Efficiency AC Tune-Up Program (HETU);
- Chapter 9 provides results for the School Kits and Education Program (SK&E);

- Chapter 10 provides results for the Scorecard Behavioral Program;
- Chapter 11 provides results for the EasyCool Direct Load Control Program (EASYCOOL PROGRAM);
- Chapter 12 provides results for the Small Commercial Solutions Program (SCS);
- Chapter 13 provides results for the Large Commercial and Industrial Solutions Program (Large C&I);
- Chapter 14 provides results for the Publicly Funded Institutions Program (PFI);
- Appendix A provides the site-level custom reports for the SCS, C&I Solutions and PFI Programs;
- Appendix B provides the survey instruments and interview guides used in this evaluation;
- Appendix C provides support for the Scorecard behavioral analysis;
- Appendix D provides a copy of the Energy Smart Saver Kit Product Guide and
- Appendix E 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[3]:

- *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

2.2 Overview of Methodology

The proposed methodology for the evaluation of the PY9 ENO Portfolio is intended to provide:

- Impact results; and

[3] Arkansas TRM V7.0, Volume 1, Pg. 80-86

- 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	5	20
Large Commercial and Industrial	4, plus 1 certainty	16
Publicly Funded Institutions	3, plus 1 certainty	9

2.2.2 Impact Calculations

The general approach for calculation of verified kWh and kW savings was to use the New Orleans TRM 2.0. Further detail can be found in each program chapter for relevant measures.

2.2.3 Estimation of Net Savings

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

Table 2-2 Summary of Net Savings Approaches

Program	*Self-Report Surveys*	*Literature Review*	*Billing Analysis/Price Response Modeling*	*Deemed Value*
Home Performance with ENERGY STAR	✓			
Home Performance with ENERGY STAR (Kits)	✓			
Low Income Audit and Weatherization				✓
EnergySmart for Multifamily	✓			✓
Green Light Direct Install				✓
Residential Lighting and Appliances			✓	✓
Residential Heating and Cooling				✓
Energy Smart School Kits and Education				✓
Scorecard Behavioral Program			✓	
EasyCool Direct Load Control			✓	
Small Commercial Solutions	✓			
Large Commercial and Industrial	✓			
Publicly Funded Institutions	✓			

2.2.3.1 Residential Program Self-Report Approach

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

2.2.3.1.1 Major Measure Free Ridership Assessment

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

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

<u>Prior Plans</u>

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

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

Likelihood of Project Completion Score

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

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

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

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

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

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

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

Timing Score

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

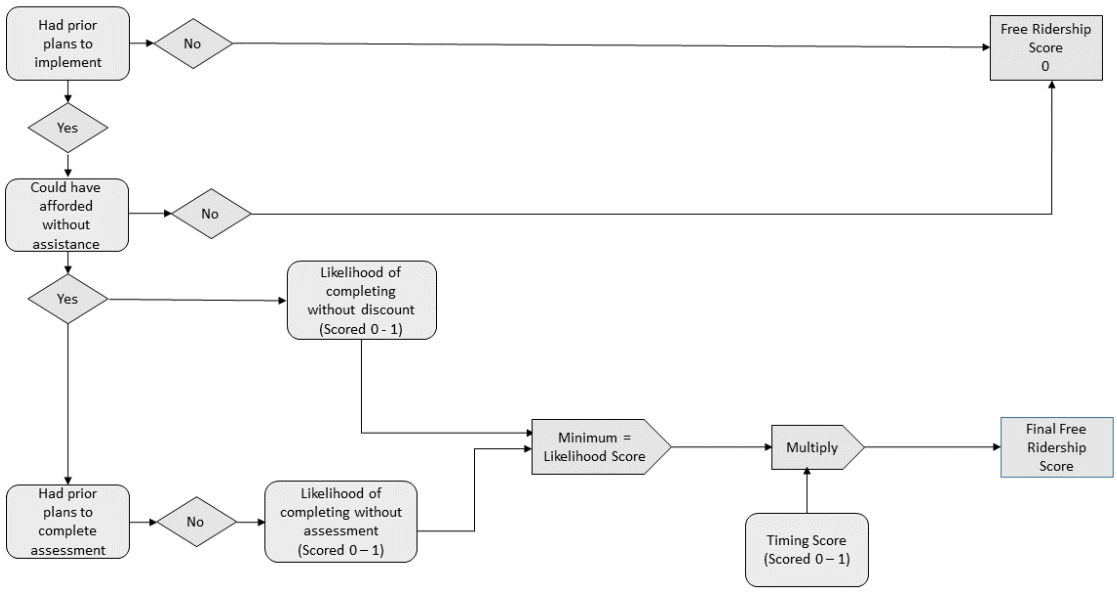
- Project would have been completed in 0 to 6 months: 1

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

Final Free Ridership Score

The procedures used to estimate free ridership are summarized below in Figure 2-1.

Figure 2-1 Summary of Free Ridership Scoring Algorithm

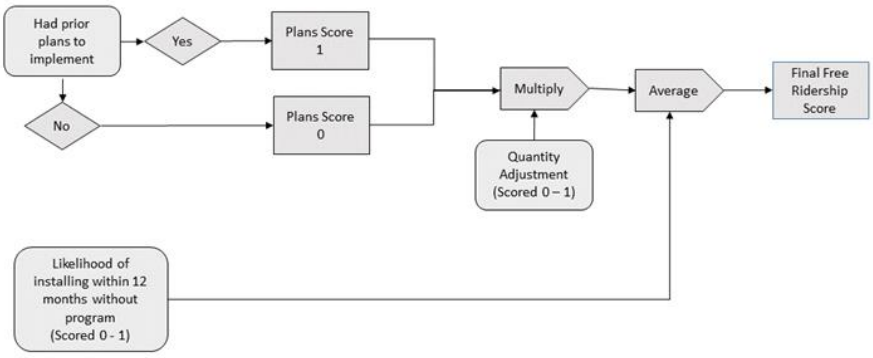


2.2.3.1.2 HPwES Direct Install Free Ridership Assessment

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

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

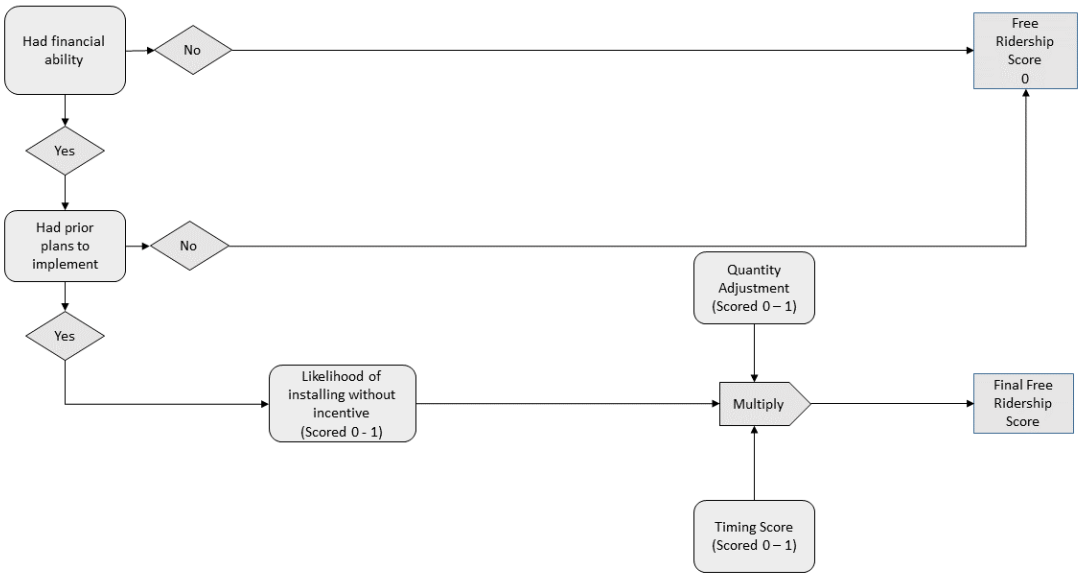
Figure 2-2 HPwES Direct Install Free Ridership Scoring Methodology



2.2.3.1.3 Multifamily Direct Install Free Ridership Assessment

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

Figure 2-3 Multifamily Direct Install Free Ridership Assessment



2.2.3.1.4 HPwES Energy Efficiency Kit Free Ridership

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

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

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

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

2.2.3.1.5 Participant Spillover Assessment

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

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

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

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

2.2.3.2 Commercial Program Self-Report Approach

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

2.2.3.2.1 Free Ridership Assessment

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

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

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

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

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

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

- The respondent answers "yes" to the following two questions: "Did you have plans to install energy efficient [Measure/Equipment] at the location before deciding to participate in the program?" and "Would you have gone ahead with this planned project if the you had not received the rebate through the program?"

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

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

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

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

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

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

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

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

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

The four sets of rules described above were used to construct four different indicator variables that address free ridership behavior. For each customer, a free ridership value was assigned based on the combination of variables. With the four indicator variables, there are 11 applicable combinations for assigning free ridership scores for each respondent, depending on the combination of answers to the questions creating the indicator variables. Table 2-3 shows these values.

Table 2-3 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%

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	N	67%
N	Y	N	Y	67%
N	N	N	Y	33%
N	Y	N	N	33%
N	Y	Y	N	0%
N	N	N	N	0%
N	N	Y	N	0%
N	N	Y	Y	0%

2.2.3.2.2 Participant Spillover Assessment

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

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

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

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

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

2.2.3.3 Billing Analysis/Price Response Modeling

Savings for the Scorecard Behavioral Program and the Easy Cool Direct Load Control Program were assed through an analysis of participant energy consumption (i.e., billing

analysis). The energy impacts developed through these approaches are net impacts. The approaches used are described in additional detail in the program chapters.

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

2.2.3.4 Deemed Values

The net-to-gross ratio for the Income Qualified Weatherproofing Program was deemed to be 1.0 in line with common practice for estimation of low-income program net savings.[4]

The net-to-gross ratios for participants with single residences participating in the Energy Smart for Multifamily program, and for Green Light Direct Install, the appliance component of Residential Lighting and Appliances, Residential Heating and Cooling, and Energy Smart School Kits and Education were deemed based on prior evaluation findings.

2.2.4 Process Evaluation

The Evaluators completed process evaluations of the following PY8 programs:

- Home Performance with ENERGY STAR
- Low Income Audit and Weatherization
- EnergySmart for Multifamily
- Residential Lighting and Appliances
- Residential Heating and Cooling
- Scorecard Behavioral Program
- Easy Cool Direct Load Control
- Small Commercial Solutions
- Large Commercial and Industrial
- Publicly Funded Institutions

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

Table 2-4 Summary of Process Evaluation Activities

Program	***Data Review***	***Staff Interviews***	***Participant Surveys***
Home Performance with ENERGY STAR	✓	✓	✓
Low Income Audit and Weatherization		✓	
EnergySmart for Multifamily	✓	✓	✓
Residential Lighting and Appliances	✓	✓	
Residential Heating and Cooling	✓	✓	
Scorecard Behavioral Program	✓	✓	✓
EasyCool Direct Load Control	✓	✓	
Small Commercial Solutions	✓	✓	✓
Large Commercial and Industrial	✓	✓	✓
Publicly Funded Institutions	✓	✓	✓

2.2.4.1 Data and Document Review

The Evaluators reviewed program data to characterize participation during the year.

2.2.4.2 Program Staff Interviews

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

Table 2-5 Summary of Staff Interviews

Programs	Organizational Role	Interviewed Staff Roles	Number of Staff Interviewed
Portfolio	Entergy	DSM Manager	1
Portfolio	Entergy	Project Manager	1
Portfolio	Implementation Contractor	Program Director	1
EnergySmart Behavioral Program	Implementation Contractor	Vice President of Marketing	1
RLA	Implementation Contractor	National Program Retail Manager	1
C&I Incentive Programs	Implementation Contractor	Project Lead	1
Residential Incentive Programs	Implementation Contractor	Program Manager	1
Residential Incentive Programs	Implementation Contractor	Project Manager – Data Quality Karen O'Brien	1
Publicly Funded Institutions	Program Partner	Chief Operating Officer	1
Total			**9**

2.2.4.3 Participant Surveys

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

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

Table 2-6 Summary of Participant Survey Response

Survey Group	Mode	Survey Fielding Time Frame	Number of Contacts*	Number of Completions
HPwES Participant	Online / Telephone	Sept 2019 / Jan 2020	503	90
Multifamily Participant	?	Apr 2020	24	7
HPwES Kits	Online	Sept / Oct 2019	2,118	178
Behavioral Program Treatment Group	Online	January 2019	6,000	145
C&I Participant	Online / Telephone	Sept 2019 / Jan 2020 / Apr 2020	194	46
Large C&I Participant			90	21
Small Business Participant			100	25
PFI Participant			4	0
Total			**9,033**	**512**

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

3. Home Performance with ENERGY STAR®

3.1 Program Description

The Home Performance with ENERGY STAR® Program (HPwES) is designed to promote 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 (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 Energy Smart auditor 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.

3.1.1 Program Delivery Channels and Expected Savings

A total of 874 households participated in HPwES by way or Direct Install (DI) and/or a major measure, with an additional 6,280 households participating by ordering a Home Energy Savings Kit (HESK) via the Energy Smart website.

3.1.1.1 Home Energy Savings Kits (HESKs)

A total of 6,302 kits were distributed to 5,424 New Orleans residences and 878 Algiers residences. Kits were free of charge and included the following items:

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

Expected and verified savings from HESKs is presented in section 3.3.6.

3.1.1.2 Direct Install and Major Measure

Below, Table 3-1 and Table 3-2 summarizes the total number of homes a DI or major measure was installed in and/or performed at, total measures installed/performed and the expected kWh and peak kW savings by measure. HESK savings is presented as a single line item in the table for continuity.

Table 3-1 Summary of Measures and Expected Savings – New Orleans

Measure	***Count of Measures Distributed***	***Expected kWh Savings***	***Expected kW Savings***	***Percent of kWh Contribution***
AC Tune Ups	190	179,358	63.78	6.67%
Aerators	16	566	0.06	0.02%
Air Sealing	162	162,439	47.87	6.04%
Duct Sealing	415	1,026,657	319.77	38.18%
Insulation	1	5,395	8.03	0.20%
LED Lighting	1,544	417,345	86.44	15.52%
Pipe Wrap	7	1,140	0.13	0.04%
Power Strips	264	58,401	5.50	2.17%
Showerheads	21	7,684	0.80	0.29%
Smart	113	43,575	0.00	1.62%
HESKs	5,424	786,459	172.63	29.25%
Total:	**8,157**	**2,689,017**	**705.02**	

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

Measure	***Count of Measures Distributed***	***Expected kWh Savings***	***Expected kW Savings***	***Percent of kWh Contribution***
AC Tune-Ups	18	17,036	6.06	3.50%
Aerators	4	106	0.01	0.02%
Air Sealing	31	31,244	9.21	6.42%
Duct Sealing	96	240,689	71.41	49.43%
LED Lighting	242	57,070	11.78	11.72%
Power Strips	36	7,760	0.73	1.59%
Showerheads	3	904	0.09	0.19%
Smart	13	4,804	0.00	0.99%
HESKs	878	127,310	27.95	26.15%
Total:	**1,321**	**486,922**	**127.24**	

Below, Figure 3-1 shows the overall program performance during 15-month PY9 program year. Project and HESK counts reference the left axis, all others reference the right axis.

Figure 3-1 Program Performance Over PY9

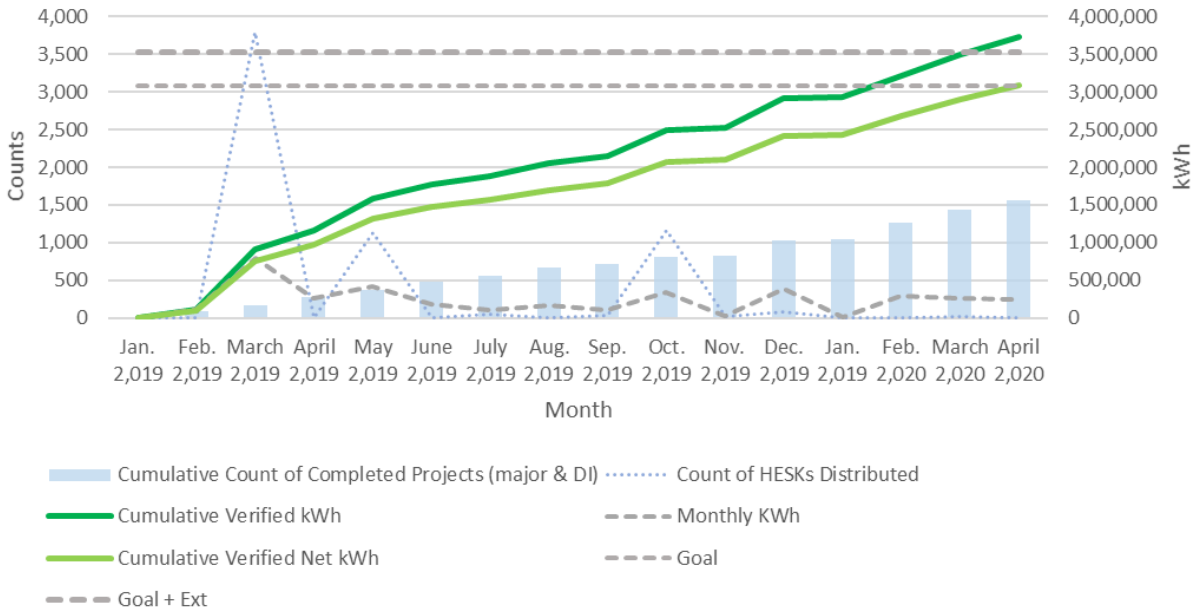
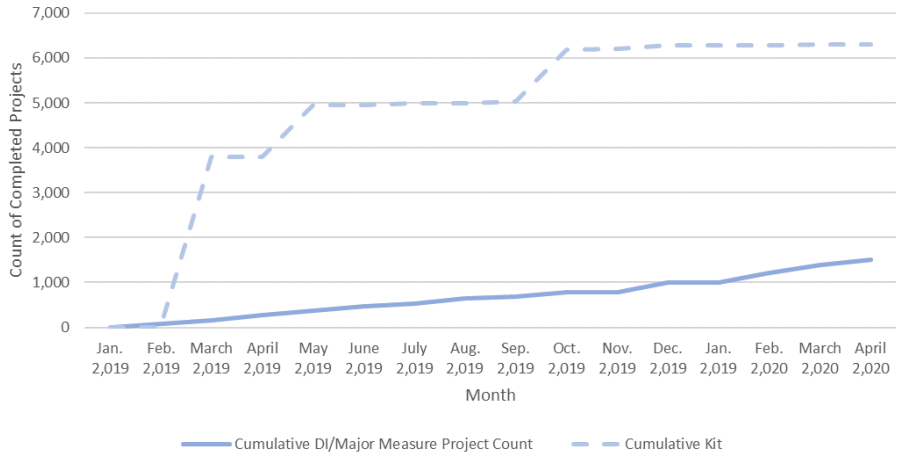
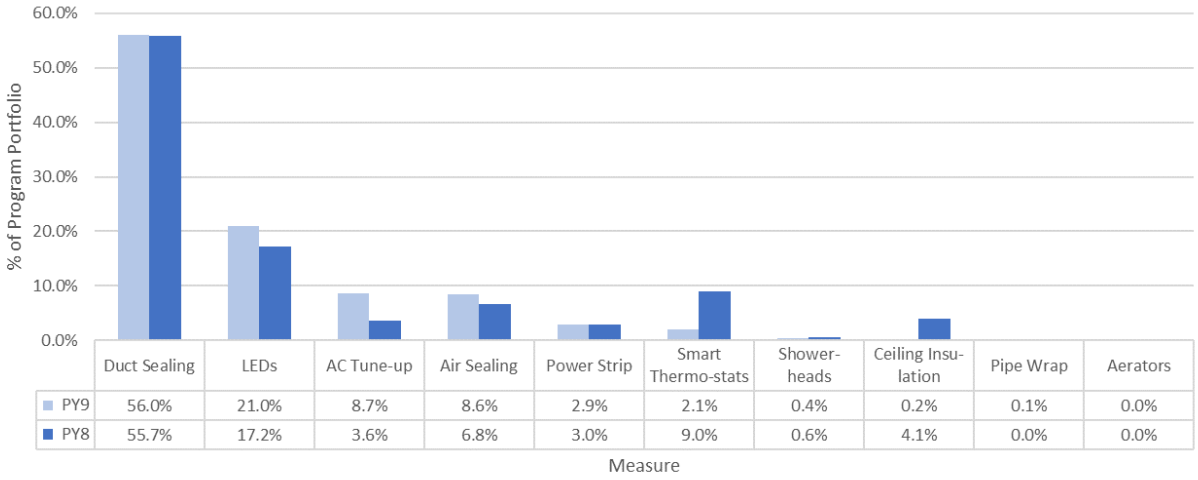


Figure 3-2 HESK and DI/Major Measure Projects by Month



Below, Figure 3-3 illustrates and compares the differences in kWh savings contributions by each DI and major measure provided during PY8 and PY9. Savings associated with HESKs are excluded from this table.

Figure 3-3 Combined Savings Contribution by Measure[5], PY8/9 Comparison



In PY8, not considering HESKS, 739 projects summing to 2,416,122 kWh were completed during a normal 12-month period (a regular, full program year). In PY9, there were 906 non-HESK projects summing to 2,262,170 kWh were completed during an extended 15-month period. Normalizing these figures to a 12-month program year for an 'apples-to-apples' comparison yields an expected 651 projects summing to 1,554,997 kWh, a 35.6% decrease in kWh overall. The number of participants decreased by 11.9% and per-project savings decreased by 26.9%.[6] Table 3-3 below provides comparisons of DI and major measure activity between program years; kit counts and savings are excluded from these comparisons.

Table 3-3 Participation and Expected Savings by Program Year

PY	***Count Homes***	***Expected kWh***	***Expected kWh per Home***
PY7 (nominal)	348	1,139,700	3,275
PY7 (adjusted)	496	1,624,400	3,275
PY8	739	2,416,122	3,269
PY9 (total)[7]	906	2,262,170	2,497
PY9 (calendar)[8]	651	1,554,997	2,389

[5] DI and Major Measure only. HESKs are not included.
[6] These are in comparison to the 2,019 calendar year.
[7] Shown without HES Kits. Including data from HESKs, PY9 total household count is 6,280 and savings per home is 146 kWh.
[8] PY9 was an extended year, lasting 15 months. Figures presented here are normalized to represent a full program year (12 months).

Between PY8 and PY9 HESK distribution and savings increased by approximately 28%:

Table 3-4 HESK Comparison by Program Year

PY	Count Homes	Expected kWh
PY8	4,926	714,270
PY9 (total)	6,302	913,769
PY9 (calendar)	6,280	910,579

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

Table 3-5 HPwES Summary of kWh Goal Achievement

Utility	Year	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
New Orleans	2019	2,863,506	2,298,962	80.28%	571.84	657.02	114.90%
	2020	390,000	645,380	165.48%			
ENO Subtotal	**Both**	**3,253,506**	**2,944,342**	**90.50%**	**571.84**	**657.02**	**114.90%**
Algiers	2019	214,789	422,322	196.62%	42.70	125.31	293.47%
	2020	64,000	124,322	194.25%			
Algiers Subtotal	**Both**	**278,789**	**546,644**	**196.08%**	**42.70**	**125.31**	**293.47%**
Overall Total	**Both**	**3,532,295**	**3,490,986**	**98.83%**	**614.54**	**782.33**	**127.30%**

All goals were met except the 2019 kWh goal for the New Orleans territory, causing the Program to fall short of the overall kWh goal. Overall goal achievement is 98.83% of kWh and 127.30% of kW.

3.2 M&V Methodology

Evaluation of HPwES included the following:

- Surveys with participants;
- Interviews with program staff;
- Interviews with program trade allies; and
- Previous program year field visit results review instead of on-site testing and data collection.

Verified savings were calculated using methods and inputs in the New Orleans TRM v2.0 and incorporated results from reviewing prior program years' field visit results to determine appropriate adjustment factors. PY9 major savings components are duct

sealing, AC tune ups and LEDs. The following section discusses savings calculation methods for these measure in detail.

3.3 Verified Savings by Measure

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

3.3.1 Central Air Conditioner Tune-Up Savings Calculations

Central Air Conditioner Tune-Up savings were calculated using the following savings algorithms from the New Orleans TRM 2.0, section C.3.7.

3.3.1.1 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,

CAPc = Cooling capacity (in BTU)

EERpre = Efficiency of the equipment prior to tune-up

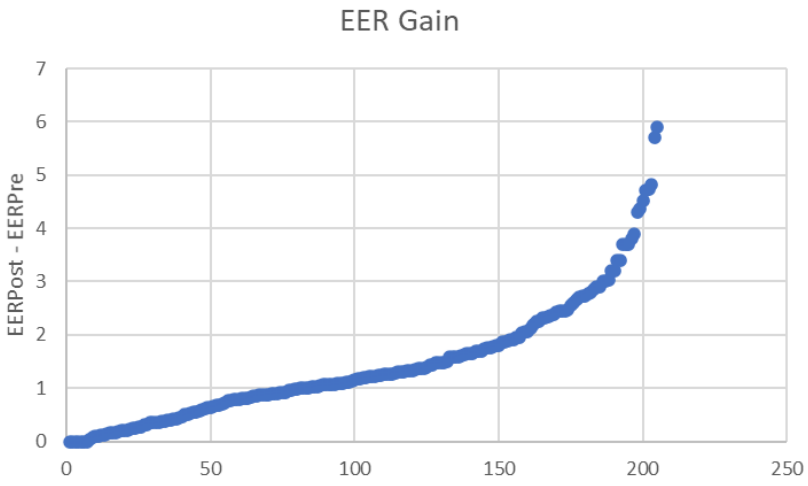
EERpost= Nameplate efficiency of the existing equipment

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

%CF = Peak Coincidence Factor (.77)

Figure 3-4 below shows the efficiency gains from each unit tuned up.

Figure 3-4 EER Gain



3.3.1.2 CAC Tune-Ups Results

Resulting 2019 gross savings are summarized in Table 3-6.

There were no AC tune-up projects that were completed in 2020.

Table 3-6 2019 CAC Tune-Up Savings Summary

Territory	Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	Peak kW Realization Rate
New Orleans	179,357	179,924	100.32%	63.78	83.98	131.67%
Algiers	17,036	21,561	126.56%	6.06	9.98	164.76%
Total	**196,393**	**201,485**	**102.59%**	**69.84**	**93.98**	**134.56%**

Seven projects did not see a significant enough efficiency improvement to result in kWh savings.

The program implementer applied fixed deemed savings values in generating Ex-ante calculations, in accordance with section C.3.7.4 of the New Orleans TRM 2.0. All tune-up projects are for Central AC, in which 277 kWh/Ton were applied per project. Ex-ante savings range from 277 kWh to 1492 kWh. The average project Ex-ante savings is approximately 900 kWh, and 3.24 tons.

The Evaluators calculated savings based on the Test-in and Test-out Efficiency method, found in section C.3.7.5.1 of the New Orleans TRM v2.0, resulting in higher ex post savings.

Overall kWh realization for CAC tune-ups is 102.59% and overall kW realization is 134.56%.

3.3.2 Air Infiltration Reduction Savings Calculations

Methods for calculating he deemed savings values for air infiltration reduction came from the New Orleans TRM v2.0, section C.4.6. Deemed savings multipliers were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in in developing savings values denominated in deemed savings per CFM50 of air leakage rate reduction. Table 3-7 summarizes the deemed savings values for New Orleans.

Table 3-7 Deemed Savings Values for Air Infiltration Reduction[9]

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

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

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

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

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

3.3.2.1 Adjustments from Historic Field Data Collection

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

3.3.2.2 Air Sealing Savings Results

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

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

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	162,439	153,861	94.7%	47.87	50.18	104.8%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**162,439**	**153,861**	**94.7%**	**47.87**	**50.18**	**104.8%**

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

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	31,244	29,684	95.0%	9.21	9.68	105.1%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**31,244**	**29,684**	**95.0%**	**9.21**	**9.68**	**105.1%**

A majority of the ex ante calculations were performed with a rounded kW/CFM Savings value of 0.0003 while a few other projects assumed a value slightly less than that. Other than a difference in rounding within the calculations, the Evaluators were able to reasonably recreate ex ante savings calculations for all projects. Adjusting the CFMpost measurements by 1.96% lowered an otherwise 100% verified savings. Variation in the expected and verified kW reductions are attributable to the rounding of significant figures; the Evaluators kept all significant figures until reporting.

3.3.3 Duct Sealing Savings Calculations

Duct sealing savings was calculated using the following savings algorithms from the New Orleans TRM v2.0, section C.3.8.

3.3.3.1 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 (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	0.076
Pout	0.074
SEER	11.5

ρ_{out} = Density of outdoor air at 95°F = 0.0740 (lb/ft3)[10]

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.

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

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

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

3.3.3.2 Heating Savings (Heat Pump):

$$kWh_{savings,H} = \frac{(DL_{pre} - DL_{post}) x\ 60\ x\ HDDx(h_{out}\rho_{out} - h_{in}\rho_{in})\ x\ 24\ x\ 0.018}{1{,}000\ x\ HSPF}$$

Where:

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

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

h_{out} = Outdoor design enthalpy, 40 BTU/lb.

h_{in} = Indoor design enthalpy, 30 BTU/lb.

p_{out} = Density of outdoor air at 95 deg. F, .0740 lb./ft.^{3}

p_{in} = Density of outdoor air at 95 deg. F, .0756 lb./ft.^{3}

$EFLH_H$ = 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 = 7.30.11

3.3.3.3 Heating Savings (Electric Resistance):

$$kWh_{savings,H} = \frac{(DL_{pre} - DL_{post}) x\ 60\ x\ HDDx(h_{out}\rho_{out} - h_{in}\rho_{in})\ x\ 24\ x\ 0.018}{1{,}000\ x\ HSPF}$$

Where:

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

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

h_{out} = Outdoor design enthalpy, 40 BTU/lb.

h_{in} = Indoor design enthalpy, 30 BTU/lb.

[11] 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)

p_{out} = Density of outdoor air at 95 deg. F, .0740 lb./ft.^{3}

p_{in} = Density of outdoor air at 95 deg. F, .0756 lb./ft.^{3}

$EFLH_H$ = 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

$3{,}412$ = Constant to convert from Btu to kWh

3.3.3.4 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[12]

3.3.3.5 Adjustments from Historic Field Data Collection

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

3.3.3.6 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.

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

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

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	378,861	428,619	113.1%	181.10	189.02	104.4%
Electric Resistance	593,447	672,486	113.3%	120.06	125.85	104.8%
Air Source Heat Pump	2,360	2,432	103.1%	0.71	0.67	95.1%
Total	**974,668**	**1,103,537**	**113.2%**	**301.87**	**315.54**	**104.5%**

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

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	79,742	95,586	119.9%	38.11	42.22	110.8%
Electric Resistance	142,752	162,429	113.8%	28.56	30.47	106.7%
Air Source Heat Pump	5,943	6,895	116.0%	1.78	1.90	107.0%
Total	**228,437**	**264,910**	**116.0%**	**68.45**	**74.59**	**109.0%**

Ex ante calculations assumed the maximum pre-installation leakage rate of 35% percent of total fan flow[13], rather than 40% specified in the TRM, resulting in an underestimation of savings. Using 40%, these homes' kWh and kW realization rates were 111% and 110% respectively, before M&V adjustments.

After M&V adjustments, the overall kWh realization rate for duct sealing is 113.9% and the overall kW realization rate is 105.5%.

3.3.4 LED Savings Calculations

Methods for calculating the deemed savings values for LEDs came from New Orleans TRM, sections C.5.3 and C.5.4. Calculation of Deemed Savings, C.5.3. ENERGY STAR® Directional and Decorative LEDs and C.5.4. ENERGY STAR® Omni-Directional LEDs. Deemed per-unit kWh and kW savings were applicable to several lamp types installed during PY9.

3.3.4.1 Calculated Energy Savings and Peak Demand Savings

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

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

Where:

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

W_{base} = Based on wattage equivalent of the lumen output of the installed LED[14]

W_{post} = Actual wattage of LED installed

$Hours$ = Average hours of use per year (819.43)

IEF_E = Interactive Effects Factor to account for cooling energy savings and heating energy penalties (see Table 3-13)

IEF_D = Interactive Effects Factor to account for cooling demand savings (see Table 3-13)

CF = Coincidence Factor, (12.74%)

ISR = In Service Rate (98.0% for DI)

Table 3-13 Energy and Demand Interactive Factors

Heating Type	***IEF_E***	***IEF_D***
Gas Heat with AC	1.10	1.29
Electric Resistance Heat with AC	0.83	1.29
Heat Pump	0.96	1.29
Heating/Cooling Unknown[15]	0.91	1.21

3.3.4.2 Direct Install LED Savings Results

The savings resulting from applying TRM algorithms and deemed savings parameters are summarized in Table 3-14 and Table 3-15.

Table 3-14 Expected and Verified LED Savings – New Orleans

Lamp Type	***Expected kWh Savings***	***Verified kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Verified Peak kW Savings***	***Peak kW Realization Rate***
LED11 A	34,913	37,881	108.5%	7.24	5.89	81.3%
LED11 Flood	112,160	122,990	109.7%	23.19	19.12	82.5%
LED15 A	2,619	2,900	110.7%	0.54	0.45	83.0%
LED15 Outdoor	27,096	29,844	110.1%	5.61	4.64	82.7%
LED5 Candle	91,937	102,555	111.5%	19.04	15.94	83.7%
LED6 Globe	12,594	13,586	107.9%	2.61	2.11	80.9%
LED9 A	134,886	147,332	109.2%	27.97	22.91	81.9%
LED9 Outdoor	1,140	1,256	110.1%	0.24	0.20	82.6%
Total	**417,345**	**458,344**	**109.8%**	**86.44**	**71.26**	**82.4%**

Table 3-15 Expected and Verified LED Savings - Algiers

Lamp Type	***Expected kWh Savings***	***Verified kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Verified Peak kW Savings***	***Peak kW Realization Rate***
LED11 A	9,087	10,532	115.9%	1.88	1.64	87.0%
LED11flood	8,622	9,483	110.0%	1.79	1.47	82.4%

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

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

LED15 A	249	302	121.1%	0.05	0.05	90.3%
LED15 outdoor	3,158	3,479	110.2%	0.65	0.54	83.0%
LED5 candle	11,536	12,516	108.5%	2.39	1.95	81.4%
LED6 globe	2,107	2,236	106.1%	0.44	0.35	79.6%
LED9 A	22,312	24,195	108.4%	4.58	3.76	82.1%
LED9 outdoor	-	-	N/A	-	-	N/A
Total	**57,071**	**62,743**	**109.9%**	**11.78**	**9.75**	**82.8%**

Expected savings for most lamps came from per-unit deemed savings based on an unknown heating type. Verified savings were based on actual home heating types (where available).

3.3.5 Deemed Savings for Other Measures

For remaining program measures, the Evaluators used the following TRM 2.0 sections and tables to verify savings:

Table 3-16 Summary of Measures and Expected Savings – New Orleans

Measure	***TRM Section***	***Calculated/Deemed***	***TRM Table(s)***	***Table Page(s)***
Aerators	C.2.4	Deemed	Table 46	C-55
Ceiling Insulation	C.4.2	Calculated with deemed savings multipliers	Table 80	C-105
LEDs	C.5.3, C.5.4	Deemed and Calculated	Table 118, Table 120, Table 124	C-142, C-145, C-148
Pipe Wrap	C.2.3	Deemed	Table 44	C-52
Power Strips	C.1.5	Deemed	Table 24	C-26
Showerheads	C.2.5	Deemed	Table 51	C-61
Smart Thermostats	C.3.9	Deemed	Table 72	C-99

3.3.6 Savings from Home Energy Savings Kits

Savings for HESKs was calculated using applicable sections from Table 3-16 above. The Evaluators interviewed 178 PY9 HESK recipients to develop PY9 in-service rates and the percentage of homes with electric resistance water heating. Overall results are shown below in Table 3-17.

Table 3-17 Kit Device Recipient Survey Results

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

Using the TRM 2.0 supplemented with this data, verified Mailer Kit savings is as follows:

Table 3-18 Mailer Kit Realization Rates, New Orleans

Kit Device	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Aerator 1.0	56,389	51,787	91.8%	5.54	<.01	<0.0%
Aerator 1.5	33,629	23,986	71.3%	5.07	<.01	<0.0%
LED 15	146,448	189,152	129.2%	48.35	38.36	79.3%
LED 9	261,979	338,483	129.2%	81.71	68.62	84.0%
Showerhead	288,014	261,018	90.6%	31.96	<.01	<0.0%
Total	**786,459**	**864,426**	**109.9%**	**172.63**	**106.98**	**62.0%**

Table 3-19 Mailer Kit Realization Rates, Algiers

Kit Device	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Aerator 1.0	9,131	8,376	91.7%	0.90	<.01	<0.0%
Aerator 1.5	5,444	3,878	71.2%	0.82	<.01	<0.0%
LED 15	23,706	30,619	129.2%	7.83	6.21	79.3%
LED 9	42,407	54,791	129.2%	13.23	11.11	84.0%
Showerhead	46,622	42,199	90.5%	5.17	<.01	<0.0%
Total	**127,310**	**139,863**	**109.9%**	**27.95**	**17.32**	**62.0%**

Several homes in each territory received multiple kits: 18 homes in New Orleans received two kits and four homes in Algiers received two kits. It is unlikely that additional aerators and showerheads will result in additional savings, though additional LED lighting may have a high in-service rate. The Evaluators have included verified savings from the LED components of the 22 kits sent to duplicate addresses, but not savings from hot water measures.

3.4 Verified Gross Savings

Verified savings is presented by program channel in Table 3-20 through Table 3-23:

Table 3-20 Gross Realization Summary – New Orleans

Measure	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
AC/HP Tune ups	2019	173,956	175,078	100.64%	61.85	81.72	132.13%
	2020	5,402	4,846	89.71%	1.92	2.28	118.75%
Aerators	2019	424	424	100.00%	0.05	0.04	80.00%
	2020	141	142	100.71%	0.01	0.01	100.00%
Air Sealing	2019	45,984	43,717	95.07%	13.55	14.26	105.24%
	2020	116,454	110,144	94.58%	34.32	35.92	104.66%
Duct Sealing	2019	702,009	794,307	113.15%	214.25	224.78	104.91%
	2020	324,648	370,107	114.00%	105.53	110.03	104.26%
Ceiling Insulation	2019	5,395	12,208	226.28%	8.03	3.29	40.97%
	2020	0	0	N/A	0.00	0.00	N/A
LED Lighting	2019	316,811	350,279	110.56%	65.59	54.46	83.03%
	2020	100,534	108,065	107.49%	20.85	16.80	80.58%
Pipe Wrap	2019	228	228	100.00%	0.03	0.03	100.00%
	2020	912	912	100.00%	0.10	0.10	100.00%
Power Strips	2019	43,086	42,882	99.53%	4.05	4.07	100.49%
	2020	15,315	15,315	100.00%	1.46	1.46	100.00%
Showerheads	2019	3,164	3,164	100.00%	0.33	0.33	100.00%
	2020	4,520	4,520	100.00%	0.47	0.47	100.00%
Smart Thermostats	2019	15,440	15,441	100.01%	0.00	0.00	N/A
	2020	28,135	28,137	100.01%	0.00	0.00	N/A
HESKS	2019	783,559	861,234	109.91%	172.01	106.58	61.96%
	2020	2,900	3,192	110.07%	0.62	0.39	62.90%
2019 Subtotal:	**2019**	**2,090,056**	**2,298,962**	**110.00%**	**539.74**	**489.56**	**90.70%**
2020 Subtotal:	**2020**	**598,961**	**645,380**	**107.75%**	**165.28**	**167.46**	**101.32%**
Overall Total:	**PY9**	**2,689,017**	**2,944,342**	**109.50%**	**705.02**	**657.02**	**93.19%**

Table 3-21 Gross Realization Summary – Algiers

Measure	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
AC/HP Tune ups	2019	13,433	17,700	131.77%	4.79	8.17	170.56%
	2020	3,601	3,860	107.19%	1.28	1.82	142.19%
Aerators	2019	80	80	100.00%	0.01	0.01	100.00%
	2020	27	27	100.00%	0.00	0.00	N/A
Air Sealing	2019	17,750	16,866	95.02%	5.23	5.50	105.16%
	2020	13,494	12,817	94.98%	3.98	4.18	105.03%
Duct Sealing	2019	165,479	192,522	116.34%	50.64	55.68	109.95%
	2020	75,210	86,698	115.27%	20.77	22.04	106.11%
LED Lighting	2019	42,056	45,908	109.16%	8.67	7.14	82.35%
	2020	15,014	16,835	112.13%	3.11	2.62	84.24%
Power Strips	2019	6,739	6,739	100.00%	0.63	0.64	101.59%
	2020	1,021	1,021	100.00%	0.10	0.10	100.00%
Showerheads	2019	904	904	100.00%	0.09	0.09	100.00%
	2020	0	0	N/A	0.00	0.00	N/A
Smart Thermostats	2019	2,059	2,059	100.00%	0.00	0.00	N/A
	2020	2,745	2,745	100.00%	0.00	0.00	N/A
HESKS	2019	127,020	139,544	109.86%	27.88	17.28	61.98%
	2020	290	319	110.00%	0.06	0.04	66.67%
2019 Subtotal:	**2019**	**375,520**	**422,322**	**112.50%**	**97.94**	**94.51**	**96.50%**
2020 Subtotal:	**2020**	**111,402**	**124,322**	**111.60%**	**29.30**	**30.80**	**105.10%**
Overall Total:	**PY9**	**486,922**	**546,644**	**112.30%**	**127.24**	**125.31**	**98.50%**

Table 3-22 Gross Realization by Territory and Year

Utility	Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Reductions	Verified kW Reductions	kW Realization Rate
ENO	2019	2,090,056	2,298,962	110.00%	539.74	489.56	90.70%
	2020	598,961	645,380	107.75%	165.28	167.46	101.32%
ENO Subtotal	**Both**	**2,689,017**	**2,944,342**	**109.50%**	**705.02**	**657.02**	**93.19%**
Algiers	2019	375,520	422,322	112.46%	97.94	94.51	96.50%
	2020	111,402	124,322	111.60%	29.30	30.80	105.12%
Algiers Subtotal	**Both**	**486,922**	**546,644**	**112.27%**	**127.24**	**125.31**	**98.48%**
Overall Total	**Both**	**3,175,939**	**3,490,986**	**109.92%**	**832.26**	**782.33**	**94.00%**

Table 3-23 Gross Realization by Year

Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Reductions	Verified kW Reductions	kW Realization Rate
2019	2,465,576	2,721,284	110.37%	637.68	584.07	91.59%
2020	710,363	769,702	108.35%	194.58	198.26	101.89%
Total	**3,175,939**	**3,490,986**	**109.92%**	**832.26**	**782.33**	**94.00%**

Overall the Program resulted in 3,490,986 saved kWh and peak kW was reduced by 782.33.

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 methodology used is described in detail in Section in 2.2.3.

To estimate program-level free ridership, the Evaluator calculated free ridership scores for major and direct install measures, weighted by the participants' gross energy savings and demand reductions. The major and direct install measure free ridership ratios were used to factor the program verified gross savings for the two measure types to estimate free ridership.

A spillover ratio was developed by dividing the total energy savings and demand reductions resulting from spillover measures by the total gross energy savings and demand reductions for the sample of survey respondents.

3.5.1 Major Measure and DI Net Savings Results

Table 3-24 summarizes free ridership findings by measure type. As shown, free ridership was higher for the direct install measures than the rebated measures.

Table 3-24 Free Ridership by Measure Type

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

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

Table 3-25 summarizes the program net kWh savings and peak kW demand reduction impacts of major measure and direct install items in the HPwES Program.[16] Net to gross ratios in above tables represent overall ratios, accounting for both major and DI measures. Individually, major measure NTG is 100.04% and DI is 64.57%.

Table 3-25 Major Measure and DI Summary of Verified Net Savings

Utility	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	2,079,915	185,696	1,894,219	91.07%	550.06	27.99	522.07	94.91%
Algiers	406,782	25,201	381,581	93.80%	107.97	3.83	104.14	96.45%
Totals	**2,486,697**	**210,897**	**2,275,800**	**91.52%**	**658.03**	**31.83**	**626.2**	**95.16%**

The overall DI and major measure NTGRs are 91.52% for kWh and 95.16% for kW.

3.5.2 HESK Net Savings Results

The net savings of the kit measures was assessed using survey responses from a sample of 178 customers that received the kit. Table 3-26 summarizes the assessed free ridership by measure type.

Table 3-26 HESK Free Ridership by Measure Type

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

Table 3-27 summarizes the net savings results for the kits.

Table 3-27 HESK Summary of Verified Net Savings

Utility	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	864,426	220,189	644,237	74.53%	106.98	38.69	68.29	63.83%
Algiers	139,863	35,637	104,226	74.52%	17.32	6.27	11.05	63.80%
Totals	**1,004,289**	**255,826**	**748,462**	**74.53%**	**124.3**	**44.95**	**79.35**	**63.84%**

Overall HESK NTGRs are 74.53% for kWh and 63.84% for kW.

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

3.5.3 Overall Program Net Savings Results

Table 3-28 summarizes the overall Net savings results of the Program as a whole.

Table 3-28 Net kWh Savings and Net Peak kW Reductions by Territory and Year

Utility	*Year*	*Verified Gross kWh Savings*	*kWh FR*	*Verified Net kWh Savings*	*kWh NTGR*	*Verified kW Reductions*	*kW FR*	*Verified Net kW Reductions*	*kW Net NTGR*
ENO	2019	2,298,962	359,593	1,939,369	84.36%	489.56	59.72	429.84	87.80%
	2020	645,380	46,293	599,087	92.83%	167.46	6.94	160.52	95.86%
ENO Subtotal	**Both**	**2,944,342**	**405,886**	**2,538,456**	**86.21%**	**657.02**	**66.66**	**590.36**	**89.85%**
Algiers	2019	422,322	54,464	367,858	87.10%	94.51	9.11	85.40	90.36%
	2020	124,322	6,373	117,949	94.87%	30.80	1.01	29.79	96.72%
Algiers Subtotal	**Both**	**546,644**	**60,837**	**485,807**	**88.87%**	**125.31**	**10.12**	**115.19**	**91.92%**
Overall Total	**Both**	**3,490,986**	**466,723**	**3,024,263**	**86.63%**	**782.33**	**76.78**	**705.55**	**90.19%**

Table 3-29 Net kWh Savings and Net Peak kW Reductions by Year

Year	*Verified Net kWh Savings*	*Verified Net kW Reductions*
2019	2,307,227	515.24
2020	717,036	190.31
Total	**3,024,263**	**705.55**

Net to gross ratios in above tables represent overall ratios, accounting for both major and DI measures and HESKs.

- Individually, major measure NTGRs are: 100.04% for kWh and 99.93% for kW.
- Individually, DI NTGRs are: 64.57% for kWh and 64.46% for kW.
- Combined major measure and DI NTGR is 91.52% for kWh and 95.16% for kW.
- HESK NTGRs are 74.53% for kWh and 63.84% for kW.
- The overall Program kWh NTGR is 86.56% and kW NTGR is 90.08%

Net kWh savings totaled to 3,024,263, kWh and equal 86.6%% of gross program savings. Net kW reductions totaled 705.55 kW and equal 90.19%% of verified gross program savings.

3.6 Process Evaluation Findings

3.6.1 Summary of Program Participation

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

Table 3-30 summarizes participation in the program, excluding HESKs. As shown, nearly all participants received direct install measures and approximately 10% implemented a

major measure (e.g., insulation, duct sealing). Eight percent of participants received direct install and implemented a major measure.

Program data indicated that 85% of customers received an assessment.

Table 3-30 Share of Customers Receiving Measures and Assessments[17]

Number of Participants	Percent Receiving Direct Install Measures	Percent Receiving Major Measures	Percent Receiving Direct Install and Major Measures	Percent Receiving an Assessment	Average Expected Savings per Participant
906	79%	66%	48%	85%	2,497

Table 3-31 summarizes projects savings by measure type. The table shows that that duct sealing accounted for nearly one-half of program expected savings though it was implemented by less than 10% of participants.

Table 3-31 Summary of Measures Installed

Measure	Expected kWh Savings	Incentives Paid	Number of Participants	Percent of Expected Savings	Incentive Dollars per kWh Saved
AC Tune up	196,393	$30,900	164	6%	$0.16
Aerator	672	$0	18	<1%	$0.00
Air Sealing	193,682	$45,575	190	6%	$0.24
Duct Sealing	1,267,346	$167,279	422	40%	$0.13
Insulation	5,395	$824	1	<1%	$0.15
Kit item	913,769	$157,412	6,280	29%	$0.17
LED	474,415	$0	688	15%	$0.00
Pipe Wrap	1,140	$0	7	<1%	$0.00
Power Strip	66,161	$0	297	2%	$0.00
Showerhead	8,588	$0	24	<1%	$0.00
Smart Thermostat	48,379	$22,000	120	2%	$0.45

3.6.2 HPwES Participant Feedback

The Evaluators administered survey online and by telephone to a sample of program participants to solicit feedback on customers experience with the program. In total, 90 participants completed the survey.

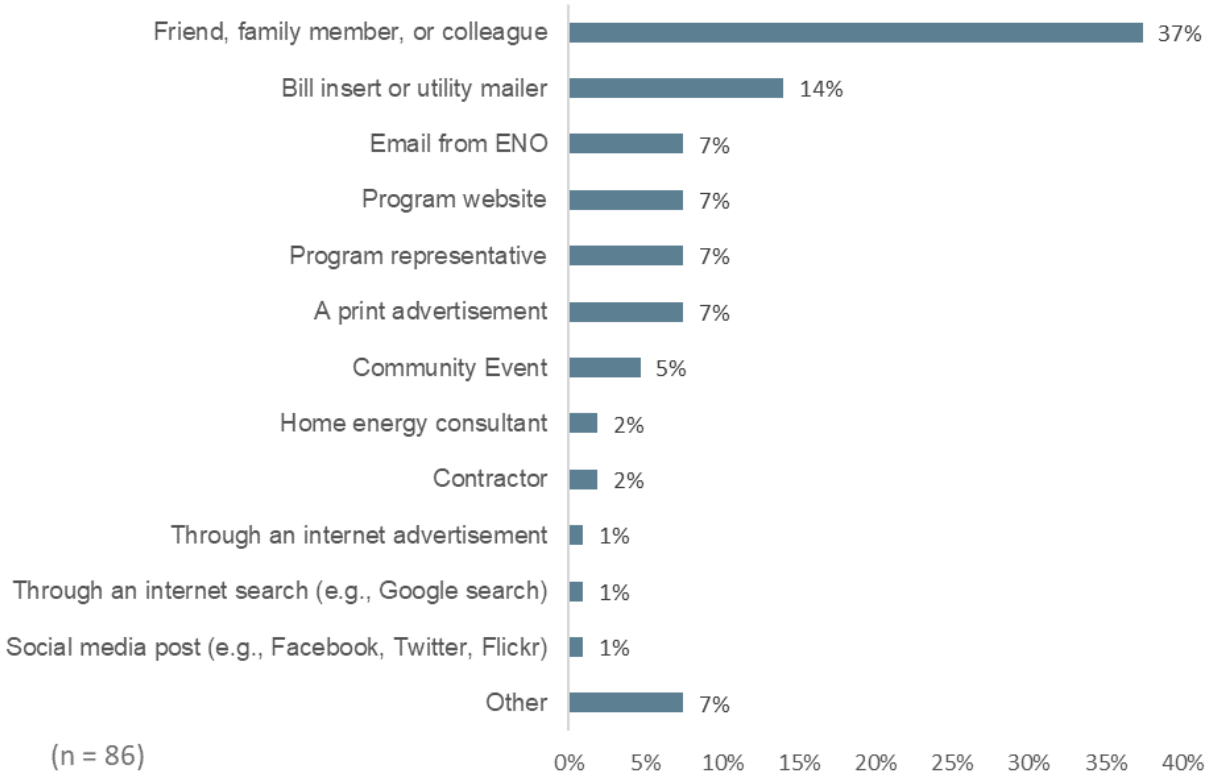
3.6.2.1 Awareness and Program Participation

Program awareness was driven by word of mouth from friends, family members, and colleagues. As shown in Figure 3-5, 37% of customers indicated that they learned about the program from a friend, family member, or colleague. Other common sources of

[17] HESKs excluded.

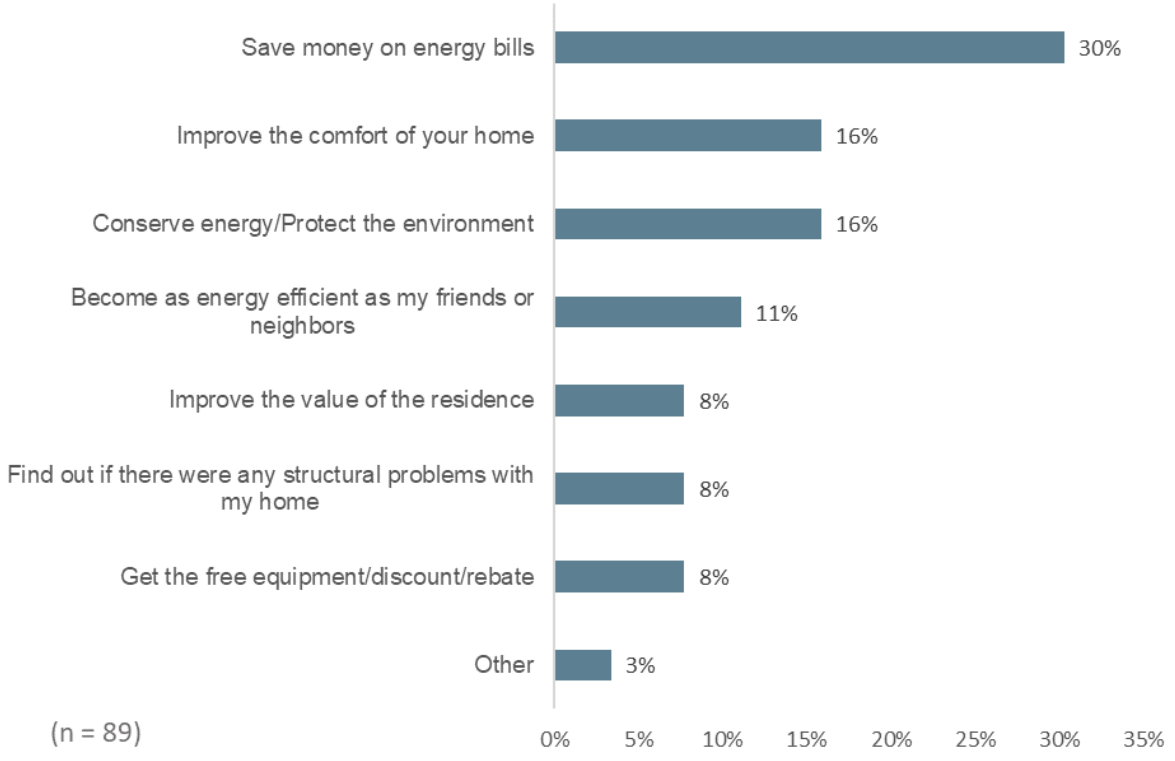
program information came from bill inserts (14%), ENO emails (7%), the ENO program website (7%), program representatives (7%), and print advertisements (7%).

Figure 3-5 Program Awareness



Saving money on energy bills is the is the most popular reason for program participation. As shown in Figure 3-6, 30% of participants decided to partake in the program to save money on their energy bills. Respondents also were interested in improving the comfort of their home (16%), conserving energy to protect the environment (16%), and becoming as energy efficient as neighbors and friends (11%).

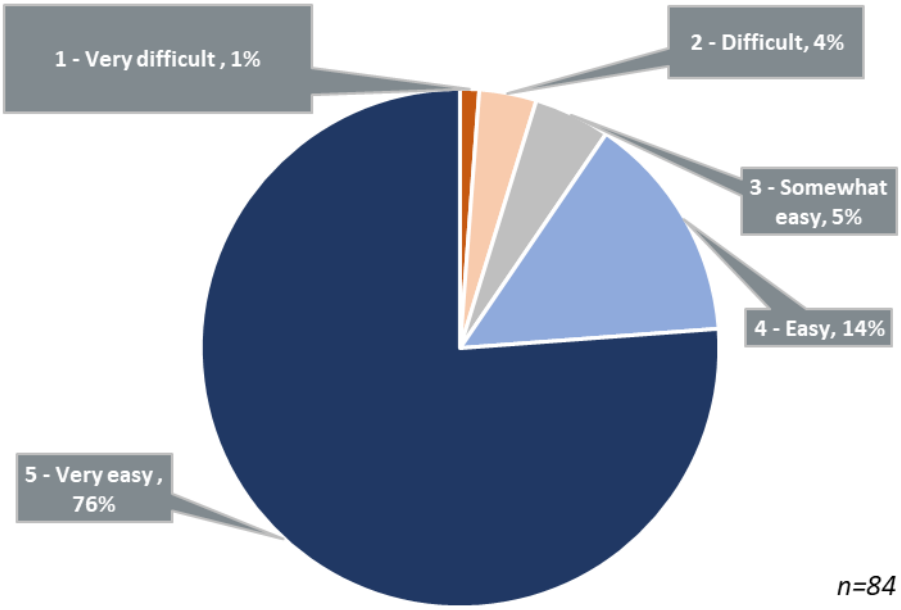
Figure 3-6 Reasons for Program Participation



3.6.2.2 Experience with Home Energy Assessment

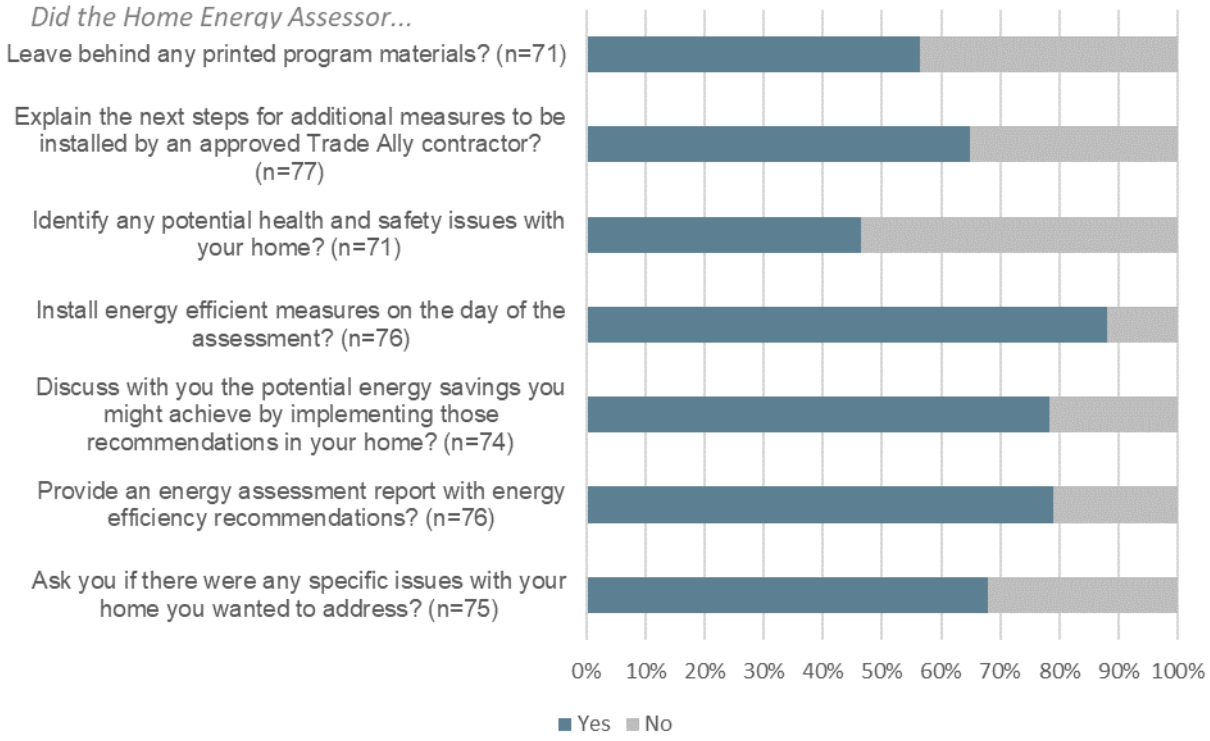
Participants had little difficulty scheduling the energy assessment. As shown in Figure 3-7, most respondents reported the process to be easy or very easy (90%). Only 5% of participants found the scheduling process to be difficult or very difficult.

Figure 3-7 Ease of Scheduling Home Energy Assessment



The home energy assessor completed multiple tasks during the assessment. Almost all participants (88%) stated that the assessor installed energy efficient measures on the day of the assessment. As seen in Figure 3-8, other common tasks the assessor completed included providing an energy assessment report with energy efficient recommendations (79%), a discussion of potential energy savings from implementing the measures in the home (78%), and asking about specific issues within the home that the participant wanted to address (68%). Less common areas that the assessor went over with the participant included identifying potential health and safety issues with the home.

Figure 3-8 Home Energy Assessment



The home energy assessment reports are generally helpful to participants. As shown in Table 3-32, 84% of participants reported that home energy assessment reports were very helpful or helpful to participants. None of those surveyed stated that the reports were not at all helpful.

Table 3-32 Home Energy Assessment Report

On a scale of 1 to 5, where 1 is "not at all helpful" and 5 is "very helpful," how helpful was that report to you?	***Percent of Respondents (n= 56)***
1 - Not at all helpful	0%
2	2%
3	15%
4	13%
5 - Very helpful	71%

Customers have generally completed some of the recommended improvements. As shown in Table 3-33, 80% of those surveyed stated that they have either completed some but not all or all of the improvements. Twenty percent of respondents did not complete any of the improvements.

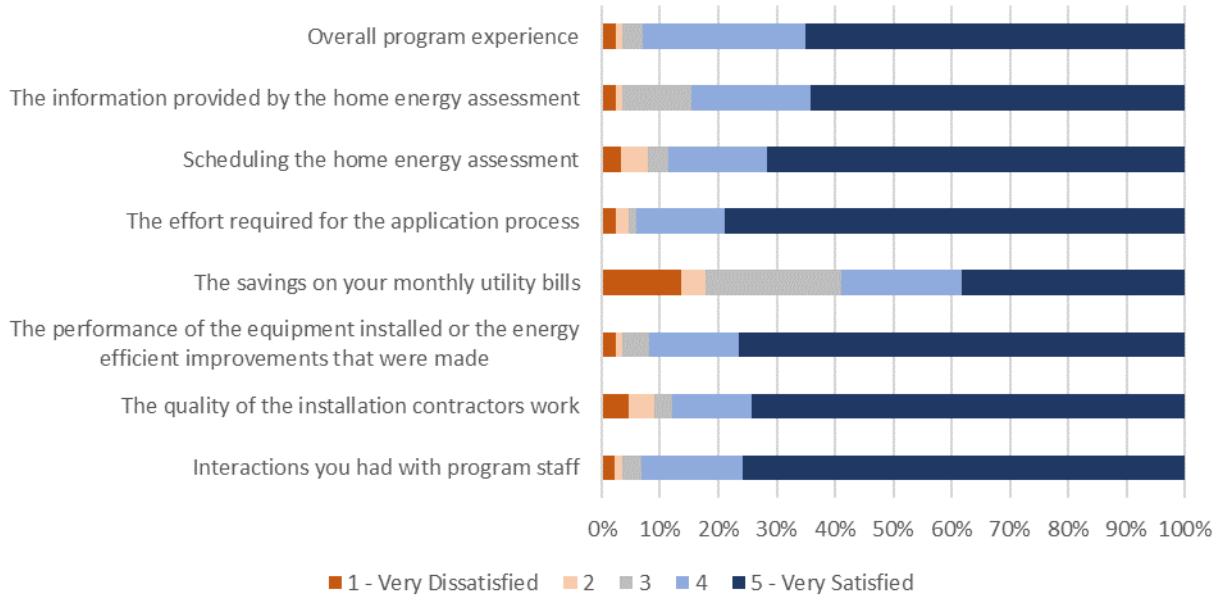
Table 3-33 Home Energy Assessment Report

Since the assessment, would you say you have completed all of the recommended energy efficiency improvements, completed some of them, or not completed any?	***Percent of Respondents (n= 80)***
Completed all	36%
Completed some but not all	44%
Have not completed any	20%

3.6.2.3 Satisfaction

Customers were satisfied with the overall program experience. As shown in the figure below, 93% expressed satisfaction with the overall program experience. Almost all those who responded (94%) expressed satisfaction with the effort required for the application process. Eighty-eight percent of respondents expressed satisfaction with the quality of the installation contractors work. Fifty-nine percent of respondents expressed satisfaction with the savings on their utility bills.

Figure 3-9 Program Satisfaction



Overall, Customers were satisfied with Entergy as their electricity service provider. As shown in Table 3-34, 76% of customers expressed satisfaction with Entergy. There was some dissatisfaction with 8% expressing dissatisfaction.

Table 3-34 Overall Satisfaction with Entergy

Using the same scale, how satisfied are you with Entergy as your electricity service provider?	***Percent of Respondents (n= 86)***
5 – Very satisfied	48%
4	28%
3	16%
2	3%
1 – Very dissatisfied	5%

3.6.2.4 Demographics

Most of the customers own their property. As shown in Table 3-35, 93% of respondents own their homes.

Table 3-35 Home Ownership

Do you own, rent, or own and rent to someone else the property?	***Percent of Respondents (n= 86)***
Own	93%
Rent	7%

Most of the participating customers use electricity to heat their homes. As shown in Table 3-36, 57% of customers use electricity to heat their homes for space heating. However, Table 3-37 shows that 58% of customers use natural gas for their water heater while 37% use an electric water heater.

Table 3-36 Heating Fuel

What is the main fuel used for heating your home?	***Percent of Respondents (n= 86)***
Natural gas	38%
Electricity	57%
Other	5%

Table 3-37 Water Heating Type

What type of water heater does this residence have?	***Percent of Respondents (n= 178)***
Natural gas water heater	58%
Electric water heater	41%
Other	1%

A significant share of participants would have met the requirements for the Low Income Audit and Weatherization Program. The 39% of participants with income of less than $20,000 would have met the 200% federal poverty level requirement for all sizes of household. As shown in the table below, out of 70 respondents, 63% made less than $50,000 per year including all sources of income. Out of 66 respondents, 74% stated that their households consist of less than 5 people.

Table 3-38 Participant Income Level

Including all money earned from wages, salaries, tips, commissions, worker's compensation, unemployment insurance, child support, or other sources, about how much was your total annual household income before taxes in 2018?	***Percent of Respondents (n =70)***
Less than $10,000	23%
$10,000 to less than $20,000	16%
$20,000 to less than $30,000	7%
$30,000 to less than $40,000	13%
$40,000 to less than $50,000	4%
$50,000 to less than $75,000	13%
$75,000 to less than $100,000	1%
$100,000 to less than $150,000	9%
$150,000 to less than $200,000	3%
$200,000 or more	3%
Prefer not to state	11%

3.6.3 Home Energy Savings Kits Participant Feedback

The Evaluators administered an online survey to a sample of program participants to solicit feedback on customers experience with the program. In total, 178 participants completed the survey. The main findings are summarized below.

A modest share of customers participated in an Entergy Energy Smart program after receiving the kit. Twelve percent of respondents reported that they participated in an Entergy energy efficiency program after receiving the kit. Of these respondents, 10 reported that they had not previously or did not recall previously participating in an Entergy

program. Additionally, six reported that they learned about the programs that they participated in after receiving he kit. It should also be noted that the survey was administered in September and October of the year that the kits were distributors and customers may participate in a program later. Table 3-39 summarizes the programs kit recipients reported participating in after receiving a kit.

Table 3-39 Programs Kit Recipients Participated in After Getting a Kit

Program	***Percent of Respondents (n = 16)***
Home Performance with ENERGY STAR	31%
Multifamily	0%
Low Income Audit	6%
A/C Tune-Up	38%
Central Air-Conditioner Units	19%
EasyCool	31%
Instore lighting discounts	6%
Appliance rebates	19%
Scorecard	38%
Don't know	25%

The primary reasons for not installing low-flow devices were that the devices did not fit the faucet or shower or because the person did not have time or needed additional assistance installing the devices. Table 3-40 summarizes the reasons given for not installing the low flow devices. The significant share of customers who reported that they did not install the low flow devices because they did not fit suggests that the program should explore providing adapters with the kits to increase the installation rates. Staff should review data collected, or observations made by staff, during direct installation of low-flow devices in the HPwES and Low Income Audit and Weatherization Programs to identify what types of adapters may be included in the kits.

Table 3-40 Reasons for Not Installing Low-Flow Devices

Reason for Not Installing	Bathroom Aerator (n = 74)	Kitchen Aerator (n = 95)	Showerhead (n = 79)
Does not fit on your faucet/ Shower	51%	52%	25%
Have not had time to install it	14%	15%	22%
Need help / do not know how to install it	16%	14%	19%
Do not like low-flow devices	5%	7%	13%
Already have one	4%	2%	6%
Not included in the kit	1%	5%	1%
Gave it to someone else	1%	2%	3%
Does not have a shower	na	na	4%
Caused pipes to vibrate/water pressure is too low	3%	1%	0%
Shower too corroded to install/cannot remove old one	na	na	3%
For some other reason	4%	2%	5%

Most respondents reported they did not install the LED light bulbs because their old bulbs were not burnt out yet. Table 3-41 summarizes all of the reasons given for not installing the light bulbs. The prevalence of waiting for bulbs to burn out suggests staff should consider providing information on the benefit of immediate energy savings resulting from replacing working inefficient bulbs with the LEDs.

Table 3-41 Reasons for Not Installing LED Light Bulbs

Reason for Not Installing	LED Light Bulbs (n = 53)
Waiting for bulbs to burn out	77%
They were broken or burnt out	8%
Have not had time to install them	8%
Wrong type of bulb	8%
Did not like the light or appearance of the bulbs	4%
Bulb caught on fire	2%
For some other reason	2%

3.7 Key Findings and Conclusions

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

- **The program exceeded all kW goals and most kWh goals.** All goals were met except the 2019 kWh goal for the New Orleans territory, causing the Program to fall short of the overall kWh goal. Overall goal achievement is 98.33% of kWh and 125.97% of kW.
- **Initial program tracking data did not contain all data points necessary for evaluation.** Large portions of customers receiving major measures, such as AC tune ups, duct sealing and air sealings were missing heating type, test-in and test-

out values as well as AC tonnage. These issues were brought to the Implementors and the missing data was provided promptly.

- **Participants experiences with the HPwES program participation process were mostly positive.**
  - Ninety percent of participants reported that the scheduling the home energy assessment was easy or very easy.
  - Eighty-four percent of participants reported that the home energy report was helpful or very helpful.
  - Ninety-four percent of participants were satisfied with the application process.
  - Ninety-three percent of participants were satisfied with the program overall.
- **A significant share of participants would have met the requirements for the Low Income Audit and Weatherization Program.** The 39% of participants with income of less than $20,000 would have met the 200% federal poverty level requirement for all sizes of household.
- **A modest share of customers participated in an Entergy Energy Smart program after receiving the kit.** Twelve percent of respondents reported that they participated in an Entergy energy efficiency program after receiving the kit.
- **The primary reasons for not installing low-flow devices were that the devices did not fit the faucet or shower or because the person did not have time or needed additional assistance installing the devices.**
- **Most respondents reported they did not install the LED light bulbs because their old bulbs were not burnt out yet.**
- **Lack of eligible measures for a gas-heated home may be contributing to low energy savings**. Natural gas-heated homes do not qualify for all available measures in HPwES. Because gas homes do not qualify for air sealing and attic insulation, many customers have been excluded from the service, thus potentially impacting the program.

3.8 Recommendations

The Evaluators' recommendations are as follows:

- **Review data collection and tracking procedures to fully capture program activity including assessments performed.** Also review data import/transfer procedures. Implementation staff indicated that the omissions mentioned in the 'Key Findings and Conclusions' section were incurred during this process.

- **Explore adding more program-eligible measures for gas-heated homes.** Staff reported that some of the initial program modeling was based on data from northern regions of the United States. Staff should model envelope measures using regional weather sensitive inputs to determine if envelope measures are cost effective. Attic insulation and air sealing are not currently eligible for gas homes and could be included in the next cycle to increase customer participation and savings in the program.
- **Explore electronic data collection for use in performing audits.** Providing more efficient ways for trade allies to upload their information could improve data collection and save time. For example, use of tablet-based data collection can streamline the process.
- **Explore providing low-flow adapters in efficiency kits to increase installation rates.** Staff should review information gathered through performing direct installations of low-flow devices to understand what types of adapters could be provided to increase installation of low-flow devices.
- **Emphasize the benefits of immediate replacement of inefficient light bulbs with LEDs in the kits.** Waiting for light bulbs to burn out was the most common reason for not installing the kit LEDs. Additional educational material on the benefits of replacing efficient bulbs may help improve the installation rate.
- **Proactively ask participants if they qualify for the Low Income Audit and Weatherization program during the enrollment and assessment process.** The significant share of participants who reported income that would qualify them for the low income program suggests that staff may need to be more assertive in channeling these customers into the low-income program.
- **Adjust Duct Sealing savings algorithms' PreDL from 35% to 40%.** Current savings assumed a 35% PreDL adjustment, though the New Orleans TRM 2.0 and the AR TRM specify 40% instead. Engineering calculations show that the interior temperature in those settings that exceed 40 percent total leakage would be above the thermally acceptable comfort levels published by ASHRAE in its 2009 Fundamentals publication.

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 of 200% the federal poverty level with home energy upgrades at low or no cost. 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 and that customers are vetted through a series of qualifying questions, but the collection of it and questions are not stated in the program implementation plan.

A total of 824 households participated in LIA&Wx, Table 4-1 and Table 4-2 summarize 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

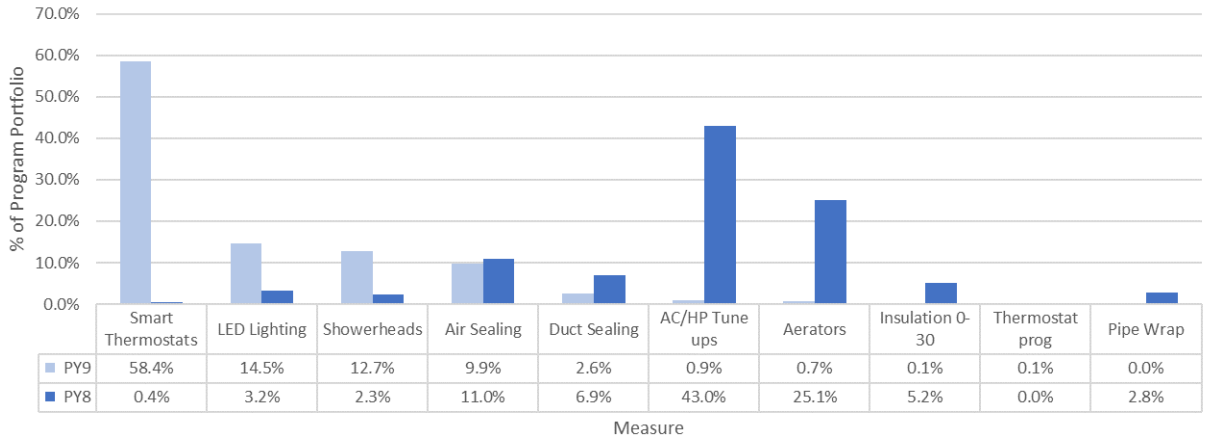
Time Period	***Number of Measures Distributed***	***Expected kWh Savings***	***Expected kW Savings***	***Percent of Program Savings (by kWh)***
AC/HP Tune Ups	175	163,153	58.02	10.2%
Aerators	21	663	0.07	0.0%
Air Sealing	27	11,188	3.50	0.7%
Duct Sealing	344	925,789	277.64	57.9%
Ceiling Insulation	74	231,185	346.24	14.5%
LED Lighting	8554	204,709	42.41	12.8%
Pipe Wrap	15	2,318	0.26	0.1%
Showerheads	66	14,916	1.56	0.9%
Smart thermostats	128	43,917	0.00	2.7%
Programmable Thermostats	2	1,402	0.00	0.1%
PY9	**9,406**	**1,599,239**	**729.70**	

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

Time Period	Number of Measures Distributed	Expected kWh Savings	Expected kW Savings	Percent of Program Savings (by kWh)
AC/HP Tune Ups	10	9,418	3.35	6.3%
Aerators	1	44	0.00	0.0%
Air Sealing	1	632	0.19	0.4%
Duct Sealing	42	95,118	31.95	64.0%
Ceiling Insulation	6	23,043	34.30	15.5%
LED Lighting	777	17,717	3.67	11.9%
Pipe Wrap	1	76	0.01	0.1%
Showerheads	2	452	0.05	0.3%
Smart thermostats	6	2,059	0.00	1.4%
PY9	**846**	**148,559**	**73.52**	

Below, Figure 4-1 shows individual measure contribution the overall program expected savings, comparing PY9 with PY8.

Figure 4-1 Savings Contributions by Measure



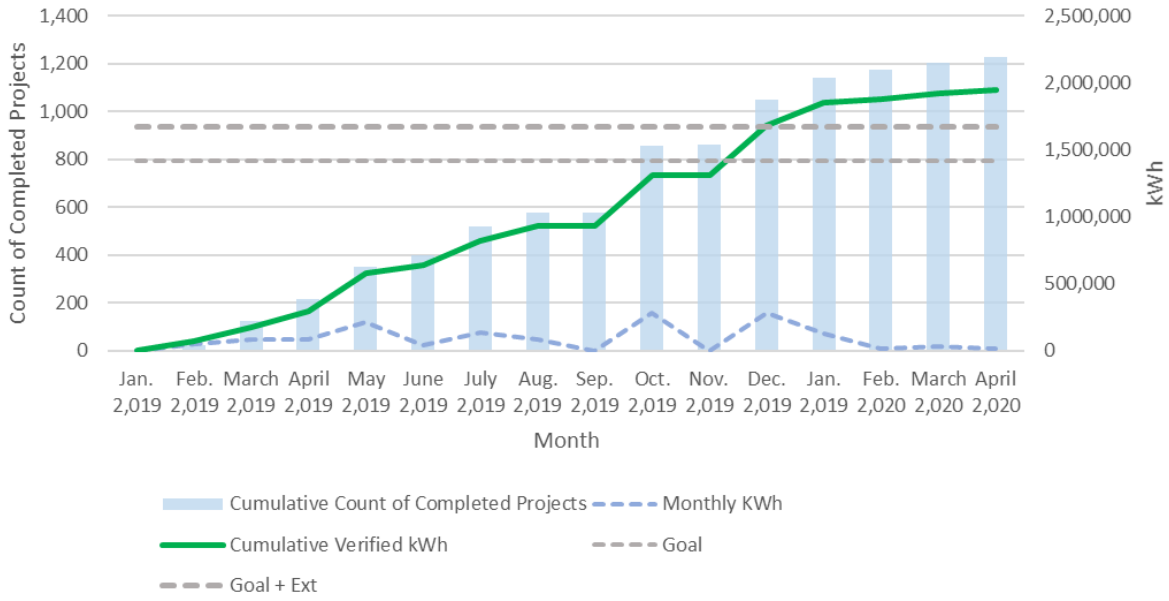
In PY8, 521 projects summing to 1,868,434 kWh were completed during a normal 12-month period (a regular, full program year). In PY9, there were 824 projects summing to 1,747,799 kWh were completed during an extended 15-month period. Normalizing these figures to a 12-month program year for an 'apples-to-apples' comparison yields an expected 659 projects summing to 1,398,239 kWh. Comparing these figures translates into a 25.2% drop in expected kWh savings, while average dwelling kWh savings decreased by 40.9%.

Table 4-3 compares program years over a 4-year period and Figure 4-2 illustrates the performance of the LIA&Wx program over the extended 15-month PY9.

Table 4-3 Participation and Expected Savings by Program Year

PY	Count Homes	Expected kWh per Home
PY6	265	6,003
PY7 (nominal)	316	3,307
PY7 (normalized)	421	3,307
PY8	521	3,586
PY9 (total)	824	2,121
PY9 (calendar)	659	2,171

Figure 4-2 Program Performance over PY9 (January 2019 – March 2020)



4.1.1 Goal Achievement

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

Utility	Year	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
New Orleans	2019	1,316,362	1,581,622	120.15%	285.11	560.97	196.76%
	2020	240,000	524,162	218.40%			
ENO Subtotal	**Both**	**1,556,362**	**2,105,784**	**135.30%**	**285.11**	**560.97**	**196.76%**
Algiers	2019	98,072	109,832	111.99%	21.10	59.37	281.37%
	2020	20,500	93,518	456.19%			
Algiers	**Both**	**118,572**	**203,350**	**171.50%**	**21.10**	**59.37**	**281.37%**
Overall Total	**Both**	**1,674,934**	**2,309,134**	**137.86%**	**306.21**	**620.34**	**202.59%**

The program exceeded all goals, achieving 137.9% of kWh goals and 202.6% of kW goals.

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
- Previous program year field visit results review instead of on-site testing and data collection.

Impact savings were calculated using methods and inputs in the New Orleans TRM v2.0 and incorporated results from historic on-site testing where appropriate. PY9 major savings components are air insulation, duct sealing, ceiling insulation and LEDs. Impact methodologies for LIA&Wx are the same as described for HPwES, described in section 3.2 M&V Methodology.

4.3 Verified Savings by Measure

4.3.1 AC/HP Tune-Ups

Details about M&V Impact methodologies for MF Tune-Ups are the same as described for HPwES, described in section 3.3.2.

Table 4-5 Expected and Verified Air Sealing Savings – New Orleans

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
AC Tune-Up	163,153	189,944	116.4%	58.02	89.22	153.8%
Total	**163,153**	**189,944**	**116.4%**	**58.02**	**89.22**	**153.8%**

Table 4-6 Expected and Verified Air Sealing Savings – Algiers

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
AC Tune-Up	9,418	15,182	161.2%	3.35	7.14	213.1%
Total	**9,418**	**15,182**	**161.2%**	**3.35**	**7.14**	**213.1%**

Six projects did not achieve EER gain as a result of the tune-up, and thus have zero savings. Expected savings were based on TRM per ton deemed savings, 277 kWh per ton. Verified savings were calculated using TRM algorithms.

4.3.2 Air Sealing Savings

Details about M&V Impact methodologies for LIA&Wx Air Infiltration are the same as described for HPwES, described in section 3.3.2.

Table 4-7 Expected and Verified Air Sealing Savings – New Orleans

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	10,181	9,502	93.3%	3.08	3.09	100.2%
Air Source Heat Pump	1,007	948	94.1%	0.42	0.44	104.4%
Total	**11,188**	**10,450**	**93.4%**	**3.50**	**3.53**	**100.7%**

Table 4-8 Expected and Verified Air Sealing Savings - Algiers

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	-	-	N/A	-	-	N/A
Electric Resistance	632	603	95.4%	0.19	0.20	105.5%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**632**	**603**	**95.4%**	**0.19**	**0.20**	**105.5%**

Two projects had overall CFM50 reductions that were too low to produce any kWh savings. Savings for two other projects were calculated assuming heat pump heating, but the Evaluators determined that they were heated with electric resistance heaters and adjusted realized savings to reflect that. Differences in kW realization are likely due to rounding within program tracking data. Verified savings calculations use all significant digits.

4.3.3 Ceiling Insulation

4.3.3.1 Ceiling Insulation Savings Multipliers

Details about M&V Impact methodologies for LIA&Wx Ceiling Insulation are the same as described for HPwES, described in section 3.3.2.

4.3.3.2 Ceiling Insulation Savings Results

Verified savings for this measure are provided in Table 4-9 and Table 4-10.

Table 4-9 Expected and Verified Attic Insulation Savings – R0 to R30

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
New Orleans	144,027	336,228	233.45%	232.15	95.01	40.92%
Algiers	23,043	53,144	230.63%	34.30	14.07	41.03%
Total	**167,070**	**389,372**	**233.06%**	**266.45**	**109.08**	**40.94%**

Table 4-10 Expected and Verified Attic Insulation Savings – R5 to R30

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
New Orleans	87,158	174,775	200.53%	114.09	32.60	28.57%
Algiers	0	0	N/A	0.00	0.00	N/A

Total	**87,158**	**174,775**	**200.53%**	**114.09**	**32.60**	**28.57%**

The Evaluators were unable to replicate ex ante calculations, as all projects seemed to be based on kWh/Sq Ft. multipliers that do not appear in the TRM 2.0. Seventy four of 80 projects (95.5%) were in homes with electric resistance heating. While these projects should have assumed a 5.9291 kWh/sq ft savings for R0 – R4 insulation, or 3.1249 kWh/sq ft savings for R5 – R8 insulation, 44 projects assumed a multiplier of approximately 2.62 kWh/sq ft and an additional 30 used 1.66. kW realization is low for similar reasons: the majority of reductions should have been calculated using a 0.0005 multiplier, but 45 projects used 0.0039 and 32 used 0.0021 instead.

4.3.4 Duct Sealing Savings

Details about M&V Impact methodologies for LIA&Wx Duct Sealing are the same as described for HPwES, described in section 3.3.3.

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

Heating Type	***Expected kWh Savings***	***Verified kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Verified Peak kW Savings***	***Peak kW Realization Rate***
Natural Gas Furnace	323,193	374,694	115.9%	154.49	165.28	107.0%
Electric Resistance	582,592	674,721	115.8%	117.17	126.31	107.8%
Air Source Heat Pump	20,004	22,113	110.5%	5.97	6.09	102.0%
Total	**925,789**	**1,071,527**	**115.7%**	**277.64**	**297.68**	**107.2%**

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

Heating Type	***Expected kWh Savings***	***Verified kWh Savings***	***kWh Realization Rate***	***Expected Peak kW Savings***	***Verified Peak kW Savings***	***Peak kW Realization Rate***
Natural Gas Furnace	45,961	54,170	117.9%	21.97	23.90	108.7%
Electric Resistance	49,157	55,028	111.9%	9.98	10.30	103.3%
Air Source Heat Pump	-	-	N/A	-	-	N/A
Total	**95,118**	**109,198**	**114.8%**	**31.95**	**34.20**	**107.0%**

The Evaluators determined that ex ante calculations applied a maximum pre-retrofit leakage rate of 35% of total fan flow adjustment, instead of 40%, as specified in the NOLA TRM 2.0. This adjustment raised realized kWh savings by 12.9%. Three projects claimed zero (0) expected kW reductions while expecting non-zero kWh savings, slightly affecting the overall kW realization rate. The Evaluators were unable to reasonably recreate ex ante savings calculations for nine projects. Using correct methodology, these homes' realization rates ranged from 56% to 161% after M&V adjustments.

4.3.5 LED Lighting Savings

The savings resulting from applying TRM 2.0 algorithms and deemed savings parameters are summarized in Table 4-13 and Table 4-14.

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

Lamp Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
LED A-Type Lamp	81,507	124,632	152.9%	16.89	23.71	140.4%
LED Decorative Lamp	81,498	88,595	108.7%	16.86	11.85	70.3%
LED Directional Lamp	41,704	47,818	114.7%	8.66	5.50	63.5%
Total	**204,709**	**261,045**	**127.5%**	**42.41**	**41.06**	**96.8%**

Table 4-14 Expected and Verified LED Savings - Algiers

Lamp Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
LED A-Type Lamp	9,416	12,944	137.5%	1.95	2.55	130.4%
LED Decorative Lamp	6,657	7,806	117.3%	1.38	0.96	69.5%
LED Directional Lamp	1,644	1,842	112.0%	0.34	0.22	63.5%
Total	**17,717**	**22,592**	**127.5%**	**3.67**	**3.72**	**101.3%**

Overall expected savings could not be recreated and ex ante per-unit savings values were inconsistent within the same measure, often varying as much a 25.6 kWh per lamp.[18]

LED savings were calculated using actual home heating types specific to residence the lamps were installed in. Calculating savings using interactive factors for 'unknown' spaces the overall realization rates are 117.5% for kWh and 93.2% for kW.

4.3.6 Programmable Thermostats

Programmable thermostats are not included in the New Orleans TRM 2.0, nor are they included in the Arkansas TRM as they are outdated technology for the residential sector. Without an appropriate measure study, the savings are speculative and unreliable, and measure studies have historically found that the savings are highly-dependent upon idiosyncratic program factors such as installation quality by the trade ally and preexisting customer behavior surrounding the management of their thermostat, with there being a possible risk of increased energy use if participants have low home occupancy. In the PY8 report the Evaluators specific that these devices be removed from program offerings.

There are no realized savings or peak kW reductions for this measure.

4.4 Verified Gross Savings

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

[18] For example, savings for (29) 15W LEDs was estimated using 16.1 kWh/unit, while (5) were estimated using 41.6 kWh/unit.

Table 4-15 Gross Realization Summary – New Orleans

Measure	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
AC/HP Tune ups	2019	148,194	178,907	120.72%	52.70	84.03	156.45%
	2020	14,958	11,036	73.78%	5.32	5.19	97.56%
Aerators	2019	566	566	100.00%	0.06	0.06	100.00%
	2020	97	97	100.00%	0.01	0.01	100.00%
Air Sealing	2019	7,782	7,270	93.42%	2.50	2.49	99.60%
	2020	3,406	3,180	93.36%	1.00	1.04	104.00%
Duct Sealing	2019	661,006	760,212	115.01%	204.69	218.36	106.68%
	2020	264,783	311,315	117.57%	72.95	79.32	108.73%
Ceiling Insulation	2019	174,603	385,346	220.70%	259.52	94.50	36.41%
	2020	56,582	125,657	222.08%	86.73	33.11	38.18%
LED Lighting	2019	161,333	213,183	132.14%	33.41	33.62	100.63%
	2020	43,375	47,862	110.34%	9.00	7.43	82.56%
Pipe Wrap	2019	2,318	2,317	99.96%	0.26	0.26	100.00%
	2020	0	0	N/A	0.00	0.00	N/A
Showerheads	2019	12,204	12,204	100.00%	1.27	1.27	100.00%
	2020	2,712	2,712	100.00%	0.28	0.28	100.00%
Programmable Thermostats	2019	1,402	0	0.00%	0.00	0.00	N/A
	2020	0	0	N/A	0.00	0.00	N/A
Smart Thermostats	2019	21,616	21,617	100.00%	0.00	0.00	N/A
	2020	22,302	22,303	100.00%	0.00	0.00	N/A
2019 Subtotal:	**2019**	**1,191,024**	**1,581,622**	**132.80%**	**554.41**	**434.59**	**78.25%**
2020 Subtotal:	**2020**	**408,215**	**524,162**	**128.40%**	**175.29**	**126.38**	**72.10%**
Overall Total:	**PY9**	**1,599,239**	**2,105,784**	**131.67%**	**729.70**	**560.97**	**76.77%**

Table 4-16 Gross Realization Summary – Algiers

Measure	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
AC/HP Tune ups	2019	8,032	13,527	168.41%	2.86	6.36	222.38%
	2020	1,385	1,655	119.49%	0.49	0.78	159.18%
Aerators	2019	44	44	100.00%	0.00	0.00	N/A
	2020	0	0	N/A	0.00	0.00	N/A
Air Sealing	2019	0	0	N/A	0.00	0.00	N/A
	2020	632	603	95.41%	0.19	0.20	105.26%
Duct Sealing	2019	62,948	72,681	115.46%	22	24	107.19%
	2020	32,171	36,518	113.51%	10	11	106.61%
	2019	2,358	5,438	230.62%	4	1	41.03%

Ceiling Insulation	2020	20,685	47,706	230.63%	31	13	41.02%
LED Lighting	2019	13,189	17,840	135.26%	2.74	2.88	105.11%
	2020	4,528	4,751	104.92%	0.94	0.84	89.36%
Pipe Wrap	2019	76	76	100.00%	0.01	0.01	100.00%
	2020	0	0	N/A	0.00	0.00	N/A
Showerheads	2019	226	226	100.00%	0.02	0.02	100.00%
	2020	226	226	100.00%	0.02	0.02	100.00%
Smart Thermostats	2019	0	0	N/A	0.00	0.00	N/A
	2020	2,059	2,059	100.00%	0.00	0.00	N/A
2019 Subtotal:	**2019**	**86,873**	**109,832**	**126.43%**	**31.10**	**34.25**	**110.13%**
2020 Subtotal:	**2020**	**61,686**	**93,518**	**151.60%**	**42.42**	**25.12**	**59.22%**
Overall Total:	**PY9**	**148,559**	**203,350**	**136.88%**	**73.52**	**59.37**	**80.75%**

Table 4-17 present overall realization by territory and by year, and Table 4-18 by year only.

Table 4-17 Realization by Territory and Year

Utility	*Year*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*	*Expected kW Savings*	*Verified kW Savings*	*kW Realization Rate*
New Orleans	2019	1,191,024	1,581,622	132.80%	554.41	434.59	78.39%
	2020	408,215	524,162	128.40%	175.29	126.38	72.10%
ENO Subtotal	**Both**	**1,599,239**	**2,105,784**	**131.67%**	**729.70**	**560.97**	**76.88%**
Algiers	2019	86,873	109,832	126.43%	31.10	34.25	110.13%
	2020	61,686	93,518	151.60%	42.42	25.12	59.22%
Algiers Subtotal	**Both**	**148,559**	**203,350**	**136.88%**	**73.52**	**59.37**	**80.75%**
Overall Total	**Both**	**1,747,798**	**2,309,134**	**132.12%**	**803.22**	**620.34**	**77.23%**

Table 4-18 Realization by Year

Year	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*	*Expected kW Savings*	*Verified kW Savings*	*kW Realization Rate*
2019	1,277,897	1,691,454	132.36%	585.51	468.84	80.07%
2020	469,901	617,680	131.45%	217.71	151.50	69.59%
Total	**1,747,798**	**2,309,134**	**132.12%**	**803.22**	**620.34**	**77.23%**

4.5 Net Savings Results

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

Table 4-19 and Table 4-20 summarize the program net kWh savings and peak kW demand reduction impacts of the LIA&Wx Program.

Table 4-19 LIA&Wx Summary of Verified Net Savings by Utility and Year

Utility	*Year*	*Verified Net kWh Savings*	*Verified Net kW Reductions*
New Orleans	2019	1,581,622	434.59
	2020	524,162	126.38
ENO Subtotal	**Both**	**2,105,784**	**560.97**
Algiers	2019	109,832	34.25
	2020	93,518	25.12
Algiers	**Both**	**203,350**	**59.37**
Overall Total	**Both**	**2,309,134**	**620.34**

Table 4-20 LIA&Wx Summary of Verified Net Peak Demand Reductions by Year

Year	*Verified Net kWh Savings*	*Verified Net kW Reductions*
2019	1,691,454	468.84
2020	617,680	151.50
Total	**2,309,134**	**620.34**

4.6 Process Evaluation Findings

4.6.1 Summary of Program Participation

Table 4-21 summarizes program activity. As shown, 73% of customers received direct install measures and 50% received major measures. Thirty percent of customers received both direct install and major measures.

The tracking data indicated that 79% of customers received an assessment. This is likely an undercount reflecting incomplete data since the program design is such that participation begins with an assessment.

Table 4-21 Share of Customers Receiving Measures and Assessments

Number of Participants	Percent Receiving Direct Install Measures	Percent Receiving Major Measures	Percent Receiving Direct Install and Major Measures	Percent Receiving an Assessment	Average Expected Savings per Participant
949	73%	50%	30%	79%	1,842

As shown in Table 4-22, insulation and duct sealing accounted for most of the program savings. The incentive dollars per kWh saved for direct install measures is shown as 0 because incentive dollars were not recorded with project records.

Table 4-22 Summary of Measures Installed

Measure	Expected kWh Savings	Incentives Paid	Number of Participants[19]	Percent of Expected Savings	Incentive Dollars per kWh Saved
Insulation	254,228	$91,877	80	15%	$0.36
Duct sealing	1,020,907	$373,689	386	58%	$0.37
Lighting	222,426	$0	618	13%	$0.00
Smart thermostat	45,976	$33,500	119	3%	$0.73
AC tune-up	172,571	$27,175	168	10%	$0.16
Showerhead	15,368	$0	51	1%	$0.00
Air sealing	11,820	$1,930	29	1%	$0.16
Faucet aerator	707	$0	17	<1%	$0.00
Programable thermostat	1,402	$160	2	<1%	$0.11
Pipe wrap	2,394	$0	16	<1%	$0.00

Note: Program data did not include the incentive cost of the direct install measures.

4.7 Key Findings and Conclusions

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

- **All savings goals were exceeded.** The program exceeded all goals, achieving 137.9% of kWh goals and 202.6% of kW goals.
- **Duct Sealing and Insulation accounted for most of the expected kWh savings.** Seventy-three percent of the expected savings came from duct sealing and insulation.

4.8 Recommendations

The Evaluators' recommendations are as follows:

[19] Individual homes receiving each measure, not total number of each measure implemented through the PY9 program.

- **Consider exploring partnership opportunities with local health authorities (LHA) to expand reach and cultivate unique funding streams as a way to enhance low income program offerings.** Weatherization programs that target low-income residents have additional non-energy benefits, like improving indoor air quality and reducing the burden of chronic conditions (e.g., COPD and asthma). Partnering with LHAs may result in new funding streams and identify new customers to expand the reach and impact of the program.
- **Adjust Duct Sealing savings algorithms' PreDL from 35% to 40%.** Current savings assumed a 35% Pre DL adjustment, though the New Orleans TRM 2.0 and the AR TRM specify 40% instead. Engineering calculations show that the interior temperature in those settings that exceed 40 percent total leakage would be above the thermally acceptable comfort levels published by ASHRAE in its 2009 *Fundamentals* publication.
- **Remove Programmable Thermostats from measure offerings** Programmable thermostats are not included in the New Orleans TRM 2.0, nor are they included in the Arkansas TRM as they are outdated technology for the residential sector. Without an appropriate measure study, the savings are speculative and unreliable, and measure studies have historically found that the savings are highly-dependent upon idiosyncratic program factors such as installation quality by the trade ally and preexisting customer behavior surrounding the management of their thermostat, with there being a possible risk of increased energy use if participants have low home occupancy.

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. Multifamily tenants who meet requirements for the Low Income Weatherization program are assessed through that channel instead of the traditional Multifamily channel.

Records indicated a total of 542[20] dwellings participated in the Multifamily program, with one educational housing facility accounting for 294 dwellings. 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	***Count of Measures Distributed***	***Expected kWh Savings***	***Expected kW Savings***	***Percent of kWh Contribution***
AC Tune up	208	130,744	46.50	10.30%
Aerator	154	6,648	0.69	0.52%
Air Sealing	35	41,386	12.20	3.26%
Duct Sealing	224	686,520	154.74	54.10%
Insulation	6	19,184	28.56	1.51%
LED Lighting	6,671	170,948	35.44	13.47%
Pipe Wrap	1	12,689	1.44	1.00%
Showerhead	278	62,828	6.53	4.95%
Smart Thermostat	10	3,431	0.00	0.27%

[20] This total does not equal the sum of the "Number of Homes" column in **Error! Reference source not found.**, Table 3-1 Summary of Measures and Expected Savings – New Orleans and **Error! Reference source not found.** due to individual residences receiving multiple measures.

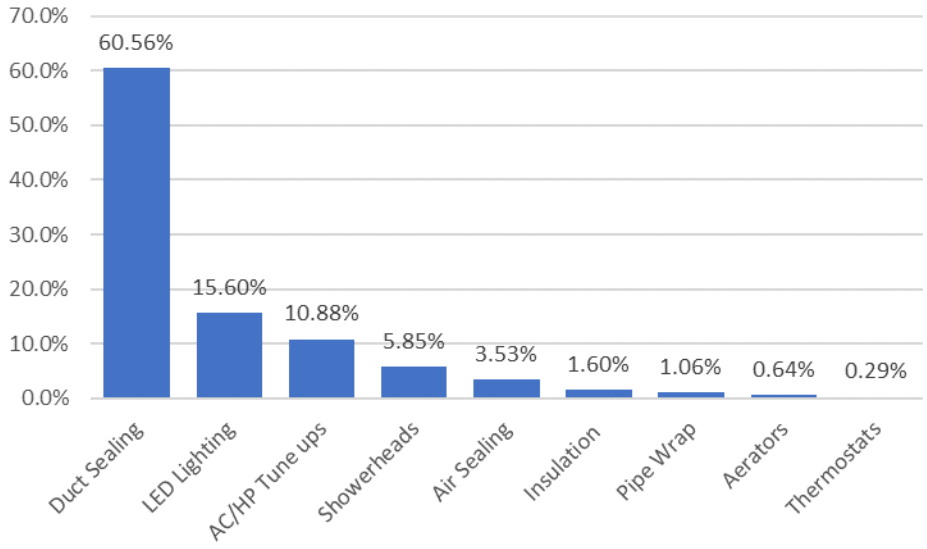
Thermostat prog	192	134,636	0.00	10.61%
Total:	**7,779**	**1,269,013**	**286.10**	

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

Measure	***Count of Measures Distributed***	***Expected kWh Savings***	***Expected kW Savings***	***Percent of kWh Contribution***
Aerator	35	1,087	0.11	1.80%
Air Sealing	2	1,064	0.31	1.77%
Duct Sealing	22	41,423	9.16	68.73%
LED Lighting	339	8,537	1.77	14.16%
Showerhead	33	7,458	0.78	12.37%
Thermostat prog	1	701	0.00	1.16%
Total:	**432**	**60,270**	**12.14**	

Below, Figure 5-1 illustrates overall program contribution my measure.

Figure 5-1 Contribution by Measure



In PY8, 504 projects summing to 836,131 kWh were completed during a normal 12-month period (a regular, full program year). In PY9, there were 542 projects summing to 1,329,282 kWh were completed during an extended 15-month period. Normalizing these figures to a 12-month program year for an 'apples-to-apples' comparison yields an expected 506 projects summing to 1,244,470 kWh, a 48.8% increase overall. While the number of participants decreased by 31.2% overall, per-project savings increased by 116.5%.[21]

[21] These are in comparison to the 2019 calendar year.

Table 5-3 Program Year Comparison

PY	# Participants	Expected kWh	Expected kWh per Home
PY7 (nominal)	261	343,424	1,316
PY7 (adjusted)	348	457,898	1,316
PY8	504	836,131	1,659
PY9 (total)	542	1,329,282	2,453
PY9 (calendar)	506	1,244,470	2,459

Below, Figure 5-2 illustrates the differences in program kWh savings contributions between PY8 and PY9.

Figure 5-2 PY8 and PY9 Measure Contribution Comparison

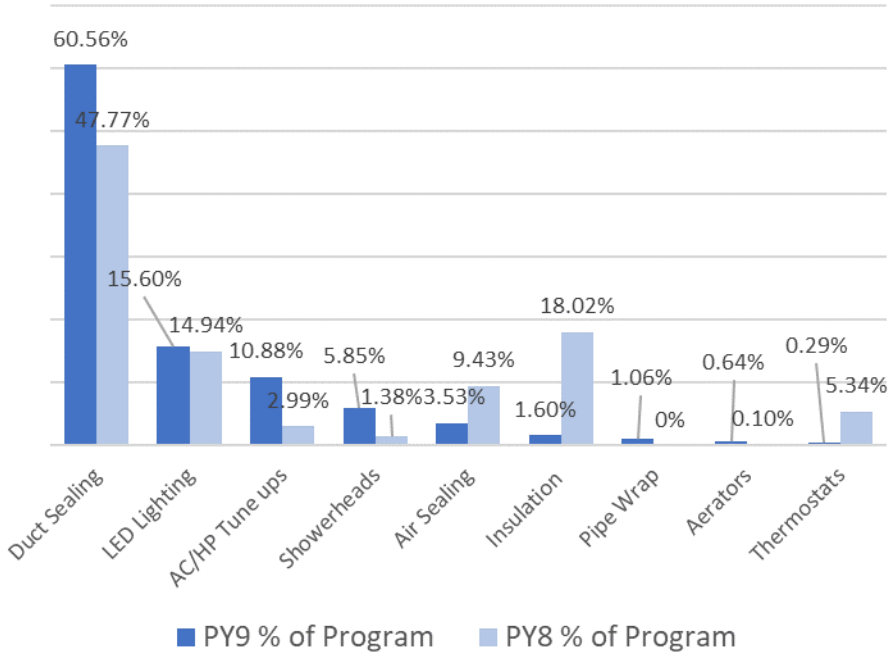
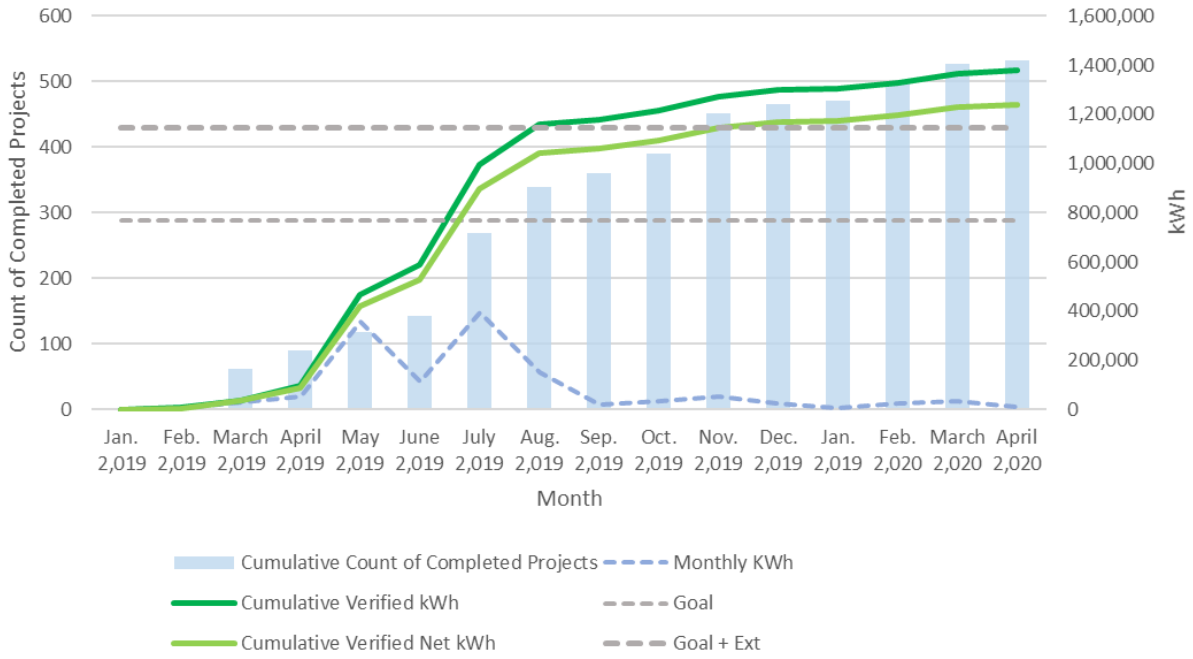


Figure 5-3 Program Performance Over Time



5.1.1 Goal Achievement

Total verified savings and percentage of goals for the Multifamily Program are summarized in Table 5-4.

Table 5-4 Multifamily Summary of Goal Achievement

Utility	*Year*	*kWh Goal*	*Verified kWh Savings*	*Percent of kWh Goal Met*	*kW Goal*	*Verified kW Reductions*	*Percent of kW Goal Met*
New Orleans	2019	717,509	1,220,182	170.06%	138.03	318.84	230.99%
	2020	350,000	95,452	27.27%			
ENO Subtotal	**Both**	**1,067,509**	**1,315,634**	**123.24%**	**138.03**	**318.84**	**230.99%**
Algiers	2019	53,717	64,299	119.70%	10.30	13.66	132.62%
	2020	23,000	4,215	18.33%			
Algiers	**Both**	**76,717**	**68,514**	**89.31%**	**10.30**	**13.66**	**132.62%**
Overall Total	**Both**	**1,144,226**	**1,384,148**	**120.97%**	**148.33**	**332.5**	**224.16%**

While extension (2020) goals were not met in either territory, the program exceeded 2019 kWh goals, reaching 170.1% and 119.7% for the New Orleans and Algiers territories, respectively. Overall goal achievement was 120.97%. The program surpassed both kW goals were exceeded, resulting in 224.6% achievement overall.

5.2 Impact Savings Calculation Methodology

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

5.3 Verified Savings by Measure

5.3.1 AC/HP Tune-Ups

Details about M&V Impact methodologies for MF Tune-Ups are the same as described for HPwES, described in section 3.3.2.

Table 5-5 Expected and Verified AC/HP Tune-Up Savings – New Orleans

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
AC Tune-Up	130,744	183,000	139.97%	46.50	82.55	177.53%
Total	**130,744**	**183,000**	**139.97%**	**46.50**	**82.55**	**177.53%**

There were no tune-up projects in the Algiers territory.

Verified savings were calculated using TRM algorithms. Where data was insufficient to perform the full calculation (47 projects), deemed savings estimates were used.

5.3.2 Infiltration/Air Sealing Savings

Details about M&V Impact methodologies for Multifamily Air Infiltration are the same as described for HPwES, section 3.3.2.

Table 5-6 Expected and Verified Air Sealing Savings – New Orleans

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Electric Resistance	41,386	39,830	96.24%	12.20	12.99	106.51%
Total	**41,386**	**39,830**	**96.24%**	**12.20**	**12.99**	**106.51%**

Table 5-7 Expected and Verified Air Sealing Savings – Algiers

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Electric Resistance	1,064	993	93.33%	0.31	0.32	103.16%
Total	**1,064**	**993**	**93.33%**	**0.31**	**0.32**	**103.16%**

5.3.3 Duct Sealing Savings

Details about M&V Impact methodologies for Multifamily Duct Sealing are the same as described for HPwES, section 3.3.3.

Table 5-8 Expected and Verified Duct Sealing Savings – New Orleans

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	56,081	63,385	113.02%	26.81	29.81	111.22%
Electric Resistance	630,439	733,754	116.39%	127.93	146.47	114.49%
Total	**686,520**	**797,139**	**116.11%**	**154.74**	**176.28**	**113.92%**

Table 5-9 Expected and Verified Duct Sealing Savings – Algiers

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	2,750	3,891	141.49%	1.31	1.83	140.24%
Electric Resistance	38,673	46,531	120.32%	7.85	9.29	118.36%
Total	**41,423**	**50,422**	**121.72%**	**9.16**	**11.12**	**121.35%**

The Evaluators determined that ex ante calculations applied a maximum pre-retrofit leakage rate of 35% of total fan flow adjustment, instead of 40%, as specified in the NOLA TRM 2.0. This adjustment raised verified kWh savings by an average of 14.6%. Applying the adjustment from historic field testing raised the average realization by an additional 1.9%.

5.3.4 Ceiling Insulation Savings

Methods for calculating he deemed savings values for ceiling insulation came from the New Orleans TRM 2.0, section C.4.2. Ceiling Insulation, as well as section 3.3.3. of this report.

Table 5-10 Expected and Verified Ceiling Insulation Savings – New Orleans

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Electric Resistance	19,184	44,617	230.32%	28.56	11.99	41.63%
Total	**19,184**	**44,617**	**230.32%**	**28.56**	**11.99**	**41.63%**

There were no insulation projects in the Algiers territory during PY9.

The Evaluators were unable to replicate ex ante calculations, as all projects seemed to be based on kWh/Sq Ft. multipliers that do not appear in the TRM 2.0. All projects were in homes with electric resistance heating. While these projects should have assumed a

5.9291 kWh/sq ft savings for R0 – R4 insulation, or 3.1249 kWh/sq ft savings for R5 – R8 insulation, five out of six program projects assumed a multiplier of approximately 2.62 kWh/sq ft and an additional project used 2.278. The kW realization is low for similar reasons: the majority of reductions should have been calculated using a 0.0005 multiplier, but five projects used 0.0039 and one used 0.0034 instead.

5.3.5 LED Lighting Savings

The savings resulting from applying TRM algorithms and deemed savings parameters are summarized in HPwES, section 3.3.3.

Table 5-11 Expected and Verified LED Savings – New Orleans

Lamp Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
LED A-lamp	114,748	107,837	93.98%	23.79	16.77	70.47%
LED Directional	4,411	4,500	102.03%	0.92	1.01	110.32%
LED Specialty	16,396	16,279	99.29%	3.40	2.53	74.45%
Total	**135,555**	**128,616**	**94.88%**	**28.11**	**20.31**	**72.25%**

Table 5-12 Expected and Verified LED Savings - Algiers

Lamp Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
LED A-lamp	5,238	5,173	98.77%	1.09	0.80	74.08%
LED Directional	-	-	N/A	-	-	N/A
LED Specialty	1,174	1,255	106.93%	0.24	0.20	80.28%
Total	**6,412**	**6,429**	**100.26%**	**1.33**	**1.00**	**75.21%**

LED savings were calculated using actual home heating types specific to residence the lamps were installed in. Calculating savings using interactive factors for 'unknown' spaces the overall realization rates are 100.46% for kWh and 76.2% for kW.

5.3.6 Programmable Thermostats

Programmable thermostats are not included in the New Orleans TRM 2.0, nor are they included in the Arkansas TRM as they are outdated technology for the residential sector. Without an appropriate measure study, the savings are speculative and unreliable, and measure studies have historically found that the savings are highly-dependent upon idiosyncratic program factors such as installation quality by the trade ally and preexisting customer behavior surrounding the management of their thermostat, with there being a possible risk of increased energy use if participants have low home occupancy. In the PY8 report the Evaluators specific that these devices be removed from program offerings.

There are no verified savings or peak kW reductions for this measure.

5.4 Verified Gross Savings

Verified savings is presented by program channel in Table 5-13 and Table 5-14.

Table 5-13 Gross Realization Summary – New Orleans

Measure	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
AC/HP Tune ups	2019	130,743	183,000	139.97%	46.48	82.55	177.60%
	2020	-	-	N/A	-	-	N/A
Aerators	2019	6,621	6,625	100.06%	0.69	0.69	100.00%
	2020	27	27	100.00%	0.00	0.00	#DIV/0!
Air Sealing	2019	21,159	20,239	95.65%	6.24	6.60	105.77%
	2020	20,227	19,591	96.86%	5.96	6.39	107.21%
Duct Sealing	2019	640,930	742,030	115.77%	140.81	159.56	113.32%
	2020	45,590	55,109	120.88%	13.93	16.72	120.03%
Ceiling Insulation	2019	14,992	35,130	234.32%	22.32	9.43	42.25%
	2020	4,192	9,487	226.31%	6.24	2.56	41.03%
LED Lighting	2019	163,872	157,789	96.29%	33.98	25.17	74.07%
	2020	7,076	7,698	108.79%	1.47	1.20	81.63%
Pipe Wrap	2019	12,689	12,689	100.00%	1.44	1.44	100.00%
	2020	0	0	N/A	0.00	0.00	N/A
Showerheads	2019	62,376	62,337	99.94%	6.49	6.48	99.85%
	2020	452	452	100.00%	0.05	0.05	100.00%
Programmable Thermostats	2019	134636	0	0.00%	0.00	0.00	N/A
	2020	-	-	N/A	-	-	N/A
Smart Thermostats	2019	343	343	100.00%	0.00	0.00	N/A
	2020	3,088	3,088	100.00%	0.00	0.00	N/A
2019 Subtotal:	**2019**	**1,188,361**	**1,220,182**	**102.68%**	**258.45**	**291.92**	**112.95%**
2020 Subtotal:	**2020**	**80,652**	**95,452**	**118.35%**	**27.65**	**26.92**	**97.36%**
Overall Total:	**PY9**	**1,269,013**	**1,315,634**	**103.67%**	**286.10**	**318.84**	**111.44%**

Table 5-14 Gross Realization Summary – Algiers

Measure	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
Aerators	2019	1,087	1,088	100.09%	0.11	0.11	100.00%
	2020	-	-	N/A	-	-	N/A
Air Sealing	2019	389	354	91.00%	0.12	0.12	100.00%
	2020	675	639	94.67%	0.20	0.21	105.00%
Duct Sealing	2019	37,936	46,846	123.49%	8.45	10.40	123.08%
	2020	3,487	3,576	102.55%	0.71	0.71	100.00%
LED Lighting	2019	8,537	8,558	100.25%	1.77	1.33	75.14%

	2020	-	-	N/A	-	-	N/A
Showerheads	2019	7,458	7,453	99.93%	0.78	0.78	100.00%
	2020	-	-	N/A	-	-	N/A
Programmable Thermostats	2019	701	0	0	0.00	0.00	#DIV/0!
	2020	-	-	N/A	-	-	N/A
2019 Subtotal:	**2019**	**56,108**	**64,299**	**114.60%**	**11.23**	**12.74**	**113.45%**
2020 Subtotal:	**2020**	**4,162**	**4,215**	**101.27%**	**0.91**	**0.92**	**101.10%**
Overall Total:	**PY9**	**60,270**	**68,514**	**113.68%**	**12.14**	**13.66**	**112.52%**

Table 5-15 present overall realization by territory and by year, and Table 5-16 by year only.

Table 5-15 Realization by Territory and Year

Utility	*Year*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*	*Expected kW Savings*	*Verified kW Savings*	*kW Realization Rate*
New Orleans	2019	1,188,361	1,220,182	102.68%	258.45	291.92	112.95%
	2020	80,652	95,452	118.35%	27.65	26.92	97.36%
ENO Subtotal	**Both**	**1,269,013**	**1,315,634**	**103.67%**	**286.10**	**318.84**	**111.44%**
Algiers	2019	56,108	64,299	114.60%	11.23	12.74	113.45%
	2020	4,162	4,215	101.27%	0.91	0.92	101.10%
Algiers Subtotal	**Both**	**60,270**	**68,514**	**113.68%**	**12.14**	**13.66**	**112.52%**
Overall Total	**Both**	**1,329,283**	**1,384,148**	**104.13%**	**298.24**	**332.50**	**111.49%**

Table 5-16 Realization by Year

Year	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*	*Expected kW Savings*	*Verified kW Savings*	*kW Realization Rate*
2019	1,244,469	1,284,481	103.22%	269.68	304.66	112.97%
2020	84,814	99,667	117.51%	28.56	27.84	97.48%
Total	**1,329,283**	**1,384,148**	**104.13%**	**298.24**	**332.5**	**111.49%**

5.5 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.

For the multifamily program, the Evaluator developed estimates of net savings using a combination of deemed values based on the PY8 results and survey data collected as part of the PY9 evaluation. Specifically, the Evaluator used PY8 values in cases when the project decision maker completed a project for a single unit. Net savings were estimated for participants that completed projects at multiple units. In the latter of two cases, most of the decision makers completed projects in 2 to 5 living units, but in one case the

decision maker completed a project at a large complex. The methodology used to calculate the net savings from the survey responses for these projects is described in detail in 2.2.3.

5.6 Net Savings Results

Surveys were completed with seven participant decision makers who completed projects in multiple units. One of the surveys was with a decision maker that implemented measures at a large complex. The other six surveys were implemented at properties with 2 to 3 units. None of the respondents were found to be free riders or to have implemented spillover measures and a net-to-gross ratio of 1.0 was applied to projects with multiple units.

For all other projects, PY8 net-to-gross ratios applied. Specifically, the free ridership values applied are summarized in Table 5-17.

Table 5-17 Deemed NTG Ratios based On PY8 Evaluation Findings

Measure Type	NTG Ratio (kWh)	NTG Ratio (kW)
Major Measure	98%	97%
Direct Install	57%	55%

Table 5-18 and Table 5-19 summarize the program net kWh savings and peak kW demand reduction impacts of the Multifamily Program.

Table 5-18 Multifamily Summary of Verified Net Savings by Territory and Year

Utility	Year	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	2019	1,220,182	125,558	1,094,624	89.71%	291.92	22.95	268.97	92.14%
	2020	95,452	5,550	89,902	94.19%	26.92	1.34	25.58	95.02%
ENO Subtotal	**Both**	**1,315,634**	**131,108**	**1,184,526**	**90.03%**	**318.84**	**24.29**	**294.55**	**92.38%**
Algiers	2019	64,299	8,432	55,867	86.89%	12.74	1.31	11.43	89.72%
	2020	4,215	98	4,117	97.67%	0.92	0.03	0.89	96.74%
Algiers	**Both**	**68,514**	**8,530**	**59,984**	**87.55%**	**13.66**	**1.34**	**12.32**	**90.19%**
Overall	**Both**	**1,384,148**	**139,638**	**1,244,510**	**89.91%**	**332.50**	**25.63**	**306.87**	**92.29%**

Net to gross ratios in above tables represent overall ratios, accounting for both major and DI measures. Individually, major measure NTG is 97.66% and DI is 57.16%. The overall kWh NTGR is 89.9% and the over kW NTGR is 92.3%. Net kWh savings totaled to 1,244,510 kWh and net kW reductions totaled 306.87 kW.

Table 5-19 Multifamily Summary of Verified Net Savings by Year

Year	Verified Net kWh Savings	Verified Net kW Reductions
2019	1,150,491	280.40
2020	94,019	26.47
Total	**1,244,510**	**306.87**

5.7 Process Evaluation Findings

5.7.1 Summary of Program Participation

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

Table 5-20 summarizes the program activity. As shown, 361 customers received program services – 68% received direct install measures and 32% installed major measures. Twenty-seven percent of customers received direct install and major measures.

Table 5-20 Share of Customers Receiving Measures and Assessments

Number of Participants	Percent Receiving Direct Install Measures	Percent Receiving Major Measures	Percent Receiving Direct Install and Major Measures	Percent Receiving an Assessment	Average Expected Savings per Participant
361[22]	68%	32%	27%	0%	3,330

Duct sealing accounted for about one-half of program savings (Table 5-21) and was the major measure most commonly implemented.

Table 5-21 Summary of Measures Installed

Measure	Expected kWh Savings	Incentives Paid	Number of Participants	Percent of Expected Savings	Incentive Dollars per kWh Saved
Duct Sealing	727,943	$89,903	237	61%	$0.004
LED Lighting	187,510	$0	173	16%	$0.00
AC Tune Ups	130,744	$26,000	180	11%	$0.20
Showerheads	70,286	$0	29	6%	$0.00
Air Sealing	42,450	$16,678	37	4%	$0.39
Insulation	19,184	$2,929	6	2%	$0.15
Pipe Wrap	12688.7	0	1	1%	$0.00
Aerators	7734.3	$0	36	1%	$0.00

[22] Unique addresses appearing in program tracking data.

Smart Thermostats	3,431	$2,500	9	<1%	$0.73

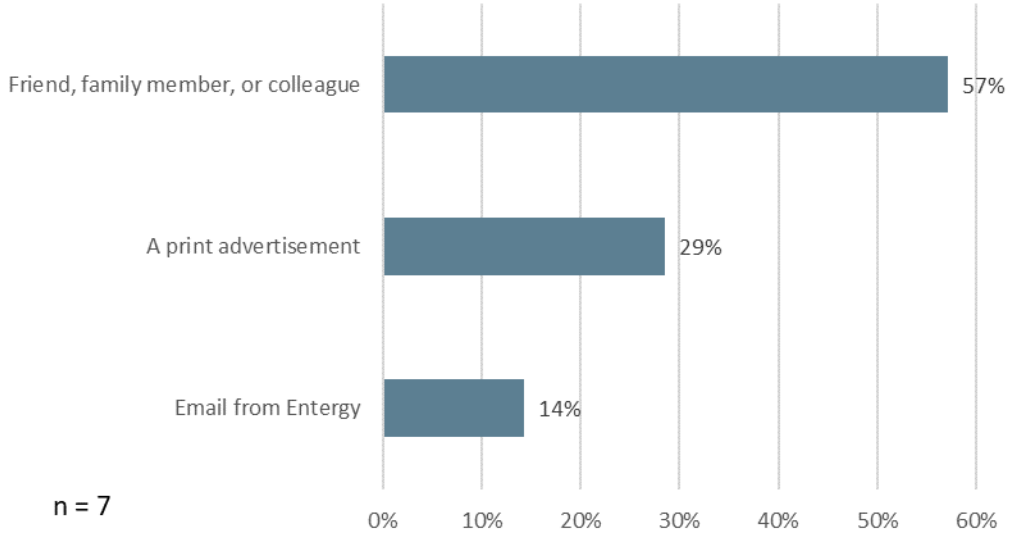
5.7.2 Participant Feedback

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

5.7.2.1 How Customers Learned of the Program

The most common reported source of awareness was word-of-mouth (learning through a friend, family member, or colleague). Other reported sources of awareness included a print advertisement (29%) and an email from Entergy (14%). Figure 5-4 summarizes how participants learned of the program.

Figure 5-4 Sources of Program Awareness



5.7.2.2 Motivations for Participating

The main motivation for completing the efficiency improvements were to reduce property utility bills. Eighty-six percent of respondents stated that their main motivation for deciding to complete the efficiency improvements at the property were due to this reason. Other common reasons were to improve tenant comfort and satisfaction (57%), reduce tenant utility bills (57%), and to take advantage of rebates/no-cost efficiency improvements (57%). Results are summarized in **Error! Reference source not found.**.

Table 5-22 Motivations for Participating

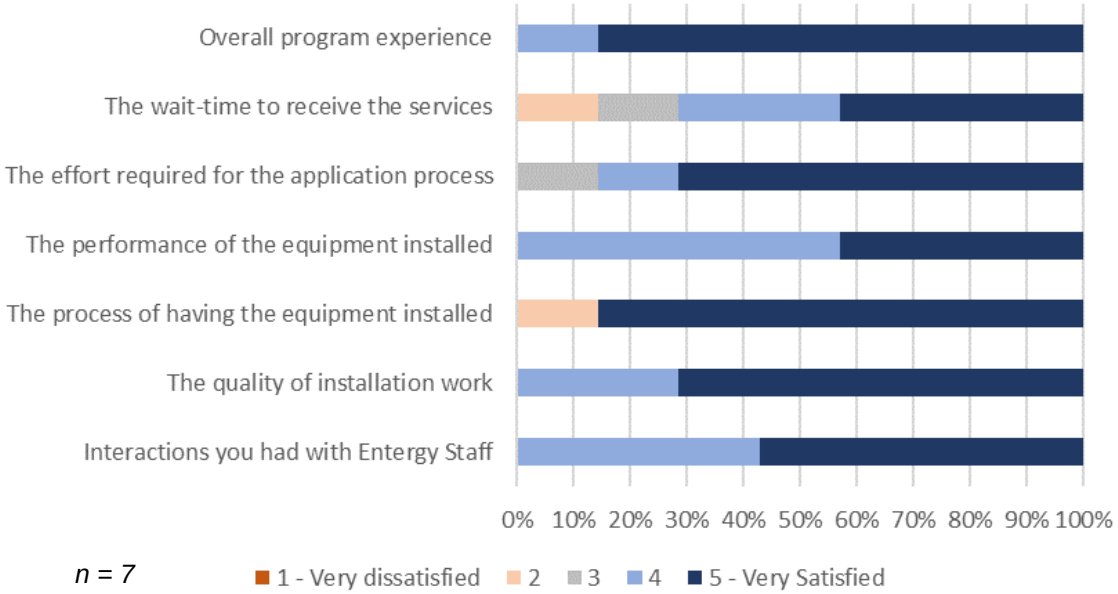
Responses	***Percent of Respondents (n = 7)***
Improve tenant comfort and satisfaction	57%

Reduce tenant utility bills	57%
Reduce property utility bills	86%
To take advantage of rebates/no-cost efficiency improvements	57%
To replace old or non -functioning equipment	29%
To make units more attractive to prospective tenants	14%
*The sum of responses is greater than 100% because respondents were able to select more than one response.	

5.7.2.3 Participant Satisfaction

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

Figure 5-5 Participant Satisfaction



5.7.2.4 Property Characteristics

The majority of the properties were built before the 1970s. Seventy-one percent of respondents reported that their property was built before the 1970s, and 14% reported that the property was built in the 1970s. Fourteen percent reported that the property was built between 2000-2009. Results are summarized in Table 5-23.

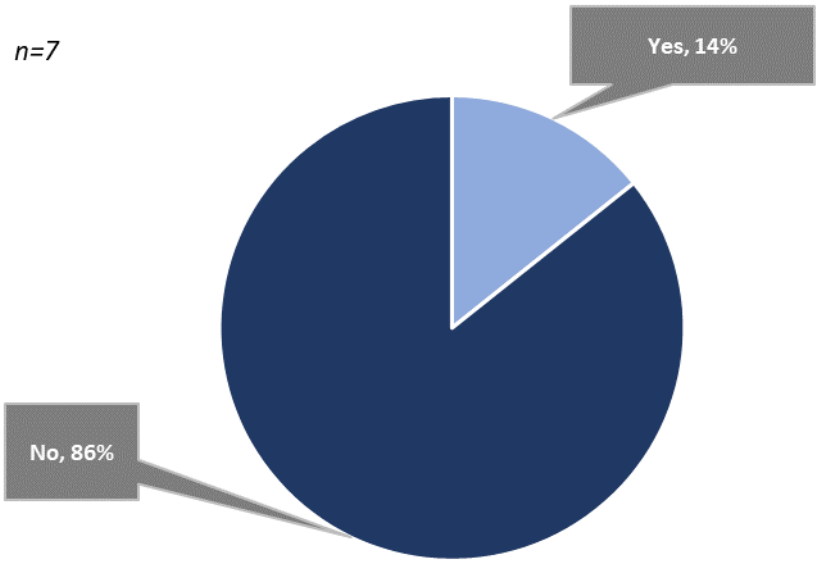
Table 5-23 Year Built

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

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

The majority of the units in the properties are not receiving any type of federal, state or other housing assistance. Eighty-six percent of respondents stated their units at the property do not receive housing assistance while 14% of respondents stated that some of the units are receiving housing assistance. Results are summarized in Figure 5-6.

Figure 5-6Table 5-23 Received Housing Assistance



5.8 Key Findings and Conclusions

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

- **The program surpassed its overall goals.** While extension (2020) goals were not met in either territory, the program exceeded 2019 kWh goals, reaching 165.2% and 115.7% for the New Orleans and Algiers territories, respectively.

Overall goal achievement was 117.7%. The program surpassed both kW goals were exceeded, resulting in 220.4% achievement overall.

- **The program included a large complex in PY9.** In PY8, most projects were completed at duplexes and triplexes, but the program has focused expanding the participation of larger complexes in PY9. As of the time of the interview, the program completed a project at a large complex of a mix of multifamily and single-family homes. Implementation staff indicated they are seeking to evolve this program to focus on buildings of five or more units.
- **Council resolution allowed Entergy to receive whole-building data for use in benchmarking to develop energy efficiency projects.** Multifamily benchmarking data will be released to identify potential energy efficiency projects. The program created an energy advisor role to help drive these projects. After a building receives a portfolio manager score, the energy advisor will work closely with the owner to identify and implement projects.
- **Participants satisfaction was high.** All of the survey respondents reported that they were satisfied with the program overall.

5.9 Recommendations

The Evaluators' recommendations are as follows:

- **Identify new program-qualifying measures to target past multifamily participants.** Implementation staff stated that many of the multifamily complexes received measures through the program when CLEAResult was the implementer, but there may be additional measures that could now be available. Outreach to past participants should frame the program as promoting relationship building between customer and utility.
- **Adjust Duct Sealing savings algorithms' PreDL from 35% to 40%.** Current savings assumed a 35% PreDL adjustment, though the New Orleans TRM 2.0 and the AR TRM specify 40% instead. Engineering calculations show that the interior temperature in those settings that exceed 40 percent total leakage would be above the thermally acceptable comfort levels published by ASHRAE in its 2009 *Fundamentals* publication.
- **Remove Programmable Thermostats from measure offerings** Programmable thermostats are not included in the New Orleans TRM 2.0, nor are they included in the Arkansas TRM as they are outdated technology for the residential sector. Without an appropriate measure study, the savings are speculative and unreliable, and measure studies have historically found that the savings are highly-dependent upon idiosyncratic program factors such as installation quality by the trade ally and preexisting customer behavior surrounding the management of their thermostat,

with there being a possible risk of increased energy use if participants have low home occupancy.

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 place of incandescent 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

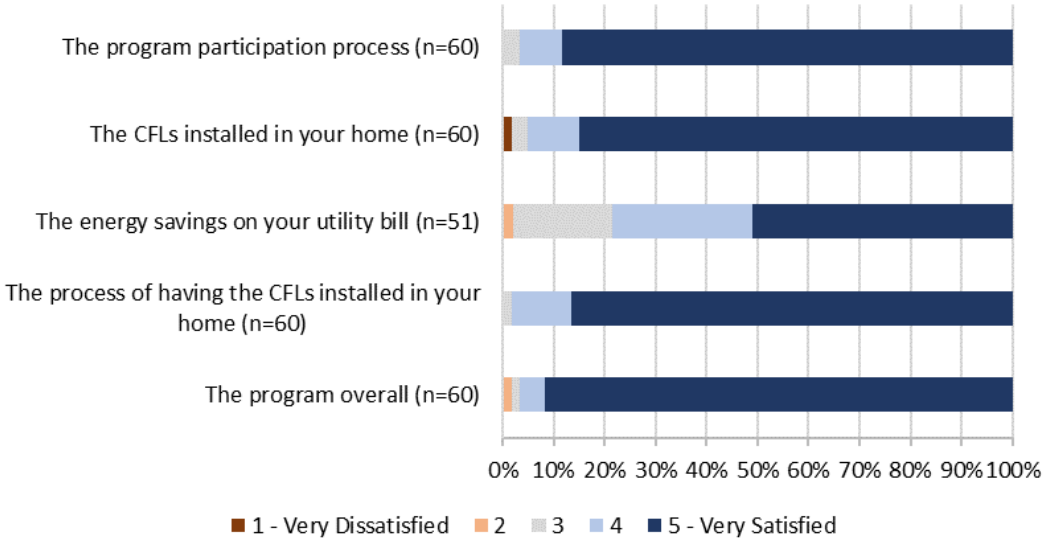
The GLDI Program has received comprehensive impact and process evaluations in PY5 and PY6.The evaluations provided estimates of in-service rates for installed lighting, benchmarks against other direct install programs, and strategic recommendations for program improvement. In the initial review of the PY9 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 PY9, the program provided 44,706 expected kWh savings, comprising 0.08% of the Energy Smart portfolio. In comparison, in PY9 the program was 0.26% of portfolio savings.

Coverage of program measures in New Orleans TRM 2.0. Most measures installed in GLDI have deemed savings provided in the New Orleans TRM 2.0, with usage estimates based on the New Orleans lighting metering study conducted in the PY6 evaluation. The TRM 2.0 provides guidance for calculating savings for lamp types without deemed savings estimates, as discussed below.

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 PY9.

Figure 6-1 GLDI Participant Satisfaction – PY6



6.3 Expected Savings and Program Participation

In PY9, a total of 1,935 lamps were installed through the program; 1,648 in the ENO territory and 287 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***
13 Watt CFL A-Type Lamp	602	12,762	2.65
14 Watt CFL Candelabra Lamp	166	3,088	0.65
20 Watt CFL A-Type Lamp	165	3,977	0.83
23 Watt CFL A-Type Lamp	201	6,754	1.39
8.5 Watt LED A-Type Lamp	157	3,894	0.80
9 Watt CFL Candelabra Lamp	357	7,818	1.61
Total:	**1,648**	**38,292**	**7.92**

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

Measure	Total Quantity of Measures	Total Expected kWh Savings	Total Expected kW Savings
13 Watt CFL A-Type Lamp	87	1,844	0.38
14 Watt CFL Candelabra Lamp	55	1,023	0.21
20 Watt CFL A-Type Lamp	32	771	0.16
23 Watt CFL A-Type Lamp	15	504	0.10
8.5 Watt LED A-Type Lamp	43	1,066	0.22
9 Watt CFL Candelabra Lamp	55	1,205	0.25
Total	**287**	**6,414**	**1.33**

Table 6-3 below displays lamp types by service territory.

Table 6-3 Lamps by Territory and Type

Territory	Lamps	CFLs	LEDs
New Orleans	1,648	1,491	157
Algiers	287	244	43
Total	**1,935**	**1,735**	**200**

Expected program savings has continued to decrease from PY6. See Table 6-4 for comparisons.

Table 6-4 Program Year Comparisons

Year	Lamps Distributed	% LEDs	Expected kWh Savings
PY6	8,178	0.00%	136,989
PY7	4,770	28.76%	116,016
PY8	3,341	9.49%	76,840
PY9[23]	1,935	10.34%	44,706
Difference	**-42.08%**	**8.91%**	**-41.82%**

Between PY8 and PY9 the percentage of LED to CFL distribution[24] rose from 10.5% to 11.5%. In previous program years this ratio has remained constant.

The GLDI program did not have any PY9 savings goals.

6.4 Gross Impact Savings Calculation Methodology

For equipment and retrofits rebated through the PY9 GLDI Program, calculation methodologies were performed using sections C.5.1, 5.2 and 5.3 of the New Orleans TRM 2.0. Calculations used to analyze the program are described in this section.

[23] Includes 2019 and extension.
[24] #LEDs/#CFLs

6.4.1 Savings Calculations

6.4.1.1 Deemed Energy and Demand Savings

Table 6-5 ENERGY STAR® CFLs – Deemed Savings Per Lamp[25]

Minimum Lumens	*Maximum Lumens*	*Incandescent Equivalent 1st Tier EISA 2007 (Wbase)*	*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

6.4.1.2 Energy and Demand Savings Calculation

Not all wattages for lamps distributed had deemed savings, so the Evaluators calculated per-unit savings for these lamps using actual efficient wattages. Additionally, some candelabra CFLs distributed through the program are exempt from EISA. Their per unit savings was calculated the same way, using an EISA-exempt baseline. All calculations and inputs are based on the New Orleans TRM 2.0 and were conducted as follows:

$$kWhsavings = ((Wbase - Wpost)/1000) \times Hours \times ISR \times IEFE$$

$$kWsavings = ((Wbase - Wpost)/1000) \times CF \times ISR \times IEFD$$

Where,

Wbase = Baseline watts (Based on EISA standard see Table 6-6 and Table 6-7)

Wpost = Installed watts

Hours = Annual hours of use, 819.43[26]

IEFE = Energy Interactive Factor, .91

ISR = In Service Rate, the percentage of lamps installed, 0.98

CF = Summer Peak Coincidence Factor, 12.74%

IEFD = Interactive Effects Factor, 1.21

1000 = W/kW conversion

Table 6-6 Baseline Wattage for Non-Exempt Lamps

Minimum Lumens	*Maximum Lumens*	*Incandescent Equivalent (W_{base})*
310	749	29

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

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

750	1,049	43
1,050	1,489	53
1,490	2,600	72

Table 6-7 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

Verified savings are presented by measure type in Table 6-8.

Table 6-8 Verified Gross Savings by Measure

Measure	***Ex Ante kWh Savings***	***Ex Post kWh Savings***	***kWh Realization Rate***	***Ex Ante kW Savings***	***Ex Post kW Savings***	***Peak kW Realization Rate***
13 Watt CFL A-Type	14,607	15,106	103.42%	3.04	3.12	102.63%
14 Watt CFL Candelabra	4,111	4,683	113.91%	0.86	0.97	112.79%
20 Watt CFL A-Type	4,748	4,751	100.06%	0.99	0.98	98.99%
23 Watt CFL A-Type	7,258	7,734	106.56%	1.49	1.60	107.38%
8.5 Watt LED A-Type	4,960	5,042	101.65%	1.02	1.04	101.96%
9 Watt CFL Candelabra	9,023	9,333	103.44%	1.85	1.93	104.32%
Total	**44,707**	**46,649**	**104.34%**	**9.25**	**9.64**	**104.22%**

Small savings deviations are due actual wattages being used in verified savings calculations, though for deemed measures variation is likely the result of rounding differences between ex ante and ex post estimations.

Below, Table 6-8 presents overall verified gross savings both by Utility and by year. Table 6-9 presents overall gross savings by year.

Table 6-9 Verified Gross Savings by Measure

Utility	Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
New Orleans	2,019	21,583	22,516	104.32%	4.47	4.65	104.03%
	2,020	16,709	17,422	104.27%	3.45	3.60	104.35%
ENO Subtotal	**Both**	**38,292**	**39,938**	**104.30%**	**7.92**	**8.25**	**104.17%**
Algiers	2,019	2,347	2,395	102.05%	0.49	0.50	102.04%
	2,020	4,067	4,316	106.12%	0.84	0.89	105.95%
Algiers Subtotal	**Both**	**6,414**	**6,711**	**104.63%**	**1.33**	**1.39**	**104.51%**
Overall Total	**Both**	**44,706**	**46,649**	**104.35%**	**9.25**	**9.64**	**104.22%**

Table 6-10 GLDI Summary of Ex Post kWh Savings and kW Reductions by Year

Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
2,019	23,930	24,911	104.10%	4.96	5.15	103.83%
2,020	20,776	21,738	104.63%	4.29	4.49	104.66%
Total	**44,706**	**46,649**	**104.35%**	**9.25**	**9.64**	**104.22%**

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 PY9 participants.

6.6.1 Net Savings Results

Table 6-11 and Table 6-12 summarize the ex post net kWh and kW achieved through the GLDI Program, both by Utility and year.

Table 6-11 GLDI Summary of Ex Post Net kWh and kW Savings by Utility and Year

Utility	Year	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	2,019	22,516	2,252	20,264	90.00%	4.65	0.46	4.19	90.11%
	2,020	17,422	1,743	15,679	90.00%	3.60	0.36	3.24	90.00%
ENO Subtotal	**Both**	**39,938**	**3,995**	**35,943**	**90.00%**	**8.25**	**0.82**	**7.43**	**90.06%**
Algiers	2,019	2,395	239	2,156	90.02%	0.50	0.05	0.45	90.00%
	2,020	4,316	431	3,885	90.01%	0.89	0.09	0.80	89.89%
Algiers Subtotal	**Both**	**6,711**	**670**	**6,041**	**90.02%**	**1.39**	**0.14**	**1.25**	**89.93%**
Overall Total	**Both**	**46,649**	**4,665**	**41,984**	**90.00%**	**9.64**	**0.96**	**8.68**	**90.04%**

Table 6-12 GLDI Summary of Ex Post kWh Savings and kW Reductions by Year

Year	Verified Net kWh Savings	Verified Net kW Reductions
2,019	22,420	4.64
2,020	19,564	4.04
Total	**41,984**	**8.68**

Net kWh savings totaled to 41,984 kWh and equal 90.0% of gross program savings. Net kW reductions totaled 8.68kW and equal 90.0% of verified gross program savings.

6.7 Lifetime Savings

Table 6-13 and Table 6-14 present the lifetime kWh and peak kW savings attributable to lamps distributed through the PY9 GLDI program:

Table 6-13 ENO Lifetime Savings

Measure	Lifetime kWh (2019)	Lifetime kWh (2020)	Total Lifetime kWh
13 Watt CFL A-Type Lamp	44,100	17,929	62,029
14 Watt CFL Candelabra Lamp	8,911	7,344	16,255
20 Watt CFL A-Type Lamp	8,550	10,260	18,810
23 Watt CFL A-Type Lamp	24,810	26,600	51,410
8.5 Watt LED A-Type Lamp	12,598	22,102	34,700
9 Watt CFL Candelabra Lamp	31,398	25,214	56,612
Totals:	**130,367**	**109,449**	**239,816**

Table 6-14 Algiers Lifetime Savings

Measure	Lifetime kWh (2019)	Lifetime kWh (2020)	Total Lifetime kWh
13 Watt CFL A-Type Lamp	2,575	6,388	8,963
14 Watt CFL Candelabra Lamp	0	5,386	5,386
20 Watt CFL A-Type Lamp	2,850	798	3,648
23 Watt CFL A-Type Lamp	0	3,837	3,837
8.5 Watt LED A-Type Lamp	5,747	3,757	9,504
9 Watt CFL Candelabra Lamp	4,123	4,599	8,722
Totals:	**15,295**	**24,765**	**40,060**

7. Residential Lighting and Appliances

7.1 Program Description

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

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

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*
Lighting Retail Sales	62,713	7,454,868	1,551.37
Refrigerators	107	6,449	0.00
Window ACs	39	3,359	1.85
Pool Pumps	6	17,347	3.47
HPWHs	5	6,372	0.00
Total	**62,870**	**7,488,395**	**1,556.68**

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

Measure	*Total Quantity of Measures*	*Total Expected kWh Savings*	*Total Expected kW Savings*
Lighting Retail Sales	2,504	405,850	82.18
Refrigerators	16	898	0.00
Window ACs	3	204	0.15
HPWHs	1	2,371	0.00
Total	**2,524**	**409,323**	**82.33**

Stores carrying bought-down lighting grew from four stores in PY7 to 16 stores in PY8 and 21 in PY9. Between PY8 and PY9 expected kWh savings from the lighting buydown increased by 29.7%:

Table 7-3 Store Participation per Year

Store Type	***Count PY7***	***Count PY8***	***Count PY9***
Dollar Store / Discount Store	1	6	7
Membership Store	1	1	1
Big Box Retail Store	-	6	9
Big Box Construction Store	1	2	2
Hardware Store	1	1	2
Total Number of Stores	**4**	**16**	**21**
Expected Lighting kWh Savings	**548,008**[27]	**4,111,210**[28]	**7,860,718**

Table 7-4 shows the number of mail-in appliance rebate (non-lighting) participants by year.

Table 7-4 Program Year Comparison

PY	***Appliance Rebates***	***Expected kWh***	***Expected kWh per Rebate***
PY7 (nominal)	120	14,227	119
PY7	160	18,970	119
PY8	162	23,359	144
PY9 (total)	176	37,000	211
PY9 (calendar)	145	28,881	199

In PY8, 162 rebates summing to 23,359 kWh were issued during a normal 12-month period (a regular, full program year). In PY9, there were 176 rebates summing to 37,000 kWh were submitted during an extended 15-month period. Normalizing these figures to a 12-month program year for an 'apples-to-apples' comparison yields 145 rebates summing

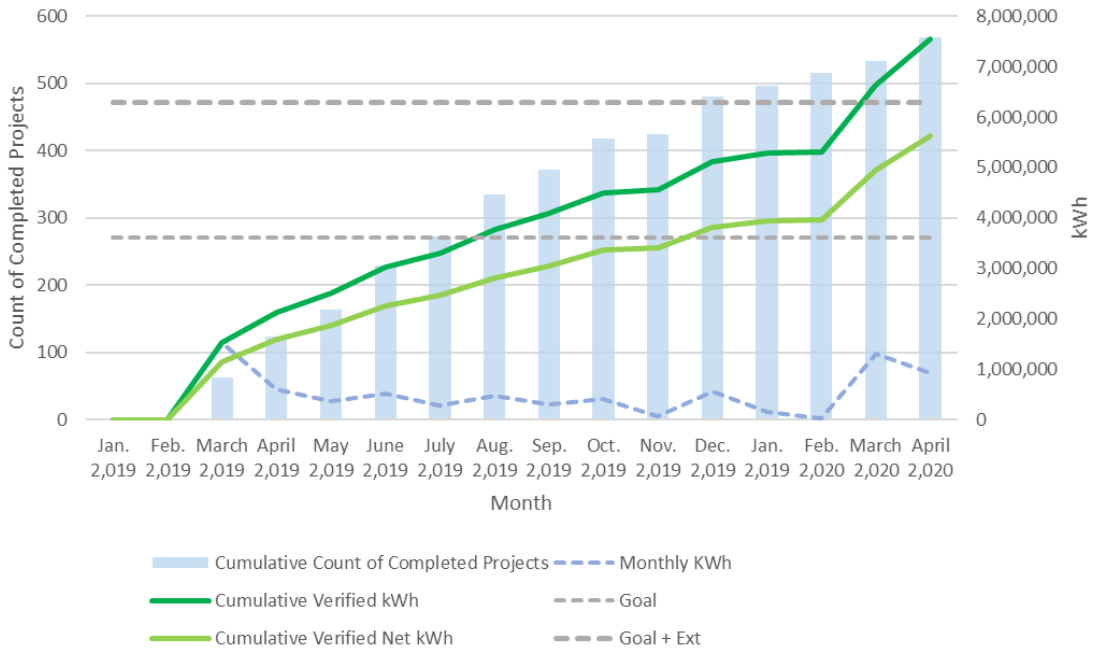
[27] 'Normalized' to full program year
[28] Does not include giveaways
[29] PY7 ran for approximately nine months only. This value is the extrapolation of existing values to a full year, allowing for a more direct comparison.

to 28,881 kWh, a 23.6% increase overall. While the number of rebates decreased by 10.5% overall, per-rebate savings increased by 38.1%.

Table 7-5 Measure Type and Count Installed by Program Year[30]

Measure	Expected kWh PY9 (full program)	Expected kWh PY9 (2019 only)	Expected kWh PY8	Expected kWh PY7 (normalized)[1]	Expected kWh PY7 (nominal)
Lighting Buydown	7,860,718	5,333,831	4,111,210	3,797,946	2,848,460
Refrigerators	7,347	6,141	5,462	4,751	3,564
Window ACs	3,563	3,004	4,445	5,569	4,176
Pool Pumps	17,347	12,164	9,300	4,960	3,720
HPWHs	8,743	7,572	4,151	3,690	2,767

Figure 7-1 Program Performance Over Time



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

7.1.1 Goal Achievement

Table 7-6 Retail Lighting and Appliances Summary of Goal Achievement

Utility	Year	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
New Orleans	2,019	3,357,145	4,871,705	145.11%	711.45	1,484.75	208.69%
	2,020	2,500,000	2,287,351	91.49%			
ENO Subtotal	**Both**	**5,857,145**	**7,159,056**	**122.23%**	**711.45**	**1,484.75**	**208.69%**
Algiers	2,019	250,986	202,803	80.80%	53.40	80.25	150.28%
	2,020	175,000	184,903	105.66%			
Algiers	**Both**	**425,986**	**387,706**	**91.01%**	**53.40**	**80.25**	**150.28%**
Overall Total	**Both**	**6,283,131**	**7,546,762**	**120.11%**	**764.85**	**1565**	**204.62%**

All overall goals were surpassed. The Program exceeded the 2019 New Orleans and 2020 Algiers kWh goals, but did not meet goals in the New Orleans 2020 or Algiers 2019 kWh goals. Both kW goals were surpassed and the Program surpassed all overall goals.

7.2 M&V Methodology

Electricity and peak demand reductions of the PY9 RLA program were estimated using the New Orleans TRM 2.0

Evaluation of the RLA Program included the following:

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

For equipment and retrofits rebated through the PY9 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 7-7. ENERGY STAR® Omnidirectional LEDs – Deemed Savings Per Lamp[31]

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

7.2.1.2 Calculated Savings

Table 7-8 ENERGY STAR® Directional LEDs – Reflector Lamps Baseline Watts[32]

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

[31] TRM Table 105, page B-138

[32] TRM Table 98, page B-131

Lamp Type (a)	Incandescent Equivalent (Pre-EISA) (b)	WattsBase (Post-EISA) (c)
PAR38	120	70
R20	≤ 45	EXEMPT
BR30	≤ 50	EXEMPT
BR40	≤ 50	EXEMPT
ER30	≤ 50	EXEMPT
ER40	≤ 50	EXEMPT

Table 7-9 ENERGY STAR® Directional LEDs –Baseline Watts for EISA-Exempt Lamps33

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

7.2.1.3 LED Buydown Savings Results

The savings resulting from applying TRM algorithms are summarized in Table 7-10 through Table 7-13.

Table 7-10 Expected and Verified LED Savings – New Orleans

Location Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Big Box Construction Store #1	881,192	851,405	96.62%	186.19	176.01	94.53%
Big Box Construction Store #2	2,382,695	2,305,189	96.75%	497.55	476.55	95.78%
Big Box Retail Store #2	141,753	131,850	93.01%	29.12	27.26	93.61%
Big Box Retail Store #3	116,508	107,190	92.00%	23.79	22.16	93.14%
Big Box Retail Store #5	155,176	143,988	92.79%	31.17	29.77	95.49%
Discount Store #2	43,081	39,801	92.39%	8.94	8.23	92.06%
Discount Store #4	27,697	26,685	96.34%	5.75	5.52	95.99%
Discount Store #5	33,984	30,447	89.59%	7.05	6.29	89.29%
Discount Store #6	34,012	32,005	94.10%	7.06	6.62	93.76%
Discount Store #7	37,871	35,249	93.08%	7.86	7.29	92.76%
Drugstore #1	17,575	17,617	100.24%	3.65	3.64	99.91%

[33] TRM Table 99, page B-IJ

Drugstore #2	9,087	9,108	100.24%	1.89	1.88	99.89%
Hardware Store	1,191,390	1,114,068	93.51%	247.12	230.31	93.20%
Membership Store	2,382,848	2,279,722	95.67%	494.25	471.17	95.33%
Totals	**7,454,868**	**7,124,323**	**95.57%**	**1,551.37**	**1,472.69**	**94.93%**

Table 7-11 Expected and Verified LED Savings – Algiers

Location Type	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*	*Expected Peak kW Savings*	*Verified Peak kW Savings*	*Peak kW Realization Rate*
Big Box Retail Store #1	233,775	213,281	91.23%	46.49	44.09	94.84%
Discount Store #3	8,635	7,408	85.79%	1.79	1.53	85.46%
Discount Store #1	1,598	1,473	92.19%	0.33	0.30	91.85%
Membership Store	161,842	161,842	100.00%	33.57	33.57	100.00%
Totals	**405,850**	**384,004**	**94.62%**	**82.18**	**79.50**	**96.73%**

Table 7-12 Expected and Verified LED Savings by Utility and Year

Utility	*Year*	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*	*Expected kW Reductions*	*Verified kW Reductions*	*kW Realization Rate*
ENO	2,019	5,113,516	4,844,959	94.75%	1,067.04	1,001.59	93.87%
	2,020	2,341,352	2,279,364	97.35%	484.32	471.10	97.27%
ENO Subtotal	**Both**	**7,454,868**	**7,124,323**	**95.57%**	**1,551.37**	**1,472.69**	**94.93%**
Algiers	2,019	220,315	199,279	90.45%	43.86	41.20	93.93%
	2,020	185,535	184,725	99.56%	38.32	38.30	99.94%
Algiers	**Both**	**405,850**	**384,004**	**94.62%**	**82.18**	**79.50**	**96.73%**
Overall Total	**Both**	**7,860,718**	**7,508,327**	**95.52%**	**1,633.55**	**1,552.19**	**95.02%**

Table 7-13 Expected and LED Verified Savings by Year

Year	*Expected kWh Savings*	*Verified kWh Savings*	*kWh Realization Rate*	*Expected kW Reductions*	*Verified kW Reductions*	*kW Realization Rate*
2,019	5,333,831	5,044,237	94.57%	1,110.90	1,042.79	93.87%
2,020	2,526,887	2,464,090	97.51%	522.65	509.40	97.47%
Both	**7,860,718**	**7,508,327**	**95.52%**	**1,633.55**	**1,552.19**	**95.02%**

Verified savings estimates are based on the tables above and Table 1-14 ENERGY STAR® Omni-Directional LEDs – EISA Baselines,[34] using actual efficient wattages of bought-down lamps.

7.2.2 Window Air Conditioner Calculations

7.2.2.1 Deemed Energy Savings

Window air conditioner savings were calculated using the following:

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

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

Where,

CAP_c = Cooling capacity (in BTU)

$CEER_{base}$ = Full-load efficiency of baseline equipment (see Table 7-14)

$CEER_{eff}$ = Full-load efficiency of baseline equipment (see Table 7-14)

$CEER_{base}$ = Seasonal efficiency of baseline equipment (see Table 7-14)

$CEER_{eff}$ = Seasonal efficiency of efficient equipment (see Table 7-14)

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

%CF = Peak Coincidence Factor, 77%

RAF = Room AC Adjustment Factor, .49[35]

Table 7-14: Window Air Conditioner – Baseline and Efficiency Levels[36]

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

[34] Page C-41.
[35] This is a factor derived from the ENERGY STAR calculator which corrects for the fact that window AC's are typically not run as often as central AC systems. This value comes from the Arkansas TRM, which developed estimates based on the ENERGY STAR Room AC calculator.
[36] Page C-70

	No	< 14,000	9.3	10.2
		≥ 14,000	8.7	9.6

Table 7-15 Window AC Realization Summary

Measure	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
New Orleans	3,359	4,176	124.34%	1.85	4.01	217.06%
Algiers	204	455	223.05%	0.15	0.44	290.24%
Total	**3,563**	**4,631**	**129.99%**	**2.00**	**4.45**	**222.58%**

Ex ante Calculations used New Orleans TRM 2.0 deemed savings values. The Evaluators used the methods described above, specifically actual efficient EERs instead of TRM deemed efficient EER values, realization rates are above 100%.

7.2.3 ENERGY STAR® Pool Pump Calculations

7.2.3.1 Deemed Energy Savings

ENERGY STAR® Pool Pump savings was calculated using the savings methodology from the New Orleans TRM 2.0, section C.1.8.5.1.

Table 7-16 Pool Pumps Realization Summary

Measure	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
New Orleans	17,347	17,348	100.0%	3.47	3.45	99.5%
New Orleans	**17,347**	**17,348**	**100.0%**	**3.47**	**3.45**	**99.5%**

The kWh realization rate is 100.0% and the kW realization rate is 99.5%. Ex ante savings were calculated using the New Orleans 2.0 deemed savings approach. The Evaluators used the calculated methodology for verified savings.

7.2.4 ENERGY STAR® Refrigerator Calculations

7.2.4.1 Deemed Energy Savings

ENERGY STAR® Refrigerator savings was calculated using the deemed savings from the New Orleans TRM 2.0, section C.1.4.1. After verifying model configurations and

features, deemed savings were assigned to each unit using TRM Table 22: Formulas to Calculate the ENERGY STAR® Refrigerator Criteria[37].

Table 7-17 ENERGY STAR® Refrigerator Realization Summary

Measure	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
New Orleans	6,449	6,837	106.02%	0.00	1.58	NA
Algiers	898	876	97.55%	0.00	0.20	NA
Total	**7,347**	**7,713**	**104.98%**	**0.00**	**1.78**	**NA**

Ex ante Calculations were not able to be replicated by the Evaluators. Verified savings calculations used the methods described above, resulting in slightly higher realization rates for New Orleans, and slightly lower realization rates for Algiers.

7.2.5 Heat Pump Water Heater Calculations

HPWH savings were calculated using the savings methodology from the New Orleans TRM 2.0, section C.2.1.5.

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

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

[37] Pages C-16 to C-19

Table 7-18 HPWH Realization Summary

Measure	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	kW Realization Rate
New Orleans	6,372	7,365	115.58%	0.00	0.65	NA
Algiers	2,371	1,234	52.06%	0.00	0.11	NA
Total	**8,743**	**8,599**	**98.35%**	**0.00**	**0.75**	**NA**

Ex ante calculations used deemed savings values from the New Orleans 2.0 TRM. For verified savings the Evaluators used the calculated methods described above, resulting in slightly lower realization rates.

7.2.5.1 Verified Gross Savings by Measure

Table 7-19 through Table 7-22 summarize the savings from the RLA Program.

Table 7-19 kWh and Peak kW Realization Summary – New Orleans

Measure	Time Period			kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
Lighting Buydown	2019	5,113,516	4,844,959	94.75%	1,067.05	1,001.59	93.87%
	2020	2,341,352	2,279,364	97.35%	484.32	471.10	97.27%
Refrigerators	2019	5,380	5,684	105.65%	0.00	1.31	N/A
	2020	1,070	1,153	107.76%	0.00	0.27	N/A
Window Acs	2019	2,846	3,697	129.90%	1.60	3.55	221.88%
	2020	512	479	93.55%	0.24	0.46	191.67%
Pool Pumps	2019	12,164	12,164	100.00%	2.48	2.47	99.60%
	2020	5,183	5,184	100.02%	0.99	0.98	98.99%
HPWHs	2019	5,201	5,201	100.00%	0.00	3.00	N/A
	2020	1,171	1,171	100.00%	0.00	0.02	N/A
2019 Subtotal:	**2019**	**5,139,107**	**4,871,705**	**94.80%**	**1,071.13**	**1,011.92**	**94.47%**
2020 Subtotal:	**2020**	**2,349,288**	**2,287,351**	**97.36%**	**485.55**	**472.83**	**97.38%**
Overall Total:	**PY9**	**7,488,395**	**7,159,056**	**95.60%**	**1,556.68**	**1,484.75**	**95.38%**

Table 7-20 kWh and Peak kW Realization Summary – Algiers

Measure	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
Lighting Buydown	2019	220,315	199,279	90.45%	43.86	41.20	93.94%
	2020	185,535	184,725	99.56%	38.32	38.30	99.95%
Refrigerators	2019	761	752	98.82%	0.00	0.17	N/A
	2020	137	124	90.51%	0.00	0.03	N/A
Window Acs	2019	158	401	253.80%	0.11	0.39	354.55%
	2020	46	54	117.39%	0.04	0.05	125.00%
HPWHs	2019	2,371	2,371	100.00%	0.00	0.11	#DIV/0!
	2020	0	0	N/A	0.00	0.00	N/A
2019 Subtotal:	**2019**	**223,605**	**202,803**	**90.70%**	**43.97**	**41.87**	**95.22%**
2020 Subtotal:	**2020**	**185,718**	**184,903**	**99.56%**	**38.36**	**38.38**	**100.05%**
Overall Total:	**PY9**	**409,323**	**387,706**	**94.72%**	**82.33**	**80.25**	**97.47%**

Table 7-21 Expected and Verified Savings by Utility and Year

Utility	Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Reductions	Verified kW Reductions	kW Realization Rate
ENO	2,019	5,139,107	4,871,705	94.80%	1,071.13	1,011.92	94.47%
	2,020	2,349,288	2,287,351	97.36%	485.55	472.83	97.38%
ENO Subtotal	**Both**	**7,488,395**	**7,159,056**	**95.60%**	**1,556.68**	**1,484.75**	**95.38%**
Algiers	2,019	223,605	202,803	90.70%	43.97	41.87	95.22%
	2,020	185,718	184,903	99.56%	38.36	38.38	100.05%
Algiers	**Both**	**409,323**	**387,706**	**94.72%**	**82.33**	**80.25**	**97.47%**
Overall Total	**Both**	**7,897,718**	**7,546,762**	**95.56%**	**1,639.01**	**1,565.00**	**95.48%**

Table 7-22 Expected and Verified Savings by Year

Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Reductions	Verified kW Reductions	kW Realization Rate
2,019	5,362,712	5,074,508	94.63%	1,115.10	1,053.79	94.50%
2,020	2,535,006	2,472,254	97.52%	523.91	511.21	97.58%
Total	**7,897,718**	**7,546,762**	**95.56%**	**1,639.01**	**1,565.00**	**95.48%**

7.3 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.

7.3.1 Lighting Component

7.3.1.1 Lighting Methodology

The Evaluators estimated NTG for upstream bulbs using a price response model, wherein a regression is developed to estimate the relationship between price and quantity sold. Program sales data are, by their nature, non-negative integer values (i.e., count data). Typical ordinary least squares (OLS) estimation procedures are designed to deal with continuous dependent variables that are normally distributed. Count data dependent variables can be adapted for OLS estimation through logarithmic or square root transformations, but these models may produce nonsensical predictions, such as negative sales. The Evaluators used a negative binomial model to account for the right-skewed relationship between prices and quantities.

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

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

Where:

ln = natural logarithm

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

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

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

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

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

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

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

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

Where:

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

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

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

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

7.3.1.2 Lighting Results

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

on program price are negative (the expected direction) and statistically significant at the 99% level.

As shown in Table 7-25, the Evaluators estimated the free-ridership rate for upstream LEDs overall to be 33.4% using the price response model. The free-ridership rate for Specialty LEDs is 66.9%, while the free-ridership rate for Omni-directional LEDs is 21.4%.

The Evaluators also performed a literature review for spillover and estimated a spillover rate of 8%[38].

Table 7-23 Results of Spillover Benchmarking Study

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

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

Table 7-24 NTGR Results by Bulb Type

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

Table 7-25 Price Response Model Results: Specialty LEDs

Coefficient	Estimate	Std Err	Statistic	P Value	90% CI Lower	90% CI Upper
(Intercept)	5.277	0.275	19.163	0.000	4.823	5.731
Program Price	-0.036	0.009	-3.930	0.000	-0.052	-0.021
Aug	-0.427	0.095	-4.508	0.000	-0.583	-0.271
Dec	-0.526	0.081	-6.457	0.000	-0.660	-0.391
Feb	-0.420	0.230	-1.825	0.068	-0.800	-0.040
Jan	-0.795	0.135	-5.865	0.000	-1.018	-0.571
July	-0.721	0.101	-7.105	0.000	-0.888	-0.553
June	-0.668	0.090	-7.400	0.000	-0.817	-0.519
Mar	0.008	0.071	0.112	0.911	-0.109	0.125

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

May	-0.558	0.098	-5.701	0.000	-0.719	-0.396
Nov	-0.582	0.166	-3.502	0.000	-0.856	-0.308
Oct	-0.621	0.094	-6.624	0.000	-0.776	-0.466
Sept	-0.556	0.103	-5.394	0.000	-0.726	-0.386
LEDspec_BA10_6[39]	1.041	0.541	1.924	0.054	0.148	1.933

Table 7-26 Price Response Model Results: Omni-directional LEDs

Coefficient	*Estimate*	*Std Err*	*Statistic*	*P Value*	*90% CI Lower*	*90% CI Upper*
(Intercept)	2.695	0.106	25.364	0.000	2.519	2.870
Program Price	-0.211	0.011	-19.889	0.000	-0.229	-0.194
Aug	-0.429	0.103	-4.167	0.000	-0.598	-0.259
Dec	-0.489	0.093	-5.261	0.000	-0.643	-0.336
Feb	-1.381	0.286	-4.837	0.000	-1.852	-0.910
Jan	-0.803	0.192	-4.177	0.000	-1.120	-0.486
July	-0.602	0.109	-5.530	0.000	-0.781	-0.422
June	-0.509	0.094	-5.426	0.000	-0.664	-0.354
Mar	-0.202	0.084	-2.411	0.016	-0.340	-0.064
May	-0.321	0.116	-2.759	0.006	-0.514	-0.129
Nov	-0.632	0.190	-3.323	0.001	-0.946	-0.318
Oct	-0.267	0.106	-2.518	0.012	-0.441	-0.092
Sept	-0.330	0.114	-2.908	0.004	-0.518	-0.143
LEDstd_A19_2[39]	0.928	0.109	8.535	0.000	0.749	1.108

7.3.2 Appliance Component

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

A literature review was performed for ENERGY STAR pool pumps and heat pump water heaters. Table 7-27 and Table 7-28 summarize the free ridership findings for these two measures. The Evaluators applied the average free ridership ratio.

Table 7-27 Free Ridership Findings for Heat Pump Water Heaters

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

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

Table 7-28 Free Ridership Findings for Pool Pumps

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

7.3.3 Net Savings Results

7.3.3.1 Lighting Component

The shape-specific NTGR in Table 7-24 were applied to verified gross savings. Results are shown below in Table 7-29.

Table 7-29 Summary of Verified Net Savings – Lighting Component

Utility	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	7,124,323	2,432,642	4,691,681	65.85%	1,472.69	502.83	969.86	65.86%
Algiers	384,004	130,441	253,563	66.03%	79.50	27.03	52.47	66.00%
Total	**7,508,327**	**2,563,083**	**4,945,244**	**65.86%**	**1,552.19**	**529.86**	**1,022.33**	**65.86%**

7.3.3.2 Appliance Component

Table 7-30 summarizes the free ridership findings for refrigerators, window air conditioners, pool pumps and HP water heaters.

Table 7-30 Summary of Free Ridership Self-Reported Net to Gross

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

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

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

total verified gross savings for survey respondents to the program gross savings. values.[40]

Table 7-31 summarizes the appliances portions of net kWh savings and peak kW demand reduction impacts of the RLA Program.

Table 7-31 Summary of Verified Net Savings – Appliance Component

Utility	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	35,726	7,927	27,799	77.81%	9.68	2.72	6.96	71.91%
Algiers	2,565	794	1,771	69.06%	0.75	0.28	0.47	62.98%
Total	**38,291**	**8,721**	**29,571**	**77.23%**	**10.43**	**3.00**	**7.43**	**71.27%**

7.3.3.3 Total Net Savings

Table 7-32 Overall Verified Net Savings and kW Reductions by Territory and Year

Utility	Year	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	2,019	4,871,705	1,533,531	3,338,174	68.52%	1,011.92	320.75	691.17	68.30%
	2,020	2,287,351	906,044	1,381,307	60.39%	472.83	187.18	285.65	60.41%
ENO Subtotal	**Both**	**7,159,056**	**2,439,575**	**4,719,481**	**65.92%**	**1,484.75**	**507.93**	**976.82**	**65.79%**
Algiers	2,019	202,803	31,542	171,261	84.45%	41.87	6.39	35.48	84.74%
	2,020	184,903	100,830	84,073	45.47%	38.38	20.93	17.45	45.47%
Algiers	**Both**	**387,706**	**132,372**	**255,334**	**65.86%**	**80.25**	**27.32**	**52.93**	**65.96%**
Overall Total	**Both**	**7,546,762**	**2,571,947**	**4,974,815**	**65.92%**	**1,565.00**	**535.25**	**1,029.75**	**65.80%**

Table 7-33 Overall Verified Net Savings and kW Reductions by Year

Year	Verified Net kWh Savings	Verified Net kW Reductions
2,019	3,509,435	726.65
2,020	1,465,380	303.10
Total	**4,974,815**	**1,029.75**

Overall net kWh savings are 4,974,815 and kW reductions are 1,029.75. These represent 65.9% of verified gross savings.

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

7.4 Process Evaluation Findings

7.4.1 Summary of Program Participation

Table 7-34 summarizes the program activity by measure type. Nearly all program savings were from midstream lighting measures.

Table 7-34 Summary of Measures Installed

Measure	*Expected kWh Savings*	*Incentives Paid*	*Number of Participants*	*Percent of Expected Savings*	*Incentive Dollars per kWh Saved*
Lighting	7,860,718	$437,083	22[41]	99.5%	$0.06
ENERGY STAR pool pump	17,347	$1,800	6	<1%	$0.10
ENERGY STAR refrigerator	7,347	$6,150	123	<1%	$0.84
ENERGY STAR window air	3,563	$2,100	36	<1%	$0.59
Heat pump water heater	8,743	$2,400	6	<1%	$0.27

7.5 Key Findings and Conclusions

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

- **Overall goals were surpassed.** The Program exceeded the 2019 New Orleans and 2020 Algiers kWh goals, but did not meet goals in the New Orleans 2020 or Algiers 2019 kWh goals. Both kW goals were surpassed and the Program
- **Five stores were added in PY9.** Among these, s drugstore chain and discount store chain signed an agreement to participate in the program. The drugstore agreement supports seasonal promotion. The discount store contract provides funding for discounts in the Algiers' territory but not in the New Orleans territory. The agreement with membership store was discontinued in the beginning of the year when staff determined that the retailer would be unable to provide the volume of lamps discounted through the agreement.
- **Signed agreement with a new manufacturing partner with a big box retail chain.** The agreement is exclusive to the Algiers territory.
- **In-store outreach is still a primary channel to increase customer awareness of rebates.** Implementation staff indicated that training retail staff are one of their primary outreach activities. This training increases retail staff's awareness of the discounts and engagement with the program and indirectly facilitates customer awareness of the discounts. There are also field staff members who aid customers in retail locations when they are onsite performing quality control activities.

[41] Participating retailers.

- **Staff is considering adding new measures.** The program is looking to add additional measures including more specialty lighting and additional appliances (e.g., dehumidifiers, ceiling fans, power strips).
- **Proposing an online marketplace.** Staff is currently proposing to offer their programs on a digital platform. The online market would provide easier access to customers looking for information on products and program.

7.6 Recommendations

The Evaluators' recommendations are as follows:

- **Utilize more signage in retail stores and clearly label which products offer discounts.** In retail stores, not every product has a label discount on it even though there may be signage announcing discounts on LED products. Increasing the in-store signage will also help increase customer attribution of rebates to Entergy.
- **Examine strategies to launch an online marketplace.** If an online market is launched, complement it with more social media presence and promotion. Research ways to educate customers who utilize the online marketplace and who may have questions about specific items (e.g., offer a pop-up chat box that can answer customer questions). Additionally, in other jurisdictions, ADM has found that limited time promotions are effective means of driving sales through online marketplaces.

8. High Efficiency AC Tune Up

8.1 Program Description

The High Efficiency AC Tune Up (HETU) 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, as well as duct sealing.

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.

Duct sealing is performed using mastic sealant or metal tape to the distribution system of air conditioning systems. Duct sealing performance is tested by taking the pre-measurement and post-measurement leakage.

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.

Data provided by APTIM/Franklin showed a total of 687[42] customers participated in the HETU Program; 774 tune-ups, 646 duct sealings, two ductless heat pump and 15 AC/HP replacements. These projects were expected to provide a combined savings of 2,294,095 kWh and 740.39kW.

Below, Table 8-1 and Table 8-2 summarize the total number of measures conducted and distributed through the program and overall expected savings:

Table 8-1 Summary of Measures and Expected Savings – New Orleans

Measure	***Total Quantity of Measures***	***Total Expected kWh Savings***	***Total Expected peak kW Savings***	***Percent of Program Savings (by kWh)***
Duct Sealing	570	1,411,428	430.22	69.1%

[42] Individual dwellings, designated by address/meter number. Each dwelling may receive multiple measures, or multiples of the same measure. Examples: A house may receive duct sealing and a tune up, or a house with multiple central AC units may receive a tune up on each unit.

Tune up	674	610,626	216.93	29.9%
Ductless HP	2	3,713	0.27	0.2%
Heat Pump	1	1,006	-	0.0%
Central AC	14	15,572	9.32	0.8%
Total	1,261	2,042,344	657	100.0%

Table 8-2 Summary of Measures and Expected Savings -Algiers

Measure	***Total Quantity of Measures***	***Total Expected kWh Savings***	***Total Expected Peak kW Savings***	***Percent of Program Savings (by kWh)***
Duct Sealing	76	166,158	53.21	66.0%
Tune up	100	85,593	30.44	34.0%
Total	**176**	**251,751**	**83.66**	**100.0%**

In PY8 the program efforts shifted away from AC tune-ups towards duct sealing, with approximately 64% of expected savings coming from duct sealing and 32% from tune-ups. This relative contribution continued in PY9: 69% of kWh savings coming from duct sealing and 30% from tune-ups.

During PY8 850 projects summing to 2,245,602 kWh were completed during a normal 12-month period (a regular, full program year). In PY9, there were 682 projects summing to 2,287,604 kWh were completed during an extended 15-month period. Normalizing these figures to a 12-month program year for an 'apples-to-apples' comparison yields an expected 688 projects summing to 2,294,095 kWh. Comparing these figures translates into a 19.8% drop in expected kWh savings, while average dwelling kWh savings increased by 27.0%.

Comparisons are shown below in Table 8-3 below:

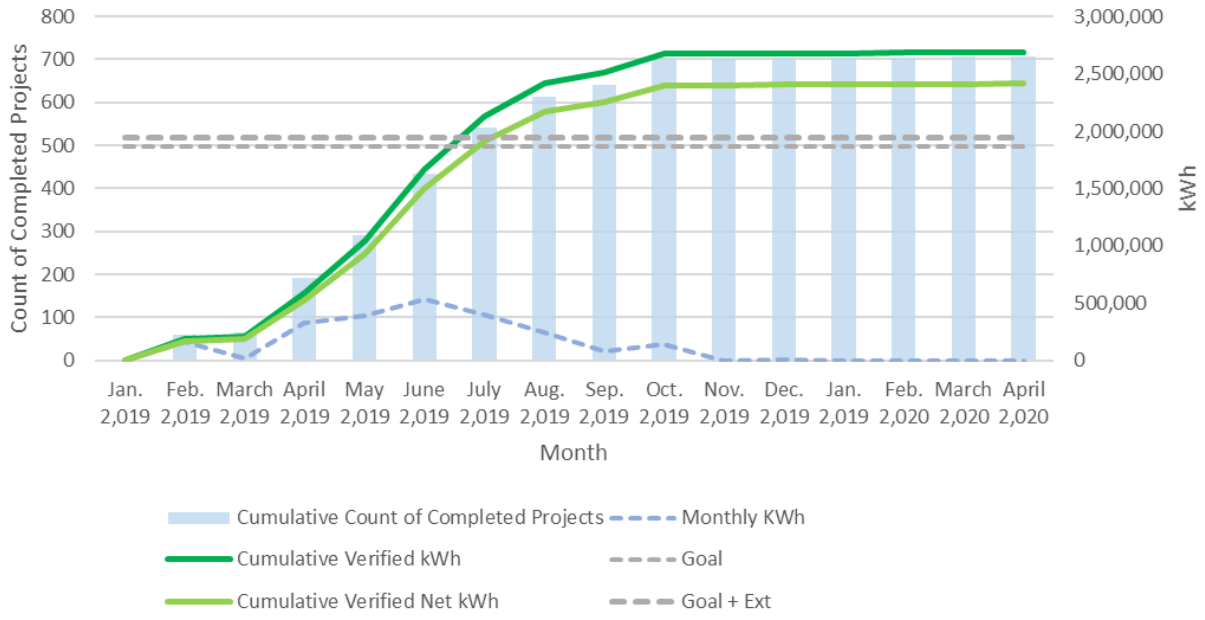
Table 8-3 Program Year Comparison[43]

PY	***# Participants***	***Expected kWh***	***Expected kWh per Home***
PY6	1,048	2,342,703	2,235
PY7 (nominal)	372	1,218,180	3,275
PY7 (adjusted)	496	1,624,239	3,275
PY8	850	2,245,602	2,642
PY9 (total)	688	2,294,095	3,334
PY9 (calendar)	682	2,287,604	3,354

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

Below Figure 8-1 illustrates program performance over PY9.

Figure 8-1 Program Performance Over PY9



Total verified net savings and percentage of goals for the HETU Program are summarized in Table 8-4.

Table 8-4 Savings Goals & Attainment by Utility

Utility	*Year*	*kWh Goal*	*Verified kWh Savings*	*Percent of kWh Goal Met*	*kW Goal*	*Verified kW Reductions*	*Percent of kW Goal Met*
New Orleans	2019	1,727,139	2,386,070	138.15%	541.09	851.99	157.46%
	2020	75,000	6,431	8.57%			
ENO Subtotal	**Both**	**1,802,139**	**2,392,501**	**132.76%**	**541.09**	**851.99**	**157.46%**
Algiers	2019	134,413	300,383	223.48%	40.40	111.50	275.99%
	2020	8,500	0	0.00%			
Algiers Subtotal	**Both**	**142,913**	**300,383**	**210.19%**	**40.40**	**111.50**	**275.99%**
Overall	**Both**	**1,945,052**	**2,692,884**	**138.45%**	**581.49**	**963.49**	**165.69%**

The program did not meet extension goals for either territory, however all other goals were exceeded, achieving 138.5% of the overall kWh goal and 165.7% of the overall kW goal.

8.2 M&V Methodology

Evaluation of the HETU Program included the following:

- Surveys with participants;
- Interviews with program staff; and
- Interviews with program trade allies.

Verified savings were calculated using methods and inputs in the New Orleans TRM 2.0 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 were calculated using the following savings algorithms from the New Orleans TRM 2.0, section C.3.7.

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,

CAPc = Cooling capacity (in BTU)

EERpre = Efficiency of the equipment prior to tune-up

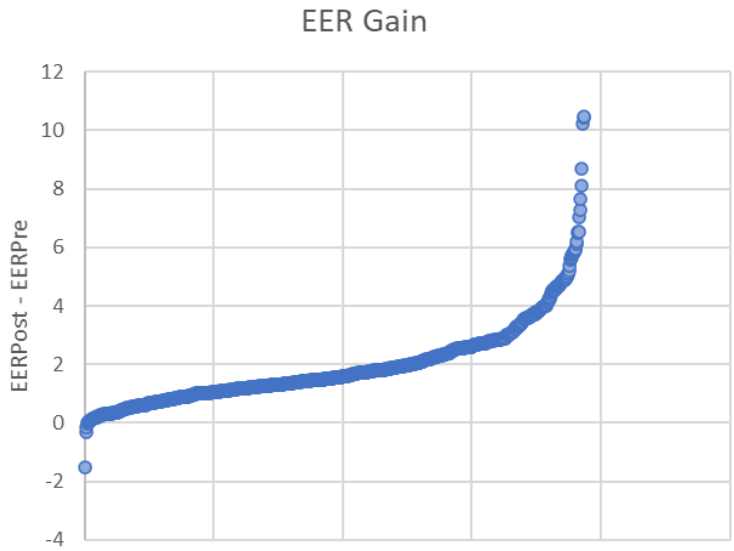
EERpost= Nameplate efficiency of the existing equipment

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

%CF = Peak Coincidence Factor (.77)

Figure 8-2 below shows the efficiency gains from each unit tuned up.

Figure 8-2 EER Gain



8.2.1.2 CAC Tune-Ups Results

Resulting 2019 gross savings are summarized in Table 8-5. There were no AC tune-up projects that were completed in 2020.

Table 8-5 CAC Tune-Up Savings Summary

Territory	Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	Peak kW Realization Rate
New Orleans	610,626	776,798	127.21%	216.93	365.38	168.43%
Algiers	85,593	105,781	123.59%	30.44	49.76	163.43%
Total	**696,219**	**882,580**	**126.77%**	**247.37**	**415.14**	**167.82%**

Test-out post capacity data was used in ex post calculations. Six projects did not see a significant enough improvement to result in kWh savings.

The program implementers applied fixed deemed savings values in generating ex-ante calculations, in accordance with section C.3.7.4 of the New Orleans TRM 2.0. All tune-up projects are for Central AC, in which 277 kWh/Ton were applied per project. Implementers used nameplate cooling capacity tons, ranging from 1 ton to 6 tons. Ex-ante savings range from 277 kWh to 1,492 kWh. The average project Ex-ante savings is approximately 900 kWh, and 3.24 tons.

The Evaluators calculated savings based on the Test-in and Test-out Efficiency method, found in section C.3.7.5.1 of the New Orleans TRM v2.0, resulting in higher ex post savings. Average project ex post savings are 1,140 kWh.

Overall kWh realization for CAC tune-ups is 126.8% and overall kW realization is 167.8%.

8.2.2 Central AC Replacement

The PY9 HETU Program rebated 14 central air conditioners. The Evaluators calculated savings for all replacements as NC/normal replacement with the current minimum code as baseline: 14 SEER and 11.8 EER. Methods for calculating he deemed savings came from the New Orleans TRM 2.0, section C.3.1. Central Air Conditioner Replacement. Energy Savings

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

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

Where,

CAPc = Cooling capacity (in BTU)

EERbase = Full-load efficiency of baseline equipment

EEReff = Full-load efficiency of baseline equipment

SEERbase = Seasonal efficiency of baseline equipment

SEEReff = Seasonal efficiency of efficient equipment

EFLHc = Equivalent Full-Load Cooling Hours

%CF = Peak Coincidence Factor

8.2.2.1 CAC Replacement Results

Resulting gross savings are summarized in Table 8-6. Central air conditioner projects were installed in 2019 and in 2020.

Table 8-6 CAC Savings Summary

Measure	*Expected kWh*	*Verified kWh*	*kWh Realization Rate*	*Expected kW*	*Verified kW*	*Peak kW Realization Rate*
New Orleans	15,572	10,626	68.24%	9.32	3.8	41.11%
Total	**15,572**	**10,626**	**68.24%**	**9.32**	**3.8**	**41.11%**

There were no CAC replacements in the Algiers territory. The Evaluators were unable to recreate ex ante savings estimates using TRM methods. The Evaluators found that for projects without ECM, TRM deemed values were applied in ex-ante calculations, however incorrect savings were applied to Central AC with ECM. The New Orleans TRM 2.0 does

not distinguish differences in savings for AC units with and without ECM. Below are the deemed savings that implementers used for Ex-ante calculations.

- Central AC with ECM, SEER 17: Ex ante Deemed value = 406.67 kWh/Tons
- Central AC with ECM, SEER 16: Ex ante Deemed value = 334.45 kWh/Tons
- Central AC without ECM, SEER 16: Ex ante Deemed value = 175.40 kWh/Tons
- Central AC with ECM, SEER 19: Ex ante Deemed value = 528.32 kWh/Tons

Overall kWh realization for HVAC replacements is 68.2% and overall kW realization is 41.1%.

8.2.3 Heat Pump Replacement

The PY9 HETU Program rebated one central heat pump. The Evaluators calculated savings for the replacement as NC/normal replacement with the current minimum code as baseline: 14 SEER, 11.8 EER and 8.2 (split) 8.0 (packaged) HSPF. Methods for calculating he savings came from New Orleans TRM 2.0, section C.3.4. Heat Pump Replacement. Heat Pump Replacement Results

Resulting gross savings are summarized in Table 8-6. The one heat pump project was completed in 2020.

Table 8-7 Heat Pump Savings Summary

Utility	*Expected kWh*	*Verified kWh*	*kWh Realization Rate*	*Expected kW*	*Verified kW*	*Peak kW Realization Rate*
New Orleans	1,006	1,532	152.29%	0.00	0.22	N/A
Total	**1,006**	**1,532**	**152.29%**	**0.00**	**0.22**	**N/A**

There were no heat pump replacements in Algiers territory. The Evaluators found that the implementer applied the correct TRM deemed heating savings but did not include any cooling savings. Ex post savings calculations include cooling savings, leading to more verified kWh savings. Similarly, there were no kW reductions claimed, while the Evaluators calculated these kW reductions. Overall, the kWh realization rate for heat pump replacements is 152.3% and the overall kW realization rate is N/A due to unclaimed kW reductions.

8.2.4 Ductless Heat Pump

The PY9 HETU Program rebated two ductless heat pumps. The Evaluators calculated savings for all replacements as NC/normal replacement with the current minimum code as baseline: 14 SEER, 11.8 EER and 8.2 (split) 8.0 (packaged) HSPF. Methods for

calculating he deemed savings values came from the New Orleans TRM 2.0, section C.3.6. Ductless Heat Pump. Deemed per-unit kWh and kW reductions were applied to all units installed during PY9.

8.2.4.1 Deemed Energy Savings

Table 8-8 Ductless HP Deemed kWh[44]

	kWh Per Ton	kW per Ton	Average Tons	kWh per Unit	kW per Unit
New Construction and Normal Replacement	825	.0606	2.28	1,881	.1382
Early Replacement – Heat Pump	1,039	.1025	2.28	2,370	.2337

8.2.4.2 Ductless HP Replacement Results

Resulting gross savings are summarized in Table 8-9. One project was completed in 2019 and one project was completed in 2020.

Table 8-9 Ductless HP Savings Summary

Utility	Expected kWh	Verified kWh	kWh Realization Rate	Expected kW	Verified kW	Peak kW Realization Rate
New Orleans	3,713	3,713	100.00%	0.27	0.27	100.00%
Total	**3,713**	**3,713**	**100.00%**	**0.27**	**0.27**	**100.00%**

There were no ductless heat pumps in Algiers territory. The Evaluators found that ex-ante savings estimates were from TRM deemed savings values. The Evaluators also used TRM deemed savings values in ex post calculations, giving overall kWh and kW realization rates of 100.0%.

8.2.5 Duct Sealing

Duct sealing savings was calculated using the following savings algorithms from the New Orleans TRM 2.0, section C.3.8.

8.2.5.1 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-measurement of leakage to unconditioned space

DL_{post} = Post-measurement of leakage to unconditioned space

[44] TRM Table 67, page C-85

$EFLH_c$ = Equivalent Full Load Cooling Hours, 1,637, based on ADM metering of New Orleans homes

H_{out} = Outdoor design enthalpy, 40 BTU/lb.

H_{in} = Indoor design enthalpy, 30 BTU/lb.

P_{out} = Density of outdoor air at 95 deg. F, .0740 lb./ft.^{3}

P_{in} = Density of outdoor air at 95 deg. F, .0756 lb./ft.^{3}

SEER = Seasonal Efficiency Rating of existing systems (BTU/W*hr.). Default of 13

1,000 = W/kW conversion factor

60 = Minutes/hour conversion factor

Table 8-10 Deemed Savings Values for Duct Sealing Calculations

Parameter	***Value***
EFLHC	1,637
HDD	1,349
h_{out}	40
h_{in}	30
ρ_{in}	.076
P_{out}	.074
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 (40x0.0076 – 30x0.074) x 60 / (1000 x 11.5) = 1,891 kWh per year.

8.2.5.2 Heating Savings (Electric Resistance):

$$kWh_{Savings,H} = \frac{\left(DL_{pre} - DL_{post}\right) \times HDD \times (h_{out}\rho_{out} - h_{in}\rho_{in}) \times 60 \times 24 \times .018}{3{,}412}$$

Where:

DL_{pre} = Pre-measurement of leakage to unconditioned space

DL_{post} = Post-measurement of leakage to unconditioned space

HDD = Heating degree days for New Orleans, based on TMY3 data: 1,349

H_{out} = Outdoor design enthalpy, 40 BTU/lb.

H_{in} = Indoor design enthalpy, 30 BTU/lb.

P_{out} = Density of outdoor air at 95 deg. F, .0740 lb./ft.^{3}

P_{in} = Density of outdoor air at 95 deg. F, .0756 lb./ft.^{3}

3,412 = Conversion of BTU/kWh

60 = Minutes/Hour conversion factor

24 = Hours/Day conversation factor

.018 = Volumetric heat capacity of air (BTU/Ft.^{3} *deg. F)

8.2.5.3 Demand Savings (Cooling):

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

Where:

$kWh_{cooling}$ = Calculated kWh cooling savings

$EFLH_c$ = Equivalent Full Load Cooling Hours, 1,637, based on ADM metering of New Orleans homes

Coincidence% = 77%, calculated based on ADM metering of New Orleans homes.

8.2.5.4 Adjustments from Historic Field Data Collection

During the site visits conducted in PY5 – PY8, the Evaluators' field staff conducted blower door testing from 320 homes in an effort to validate post-retrofit leakage estimates indicated in program tracking data. The resulting average is 93.78%. That is, of 320 homes the Evaluators found that duct sealing $CFM25_{post}$ results were 6.22% lower than those reported in tracking data. This factor was used to adjust the reported $CFM25_{post}$ values in air sealing program data before conducting the final analysis.

The savings resulting from applying TRM algorithms and deemed savings parameters, plus the application of field results are summarized in Table 8-11 and Table 8-12. All projects were completed in 2019.

8.2.5.5 Duct Sealing Results

Table 8-11 Expected and Verified Duct Sealing Savings – New Orleans

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	522,712	603,170	115.39%	249.87	283.71	113.55%
Electric Resistance	888,716	994,434	111.90%	180.35	198.12	109.86%
Air Source Heat Pump	0	0	N/A	0.00	0.00	N/A
Total	**1,411,428**	**1,597,604**	**113.19%**	**430.22**	**481.84**	**112.00%**

Table 8-12 Expected and Verified Duct Sealing Savings - Algiers

Heating Type	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected Peak kW Savings	Verified Peak kW Savings	Peak kW Realization Rate
Natural Gas Furnace	70,851	84,544	119.33%	33.88	39.77	117.38%
Electric Resistance	95,308	110,059	115.48%	19.34	21.97	113.59%
Air Source Heat Pump	0	0	N/A	0.00	0.00	N/A
Total	**166,158**	**194,602**	**117.12%**	**53.22**	**61.74**	**116.02%**

Ex ante calculations assumed the maximum pre-installation leakage rate of 35% percent of total fan flow[45], rather than 40% specified in the TRM, resulting in an underestimation of savings. Using 40%, these homes' kWh and kW realization rates were 111% and 110% respectively, before M&V adjustments.

After M&V adjustments, the overall kWh realization rate for duct sealing is 113.6% and the overall kW realization rate is 112.4%.

8.3 Savings Results

Verified savings are summarized in Table 8-13, Table 8-14.

Table 8-13 Realization Summary – New Orleans

Measure	Time Period	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
AC Tune-ups	2019	610,626	778,882	127.55%	216.93	365.83	168.64%
	2020	0	0	N/A	0	0	N/A
Duct Sealing	2019			113.19%	430.22	481.84	112.00%
	2020	0	0	N/A	0	0	N/A
CAC Replacement	2019	12,561	8,346	66.44%	7.49	2.89	38.58%
	2020	3,010	2,280	75.75%	1.83	0.94	51.37%
Heat Pump Replacement	2019	0	0	N/A	0.00	0.00	N/A

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

	2020	1,006	1,676	166.60%	0.00	0.22	N/A
Ductless Heat Pump	2019	1,238	1,238	100.00%	0.09	0.09	100.00%
	2020	2,475	2,475	100.00%	0.18	0.18	100.00%
2019 Subtotal:	**2019**	**2,035,853**	**2,386,070**	**117.20%**	**654.73**	**850.65**	**129.92%**
2020 Subtotal:	**2020**	**6,491**	**6,431**	**99.08%**	**2.01**	**1.34**	**66.67%**
Overall Total:	**PY9**	**2,042,344**	**2,392,501**	**117.14%**	**656.74**	**851.99**	**129.73%**

Table 8-14 Realization Summary - Algiers

Measure	***Time Period***	***Expected kWh Savings***	***Verified kWh Savings***	***kWh Realization Rate***	***Expected kW Savings***	***Verified kW Savings***	***kW Realization Rate***
AC Tune-ups	2019	85,593	105,781	123.59%	30.44	49.76	163.47%
	2020			N/A	-	-	N/A
Duct Sealing	2019	166,158	194,602	117.12%	53.22	61.74	116.03%
	2020	0	0	N/A	0.00	0.00	N/A
2019 Subtotal:	**2019**	**251,751**	**300,383**	**119.32%**	**83.65**	**111.50**	**133.28%**
2020 Subtotal:	**2020**	**0**	**0**	**N/A**	**0.00**	**0.00**	**N/A**
Overall Total:	**PY9**	**251,751**	**300,383**	**119.32%**	**83.66**	**111.50**	**133.28%**

There were no expected or verified savings in the Algiers territory during 2020.

Table 8-15 and Table 8-16 show overall program realization.

Table 8-15 Overall Realization by Territory and Year

Utility	***Year***	***Expected kWh Savings***	***Verified kWh Savings***	***kWh Realization Rate***	***Expected kW Savings***	***Verified kW Savings***	***kW Realization Rate***
ENO	2019	2,035,853	2,386,070	117.20%	654.73	850.65	129.92%
	2020	6,491	6,431	99.08%	2.01	1.34	66.67%
ENO Subtotal	**Both**	**2,042,344**	**2,392,501**	**117.14%**	**656.74**	**851.99**	**129.73%**
Algiers	2019	251,751	300,383	119.32%	83.66	111.50	133.28%
	2020	0	0	N/A	0.00	0.00	N/A
Algiers Subtotal	**Both**	**251,751**	**300,383**	**119.32%**	**83.66**	**111.50**	**133.28%**
Overall Total	**Both**	**2,294,095**	**2,692,884**	**117.38%**	**740.40**	**963.49**	**130.13%**

Overall realization is 117.4% for kWh and 130.1% for kW.

Table 8-16 Overall Realization by year

Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
2019	2,287,604	2,686,453	117.44%	738.39	962.15	130.30%
2020	6,491	6,431	99.08%	2.01	1.34	66.67%
Total	**2,294,095**	**2,692,884**	**117.38%**	**740.40**	**963.49**	**130.13%**

8.4 Estimation of Net Savings

The Evaluator applied the PY8 net-to-gross ratio to estimate the net impacts of the Residential Heating and Cooling Program. As in PY8, program savings were largely the result of duct sealing and tune-up measures with system replacements accounting for a limited share of projects (two system replacement projects were completed. The net to gross ratios applied were:

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

8.4.1 Net Savings Results

The results of the net savings survey results above, the Evaluators calculated net kWh savings and kW reductions by measure. Results are shown below in Table 8-17 and Table 8-18.

Table 8-17 Summary of Verified Net Savings

Utility	Year	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	2019	2,386,070	233,378	2,152,692	90.22%	850.65	97.76	752.89	88.51%
	2020	6,431	628	5,803	90.23%	1.34	0.13	1.21	90.30%
ENO Subtotal	**Both**	**2,392,501**	**234,006**	**2,158,495**	**90.22%**	**851.99**	**97.89**	**754.10**	**88.51%**
Algiers	2019	300,383	30,593	269,790	89.82%	111.50	13.10	98.40	88.25%
	2020	0	0	0	N/A	0.00	0.00	0.00	N/A
Algiers Subtotal	**Both**	**300,383**	**30,593**	**269,790**	**89.82%**	**111.50**	**13.10**	**98.40**	**88.25%**
Overall Total	**Both**	**2,692,884**	**264,599**	**2,428,285**	**90.17%**	**963.49**	**110.99**	**852.50**	**88.48%**

Net to gross ratios in above tables represent overall ratios, accounting for duct sealing, tune-ups and other measures.

Table 8-18 2020 Summary of Verified Net Savings

Year	Verified Net kWh Savings	Verified Net kW Reductions
2019	2,422,482	851.29
2020	5,803	1.21
Total	**2,428,285**	**852.50**

8.5 Process Evaluation Findings

8.5.1 Summary of Program Participation

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

Table 8-19 summarizes the PY9 program activity by measure. As shown, duct sealing and AC Tune Up accounted for most of the program savings. HVAC replacements accounted for a little under 1% of program savings.

Table 8-19 Summary of Measures Installed

Measure	Expected kWh Savings	Incentives Paid	Number of Participants[46]	Percent of Expected Savings	Incentive Dollars per kWh Saved
Duct sealing	1,577,586	$264,672	555	69%	$0.17
AC tune-up	696,219	$113,600	674	30%	$0.16
Ductless heat pump	1,238	$250	2	<1%	$0.20
Heat pump	1,006	$200	3	<1%	$0.20
Central air conditioner	18,047	$2,550	10	1%	$0.14

As shown in Table 8-20 projects that involved AC tune-ups and duct sealing were most frequently implemented. These projects provided an average expected combined savings of 3,251 kWh.

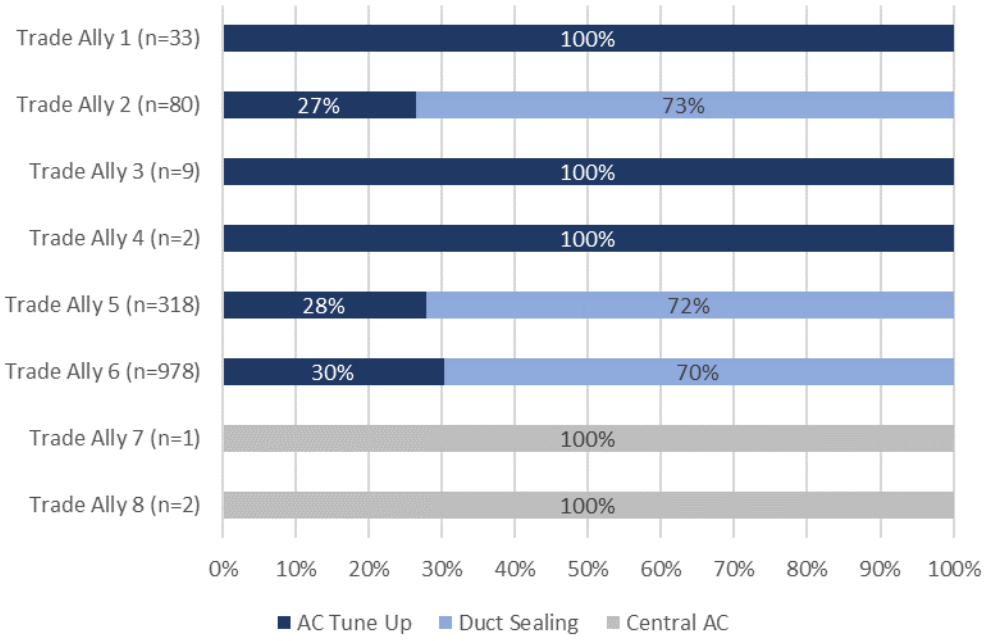
Table 8-20 Summary of Project Types Completed

Measure	Share of Participating Homes	Average Expected Savings (kWh)
AC tune-up + Duct sealing	81%	3,251
AC tune-up	98%	898
Duct sealing	81%	2,430
Ductless heat pump	0.1%	1,856
Central air conditioner	2%	1,037
Heat pump	<1%	335

[46] Unique addresses where the measure was performed/installed.

Figure 8-3 summarize trade ally projects by the type of project implemented. One trade ally was much more active than others with 978 completed projects. AC Tune Up and Duct Sealing accounted for the majority of the savings amongst trade allies.

Figure 8-3 Trade Ally Company Share of Savings



8.6 Key Findings and Conclusions

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

- **Overall kWh and kW goals were surpassed.** The program did not meet extension goals for either territory, however all other goals were exceeded, achieving 138.3% of the overall kWh goal and 165.6% of the overall kW goal.
- **There are few early replacements of HVAC systems.** System costs are still a barrier. Staff indicated there were approximately six replacements at the time of the interview.
- **HVAC tune-ups are now recommended during home energy audits performed through HPwES in PY9.**
- **Staff exploring to evolve into an AC solutions program.** Staff mentioned they would like to make the program more comprehensive by adding a smart thermostat measure to the program. They also noted that trade allies could do a tune-up, replacement, and/or install a smart thermostat.

8.7 Recommendations

The Evaluators' recommendations are as follows:

- **Pilot a midstream offering to increase AC replacements.** Develop a partnership with HVAC manufacturing companies to negotiate prices and installation costs for certain population segments or industries during next year's cycle. Midstream program designs can increase stocking of efficient units, making them more available to customers when their existing unit fails.

9. Energy Smart School Kits and 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 6th and 10th 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, and other Energy Smart offerings.

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.

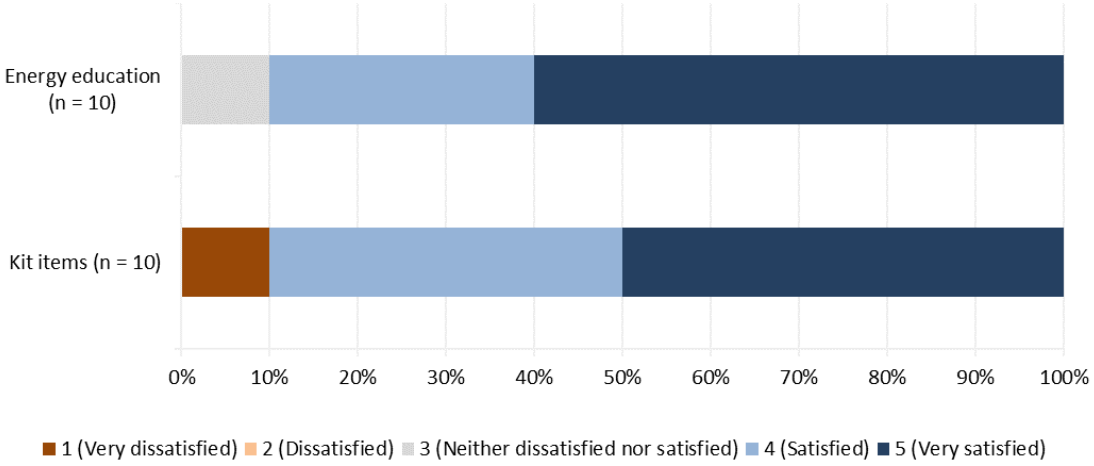
9.2 Evaluation Scope

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 PY9 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 PY9, the program provided 1,158,771 expected kWh savings, comprising 2.05% of the Energy Smart portfolio.

- **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 PY9.

Figure 9-1 Satisfaction with the Energy Education and Kits Contents



9.3 Expected Savings and Program Participation

During PY9 kits were administered year-round with a total of 4,969 kits distributed among 43 schools[47]. Kit contents were identical to the previous years' offerings. Figure 9-2 below illustrates kit distribution by month and cumulatively.

[47] The Program planned to visit more school before the end of the program year but was not able to due to stay-at-home orders issued March 22.

Figure 9-2 Kit Distribution Over Program Year

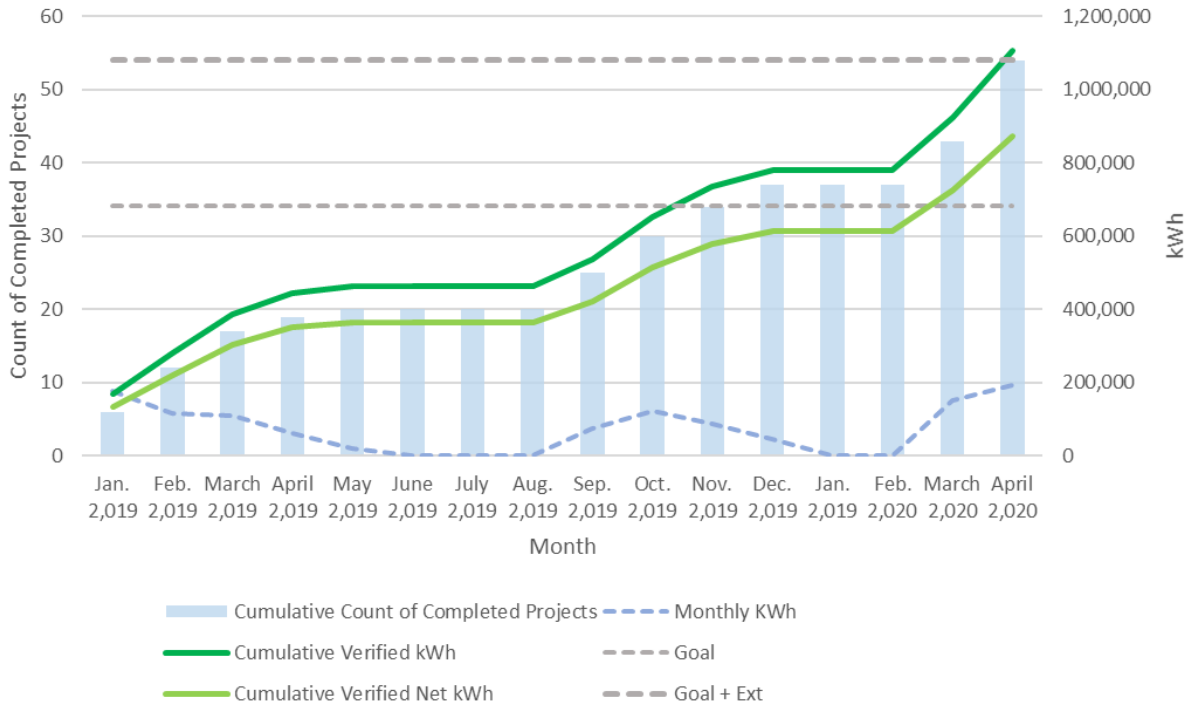


Table 9-1 below summarizes the total number of kits distributed and expected kWh and kW savings per territory.

Table 9-1 Summary of Measures and Expected Savings

Service Territory	***Time Period***	***Total Number of Kits***	***Total Expected kWh Savings***	***Total Expected kW Savings***
ENO	2019	3,146	733,647	86.83
	2020	972	226,671	26.83
	Total	**4,118**	**960,318**	**113.66**
Algiers	2019	354	82,553	9.77
	2020	497	115,900	13.72
	Total	**851**	**198,453**	**23.49**
Total		**4,969**	**1,158,771**	**137.15**

Total verified savings and percentage of goals for the SK&E Program are summarized in Table 9-2.

9.4 Goal Achievement

Table 9-2 SK&E Savings Goals by Utility

Utility	Year	kWh Goal	Verified kWh Savings	Percentage of Goal Met	kW Goal	Verified kW Savings	Percentage of Goal Met
ENO	2019	546,782	700,448	128.10%	74.50	151.13	202.86%
	2020	347,468	216,413	62.28%			
	Both	**894,250**	**916,861**	**102.53%**	**74.50**	**151.13**	**202.86%**
Algiers	2019	136,695	78,817	57.66%	18.60	31.23	167.90%
	2020	48,972	110,656	225.96%			
	Both	**185,667**	**189,473**	**102.05%**	**18.60**	**31.23**	**167.90%**
Overall Total	**Both**	**1,079,917**	**1,106,334**	**102.45%**	**93.10**	**182.36**	**195.88%**

The program met all goals. Overall ENO goal attainment is 102.5% and 202.9% for kWh and kW, respectively, and Algiers goal attainment is 102.5% and 195.9%.

9.5 Impact Calculation Methodology

Electricity savings and peak demand reductions of the PY9 SK&E Program were estimated using inputs from the New Orleans TRM 2.0. Measure-specific savings are provided below.

9.5.1 Savings Calculations

Table 9-3 ENERGY STAR® Omnidirectional LEDs – Deemed Savings Per Lamp[48]

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

$$kWh_{savings} = \left(\left(W_{base} - W_{post}\right)/1000\right) \times Hours \times ISR^{49} \times IEF_E{}^{50}$$

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

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

[48] New Orleans TRM V2.0, Table 116, page C-141.
[49] 100% in this calculation. Measure-specific ISR applied after.
[50] Unknown heating type: 0.91

Table 9-4 Faucet Aerators – Deemed Savings[51]

Efficient GPM Rating	kWh	kW
1.5 GPM	26.53	.0028
1.0 GPM	44.22	.0046

Table 9-5 Low Flow Showerhead Retrofit Deemed Energy Savings[52]

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

9.5.2 In-Service Rate Findings

Kits were distributed along with a survey form to be filled out by students and parents, then returned. The forms included questions regarding which measures had been installed in the home as well as home characteristics. This information was used to determine in-service rates of each measure provided, and the prevalence of electric water heating in homes as a whole. Data from PY6 - PY8 were averaged to create deemed ISRs for each measure. These ISRs were applied to PY9.

Table 9-6 presents the ISRs found in the PY6 - PY8 evaluations. Along with resulting averages, which were applied to savings estimates shown above.

Table 9-6 SK&E Summary of In-Service and Water Heating Type Rates

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

9.6 Verified Savings by Measure

The over program gross realization is 95.5% for kWh and 133.0% for peak kW reductions.

Expected kWh estimates were based on PY8 ISRs, whereas PY9 verified savings were based on averaged ISRs from the previous years, resulting in a slightly low realization

[51] New Orleans TRM V2.0, Table 46, page C-55.
[52] New Orleans TRM V2.0, Table 51, page C-61.

rate. Expected savings calculations used rounded kW reductions estimates, whereas verified savings calculations kept all significant figures throughout calculations, resulting in higher verified kW reductions.

Table 9-7 Verified Gross Savings by Utility and Year

Utility	Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
ENO	2019	733,647	700,448	95.47%	86.83	115.46	132.97%
	2020	226,671	216,413	95.47%	26.83	35.67	132.95%
	Both	**960,318**	**916,861**	**95.47%**	**113.66**	**151.13**	**132.97%**
Algiers	2019	82,553	78,817	95.47%	9.77	12.99	132.96%
	2020	115,900	110,656	95.48%	13.72	18.24	132.94%
	Both	**198,453**	**189,473**	**95.47%**	**23.49**	**31.23**	**132.95%**
Overall Total	**Both**	**1,158,771**	**1,106,334**	**95.47%**	**137.15**	**182.36**	**132.96%**

Table 9-8 Verified Gross Savings Overall

Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
2019	816,200	779,265	95.47%	96.60	128.45	132.97%
2020	342,571	327,069	95.47%	40.55	53.91	132.95%
Total	**1,158,771**	**1,106,334**	**95.47%**	**137.15**	**182.36**	**132.96%**

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 PY8 participants.

9.7.1 Measure Level Free Ridership Results

Table 9-9 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 9-9 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%[53]

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 2019, 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 9-10, the overall Net-to-Gross ratio for this program was 78.9%.

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

Table 9-10 SK&E Summary of Verified Net kWh Savings and Peak kW Reductions

Utility	Year	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	2019	700,448	148,067	552,381	78.86%	115.46	27.29	88.17	76.36%
	2020	216,413	45,747	170,666	78.86%	35.67	8.43	27.24	76.37%
ENO Subtotal	**Both**	**916,861**	**193,814**	**723,047**	**78.86%**	**151.13**	**35.72**	**115.41**	**76.36%**
Algiers	2019	78,817	16,661	62,156	78.86%	12.99	3.07	9.92	76.37%
	2020	110,656	23,392	87,264	78.86%	18.24	4.31	13.93	76.37%
Algiers Subtotal	**Both**	**189,473**	**40,053**	**149,420**	**78.86%**	**31.23**	**7.38**	**23.85**	**76.37%**
Overall Total	**Both**	**1,106,334**	**233,867**	**872,467**	**78.86%**	**182.36**	**43.10**	**139.26**	**76.37%**

Table 9-11 SK&E Verified Net Savings by Year

Year	Verified Net kWh Savings	Verified Net kW Reductions
2019	614,537	98.09
2020	257,930	41.17
Total	**872,467**	**139.26**

Net kWh savings totaled to 872,467 kWh and equal 78.9% of gross program savings. Net kW reductions totaled 139.26 kW and equal 76.4% of verified gross program savings.

9.9 Lifetime Savings

Table 9-12 present the lifetime kWh and peak kW savings attributable to lamps distributed through the PY9 SK&E program:

Table 9-12 ENO Lifetime Savings

Measure	ENO Lifetime kWh	Algiers Lifetime kWh
9W LED	173,073,480	35,766,278
15W LED	276,568,524	57,153,913
Kitchen Aerator	238,356	49,257
Bathroom Aerator	235,720	48,712
Showerhead	2,848,906	588,737
Total	**452,964,986**	**93,606,897**

9.10 Findings

- **The program met all goals.** Overall ENO goal attainment is 102.5% and 202.9% for kWh and kW, respectively, and Algiers goal attainment is 102.5% and 195.9%.

9.11 Recommendations

The Evaluators' recommendation for the SK&E Program is as follows:

- **Update savings estimates based on averaged in-service rates.** Program planners should use in-service rates that are based on three-year averages from program data collection:

Table 9-13 Averaged ISRs

Item	*Three-year Average*
9W LED	70.1%
15W LED	71.2%
Bathroom Aerator 1.5	45.3%
Kitchen Aerator 1.5	44.8%
Showerhead	62.1%
Electric Water heating	55.4%

- **Update overall savings estimates based on TRM 3.0.** Starting in PY10, Energy Smart programs will be evaluated using the TRM 3.0, which includes changes to lighting and water sections from the previous version, thus affecting savings for school kits. Per-unit and per-kit gross savings, including averaged ISRs, are as follows:

Table 9-14 PY Savings Comparisons

Measure	PY9		PY10	
	kWh	*kW*	*kWh*	*kW*
9W LED[54]	71.1	0.0147	75.6	0.0128
15W LED[55]	60.6	0.0125	64.4	0.0109
Kitchen Aerator	6.7	0.0007	6.7	0.0007
Bathroom Aerator	6.6	0.0007	6.6	0.0007
Showerhead	77.7	0.0081	78.4	0.0082
Total	**222.6**	**0.037**	**231.7**	**0.033**

The program should be revisited for evaluation in PY10.

[54] Assumes (4) lamps
[55] Assumes (2) lamps

10. Scorecard Behavioral Program

10.1 Program Description

The Energy Smart Scorecard Program ("Scorecard" or "Program"). The Program is intended to use social norming to leverage energy savings; this is a long-known behavioral science tenet that individuals desire to be at a similar or better level than their peers, and thus, the report drives high users to reduce their energy consumption[56]. The Program was administered by Accelerated Innovations ("AI") on behalf of Entergy New Orleans ("ENO") under the direction of the New Orleans City Council.

The Program provides tailored reports to residential customers. These reports include:

- Comparisons of customers' current energy use to their past use;
- Comparison of energy use to similar homes in the area; and
- Tips on how customers can reduce their energy use as well as information on ENO energy efficiency programs

10.1.1 Background

This program was implemented [with?] [as?] a Pilot group ("Pilot") in PY7 and another three groups in PY8. The Pilot was designed to assess the potential for administering a full-scale behavioral program in future program years. The Pilot was open to all ENO households who elected to participate. Households that elected to participate received an Energy Smart Score once a month. The score card provided information on the customer's home energy use and tips for saving energy and is designed to generate quantifiable behavioral savings that cannot be feasibly attained through standard energy efficiency efforts. The program differs from standard energy conservation marketing efforts in that it provides customized reports to households, comparing their billed energy use to homes in their area with similar energy consumption. The Scorecard was first introduced to Entergy New Orleans' households in February 2017, PY7, as an opt-in pilot. In this experimental design, households could choose to opt-in to receiving home energy reports. Due to shortfalls in Pilot participant recruitment, it was concluded that the program could benefit from being changed to an opt-out design after the Pilot ended.

For PY8 the program was changed to an opt-out design and implemented in three groups: May 2018 ("Initial group"), July 2018 ("Second group") and December 2018 ("Third group"). The implementors targeted all customers with valid email addresses, including customers that were already assigned to the previous opt-out group. As a result, the design of the Second group was impacted because control customers in Second group

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

Randomized Control Trial ("RCT") were reassigned as treatment in the Third group. The Evaluators therefore requested additional nonparticipant customer billing data to attempt to create a post-hoc control group through propensity score matching (PSM) for both the Initial and Second group, as well as the Third group.

For reliable estimation of savings effects, it is ideal to have a RCT. In this experimental design, a group of eligible customers are randomly assigned to treatment or control groups. The program was a RCT, however, due to changes in program design, the previously defined RCT groups are were altered. Therefore, the Evaluators utilized a quasi-experimental method of producing a post-hoc control group. While it is not possible to guarantee the possibility of creating a sufficiently matched control group, this method is preferred because it is likely to have more meaningful results than a treatment-only analysis. Some examples of outside variables that a control group can sufficiently control for are changes in economies and markets, large-scale social changes, or impacts from weather-related anomalies such as flooding or hurricanes. All three groups (Initial, Second, and Third) had a full year of pre-period data and a full year of post-period data.

Treatment households receive mailed or emailed home energy reports, which show the comparison of their use to their neighbors. The program is an opt-out implementation model; treatment customers who wish to not participate may contact ENO and request to be removed from the program at any time.

10.1.2 Goal Achievement

Total verified savings and percentage of goals achieved for the Scorecard Program are summarized in Table 5-4.

Table 10-1 Scorecard Summary of Goal Achievement

Utility	*Year*	*kWh Goal*	*Verified kWh Savings*	*Percent of kWh Goal Met*	*kW Goal*	*Verified kW Reductions*	*Percent of kW Goal Met*
ENO	2019	6,844,121	7,991,401	116.75%	5,817.50	1,520.00	26.13%
	2020	1,711,030	1,857,069	108.54%			
ENO Subtotal	**Both**	**8,555,151**	**9,848,470**	**116.76%**	**5,817.50**	**1,856.83**	**31.92%**
Algiers	2019	1,155,879	1,379,817	119.37%	982.50	255.74	26.03%
	2020	288,970	218,249	75.53%			
Algiers	**Both**	**1,444,849**	**1,598,066**	**110.60%**	**982.50**	**312.41**	**31.80%**
Overall Total	**Both**	**10,000,000**	**11,466,536**	**114.47%**	**6,800.00**	**2,169.24**	**31.90%**

Extension (2020) goals were met only in the New Orleans territory, though 2019 goals were exceeded in both territories. Overall goals achievement was 116.76% and 110.60% for the New Orleans and Algiers territories, respectively. Overall goal achievement for both territories was 114.47%. The program did not meet kW goals, at a total achievement of 31.90% for both territories combined.

10.2 EM&V Methodology

The impact evaluation approach for this program is as follows:

1) The remaining control groups for each treatment group were tested for validity as a statistical match for the treatment households in the baseline year;
2) Cohorts were attempted to be matched to an ad-hoc control group created via propensity score matching;
3) Energy savings were estimated via regression modeling; and
4) Excess savings from other-program-participation by the treatment group and control group are accounted for and netted out of the program savings from the Home Energy Reports program.
5) Estimate kW savings from the validated energy savings after double counting adjustments

10.2.1 Participant Data

The dataset included monthly billing reads for the 26,169, 25,045, and 61,379 unique participating households in the Initial, Second, and Third opt-out groups, respectively. It also included the 9,975 and 9,967 unique nonparticipating households that comprised the Initial and Second RCT control groups. In addition, an additional 57,136 nonparticipating households (households that have never received a Scorecard) were provided to assist in the creation a valid post-hoc control group for each of the groups if the RCT control groups were no longer valid or if the group lacked a control group. The raw billing dataset contained records spanning from December 2016 to April 2020. This analysis requires that all households have complete billing data during the pre- and post-periods. Households with incomplete data were removed, leaving 22,827, 21,710, and 37,591 households in the final analysis for the Initial, Second, and Third groups, respectively. Details concerning the billing requirements are provided in the methodology sections below.

10.2.2 Control Group

AI provided a dataset of nonparticipant dwellings that were part of the randomized control trial the Evaluators created prior to PY8 opt-out group implementation. The dataset included monthly billing reads for the controls across the pre- and post-reporting timeframe. An analysis was conducted to check the validity of the remaining, altered RCT groups for the Initial and Second groups. The additional nonparticipant billing data was used to attempt to create a post-hoc control group for the Third group via quasi-experimental methods.

Reports were delivered starting May 4, 2018 for the Initial group, July 16, 2018 for the Second group, and December 27, 2018 for the Third group. A summary of data used in this analysis is provided in Table 10-2:

Table 10-2 Time Periods Data Summary

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

Table 10-3 summarizes the total number of households from the raw data provided and total number of households utilized in the analysis.

Table 10-3 Treatment and Control Group Totals

Group	Raw		Analysis	
	Treatment	Control	Treatment	Control
Initial	26,169	9,975	22,827	1,825
Second	25,045	9,967	21,710	0
Third	61,379	57,136	37,591	0

10.2.2.1 Remaining Control Group Validity Testing

The remaining control groups program alteration were tested for statistically significant differences in usage between the treatment and control groups for each of the 12 pre-period months. Before program launch, the Evaluators were given billing records of all customers to create two matched (i.e. validated) groups: a treatment group and a control group. The Evaluators conducted a two-tailed T-test based on kWh used per day (which normalize for differences in billing period length). The control groups were validated in prior evaluations of this program, however due to treatment and control groups decay, and more importantly, due to change in program implementation, there is a possibility of the groups ceasing to be a statistical match. More than 75% of each the Initial and Second control groups were reassigned to the Third group treatment group. Validity testing was completed to determine if propensity score matching is required to create an ad-hoc, quasi-experimental control group.

Below, Table 10-4 and Table 10-5 detail differences and statistical significance between the Initial group and the Second group for each of the 12 months in the pre-period. The Initial group's intervention was in May 2018, while the Second group's intervention was in July 2018. Therefore, the baseline months listed in each table differ between the two groups.

Table 10-4 2018 Initial Group Monthly Pre-Period T-Test

Month-Year	Control Mean	Treatment Mean	Difference	PR > T	Reject Null Hypothesis
Apr 2017	51.03	52.11	-1.07	3.96E-01	-
May 2017	59.28	59.03	0.26	7.83E-01	-
Jun 2017	71.40	72.06	-0.65	5.63E-01	-
Jul 2017	79.83	80.47	-0.64	5.96E-01	-
Aug 2017	80.17	80.73	-0.56	6.36E-01	-
Sep 2017	70.31	70.85	-0.54	6.19E-01	-
Oct 2017	59.96	58.33	1.63	1.21E-01	-
Nov 2017	45.18	44.80	0.39	5.96E-01	-
Dec 2017	62.00	63.32	-1.32	2.66E-01	-
Jan 2018	75.43	73.52	1.91	2.05E-01	-
Feb 2018	48.35	46.76	1.59	6.26E-02	-
Mar 2018	42.65	41.79	0.87	2.31E-01	-
*statistically significant if p<0.05					

Table 10-5 2018 Second Group Monthly Pre-Period T-Test

Month-Year	Control Mean	Treatment Mean	Difference	PR > T	Reject Null Hypothesis
Jul 2017	46.13	40.85	5.28	3.56E-11	*
Aug 2017	44.40	39.82	4.58	7.59E-11	*
Sep 2017	39.34	34.61	4.73	3.69E-13	*
Oct 2017	31.78	27.83	3.96	1.93E-13	*
Nov 2017	24.34	20.69	3.65	8.02E-17	*
Dec 2017	33.93	29.11	4.82	1.27E-11	*
Jan 2018	42.24	35.49	6.75	1.05E-14	*
Feb 2018	25.95	22.05	3.91	2.96E-16	*
Mar 2018	22.72	19.46	3.26	8.98E-17	*
Apr 2018	23.40	20.15	3.24	2.46E-14	*
May 2018	38.57	34.38	4.19	7.95E-11	*
Jun 2018	46.08	41.82	4.26	1.41E-07	*
*statistically significant if p<0.05					

The RCT for the Initial group remained balanced at the 95% confidence level in the entire pre-period. However, the RCT for the Second group indicated imbalance in all 12 pre-period months, which is displayed by the p-values less than 0.05 in the table above. Therefore, the Evaluators continued with the control group for the Initial group and employed propensity score matching to attempt to create an ad-hoc control group for both the Second group and the Third group.

10.2.2.2 Propensity Score Matching

The Evaluators aimed to use participant and nonparticipant billing data in the pre-period (before customer received Scorecard) and participant and non-participant billing data in the post-period (after customer received Scorecard) in a fixed-effects panel regression model to predict weather-dependent savings.

To conduct this billing analysis, a control group is required. The Evaluators compiled billing data for a control group to compare against treatment households via quasi-experimental methods. Quasi-experimental methods are employed when the control group has not been randomly assigned as it would be in an RCT.

The control groups were created using propensity score matching (PSM), a method that allows the Evaluators to find the most similar household based on customers' monthly energy consumption trends in the pre-period, specifically covariates for average summer, winter, fall, and spring pre-period usage. After matching, a t-test was conducted for each month in the pre-period to help determine the success of PSM.

The t-test revealed the ad-hoc control group was not a valid match through PSM for all 12 pre-period months in any of the groups tested (Initial, Second, and Third). The Evaluators were therefore unable to employ any regression models that included a control group through PSM. Details of the PSM can be found in Appendix A.

10.2.3 Savings Calculation Methodologies

For the impact evaluation, multiple analyses were run to determine group-specific savings, including the post-program regression (PPR) and treatment-only models. The PPR model was run for the Initial group. Treatment-only fixed effects models were run for the Second group and Third group, separately. The models chosen demonstrated the highest adjusted R-squared value and reasonable savings estimates. All three models displayed statistically significant savings.

The data used in this study was composed of household monthly billing reads supplied by Accelerated Innovations ("AI"). As part of the data cleaning, the following observations were removed to create the sample used in the regression analyses:

- Customers that were part of the Pilot opt-in group;
- Control customers that had changed assignment to Third group treatment group;
- Observations with fewer than 10 days or more than 90 days in the billing cycle; these observations were removed because long and short bills can be an indication of an issue in the recording of energy use. In past evaluations, the inclusion range was 20-40 days. The Evaluators broadened this range as abnormal billing reads may not be randomly distributed; long billing cycles are more common among rural populations;
- Observations outside of the evaluation period: the 12-month pre-program period and the 15- month post-program period;
- Observations with less than 9 out of 12 valid pre-program period monthly billing data [sets?];

- Observations with less than 9 out of 12 valid post-program period monthly billing data [sets?];
- Outliers, which are defined as observations with a daily kWh usage higher [than?] 10 times the group median daily kWh usage; these observations were removed because they represent implausibly high observations of energy use. High usage observations under this amount were kept in the analysis in order to account for plausibly high energy users in each group.

The following sections detail the regression models employed to estimate savings for each group.

10.2.3.1 Post-Program Regression Specification

The post-program regression (PPR) model combines both cross-sectional and time series data in a panel dataset. This model uses only the post-program data, with lagged energy use for the same calendar month of the pre-program period acting as a control for any small systematic differences between the participant and control customers. Energy use in calendar month t of the post-program period is framed as a function of both the participant variable and energy use in the same calendar month of the pre-program period. The underlying logic is that systematic differences between participants and controls will be reflected in differences in their past energy use, which is highly correlated with their current energy use. The version we estimate includes monthly fixed effects and interacts these monthly fixed effects with the pre-program energy use variable. These interaction terms allow pre-program usage to have a different effect on post-program usage in each calendar month.

Formally, the model is:

Equation 10-1 Post-Program Model Specifications

$$Usage_{it} = \alpha_0 + \delta_1 * Month_{it} + \delta_2 * Usage\ Lag_{it} + \delta_3 * Month_{it} * Usage\ Lag_{it} + \delta_4 * Treatment_i + \varepsilon_{it}$$

Where,

i denotes the *i*th customer;

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

$Usage_{it}$ is the average daily consumption in kWh for customer *i* during billing cycle *t*.

$Month_{it}$ is a dummy variable representing the month of period *t*;

$Usage\ Lag_{it}$ is customer *i*'s energy use in the same calendar month of the pre-program year as the calendar month of month *t*;

$Treatment_i$ is a binary variable indicating whether customer *i* is in the participant group (taking a value of 1) or in the control group (taking a value of 0);

And parameter definitions are:

α_0 is an intercept term;

$\delta_1, \delta_2, \delta_3, \delta_4$ are the effect of each of the independent variables on the dependent variable;

ε_{it} is the cluster-robust error term for customer *i* during billing cycle *t*. Cluster- robust errors account for heteroscedasticity and autocorrelation at the customer level[57]

In this model, δ_4 represents the average daily energy savings due to the program. Program savings are the product of the average daily savings estimate, the number of days in the program, and the total number of participant-days in the analysis.

10.2.3.2 Treatment-Only Regression Model

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

Equation 10-2 Treatment-Only Model Specifications

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

Where

i denotes the *i*th customer;

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

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

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

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

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

And parameter definitions are:

α_0 is an intercept term for household *i;*

$\delta_1, \delta_2, \delta_3, \delta_4, \delta_5$ are the effect of each of the independent variables on the dependent variable;

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

ε_{it} is the cluster-robust error term for customer *i* during billing cycle *t*. Cluster- robust errors account for heteroscedasticity and autocorrelation at the customer level.[58]

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

10.2.4 Double Counting Analysis

Measurement of savings from behavioral programs needs to account for other program savings to ensure that the ENO residential portfolio is not double counting any savings.

The first step in this process is to cross-reference the account IDs for each treatment and control group customer with all other program participation in the study period. APTIM and Franklin Energy, then Residential program implementors, provided ADM with all other program tracking data, and the datasets were cross-referenced by account number. This resulted in a total "other program kWh" per group for both the PY8 measures and PY9 measures.

It is important in this analysis to normalize the effects to the number of households in the group. The treatment and control groups are not precisely matched in customer count (the treatment group is 2.5 times larger than the control group). As such, if one were to directly compare the other-program-kWh of the treatment and control group, it would overestimate the double counting (a treatment group of 50,000 customers is most assuredly going to show higher savings than a matched control group of 20,000 customers). By comparing this on a per-household basis, we normalize to the reality of mismatched treatment and control group population sizes.

The final double counting of savings adjustment (calculated separately for each unique group in each program year) is as follows:

$$Uplift = \left(\frac{OP\ kWh}{Hosehold_{Treatment}} - \frac{OP\ kWh}{Hosehold_{Control}}\right) \times \#\ Accounts_{Treatment}$$

Where,

$$\frac{OP\ kWh}{Hosehold_{Treatment}} = Other\ program\ kWh\ per\ household\ in\ the\ treatment\ group$$

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

$$\frac{OP\ kWh}{Hosehold_{Control}} = Other\ program\ kWh\ per\ household\ in\ the\ control\ group$$

$$\#\ Accounts_{Treatment} = Total\ accounts\ in\ the\ treatment\ group$$

The Second group and the Third group did not include a control group in this analysis, and therefore an adjustment ratio was included to estimate possible control group other programs savings to net out. Further discussion of the double counting analysis as well detailed results can be found in in Appendix B.

The data used in this study comprised billing data supplied by Accelerated Innovations. Before the program launch, the Evaluators used this data to create matched treatment and control groups for the RCT design.

As mentioned above, it is important to note that this is an interim analysis and the data provided lacks the recommended minimum requirements of 12 months' pre- and post-treatment data for a proper evaluation. The data provided contains 12 months of pre-period data and 15 months of post-treatment data.

As part of the data cleaning, the following observations were removed to create the sample used in the regression analyses:

- Observations with fewer than 10 days or more than 90 days in the billing cycle; these observations were removed because long and short bills can be an indication of an issue in the recording of energy use. In past evaluations, the inclusion range was 20-40 days. ADM broadened this range as abnormal billing reads may not be randomly distributed; long billing cycles are more common among rural populations.
- Observations outside of the evaluation period: the 12-month pre-program period.
- Outliers, which are defined as observations with average daily usage at least 10 times larger; these observations were removed because very high observations of energy use can have an outsize impact on the regression results biasing the estimate of savings.

Details of the double count analysis can be found in Appendix C: Behavioral Analysis Support.

10.2.5 Demand Reduction Estimation

The relationship between annual usage savings and peak demand savings has not been defined for Scorecards. Program savings rely on monthly meter reading data provided by Entergy. At this time, smart meter data (hourly usage data) are not yet available for the majority of Entergy residential customers. Thus, the resolution of billing data provided for analysis is unsuitable for the direct evaluation of peak demand savings. We can assume

that total monthly usage can be attributed to the usage of other residential components (e.g., HVAC, lighting, etc.) and that any reduction in usage is proportional to the overall usage of these components. Load factors are available for these components at an hourly resolution, thus, the Evaluators have developed a model for predicting coincident peak demand savings from component load factors from the gross energy savings calculated using the above methodology.

10.2.5.1 Normalize kWh Usage

In order to increase the generalizability of the model, the Evaluators first normalize the kWh savings value predicted by the impact evaluation regression model into a percent savings value by dividing each month's savings by the total annual savings, as represented in Equation 10-3.

Equation 10-3 Monthly Savings Normalization Calculation

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

Where,

M = Value for given program month *m*.

Y = Value for given program year *y*.

10.2.5.2 Calculate Monthly Load Factors for Component Variables

The model assumes a linear relationship between the component variables and the percent savings calculated above. Because load shape information is available for residential components at an hourly resolution, the Evaluators can estimate the relationship between component load and percent savings in order to estimate total demand savings. To make sure that the model is interpretable, hourly load factors must be converted to monthly load factors. The Evaluators sourced hourly load data from the U.S. Department of Energy Open Data Catalog[59] of residential hourly load profiles. The database contains hourly load profiles for all TMY3 locations in the United States. The specific location chosen for this evaluation was the New Orleans International Airport.

10.2.5.3 Simple Regression

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

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

Equation 10-4 Percent Savings Prediction

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

Where,

Lf = Load factor for each component variable of interest

Total kWh = All end-uses combined

The regression coefficients for the above regression equation represent the relationship of each of the component variables to percent savings. Because both independent and dependent variables are calculated in units of months, the numerator of the regression weights are time invariant and can be used to estimate the percentage of savings across any unit of time of interest in a year.

10.2.5.4 ***Demand Calculation***

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

Equation 10-5 Peak Load Factor Calculation

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

Where,

X = Component variable of interest (Total electric load)

I = First peak hour for the entire annual peak period

N = Last peak hour for the entire annual peak period

This will generate the percent of annual savings that took place in the total peak period. Equation 10-6 demonstrates this calculation.

Equation 10-6 Percent Savings Attributable to Peak Period

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

Multiplying this value by the total annual savings will then generate the kWh savings that took place during the peak period, as illustrated by Equation 10-7.

Equation 10-7 Energy Savings During Peak Period

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

Dividing this value by the total number of peak hours will generate coincident peak demand savings in units of kW, as shown in Equation 10-8.

Equation 10-8 Peak Demand Savings

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

As with gross usage savings, the Evaluators anticipate that some participants in the treatment group will also participate in other Entergy programs. The adjusted savings per month is an input for the demand savings estimation with this method. The Evaluators adjust the savings per month by weighing the HVAC measures by degree day. Therefore, the double counting savings displays more accurate savings in relation to peak period. Because the peak demand savings is predicted from the adjusted savings calculated after double counting, an additional adjustment does not need to be made.

10.3 Impact Evaluation Results

Table 10-6 summarizes the verified energy savings. Overall verified net savings were 9,393 MWh for the 2019 calendar year. Table 10-7 summarizes the final verified net savings accounting for double counting of savings.

Savings for each group were positive before double counting analysis. However, after accounting for double counted savings, the Second group and Third group did not display valid savings.

Table 10-6 Overall Savings Summary

Variable	*Initial Group*	*Second Group*	*Third Group*
Number of Treatment Customers	21,341	20,012	50,921
Number of Control Customers	1,825	0	0
Verified Gross Savings per Month (MWh)	**10,815**	**524**	**1,070**
Verified Net Demand Savings (kW)	**1,758**	**18**	**0**

Table 10-7 Savings by Group: Treatment Only Model

Variable	*Initial Group*	*Second Group*	*Third Group*
Number of Weighted Treatment Customers	21,341	20,012	50,921
Percent Savings	2.27%	0.24%	0.15%
Average Daily Savings per Customer (kWh)	1.39	0.07	0.06
Verified Net Savings Before Double Counting Adjustment (MWh)	10,815.25	524.40	1,070.15
Savings Double Counting in Other Energy Efficiency Programs (MWh)	-1,444.03	-625.67	-1,855.94
Final Verified Net Savings (MWh)	**9,371.22**	**0**	**0**
Verified Net Demand Savings (kW)	**2,148**	**22**	**0**

10.3.1 Model Output

The post-program regression model as well as the three treatment-only models all display statistically significant energy savings coefficients. In addition, all three models display sufficient model fit. The Second group has the lowest model fit with an adjusted R-squared

value of 0.59. Of the two regression models, the post-program regression model is also the most reliable because it includes a control group. The tables below summarize the model output coefficients and adjusted r-squared values for each of the models.

Table 10-8 PPR Estimates

Variable	***Initial Group***	
	Coefficient	***t-statistic***
Treatment	-1.39	-4.97*
Average February kWh	-1.12	-2.74*
Average March kWh	-1.81	-4.52*
Average April kWh	-1.53	-3.73*
Average May kWh	1.69	3.95*
Average June kWh	3.36	7.56*
Average July kWh	-0.61	-1.39
Average August kWh	0.77	1.84
Average September kWh	1.97	4.59*
Average October kWh	-1.76	-4.37*
Average November kWh	-0.25	-0.62
Average December kWh	0.41	1.05
Average Pre-Period January kWh	0.62	212.95*
Average Pre-Period February kWh	0.16	24.17*
Average Pre-Period March kWh	0.18	26.09*
Average Pre-Period April kWh	0.14	20.08*
Average Pre-Period May kWh	0.25	42.54*
Average Pre-Period June kWh	0.30	54.76*
Average Pre-Period July kWh	0.22	46.05*
Average Pre-Period August kWh	0.22	46.43*
Average Pre-Period September kWh	0.32	61.66*
Average Pre-Period October kWh	0.15	27.82*
Average Pre-Period November kWh	0.17	24.36*
Average Pre-Period December kWh	-0.04	-7.72*
Adjusted R-Squared	**0.6619**	

*Statistically significant at the 95% confidence interval

Table 10-9 Treatment-only Estimates

Variable	***Initial Group***		***Second Group***		***Third Group***	
	Coefficient	***t-statistic***	***Coefficient***	***t-statistic***	***Coefficient***	***t-statistic***
Post	3.99	17.27*	1.80	12.96*	2.20	16.61*
Average Daily HDD	3.17	264.69*	1.59	223.93*	2.00	214.73*
Average Daily CDD	4.34	351.29*	2.21	312.52*	2.44	379.51*
Average Post-Period Daily HDD	-0.46	-21.07*	-0.12	-8.73*	-0.19	-13.50*
Average Post-Period Daily CDD	-0.80	-46.69*	-0.21	-20.53*	-0.21	-22.64*
Adjusted R-Squared	**0.6110**		**0.5872**		**0.7237**	

*Statistically significant at the 95% confidence interval

10.3.1.1 Treatment-Only Model Adjustment Factor

The Evaluators included an adjustment factor for the Second group and Third group treatment-only models to adjust for the lack of a control group. A control group is useful because it allows the regression model to include factors outside of program measures and interventions that might affect billed usage, such as changes in economy, market, or large-scale natural systems such as hurricanes. Without a control group, the treatment-only models are unable to adjust for these changes. Therefore, an adjustment factor is included, created as a ratio of the estimated Initial group PPR regression savings and the estimated Initial group treatment-only regression savings.

An adjustment factor between a model with a control group and a model without a control group was included to account for changes throughout the program period that may have impacted treatment billed usage. The adjustment factor was calculated by dividing the Initial group PPR savings estimate by the Initial group treatment-only savings estimate. This adjustment factor is applied to the Second group estimate as well as the Third group estimate.

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

Table 10-10 Treatment-Only Model Adjustment Factor

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

The 0.3692 value was used as a multiplier on the daily savings values for the Second and Third group to account for control usage. Furthermore, an adjustment factor is also included in the double counting analysis in order to be aggregated with the adjusted model output. More details are provided in the double counting discussion in Double Counting Analysis.

10.3.1.2 Program Regression Results

The output from the post-only regression model for the Initial group and the adjusted output from the treatment-only program for the Second group and Third group was used to report savings estimates. Table 10-11 displays the final regression model extrapolation for each group in the program, before adjusting for double counting. Included are 90% confidence interval boundaries for the annual percent savings, average daily savings per customer, and verified gross savings before double counting adjustment.

Table 10-11 Program Regression Results

Variable	*Initial Group*	*Second Group*	*Third Group*
Weighted Number of Treatment Customers	21,341	20,012	50,921
Number of Control Customers	1,825	0	0
Percent Savings	2.27%	0.24%	0.15%
90% Confidence Interval	[3.01%, 1.52%]	[0.33%, 0.15%]	[0.22%, 0.09%]
Average Daily Savings per Customer (kWh)	1.39	0.07	0.06
90% Confidence Interval	[1.85, 0.93]	[-0.10, -0.05]	[-0.08, -0.03]
Verified Gross Savings Before Double Counting Adjustment	**10,815**	**524**	**1,070**
90% Confidence Interval	**[14,393, 7237]**	**[724, 331]**	**[1526, 614]**

The Initial group larger savings rates as a percent of annual use. There are multiple factors which contribute to this:

- **Length of time in treatment group.** The initial group has received reports for two months longer than the additional group. Historically, there has been a documented effect in behavioral programs of longer treatment resulting increased savings as a percent of billed use.
- **Difference in pre-treatment energy use.** With each successive group, the available savings potential declines as the program first targeted high-use customers. Higher users have historically demonstrated a high percentage of savings. This is due to there being more usage than could be considered discretionary, and as a result, high-use customers have the greater potential for savings both in absolute and relative terms.
- **Includes a control group.** The Initial group regression includes a valid control group, which helps account for variances in post-program energy usage and therefore allows the Evaluators to more accurately estimate savings due to the program.

The initial group showed a higher savings rate than the Second and Third groups. This is most likely due to the Initial group having higher energy-using customers as well as having a valid control group. The average pre-period annual kWh usage from the Initial group was over 22,000 kWh while the Second and Third group was nearly 11,000 and 14,000, respectively. The Initial group has higher pre-period usage, and thus have more opportunity to save energy. Also, because the Initial group's intervention date was two months earlier than the Second group and 7 months earlier than the Third group, any behavioral changes from the treatment group have more time to manifest.

10.3.2 Double Counting Findings

Savings estimates for Scorecard must also consider savings resulting from other programs. ADM examined program tracking data from Entergy New Orleans' AC Tune-up Program (AC Tune-up), Energy Smart Home Performance with Energy Star (HPwES),

Low-Income Qualified Weatherization (LIW), Energy Smart Multifamily (MF), and Energy Smart Residential Lighting and Appliances programs (L&A). Savings claimed by these programs were netted out of Scorecard savings estimates to avoid double-counting of the same savings.

10.3.2.1 Double Counting Adjustment Factor

The double-counting analysis is for the downstream measures, such as duct sealing, air sealing, attic insulation and major appliances. An adjustment factor was also used to calculate would-be control Other Program savings for the Second group and Third group, similar to the adjustment factor between the PPR and treatment-only model estimates. This double counting adjustment factor was calculated by dividing the Initial group's control other program savings by the Initial group treatment other program savings, for each the Algiers territory, New Orleans territory, and combined. This ratio was then multiplied by the treatment other program savings for the Second group and Third group to estimate what each group's control customer other program savings would likely have been.

The following table demonstrates the calculation of the double counting adjustment factor:

Table 10-12 Treatment-Only Model Adjustment Factor

Term	*Algiers*	*New Orleans*
Initial Group Control Group Other Program Savings	15	45
Initial Group Treatment Group Other Program Savings	74	114
Adjustment Factor	0.2019	0.3922

The 0.2019 value was used as a multiplier on the treatment group other program savings for the Second and Third group to account for per-household control usage. The differences between the per-household other program savings between each group were then extrapolated by the total weighted number of participants in the post-period in order to aggregate with the weighted program savings estimates from the regression models.

10.3.2.2 Double Counting Results

The following table displays the verified double counting savings to be subtracted from each group's annual program savings.

Table 10-13 Double Counting Results

Territory	Group	Treatment Participants	Control Participants	Other-Program kWh per-Account		Total Weighted Participants	Double Count (kWh)
				Treatment	Control		
New Orleans	Initial	22,557	1,639	113.77	44.62	18,260	1,262,700
	Second	22,349	0	50.61	19.85	17,787	547,156
	Third	54,829	0	61.61	24.17	45,251	1,694,619
Algiers	Initial	186	186	73.76	14.90	3,081	181,333
	Second	3,612	0	44.21	8.93	2,225	78,510
	Third	2,696	0	35.65	7.20	5,670	161,323

*Values were aggregated from separated Algiers and New Orleans calculations

10.3.3 Demand Reduction Results

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

The following figures display average residential load by end use from the Energy Open Data Catalog database[60].

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

Figure 10-1 Typical Annual Load Profile

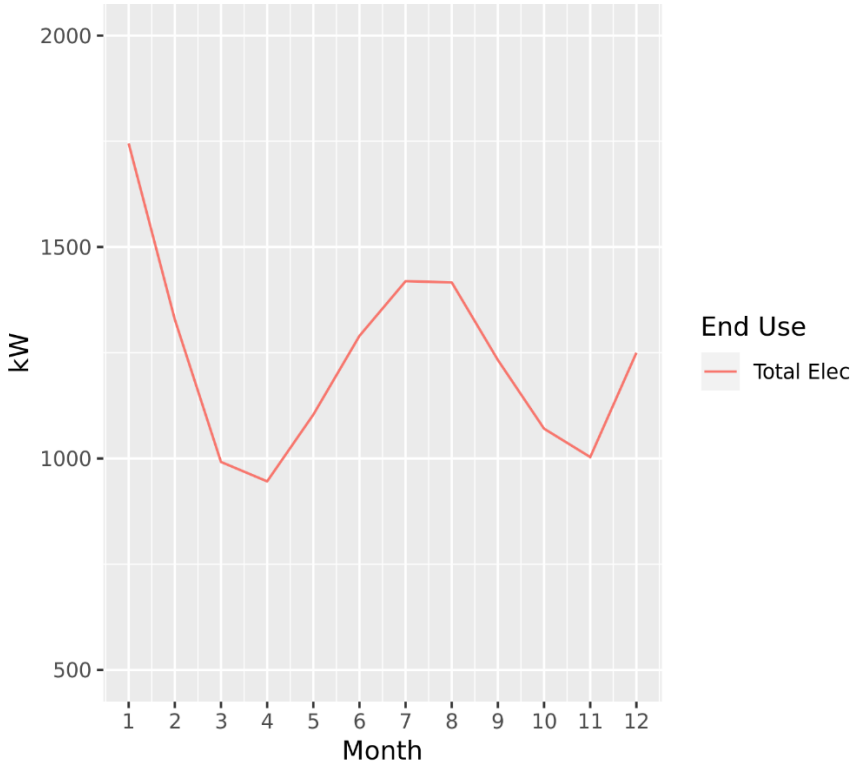
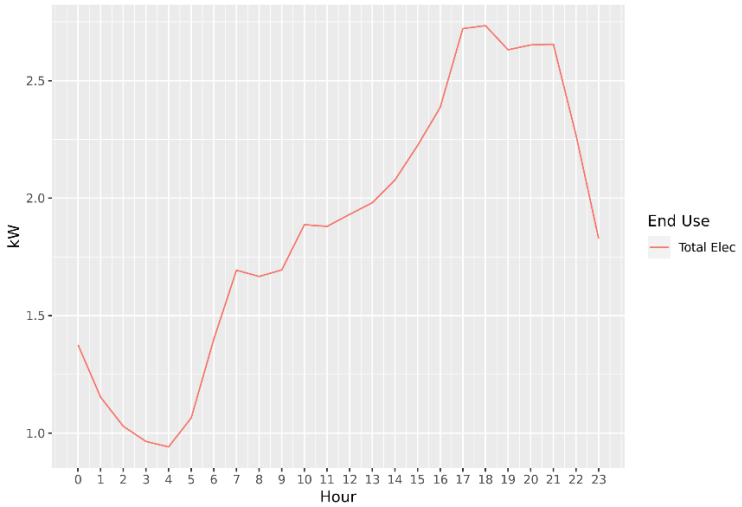
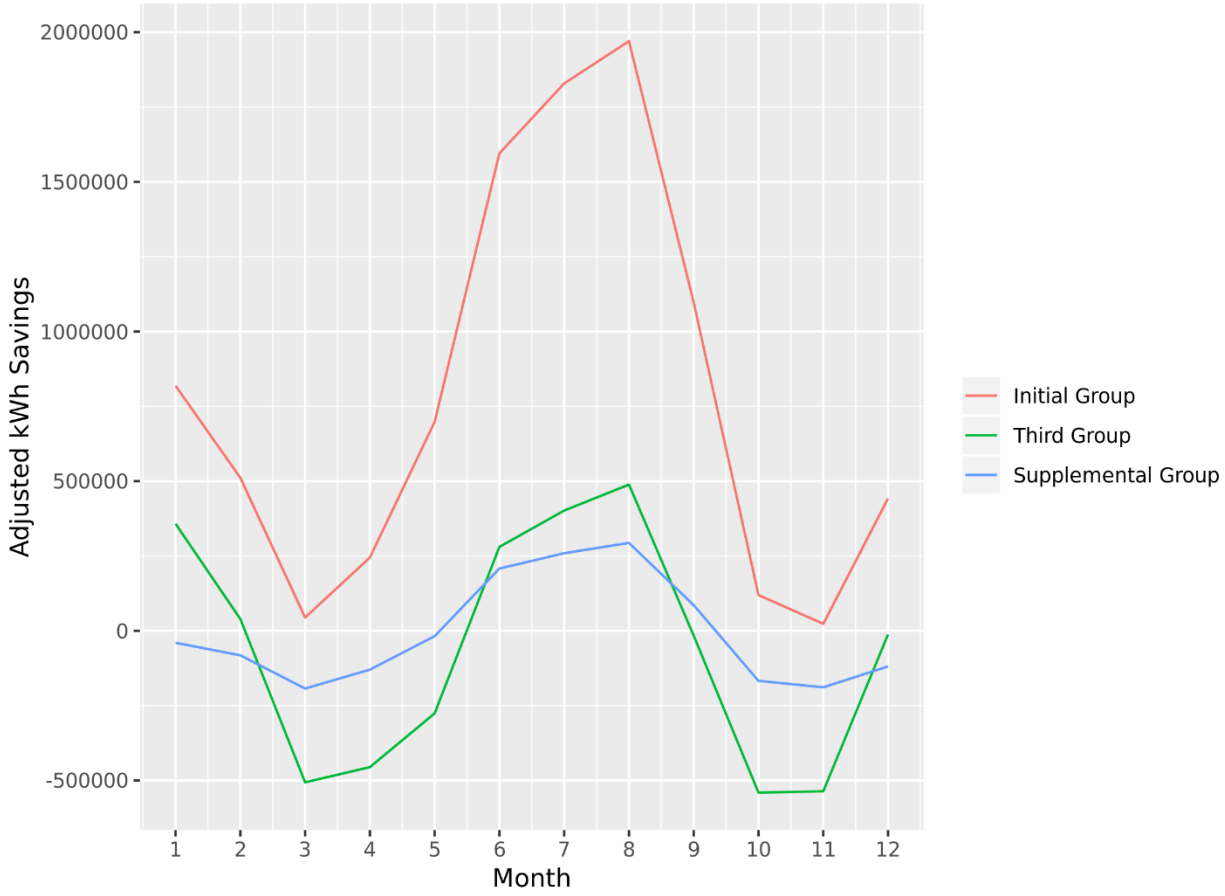


Figure 10-2 Typical Daily Load Profile



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

Figure 10-3 Net Energy Savings by Group



The Evaluators conducted the steps presented in the demand calculation methodology in Section 10.2.5. The following table displays the resulting demand savings for each group, for both the annual program year and the extended program year.

Table 10-14 Gross and Net Energy and Demand Savings By Group

Variable	***Initial Group***	***Second Group***	***Third Group***
PY9 Verified Net Demand Savings (kW)	1,758	18	0
Extended PY9 Verified Net Demand Savings (kW)	2,148	22	0

The Third group displayed negative savings, and therefore the Evaluators assigned a demand savings value of zero from the Scorecard program. In summary, PY9 is estimated to save 1,758 kW and the extended PY9 is estimated to save 2,148 kW.

The Second group amounts to zero energy savings, but still displays demand savings because this group displayed positive energy savings during the peak months, June through August, although the total annual energy savings for this group aggregated to zero. The Third group displayed savings in the peak summer months, but these savings

were not enough to offset the load usage in the winter and therefore this group displays no demand savings from the program.

Table 10-15 Verified Savings By Territory and Year

Utility	*Year*	*Verified kWh Savings*	*Verified kW Savings*
ENO	2019	7,991,401	1,520.00
	2020	1,857,069	336.83
ENO Subtotal	**Both**	**9,848,470**	**1,856.83**
Algiers	2019	1,379,817	255.74
	2020	218,249	56.67
Algiers Subtotal	**Both**	**1,598,066**	**312.41**
Overall Total	**Both**	**11,446,536**	**2,169.24**

Table 10-16 Verified Savings by Year

Year	*Verified kWh Savings*	*Verified kW Reductions*
2019	9,371,219	1,775.74
2020	2,075,318	393.50
Total	**11,446,536**	**2,169.24**

10.4 Process Evaluation Findings

10.4.1 Participant Feedback

10.4.1.1 Customer Impression of Energy Smart Scorecards

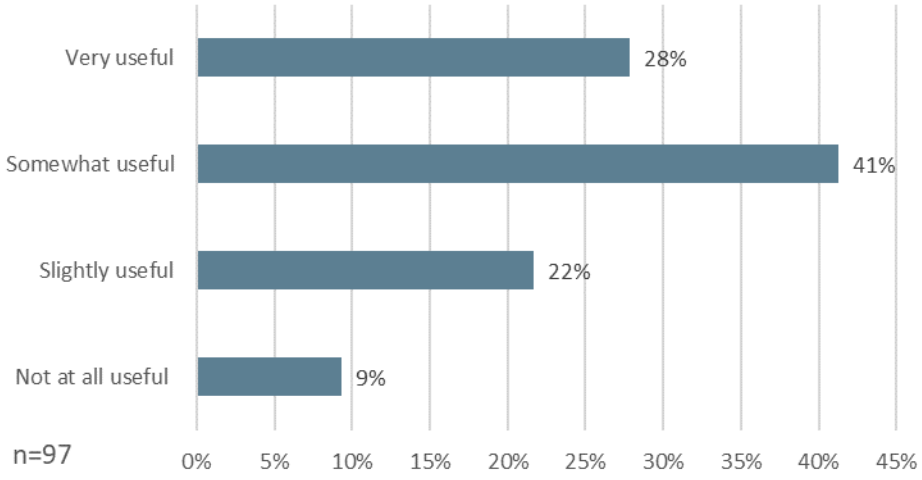
The majority of customers viewed their scorecard each month. As shown in Table 10-17, 71% of customers viewed their scorecard every month while the other 28% of customers viewed their scorecards ranging from every other month to once or twice per year. It was commonly reported (94%) that only one person in the household viewed the scorecard.

Table 10-17 Frequency of Viewing Scorecard

Frequency viewed	***Percent of Respondents (n = 137)***
Every month	71%
Every other month	10%
Every 2 - 3 months	7%
Every 4 - 6 months	4%
Once or twice per year	7%

The recommendations provided in the scorecard were considered useful by many customers but a majority thought that the home comparison information was inaccurate. Thirty one percent of customers found the recommendations "slightly useful" or "not at all useful," but 69% thought that the recommendations were "very useful" or "somewhat useful." Forty percent of customers thought that the comparison of their home's energy usage was "very accurate" or "somewhat accurate" compared to the energy usage of other homes. However, sixty percent through that the information was inaccurate.

Figure 10-4 Perceived Usefulness of the Information



Customers reported diverse reasons for why the recommendations were not useful. These ranged from the recommendations not making sense for the home to restrictions in a condo or rental. Some customers (14%) stated that the recommendations were too generic. Twenty five percent of customers stated that they were already doing the things that were recommended. Table 10-18 shows the various reasons why the recommendations were not useful for customers.

Table 10-18 Usefulness of Recommendations

Response	***Percent of Respondents (n = 28)***
They didn't make sense for my home	21%
Condo or rental restricts prevented me from taking the recommended actions	25%
I was already doing the things recommended	25%
Taking the recommended actions would make the home less comfortable	7%
Too generic	14%
Some other reason	7%

The customers thought that the information on the scorecard was presented in a clear and helpful manner. Seventy-one percent of customers stated that the information on home energy use presented in the scorecard is “clear” or “completely clear.” Sixty-two percent stated that the information on the card is also “very helpful” or “helpful” in understanding that use. Seventy-five percent of customers stated that the information is clear about the weather trends and home energy use, and 70% of customers found that information helpful. The majority of the customers also stated that the information about how energy is being used in the home was clear and helpful. However, some dissatisfaction (15%) was expressed in terms of the helpfulness in understanding the home’s energy use. See Figure 10-5 and Figure 10-6 below.

Figure 10-5 Ratings of Clarity of Information Presented

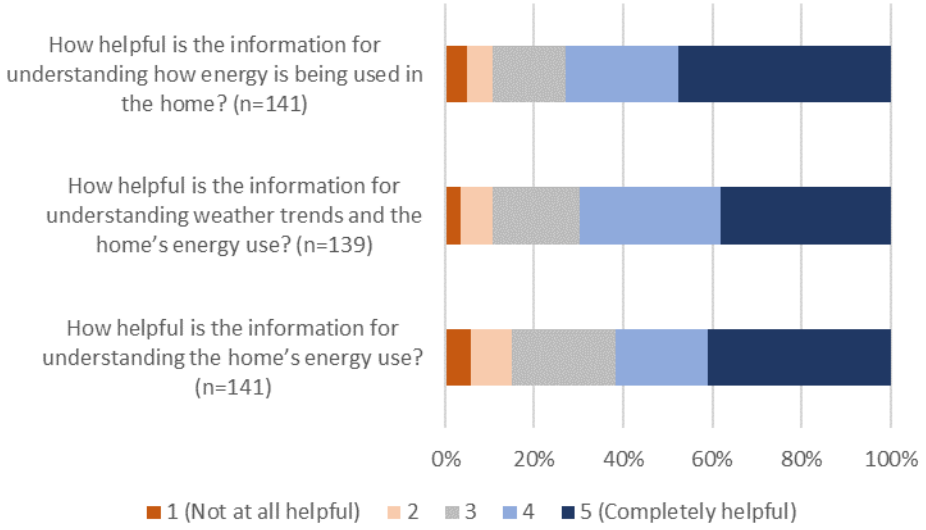
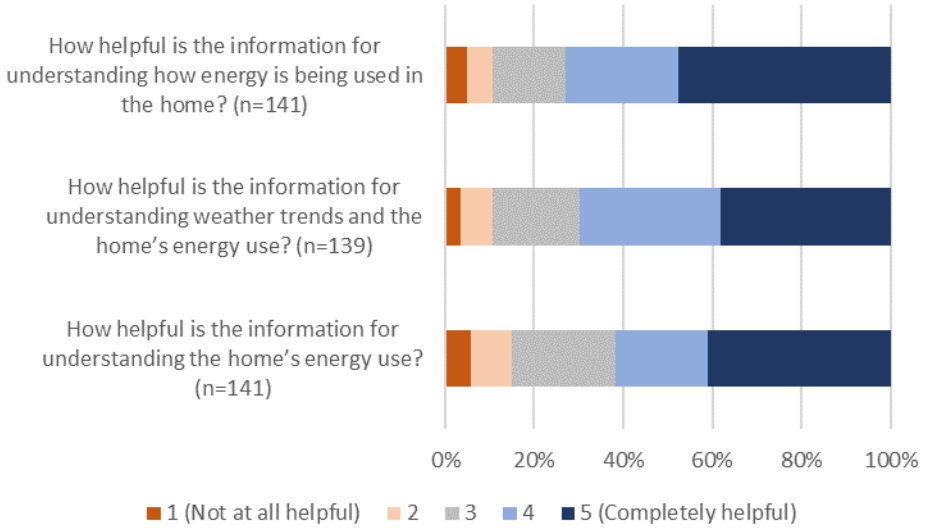


Figure 10-6 Helpfulness of Information Presented



The replacement of air filters for air conditioner or heating system and replacement of LEDs were common actions compared to the other actions that customers did to reduce energy use in the home. Seventy-four percent or customers replaced air filters for their air conditioner or heating system, and 63% of customers installed LED light bulbs. Other common actions include reducing heater use (50%) and air condition use (48%). Results are summarized in Table 10-19 below. Additionally, approximately one-half of participants reported changing their heating and cooling settings to save energy. Adjustments to thermostat settings are a primary way that behavioral programs save energy.

Table 10-19 Actions taken in the Home

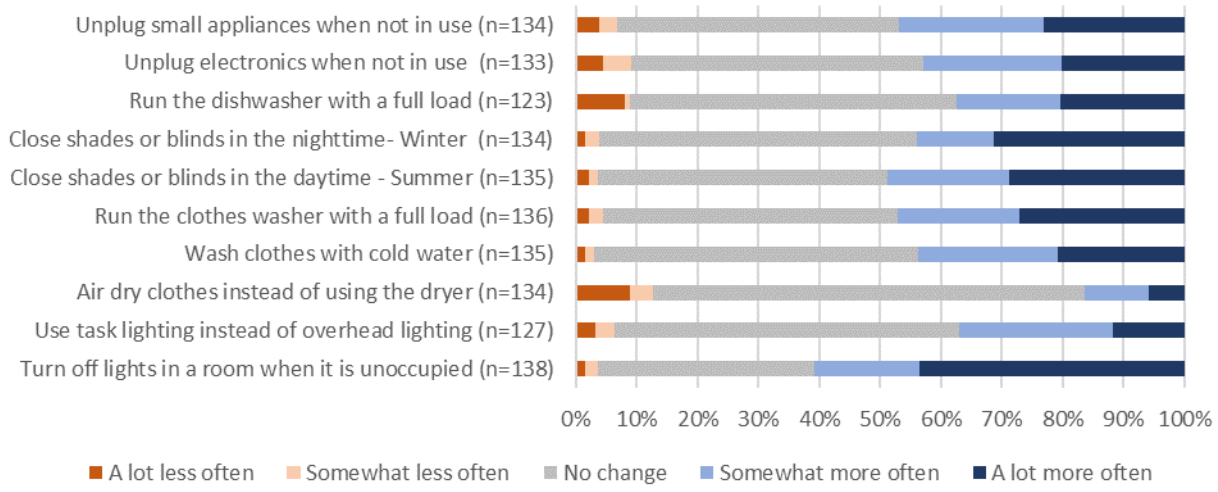
Response	Percent of Respondents (n = 145)
Replaced the air filters for your air conditioner or heating system	74%
Installed LED light bulbs	63%
Reduced heater use by decreasing the temperature setting in the winter	50%
Reduced air conditioner use by increasing the temperature setting in the summer	48%
Sealed air leaks in the home by installing weather stripping, caulking, and/or spray	23%
Make energy saving home improvements like adding insulation or sealing air leaks	18%
Changed computer stand-by energy use settings to reduce energy use	11%
Turned down the water heater temperature	11%
Purchased an ENERGY STAR refrigerator	10%
Installed low-flow faucet aerators	8%
Purchased an ENERGY STAR air conditioner or heat pump	5%
Have not taken any of these actions	8%

*Multi response question so total adds up to greater than 100%.

10.4.1.2 Behavioral Change

Customers were asked about various behavior changes that they made as a result of receiving the scorecards. The main behavior change that customers made was turning off the lights in a room when it is unoccupied. Sixty-one percent of customers turned off lights in a room when it was unoccupied. However, 36% did not change their behavioral habits. Forty-four percent of customers started to wash clothes with cold water, but 53% did not change. The scorecards inspired behavioral change but for many of the categories, it is evident that there was not a major change in behavior. Results are summarized in Figure 10-7.

Figure 10-7 Behavioral Changes as a Result of Scorecard



10.4.1.3 Satisfaction

Customers were satisfied with their Energy Smart Scorecard service overall. Sixty-nine percent of customers reported that they were "very satisfied" or "somewhat satisfied." Twenty-four percent of customers were neither satisfied or dissatisfied, and only 6% expressed dissatisfaction. Results are summarized below in Table 10-20.

Table 10-20 Energy Smart Scorecard Satisfaction

Response	***Percent of Respondents (n=136)***
Very dissatisfied	1%
Somewhat dissatisfied	5%
Neither satisfied nor dissatisfied	24%
Somewhat satisfied	37%
Very satisfied	32%

*Percentage does not add to 100% due to rounding issue.

Customers were satisfied with Entergy as their electric service provider. Fifty-six percent of participants expressed satisfaction with Entergy as their electric service provider. Twenty four percent were neither satisfied or dissatisfied and 19% expressed dissatisfaction. Results are summarized in Table 10-21.

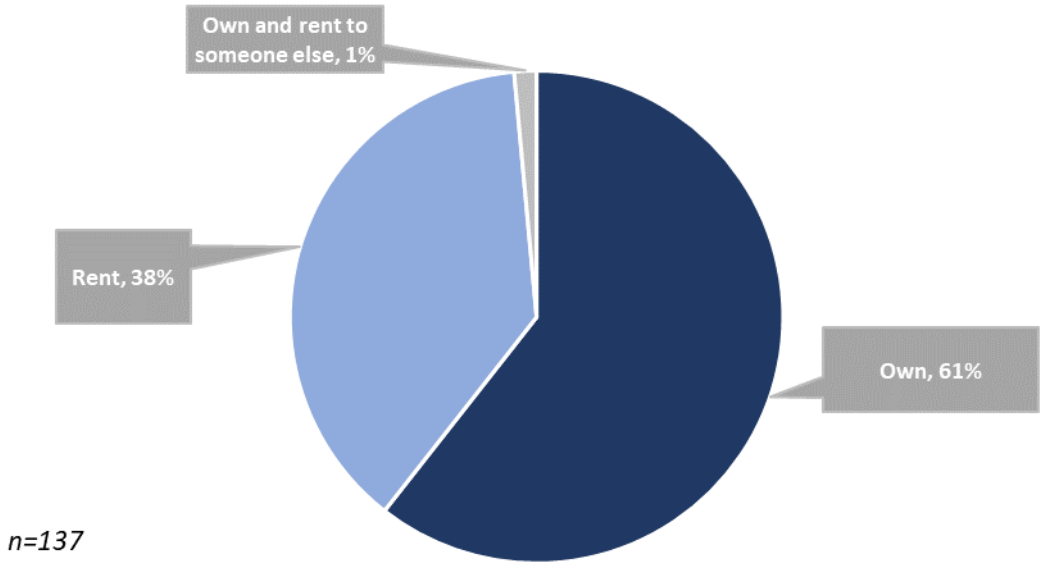
Table 10-21 Overall Satisfaction

Response	Percent of Respondents (n = 140)
Very dissatisfied	5%
Somewhat dissatisfied	14%
Neither satisfied nor dissatisfied	24%
Somewhat satisfied	26%
Very satisfied	30%

10.4.1.4 Demographics

The majority of customers own their home. Sixty one percent of customers own their own home, and 38% of customers rent their home. Results are summarized below in Figure 10-8.

Figure 10-8 Home Ownership



The majority of customers have natural gas space heating. Fifty-seven percent of respondents stated that they have natural gas heating in their homes, and 23% stated that they have an electric furnace. Results are summarized in Table 10-22.

Table 10-22 Space Heating

Response	Percent (n = 119)
Natural gas heating	57%
Heat pump	9%
Electric furnace	23%
Combination of types (Please describe)	5%
Other	6%

The majority of customers have natural gas water heating. Fifty-seven percent of respondents stated that they have a natural gas water heater, and 37% stated that they have an electric water heater. Results are summarized in Table 10-23.

Table 10-23 Water Heating

Response	Percent (n = 127)
Natural gas water heater	57%
Electric water heater	37%
Other	6%

10.5 Key Findings

- **Overall kWh goals were exceeded, but kW goals were not met.** Extension (2020) goals were met only in the New Orleans territory, though 2019 goals were exceeded in both territories. Overall goal achievement was 116.76% and 110.60% for the New Orleans and Algiers territories, respectively. Overall goal achievement for both territories was 114.47%. The program did not meet kW goals, at a total achievement of 31.90% for both territories combined.
- **The Evaluators were unable to create a valid post-hoc control group via quasi-experimental methods.** Many matching methods were employed to attempt to create a post-hoc control group with statistically similar pre-period average daily usage between participant and nonparticipant households. The Evaluators found all matched groups to still differ in pre-period usage per month. The treatment groups seem to be inherently different in behavior to the nonparticipant households provided.
- **The post-program regression (PPR) model and treatment-only model provides the verified savings for the 2019 evaluation.** It was chosen as the best-fit model for each group due to the data restraints and model results. The savings coefficients are all statistically significant.

- **The Initial group comprised all the PY9 and extended PY9 savings.** Although the Second and Third groups displayed positive gross savings, after accounting for double counting from other program savings in PY8 and PY9, the net savings reduced to zero.
- **The results of this analysis are typical in the Initial group but are considerably lower for the Second and Third group.** Typical savings for behavioral programs of this design is about 2% of household pre-energy use. However, these results are premised on the lack of a control group, and therefore do not parse out changes between the pre- and post-periods that may have affected consumption in the treatment group unrelated to the Scorecards.
- **Behavioral changes take time to materialize.** Savings resulting from these programs is not immediate and is very likely to increase as time progresses and people adjust their behaviors in response to the program.
- **Program forecasted savings has been trending ahead of savings.** At the time of the interview, the program implementer was not sure if they would meet their goal but was pleased with the level of participation. On average, participants saved 0.66% off their bill, which amounts to 9.4 million annual kWh savings.
- **AMI meters were launched, providing additional data for the Scorecard.** Staff characterized the integration of AMI meter data for use in delivering Scorecards as seamless. The goal is to have AMI meters installed for all residential customers by 2020. As more customers receive their AMI meter, they will also be sent more correspondence with information. A challenge will be to not oversaturate the customer with messages.
- **Program has increased enrolments in PY9.** There are now 150,000 customers enrolled and receiving Scorecards.
- **Content and delivery of Scorecards remained consistent from the previous program year.** Accelerated Innovations (AI) continues to provide a similar scorecard to what was given in PY8, although the tips and messaging varies from year-to-year as tips and messaging is cycled out.
- **Open rates increased significantly from the previous program year and opt-out rates have remained low.** In Q1, the open rates were 15 – 20%, then they spiked to about 35%, and the last month they increased to 42%. The initial surge occurred around Memorial Day weekend. Opt-out rates average 0.05% per send-out.
- **Scorecard will end at the end of PY9 extension as the Customer Engagement Platform ramps up.** AI is providing the AMI-metered customers with the same version of Scorecard they had previously been receiving through the end of the

program year. AI has received instruction that the Scorecard program will be winding down by the end of this program year.

- **Scorecard recipients found the scorecard to energy use graphics to be useful and helpful.** Approximately 70% of customers thought that the graphics on home energy use comparisons to other homes, home energy use for heating and cooling, and home energy use in relation to weather trends was clear and helpful.
- **A majority of scorecard recipients are satisfied with it.** Sixty-nine percent of recipients reported that they were somewhat or very satisfied with the scorecard and a minority (6%) reported that they were somewhat or very dissatisfied with it.
- **The scorecard is reaching homeowners and renters.** Thirty-eight percent of customers reported that they rent their home and 61% own it. Very few, 1%, own the home but rent to someone else – an important finding because behavioral program interventions that do not reach the occupant will not be effective.

10.6 Recommendations

The Evaluators' recommendations are as follows:

- **Design randomized controlled trials for each implemented group before sending out Scorecards.** The availability of a valid, randomly assigned control group provides the ability to estimate verified savings.
- **Develop and incorporate contests (gamification) or other incentives to continue to engage customers with the Scorecard.** For example, asking customers to complete or make commitments to complete actions to get points toward gift cards.
- **Incorporate data from customer's profiles to improve the accuracy of the Scorecards.** Currently if a customer fills out their home profile through the portal, the data is not incorporated into their Scorecard. Increasing accuracy of the Scorecard may increase engagement through improved credibility of the reported information.
- **Conduct a study to investigate the increase in open rates.** Understanding the increase in open rates can help program staff replicate the strategy if open rates fall again.

11. EasyCool Direct Load Control

11.1 Program Background

The Direct Load Control ("DLC") Program was administered by Franklin Energy Services ("Franklin Energy") on behalf of Entergy New Orleans under the direction of the New Orleans City Council. The DLC Program comprised of 1,086 residential air conditioners or heat pump units. Control switches were installed on these units in order to run test events. This brings the total active switches to 1,973. The control strategies employed were fixed cycling. In such a strategy, a duty cycle is selected *a priori* and all participants have their air conditioner limited to a maximum of this duty cycle[61].

The goals of this evaluation are to:

- **Assess the effectiveness of varying control strategies.** The program used a 50% cycling strategy. This evaluation summarizes the impacts.
- **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.

11.2 Goal Achievement

The DLC only had peak kW savings goals.

Table 11-1 DLC Goal Achievement

Utility	*kW Goal*	*Verified kW Reductions*	*Percent of kW Goal Met*
New Orleans	1,106.23	3,699.77	334.45%
Algiers	83.27	374.53	449.78%
Total	**1,189.50**	**4,074.30**	**342.52%**

The program exceeded goals in both territories, achieving 342.5% of goal.

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

11.3 M&V Methodology

11.3.1 Household Recruitment

ADM was provided participation lists by Franklin Energy, from which we recruited households to participate in the metering component of the study. Recruited households were compensated with a $50 Visa gift card upon completion of the metering and successful collection of the equipment. All four events had differing meter deployment. Table 11-2 summarizes the number of meters deployed each event after filtering for valid logger data.

Table 11-2. Meter Deployment

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

11.3.2 Data Collection

The assessment of load reductions was based on data collected for a sample of 94 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.

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.

11.3.3 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-8
- 3-of-10
- 5-of-10

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

11.4 Events

Table 11-3 summarizes the dates and times of events as well as the control strategy applied.

Table 11-3. Event Summary

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

11.4.1 Event Summary Baselines

Table 11-4 through Table 11-7 summarize the event load reductions in terms of kW/Ton for each baseline specification.

Table 11-4. Event Performance — 3-out-of-5 Baseline

Date	Hour 1	Hour 2	Hour 3	Hour 4
6/26/2019	0.164506	0.170319	0.161784	0.154976
7/9/2019	0.178667	0.207037	0.221723	0.20309
8/8/2019	0.134566	0.133144	0.135039	0.115713

8/29/2019	0.071111	0.053652	0.106737	0.086297
9/4/2019	0.171352	0.210286	0.20982	0.184054

Table 11-5. Event Performance — 3-out-of-8 Baseline

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

Table 11-6. Event Performance — 3-out-of-10 Baseline

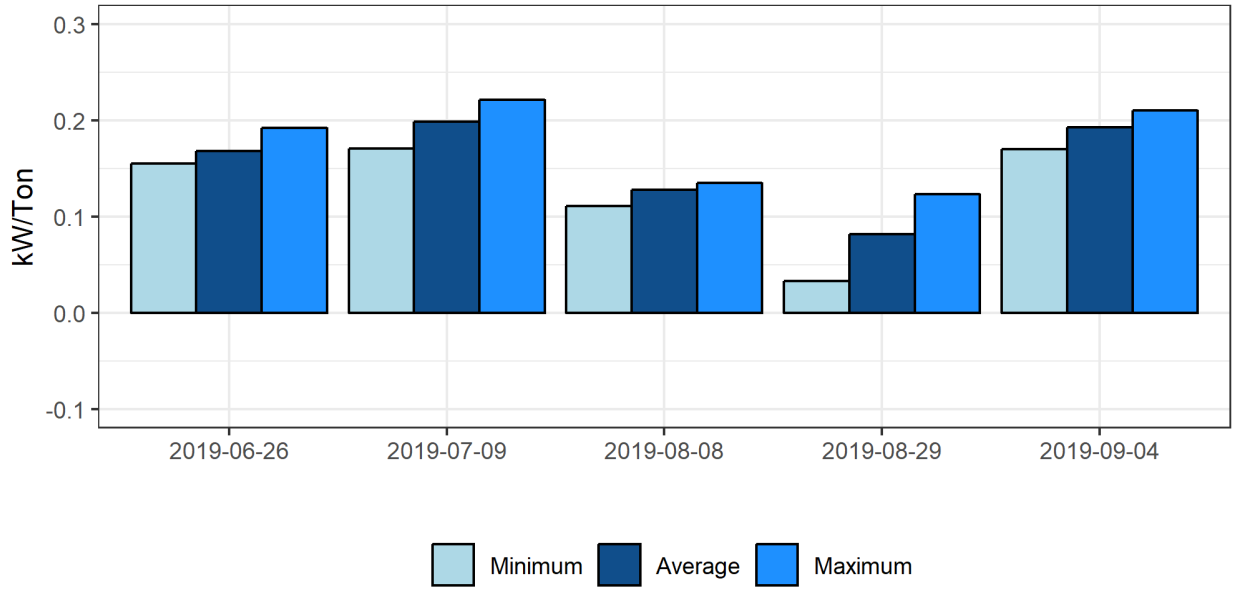
Date	Hour 1	Hour 2	Hour 3	Hour 4
6/26/2019	0.164506	0.170319	0.161784	0.154976
7/9/2019	0.170634	0.197255	0.215607	0.203044
8/8/2019	0.134566	0.133144	0.135039	0.115713
8/29/2019	0.069577	0.032803	0.12012	0.089982
9/4/2019	0.171352	0.210286	0.20982	0.184054

Table 11-7. Event Performance — 5-out-of-10 Baseline

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

Figure 11-1 summarizes the spread of load reductions for each hour of each event when comparing all four baseline specifications. Load reductions vary significantly, especially for lower-performing events. All events had positive load reductions during the course of the system event.

Figure 11-1. Variation in Load Reduction from Baseline Specification



11.4.2 Event Load Profiles

Figure 11-2 through Figure 11-6 present the kW/ton load profiles for the analyzed events. These are provided for illustrative purposes and use the three-of-five baseline data.

Figure 11-2. Event 1 Load Profile

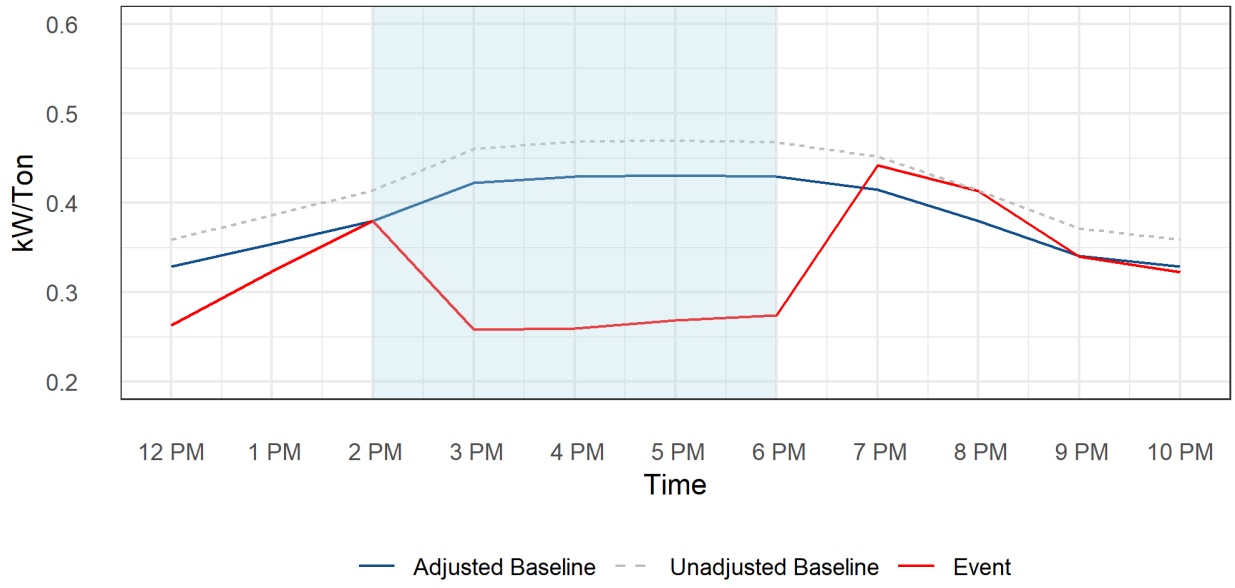


Figure 11-3. Event 2 Load Profile

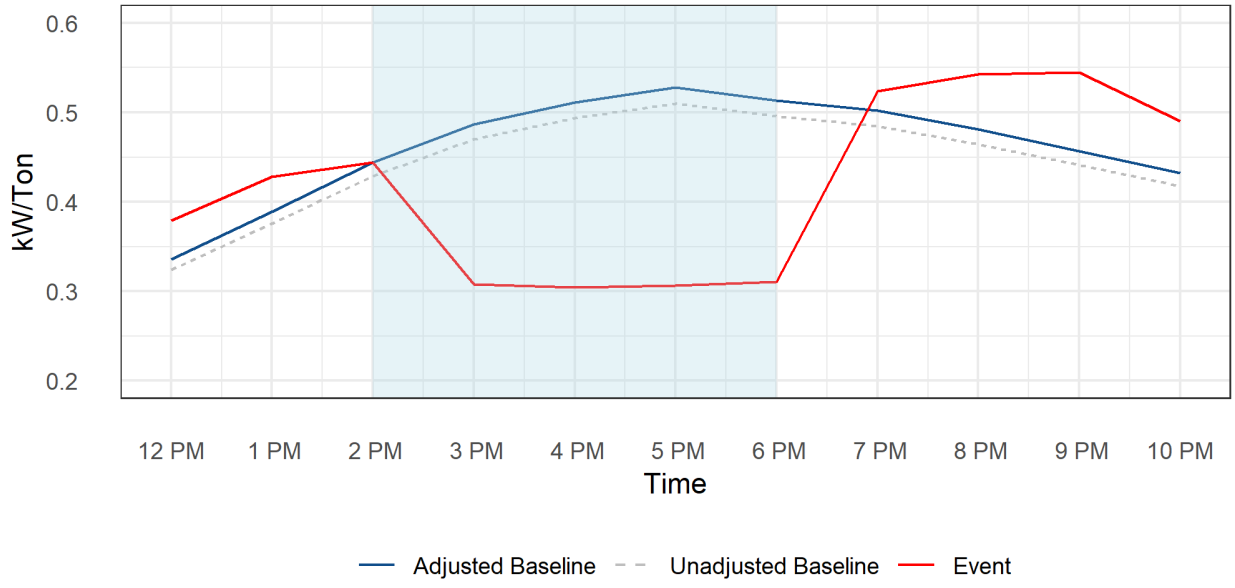


Figure 11-4. Event 3 Load Profile

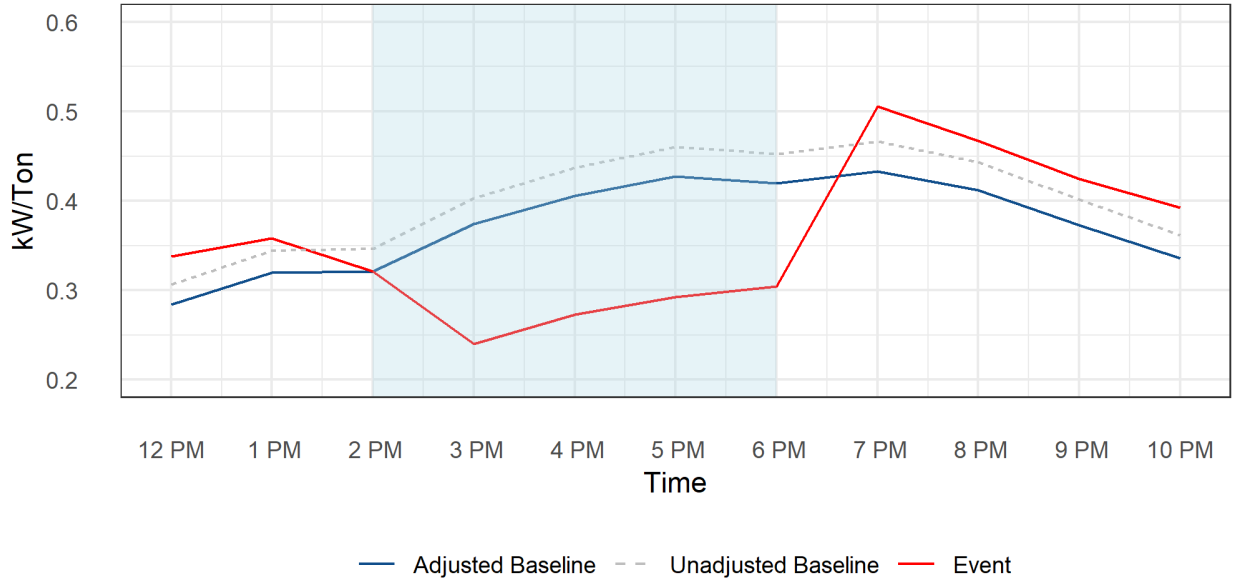


Figure 11-5. Event 4 Load Profile

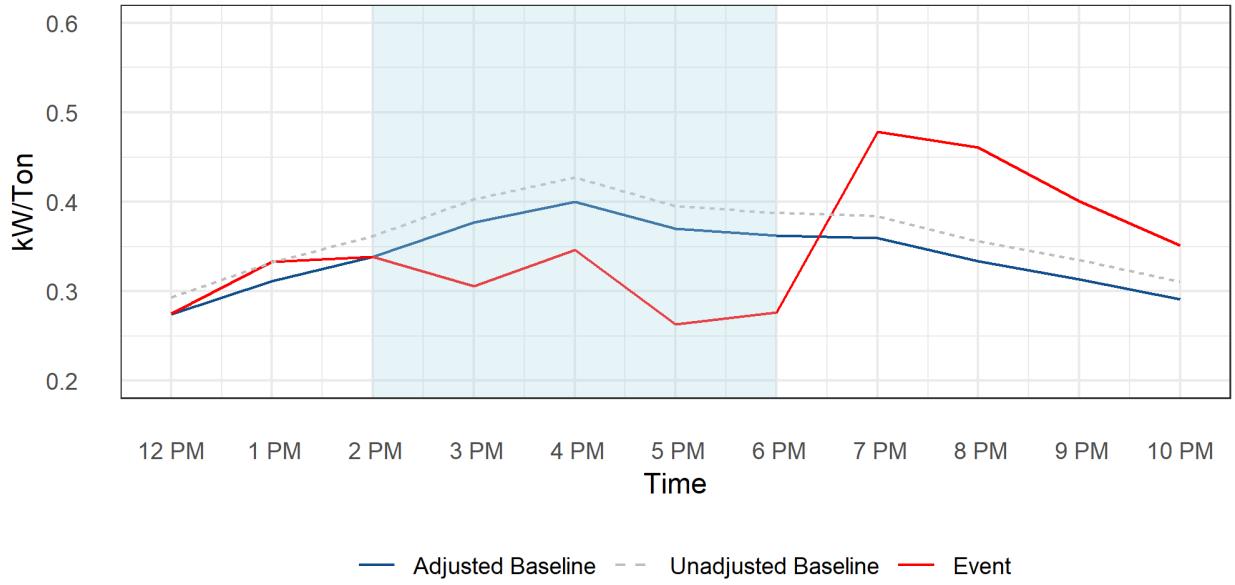
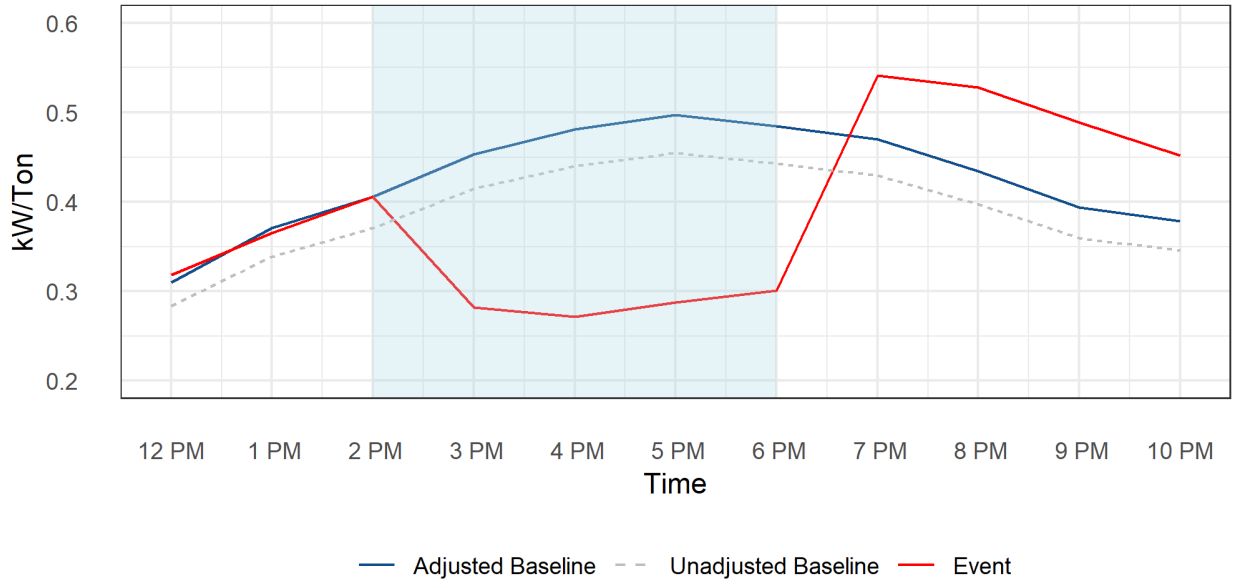


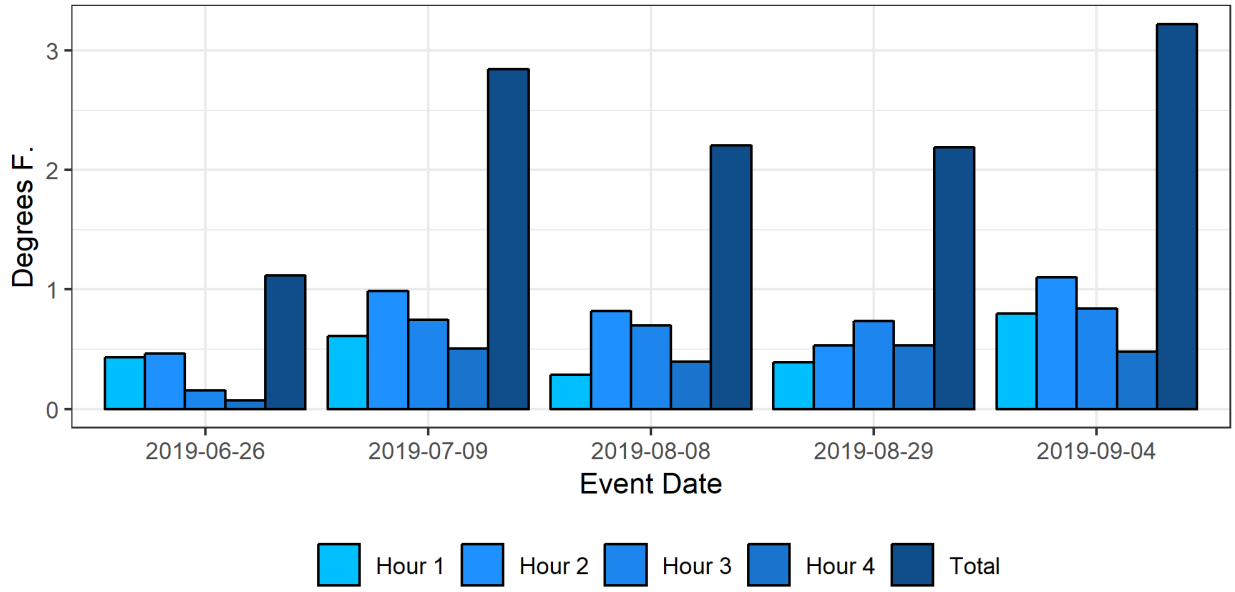
Figure 11-6. Event 5 Load Profile



11.5 Indoor Temperature

The Evaluators monitored indoor temperature in the sampled residences in order to assess the effects of the program on home comfort. The temperature increases are presented in Figure 11-7. The average temperature increase in a residence over the course of a system event was 2.32 degrees Fahrenheit. Overall, the temperature increase over the events is lower than usual. Typically, programs that use a thermostat setback method display a 4-6 degrees Fahrenheit increase in temperature.

Figure 11-7. Temperature Increase During DLC Events



11.6 Savings Summary

The Evaluators applied the 3-of-5 baseline in assessing final kW demand reductions from the DLC pilot. The average unit capacity is 3.36 tons cooling. Table 11-8 presents the average savings per ton, per event and the extrapolation to program-level savings.

Table 11-8. Final Results

Average Savings per Event per Ton (kW)	***Average Savings for all Events per Ton (kW)***	***Average Tonnage***	***Total Program Participation (Units)***	***Total Program Savings (kW)***
0.153694	0.614775	3.359	1,973	4074.30

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

The DLC program took place only during the 2019 calendar year and had no expected kWh savings or expected peak reductions.

Table 11-9 Verified Reductions by Territory

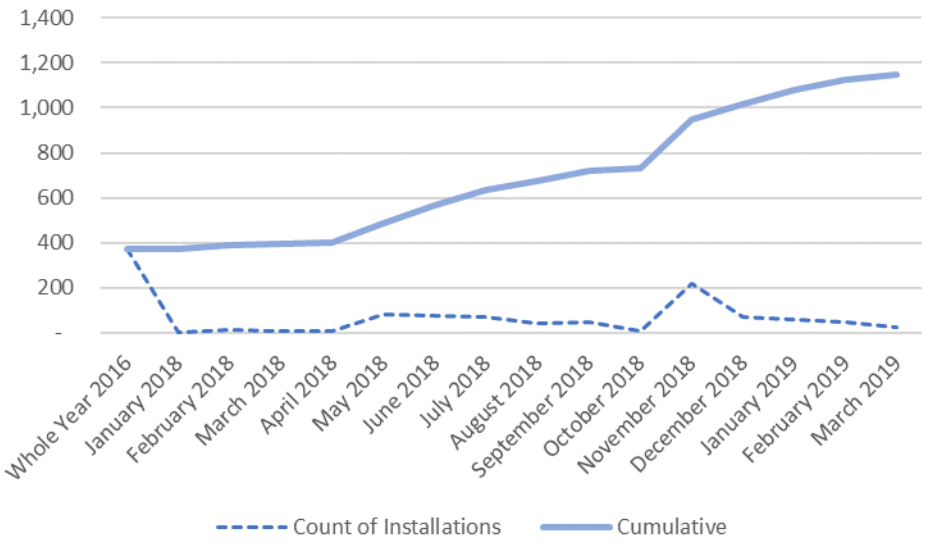
Territory	***Verified kW Reductions***
New Orleans	3,699.77
Algiers	374.53
Total	**4,074.30**

11.7 Process Evaluation Findings

11.7.1 Summary of Program Participation

The Evaluators reviewed data provided by the program implementation contractor that included enrollments through the end of PY9. A total of 1,146 meters, installed between 2016 and 2019, were installed. The monthly and cumulative installations are displayed in Figure 11-8.

Figure 11-8 Summary of Meter Installations January – September 2018



11.8 Key Findings and Conclusions

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

- **The Program exceeded goals in both territories**. The Program only had peak kW reduction goals and surpassed goals in both territories, achieved 342.5% of goal overall.
- **Investing time in educating the public about EasyCool laid the groundwork for program success.** Teaching people about demand response with regards to direct load control proved challenging. Customers needed to trust Entergy before accepting the program.
- **Usage of social media platform has increased participation in a different segment of customers.** Staff used Facebook since late of 2018 and early 2019 and has been successful in reaching new participants.
- **Business reply cards were used to market and promote the program.** This activity helped to drive more participation in the program. The reply cards continue to be good publicity for the energy kit program.

11.9 Recommendations

The Evaluators' recommendations are as follows:

- **Continue to promote the program through various channels.** Utilize social media and other avenues through paid advertising. Cross-promote the program to other program participants, thus increasing program awareness and greater participation.

12. Small Commercial Solutions

12.1 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 incentives provided are summarized below in Table 13-1.

Table 12-1 Small C&I Summary of Program Incentives

Measure	***Incentive***
Lighting	$0.12 per kWh Saved
Non-Lighting	$0.12 per kWh Saved
Custom Bonus	Additional $0.03/kWh for custom lighting and non-lighting projects completed by 3/31/2020.[62]

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.

Data provided by APTIM showed that during PY9, there were 144 projects completed at 140 sites, totaling 491 project components. These projects were expected to provide a combined savings of 8,258,263 kWh and 967.39 kW. Count of projects, expected kWh and kW savings for the SCS Program are summarized in Table 12-2 and the count of project components broken out by territory are summarized in Table 12-3 and Table 12-4.

[62] Custom projects that were initially planned to be completed and processed by 3/31/20 but were delayed directly due to COVID-19 (with written confirmation), will still receive the bonus incentive when they are processed in PY10.

Table 12-2 Savings Expectations by Utility

Utility	Count of Projects[63]	Expected kWh Savings	Expected kW Savings
ENO	130	7,775,183	907.33
Algiers	14	483,080	60.06
Total	**144**	**8,258,263**	**967.39**

Table 12-3 Savings Expectations by Program Component ENO

Program Component	Count of Project Components[64]	Expected kWh Savings	Expected kW Savings
Prescriptive	135	839,149	155.55
Custom	312	6,936,035	751.78
Total	**447**	**7,775,183**	**907.33**

Table 12-4 Savings Expectations by Program Component Algiers

Program Component	Count of Project Components	Expected kWh Savings	Expected kW Savings
Prescriptive	16	186,442	35.23
Custom	28	296,638	24.82
Total	**44**	**483,080**	**60.06**

In PY9 program savings were comprised almost entirely of lighting measures, with 3.03% of expected savings coming from non-lighting measures.

Table 12-5 Savings Expectations by Program Measure Category

Program Component	Count of Project Components	Expected kWh Savings	Expected kW Savings	Percentage of Savings Contribution
Lighting	476	8,007,853	957.36	97.0%
Refrigeration	5	51,902	5.96	0.6%
HVAC	5	7,783	2.06	0.1%
Controls	5	190,726	2.00	2.3%
Total	**491**	**8,258,264**	**967.39**	

[63] Independent projects, which contain all project components associate with said project.
[64] Many projects contain multiple components within the same project number. These numbers represent the total number of components.

Table 12-6 Savings Expectations by Measure Type

Program Component	Program Component	Count of Measures	Expected kWh Savings	Expected kW Savings	Percent Savings (kWh)
Lighting	Non-Linear LED Fixture	225	5,818,694	488.01	70.46%
	Linear LED Fixture	214	1,655,491	329.25	20.05%
	LED A-Type	16	11,936	3.16	0.14%
	LED Exit Sign	7	4,696	0.72	0.06%
	New Construction Lighting	3	509,637	133.41	6.17%
	On/Off Daylight Sensor	11	7,398	2.81	0.09%
	On/Off Occupancy Sensor	2	8,636	2.00	0.10%
Refrigeration	ECM for Refrigeration	5	51,902	5.96	0.63%
HVAC	Packaged / Rooftop Unit	5	7,783	2.06	0.09%
Controls	New Building Automation System	3	182,090	0.00	2.20%
Total		**491**	**8,258,263**	**967.39**	**100.00%**

For comparison: In PY8 130 projects summing to 7,374,272 kWh and 877.83 kW were completed during the twelve-month program year. The PY9 program ran for 15 months surpassing PY8 figures with an increase in expected kWh savings of 883,992 kWh and 89.56 kW, with average project kWh savings growing by 1.1%. Comparisons are shown below in Table 12-7 below.

Table 12-7 Small Business Program Participation Summary Comparison

Project Year	# Projects	Expected kWh	kWh per Project
PY5	191	4,011,430	21,002
PY6	156	3,152,283	20,207
PY7 (nominal)	46	2,264,029	49,218
PY7 (normalized)	61	3,018,705	49,487
PY8	130	7,374,272	56,725
PY9 (total)	144	8,258,263	57,349
PY9 (calendar)	97	6,577,262	67,807

PY9 ran for a total of 15 months: From Jan 1 to Dec 31, 2019, plus a three-month extension from Jan 1 to April 30, 2020.

In a direct comparison of PY8 and PY9:

For comparison, PY8 kWh savings compared with a total PY9 expected savings (144 projects):

- Expected kWh savings have increased by 12.0%;
- Expected kW program reductions[65] have increased by 10.2%; and

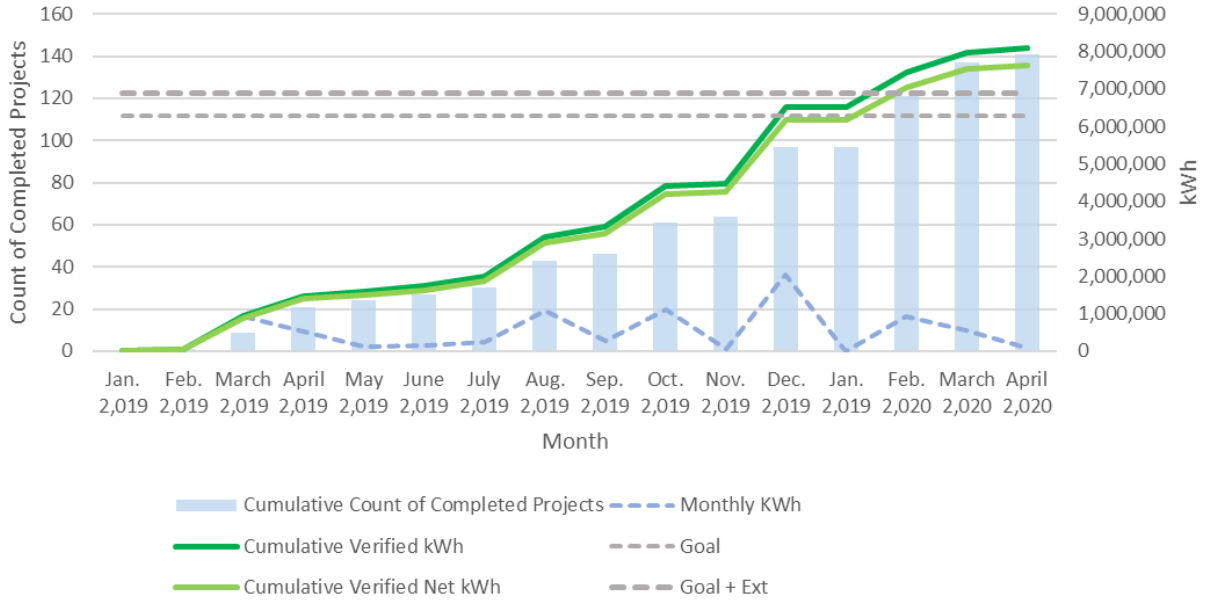
[65] Not shown.

- Per-project savings has decreased from an average of 56,725 to 57,349 kWh and 6.75 to 6.72 kW, representing 1.1% and –0.5% percentage changes, respectively.

Counting only savings that occurred during 2019 (97 projects) for an 'apples-to-apples' comparison:

- Expected kWh savings have decreased by 10.8%;
- Expected kW program reductions have decreased by 13.0%; and
- Per-project savings has increased from an average of 56,725 to 67,807 kWh and 6.75 to 7.87 kW, representing 19.5% and 16.6% percentage changes, respectively.

Figure 12-1 Overall Program Performance by Month



Total verified savings and percentage of goals for the SCS Program are summarized in Table 12-8.

12.1.1 Goal Achievement

Table 12-8 SCS Savings Goals by Utility

Utility	*Year*	*kWh Goal*	*Verified kWh Savings*	*Percent of kWh Goal Met*	*kW Goal*	*Verified kW Reductions*	*Percent of kW Goal Met*
ENO	2019	5,760,033	6,172,504	107.16%	1,098.10	892.11	81.24%
	2020	470,930	1,569,735	333.33%			
ENO Subtotal	**Both**	**6,230,963**	**7,742,239**	**124.25%**	**1,098.10**	**892.11**	**81.24%**
Algiers	2019	535,678	376,269	70.24%	107.60	59.59	55.38%
	2020	134,359	104,007	77.41%			
Algiers Subtotal	**Both**	**670,037**	**480,276**	**71.68%**	**107.60**	**59.59**	**55.38%**
Overall Total	**Both**	**6,901,000**	**8,222,515**	**119.15%**	**1,205.70**	**951.70**	**78.93%**

The program met its kWh savings goals in the New Orleans territory in both periods, achieving 107.2% and 333.3% of goal in 2019 and 2020, respectively. The program did not meet savings goals for either period in the Algiers territory: 70.2% in 2019 and 77.4% in 2020. No peak kW reduction goals were met, with 81.2% achievement in New Orleans and 55.4% achievement in Algiers. Overall, the program achieved 119.2% of the kWh savings goal and 78.9% of the peak kW reduction goal.

12.2 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 for four projects, desk reviews of all 20 sampled; and
- 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 the impact evaluation.

The on-site inspections were used to help verify installations and to determine any changes to the operating parameters since the measures were first installed. The Evaluators verified that TRM lighting hours of operation had been correctly assigned by space type. Projects were deemed analyzed using the methods described in the New Orleans TRM 2.0, section D.6.2 and 3, Lighting Efficiency and Lighting Controls. Specific algorithms for lighting savings and an explanation of deemed inputs are below.

12.2.1 Lighting Savings Calculations

$$kWh_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times AOH \times IEF_E$$

$$kW_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times CF \times IEF_D$$

Where:

Nfixt(i),pre = Pre-retrofit number of fixtures of type i

Nfixt(i),post = Post-retrofit number of fixtures of type i

Wfixt(i),pre = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table, Appendix E pages C-323 to C-475)

Wfixt(i),post = Rated wattage of post-retrofit fixtures of type i (Appendix E)

CF = Peak demand coincidence factor (TRM Table 227, pages C-294 to C-295)

AOH = Annual operating hours for specified space type (TRM Table 227, pages C-294 to C-295)

IEFD = Interactive effects factor for demand savings (TRM Table 228, page C-296)

IEFE = Interactive effects factor for energy savings (TRM Table 228, page C-296)

12.2.2 M&V Methodology for Prescriptive Measures

To facilitate program participation, program implementors in PY9 introduced prescriptive measures covering lighting, HVAC and other types of equipment. Per-unit savings for each prescriptive measure was developed by implementors by using the New Orleans TRM 2.0, including the methodology described in the previous section. All assumptions and calculations were reviewed by the Evaluators in a QAQC process before approval for use in programs. With per-unit savings and demands reductions for these measures established, evaluation of these items consisted of on-site verification and multiplying item count by per-unit savings. Below, Table 12-9 lists kWh savings, kW reductions and counting units for prescriptive measures appearing in the PY9 SCS program.[66]

Table 12-9 Prescriptive Savings and Demand Reductions by Measure

Measure Type	***Measure Description***	***kWh Savings/ unit***	***kW reduction /unit***	***Incentive/ unit***
Controls/ Sensors	Daylighting Controller (controlling < 500W) replacing No Controls	205	0.08	$30
	Daylighting Controller (controlling >= 500W) replacing No Controls	616	0.23	$85
	Occupancy Sensor (controlling < 500W) replacing No Sensors	308	0.08	$45
	Occupancy Sensor (controlling >= 500W) replacing No Sensors	925	0.23	$120
	Occupancy Sensor w/Daylighting Control (controlling < 500W) replacing No Sensors	377	0.08	$60
	Occupancy Sensor w/Daylighting Control (controlling >= 500W) replacing No Sensors	1,130	0.23	$150
Interior Lighting	LED pin-base lamp replacing CFL pin-base lamp	44	0.01	$15
	LED A-lamp replacing CFL/Incandescent Screw-In Lamp	112	0.04	$6.50
	LED Directional lamp replacing CFL/Halogen Direction Lamp	109	0.04	$6.50
	LED Downlight kit replacing CFL/Incandescent Downlight	109	0.04	$16
	2' Linear LED replacing 2' Fluorescent T12/T8	20	0.01	$6
	2' Linear LED replacing 2' Fluorescent T5	18	0.01	$6
	2' Linear LED replacing 2' Fluorescent T5 (HO)	35	0.01	$8
	4' Linear LED replacing 4' Fluorescent T12/T8	40	0.01	$8.50
	4' Linear LED replacing 4' Fluorescent T12/T8 (HO)	85	0.03	$9
	4' Linear LED replacing 4' Fluorescent T5	35	0.01	$8
	4' Linear LED replacing 4' Fluorescent T5 (HO)	69	0.02	$9

[66] Prescriptive measures in sampled sites consisted solely of lighting and controls measures in PY9.

	Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8	89	0.03	$15
	Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8 (HO)	163	0.05	$25
	LED U-tube replacing U-tube Fluorescent T12/T8	55	0.02	$12
	LED Lamp/Fixture replacing <175 W HID (lamp wattage)	331	0.11	$80
	LED Lamp/Fixture replacing 175 W to 250 W HID (lamp wattage)	516	0.17	$105
	LED Lamp/Fixture replacing 251 W to 400 W HID (lamp wattage)	804	0.26	$150
	LED Lamp/Fixture replacing 401 W to 1000 W HID (lamp wattage)	2,276	0.74	$300
	LED Lamp/Fixture replacing >1000 W HID (lamp wattage)	3,516	1.14	$500
Exterior 24/7 or Garage 24/7 Lighting	LED Lamp/Fixture replacing <175 W HID (lamp wattage)	994	0.11	$140
	LED Lamp/Fixture replacing 175 W to 250 W HID (lamp wattage)	1,551	0.18	$200
	LED Lamp/Fixture replacing 251 W to 400 W HID (lamp wattage)	2,413	0.28	$300
	LED Lamp/Fixture replacing 401 W to 1000 W HID (lamp wattage)	6,833	0.78	$600
	LED Lamp/Fixture replacing >1000 W HID (lamp wattage)	10,556	1.21	$800
	2' Linear LED replacing 2' Fluorescent T12/T8/T5	53	0.01	$8
	4' Linear LED replacing 4' Fluorescent T12/T8/T5	105	0.01	$9
	Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8	266	0.03	$40
	LED U-tube replacing U-tube Fluorescent T12/T8	164	0.02	$20
	LED pin-base lamp replacing CFL pin-base lamp	131	0.02	$15
	LED A-lamp replacing CFL/Incandescent Screw-In Lamp	335	0.04	$6.50
	LED Directional lamp replacing CFL/Halogen Direction Lamp	326	0.04	$6.50
	LED Downlight kit replacing CFL/Incandescent Downlight	326	0.04	$17
Exit Sign Replacements	LED Exit Signs (must meet state fire marshall codes/UL rated; <= 5 watts) replacing Incandescent/CFL Exit Sign	172	0.02	$40

12.2.3 Small Commercial Solutions Sample Design

Sampling for evaluation of ENO and Algiers' SCS 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 population and sample include both utilities pooled. However, savings in this report are presented for each utility individually as well as aggregated.

The participant population for the SCS was divided into five strata. Table 12-10 summarizes the strata boundaries and sample frames for the SCS and Table 12-11 summarizes expected savings for of both the sample and population.

Table 12-10 Small Business Program Sample Design (Pooled)

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Stratum 5***	***Totals***
Strata boundaries (kWh)	< 20,000	20,001 - 50,000	50,001 - 100,000	100,001 - 200,000	> 200,001	
Number of projects	74	34	15	14	7	**144**
Total kWh savings	976,520	1,472,328	1,153,147	1,971,757	2,684,511	**8,258,263**
Average kWh Savings	13,196	43,304	76,876	140,840	383,502	**57,349**
Standard deviation of kWh savings	7,392	8,158	11,339	28,512	146,482	**89,620**
Coefficient of variation	0.560	0.188	0.147	0.224	0.382	**1.563**
Final design sample	7	4	2	3	4	**20**

Table 12-11 Expected Savings for Sampled and Non-Sampled Projects by Stratum

Stratum	***Sample Expected Savings***	***Total Expected Savings***
1	87,747	976,520
2	158,505	1,472,328
3	163,699	1,153,147
4	366,521	1,971,757
5	1,813,591	2,684,511
Total	**2,590,063**	**8,258,263**

The achieved sampling precision was ±9.59% 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.

12.3 Gross Impact Findings

12.3.1 Small Business Site-Level Realization

The Evaluators reviewed all project documentation, including invoices, spec sheets and site photos to verify the installation of the equipment. Energy and demand reduction calculations were reviewed to verify that they were consistent with the TRM and that all inputs were appropriate. Changes and corrections between ex ante and ex post savings estimates were documented and realization rates based on verified savings were developed for each site. The realization rates for sites within each stratum were then

applied to the non-sampled sites within their respective stratum. Table 12-13 presents realization at the stratum level, with Table 12-12 presenting results at the site level.

Table 12-12 Summary of kWh Savings for Small Business Program by Sample Stratum (Pooled)

Stratum	Sample Expected kWh Savings	Sample Verified kWh Savings	Realization Rate
1	87,747	87,747	100.0%
2	158,505	157,874	99.6%
3	163,699	163,699	100.0%
4	366,521	360,964	98.5%
5	1,813,591	1,813,591	100.0%

Table 12-13 shows the expected and verified energy savings for the program by project.

Table 12-13 Expected and Verified Savings by Sampled Project

Project ID(s)	Facility Type	Expected kWh Savings	Verified kWh Savings	Realization Rate
SN9-018	Religious	4,868	4,868	100.0%
SN9-104	Service (Excluding Food)	7,338	7,338	100.0%
SN9-123	Retail	8,180	8,180	100.0%
SN9-030	Public Assembly	10,108	10,107	100.0%
SN9-040	Retail	16,710	16,710	100.0%
SN9-034	Small Office	18,241	18,241	100.0%
SN9-043	Food Sales	22,304	22,304	100.0%
SN9-054	Outdoor	31,516	30,885	98.0%
SN9-048	Gas Station	34,856	34,856	100.0%
SN9-022	Public Order and Safety	40,538	40,538	100.0%
SN9-038	Outdoor	51,595	51,595	100.0%
SN9-055	Warehouse: Refrigerated	77,880	77,880	100.0%
SN9-026	Outdoor	85,819	85,819	100.0%
SN9-021	Manufacturing – 1 and 2 shift	105,350	105,349	100.0%
SN9-077	Parking Structure	119,732	119,735	100.0%
SN9-019	Service (Excluding Food)	141,440	135,880	96.1%
SN9-053	Outdoor	280,908	280,908	100.0%
SN9-073	Parking Structure	421,217	421,217	100.0%
SN9-059	Warehouse: Non-refrigerated	433,426	433,426	100.0%
SN9-012	Outdoor	678,040	678,040	100.0%
Total		**2,590,066**	**2,590,066**	**99.8%**

12.3.2 Small Business Program-Level Realization

Using the realization rates presented in Table 12-13, the Evaluators extrapolated results from sampled sites to non-sampled sites in developing program-level savings estimates. Table 12-14 presents results by stratum.

Table 12-14 SCS Program-Level Realization by Stratum

Stratum	# Sites	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
1	74	976,520	976,522	100.00%	185.63	184.34	99.31%
2	34	1,472,328	1,466,472	99.60%	182.23	177.11	97.19%
3	15	1,153,147	1,153,149	100.00%	98.50	98.50	100.00%
4	14	1,971,757	1,941,861	98.48%	214.43	208.27	97.13%
5	7	2,684,511	2,684,511	100.00%	286.60	283.48	98.91%
Total	**144**	**8,258,263**	**8,222,515**	**99.57%**	**967.39**	**951.70**	**98.38%**

Table 12-15 SCS Program-Level Realization by Utility

Utility	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
ENO	7,775,183	7,742,239	99.58%	907.33	892.11	98.32%
Algiers	483,080	480,276	99.42%	60.06	59.59	99.22%
Total	**8,258,263**	**8,222,515**	**99.57%**	**967.39**	**951.70**	**98.38%**

Table 12-16 SCS Program-Level Realization by Utility and Calendar Year

Utility	Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
ENO	2019	6,198,327	6,172,504	99.6%	711.81	697.26	98.0%
	2020	1,576,856	1,569,735	99.5%	195.52	194.85	99.7%
ENO Subtotal	**Both**	**7,775,183**	**7,742,239**	**99.6%**	**907.33**	**892.11**	**98.3%**
Algiers	2019	378,935	376,269	99.3%	51.80	51.35	99.1%
	2020	104,145	104,007	99.9%	8.26	8.24	99.8%
Algiers Subtotal	**Both**	**483,080**	**480,276**	**99.4%**	**60.06**	**59.59**	**99.2%**
Overall Total	**Both**	**8,258,263**	**8,222,515**	**99.6%**	**967.39**	**951.70**	**98.4%**

Table 12-17 SCS Program-Level Realization by Calendar Year

Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
2019	6,577,262	6,548,773	99.57%	763.61	748.61	98.04%
2020	1,681,001	1,673,742	99.57%	203.78	203.09	99.66%
Total	**8,258,263**	**8,222,515**	**99.57%**	**967.39**	**951.70**	**98.38%**

12.3.3 Small Business Realization by Contractor

Forty seven percent of expected savings from 30 projects came from a single trade ally, and 10.3% from a second who completed five projects. Two other lighting-specific trade allies contributed 6.3% and 5.4% percent to expected savings, each with 18 and 9 projects, respectively. The remaining 82 projects (30.7% savings) were completed by a combination of 31 additional trade allies, each contributing between 0.006% and 3.3% to the overall expected savings. The results are presented below in Table 12-18.

Table 12-18 Savings by Contractor

Contractor	Count of Projects	Percent of kWh Savings	Expected kWh	Verified kWh	kWh Realization Rate	Expected Peak kW	Verified Peak kW	Peak kW Realization Rate
Lighting Contractor #1	30	47.3%	3,903,545	3,885,712	99.5%	482.06	471.67	97.8%
Automation Contractor[67]	5	10.2%	846,363	845,764	99.9%	28.73	28.61	99.6%
Lighting Contractor #2	18	6.3%	523,301	522,393	99.8%	48.55	48.73	100.4%
Lighting Contractor #3	9	5.4%	449,975	449,217	99.8%	60.13	60.05	99.9%
Other Contractors: 1-3.3% each	61	27.5%	2,271,126	2,255,802	99.3%	285.40	281.46	98.6%
Other Contractors: 0-1% each	21	3.2%	263,955	263,620	99.9%	62.52	61.16	97.8%

12.3.4 Small Business – Causes of Savings Deviations

For illustrative purposes, the Evaluators have summarized adjustments to kWh savings in Table 12-19.

Table 12-19 Small Business – Causes of Variance in Savings

Project ID	Expected kWh	Verified kWh	Realization Rate	Causes of Variance in Savings
SN9-019	141,440	135,880	96.1%	Auto Service: During the on site M&V visit the Evaluators found that thirteen of the fixtures were not installed on site, lowering the kWh realization rate.
SN9-054	31,516	30,885	98.0%	Golf Recreation: During the on site M&V visit the Evaluators found that two of the outdoor flood light fixtures were not operational, lowering the kWh realization rate.

Key issues identified in site-level analyses include:

- **Missing or Inoperable Fixtures.** For two sampled site, ex ante kWh calculations included savings for all fixtures installed but during the site visit some fixtures were found to be never installed on site or the fixtures installed were not in operation.

[67] This contractor specializes in building automation, but also works with lighting. All PY9 projects completed by this contractor were lighting projects.

This lowered the expected energy savings based on a lower number of fixtures installed to reduce energy.

For illustrative purposes, the Evaluators have summarized adjustments to kW reductions in Table 12-20:

Table 12-20 Small Business – Causes of Variance in Peak kW Reductions

Project ID	Expected kW	Verified kW	Realization Rate	Causes of Variance in kW Reductions
SN9-021	12.10	11.13	92.0%	Manufacturing. The Evaluators found that a peak CF of 0.26 was used to calculate the ex ante demand reductions for one of the exterior wall pack fixtures. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.
SN9-022	5.41	4.26	78.8%	Airport. Calculations for three photocell-controlled exterior fixtures included a 0.26 peak coincidence. Photocell-controlled fixtures operate during non-daylight hours, precluding operation during peak times and thus peak reductions are not appropriate for these fixtures, which accounts for the reduced verified peak kW reduction.
SN9-038	3.11	0.00	0.0%	Condo Association. The Evaluators found that a 0.26 peak coincident factor was used in ex ante kW calculations. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them
SN9-048	4.82	5.07	105.2%	Supermarket. The project's TRM-based space type is a 'Food Sales: 24-Hour Supermarket,' which has deemed annual lighting operating hours of 6,900 and a peak coincidence factor of 0.95. Verified operation of site lighting in continuous (8,760). This is reflected in ex ante kWh savings calculations, but ex ante kW reduction calculations use the deemed 0.95. Since lighting is operating continuously at the site, there is a 100% chance that lights will be operating during peak times, thus ex post calculations use 1.00 as a peak CF, raising the verified peak kW reduction.
SN9-053	3.12	0.00	0.0%	Sports and Recreation Field. Ex ante calculations applied a non-zero peak coincidence factors to exterior lighting which operates during non-daylight hours. This precludes operation during peak times, thus the peak kW reduction should be zero.

Key issues identified in site-level analyses include:

- **Peak reductions attributed to fixtures that do not operate during peak hours.** For three sampled sites, there were expected peak reductions for exterior lighting that only operates during non-daylight hours. Peak times do not occur during non-daylight hour, thus there can be no verified peak savings.
- **Non-100% CF used for continuous operation.** In one sampled the Evaluators found that in an area with continuous lighting operation peak kW reductions were

calculated using a 0.95 CF. Since the lighting operation is continuous the peak CF should be 100%.

12.4 Net Impact Findings

Participant survey responses were used to estimate the net energy impacts for the Small Commercial Solutions Program. The methodology used is described in detail in Section 2.2.3.

12.4.1 Net Savings Results

Projects implemented by 22 participants were assessed for free ridership.

No participants reported qualifying spillover measures.

Table 12-21 and Table 12-22 summarize the verified net kWh savings and peak kW demand reduction. Overall net kWh is 7,773,964 and kW 893.80, which respectively equal 94.5% and 93.9% of gross program savings.

Table 12-21 Summary of Verified Net kWh Savings and Net Peak kW Reductions by Utility and Year

Utility	*Year*	*Verified Gross kWh Savings*	*kWh FR*	*Verified Net kWh Savings*	*kWh NTGR*	*Verified kW Reductions*	*kW FR*	*Verified Net kW Reductions*	*kW Net NTGR*
ENO	2019	6,172,504	275,294	5,897,210	95.54%	697.26	42.39	654.87	93.92%
	2020	1,569,735	70,010	1,499,725	95.54%	194.85	11.85	183.00	93.92%
ENO Subtotal	**Both**	**7,742,239**	**345,304**	**7,396,935**	**95.54%**	**892.11**	**54.24**	**837.87**	**93.92%**
Algiers	2019	376,269	16,782	359,487	95.54%	51.35	3.12	48.23	93.92%
	2020	104,007	4,639	99,368	N/A	8.24	0.50	7.74	N/A
Algiers Subtotal	**Both**	**480,276**	**21,421**	**458,855**	**95.54%**	**59.59**	**3.62**	**55.97**	**93.93%**
Overall Total	**Both**	**8,222,515**	**366,725**	**7,855,790**	**95.54%**	**951.70**	**57.86**	**893.84**	**93.92%**

Net kWh savings totaled to 7,773,971 kWh and equal 94.5% of gross program savings. Net kW reductions totaled 893.80 kW and equal 93.9% of verified gross program savings.

Table 12-22 Summary of Verified Net kWh Savings and Net Peak kW Reductions by Year

Year	*Verified Net kWh Savings*	*Verified Net kW Reductions*
2019	6,256,697	703.10
2020	1,599,093	190.74
Total	**7,855,790**	**893.84**

12.5 Process Evaluation Findings

12.5.1 Summary of Program Participation

Table 12-23 summarizes program participation by measure type. The program provides incentives for prescriptive measures per piece of equipment installed, and for custom0measures that provide incentives based on expected energy savings. As shown below, custom incentive projects accounted for most program activity. The reason why most of the savings are the result of custom projects is that the program limits prescriptive lighting incentives to lighting controls and screw-in LED lamps.

To reduce administrative work associated with savings calculations for program staff and trade allies, as well as facilitate program participation in general, the program introduced prescriptive measures. These measures had an initial soft launch in September of 2019 and included prescriptive lighting measures. On January 1, 2020 a formalized set as 'standard' prescriptive measures were launched for PY10.

Table 12-23 Program Activity by Measure Type

Measure Incentive Type	Measure Type	Expected Savings (kWh)	Number of Participants	$ per kWh in Expected Savings
Prescriptive	Controls	8,636	1	$0.15
Prescriptive	HVAC	7,783	4	$0.18
Prescriptive	Lighting	975,323	57	$0.11
Prescriptive	Refrigeration	33,849	3	$0.08
Custom	Controls	182,090	3	$0.10
Custom	Lighting	7,032,530	96	$0.12
Custom	Refrigeration	18,053	2	$0.08

Table 12-24 shows the number of measure types installed at locations. As shown, most customers received a single measure type.

Table 12-24 Number of Measure Types Installed at Location

Number of Measures Installed at Location*	Number of Participants
1	142
2	2
*Locations defined by account numbers	

Thirty-five trade allies completed projects during the program year. As is typically the case, relatively few accounted for most program savings. In PY9, 64% percent of expecting savings resulted from projects completed by three trade allies (see Table 12-25).

Table 12-25 Summary of Trade Ally Participation

Trade Ally	*Expected Savings (kWh)*	*Percent of Expected Savings*	*Number of Participants*	*Average Project Size*
Trade ally 1	3,903,545	47%	30	26,737
Trade ally 2	846,363	10%	5	84,636
Trade ally 3	523,301	6%	18	10,466
Trade ally 4	449,975	5%	9	22,499
Trade ally 5	269,739	3%	17	3,746
Trade ally 6	247,756	3%	4	20,646
Trade ally 7	182,090	2%	3	60,697
Trade ally 8	168,773	2%	3	8,439
Trade ally 9	157,997	2%	1	15,800
Trade ally 10	148,120	2%	3	18,515
All 25 other trade allies	1,360,607	16%	51	9,863

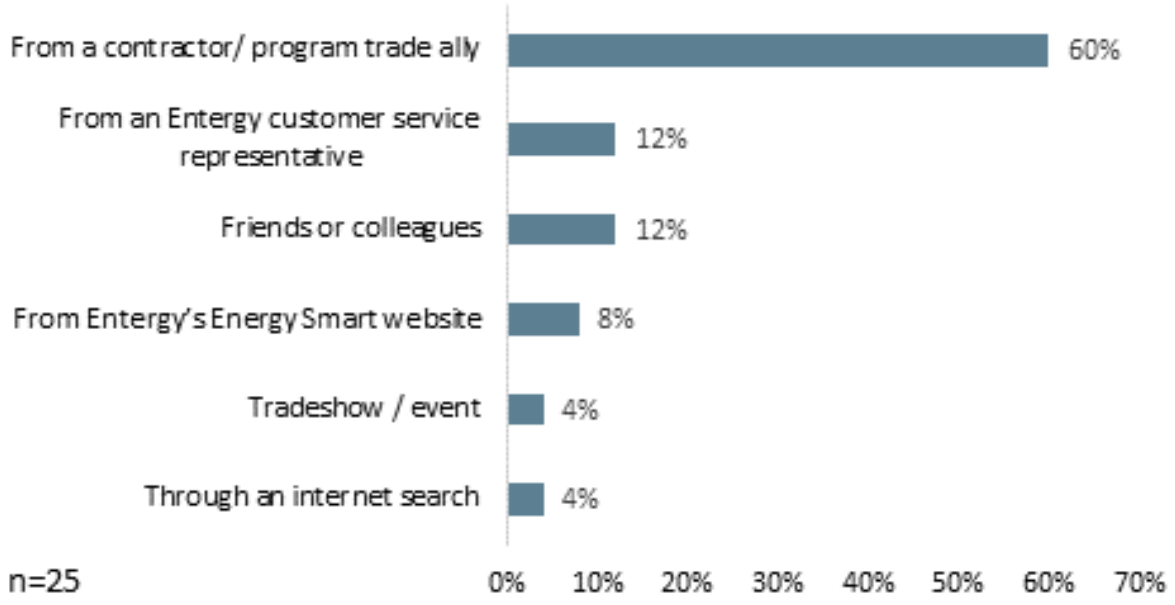
12.5.2 Participant Feedback

Twenty-five customers completed responses to a survey about the small commercial solutions program. The majority of small commercial solutions customers surveyed were either the manager or the owner of the business. Thirty-two percent of respondents stated that they were the manager of the business while 24% stated that they were the owner. Twenty percent of respondents stated that they were the facilities manager.

12.5.2.1 How Customers Learned of the Program

The most reporting source of awareness was from a contractor or program trade ally. (See Figure 12-2). Other common sources of awareness included an Entergy customer service representative (12%), from friends or colleagues (12%), and from Entergy's Energy Smart website (8%).

Figure 12-2 Source of Program Awareness (n = 25)



12.5.2.2 Motivations for Participating

Reducing energy costs was the main motivation for participating in the program. Eighty-eight respondents stated that they participated in the program to reduce their energy cost, and 64% of respondents stated that they participated to replace old or outdated equipment. Other common motivations included to improve equipment performance (44%), to improve product quality (44%), to reduce energy use/power outages (40%), and to update to the latest technology (40%). Table 12-26 below summarizes the responses.

Table 12-26 Reasons for Completing the Project (n = 25)

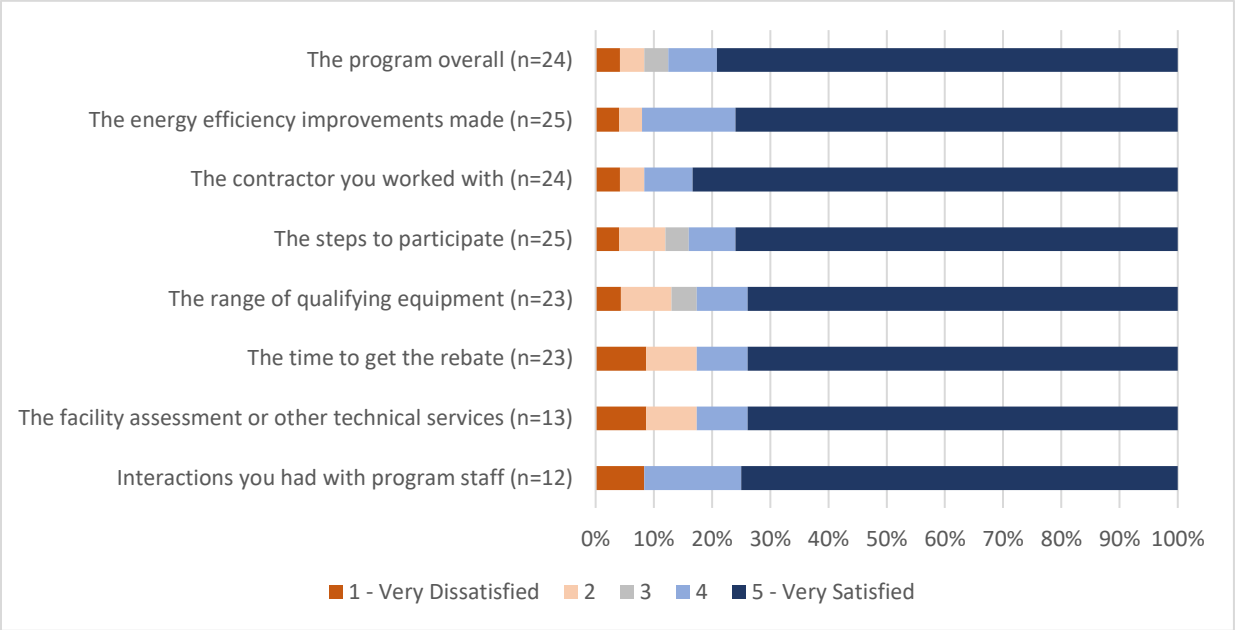
Response	*Percent of Respondents (n = 25)*
To replace old or outdated equipment	64%
As part of a planned remodeling, build-out, or expansion	4%
The maintenance downtime and associated expenses for the old equipment were too high	28%
To improve equipment performance	44%
To improve the product quality	44%
To get a rebate from the program	12%
To protect the environment	16%
To reduce energy costs	88%
To reduce energy use/power outages	40%
To update to the latest technology	40%

*Responses add to greater than 100% because respondents could select multiple responses.

12.5.2.3 Participant Satisfaction

The majority of respondents were satisfied with the interactions with the program staff, the energy efficiency improvements made, and the contractor that they worked with. Ninety-two percent of respondents stated that they were 'satisfied' or 'very satisfied' with both the interactions with the program staff, the energy efficiency improvements made, and the contractor that they worked with. Eighty-eight percent of those who responded stated that they were 'satisfied' or 'very satisfied' with the overall program experience. Satisfaction was also expressed with the range of qualifying equipment (83%), the time to get the rebate (83%), the facility assessment or other technical services (83%) and the steps to participate (84%). Although respondents were mostly satisfied, some dissatisfaction (18%) was expressed with the time it took to get the rebate and the facility assessment or other technical services (18%).

Figure 12-3 Participant Satisfaction



The majority of respondents were very satisfied with Entergy as their electric service provider. Eighty-eight percent of those surveyed stated that they were 'very satisfied' or 'satisfied' with Entergy as their electric service provider. Only 4% of respondents expressed dissatisfaction. Furthermore, most participants (96%) experienced an increase in satisfaction with Entergy due to participation. Results are summarized in Table 12-27 and Table 12-28.

Table 12-27 Satisfaction with Entergy

Response	***Percent of Respondents (n =24)***
5 (Very satisfied)	67%
4	21%
3	8%
2	0%
1 (Very dissatisfied)	4%

Table 12-28 Program Impact on Satisfaction with Entergy

Response	***Percent of Respondents (n = 23)***
Greatly increased your satisfaction with Entergy	78%
Somewhat increased your satisfaction with Entergy	17%
Did not affect your satisfaction with Entergy	4%
Somewhat decreased your satisfaction with Entergy	0%
Greatly decreased your satisfaction with Entergy	0%

Participants are likely to recommend the program to others. The likelihood of participants recommending the program to someone else is summarized in Table 12-29. As shown, all respondents indicated they were likely to recommend the program or already had recommended it.

Table 12-29 Likelihood of Recommending the Program

Response	Percent of Respondents (n = 25)
Already have	20%
5 (Very likely)	72%
4	8%
3	0%
2	0%
1 (Very unlikely)	0%

12.5.2.4 Firmographic

Participants were asked various questions relating to their facility.

The majority of participants stated that the work that was completed was at the company's only location, and most of them rented the property that work was completed. Seventy-one percent of those surveyed stated that the facility was the company's only location, and 50% of respondents stated that they rent the property. Twenty one percent of respondents stated that the facility was one of several locations owned by the company, and 33% of respondents own the facility. Results are summarized in Table 12-30

Table 12-30 Property Ownership

Response	Percent of Respondents (n = 24)
Own	33%
Rent	50%
Own and rent to someone else	17%

The majority of organizations were billed directly for electricity use at this location. Ninety-six percent of those who responded stated that they were billed directly for electricity used at this location. One person responded that they were *not* billed directly by the utility. Results are summarized in Table 12-31.

Table 12-31 Electricity Billing

Response	Percent of Respondents (n = 25)
We are billed directly for the electricity we use	96%
We are NOT billed directly for the electricity we use. Our electric bill is handled by another part of our company or a third- party service provider	0%

We are NOT billed directly for the electricity we use. The cost for our electricity is included in our rent/lease	4%

12.6 Key Findings and Conclusions

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

- **The program met kWh savings goals for New Orleans, but not Algiers.** The program met its kWh savings goals in the New Orleans territory in both periods, achieving 107.2% and 333.3% of goal in 2019 and 2020, respectively. The program did not meet savings goals for either period in the Algiers territory: 70.2% in 2019 and 77.4% in 2020. No peak kW reduction goals were met, with 81.2% achievement in New Orleans and 55.4% achievement in Algiers. Overall, the program achieved 119.2% of the kWh savings goal and 78.9% of the peak kW reduction goal.
- **Development of a new calculator.** A new global incentives and measure calculator was developed for commercial programs. Implementation staff described the calculator as a "one-stop-shop" for the application. The calculator produces a summary report and integrates with APTIM's new tracking system.
- **Preapproval for smaller project removed in PY9.** Projects that are less than $5,000 no longer require preapproval.
- **The program will offer a small business kits component.** Beginning in PY10, mailer kits. These kit are similar to those in the HPwES program, will contain energy saving measures such as 7-12W LED lighting, LED exit signs, literature, and Energy Smart promotional materials and will be delivered with no cost to the participants.
- **The program is exploring additional program opportunities.** In addition to mailer kits, program staff indicated they are looking into adding DR-enabled smart thermostats.
- **Satisfaction with the program remains high.** Ninety-two percent of respondents reported that they were somewhat or very satisfied with the program.
- **Firmographic responses suggest the program is effectively targeting small businesses facing common barriers to making energy efficiency improvements.** Seventy-one percent of those surveyed stated that the facility was the company's only location, and 50% of respondents stated that they rent the property. These findings indicate that the program is not primarily getting participant through chain stores with more resources to available to assess and make energy efficiency improvements and that many of the participants are making upgrades to facilities they do not own.

12.7 Recommendations

The Evaluators' recommendations are as follows:

- **Leverage past small business program participants to promote the value of the program to other business owners.** Approaches to this include developing case studies to show case example projects and encouraging participants to co-present to relevant business associations.
- **Peak kW reductions should not be attributed to fixtures which only operate during non-daylight hours.** This operating schedule precludes operation during peak times and thus peak reductions cannot be verified for these fixtures.

13. Large Commercial and Industrial

13.1 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.

The incentives provided are summarized below in Table 13-1.

Table 13-1 Large C&I Summary of Program Incentives

Measure	***Incentive***
Lighting	$0.10 per kWh Saved
Non-Lighting	$0.12 per kWh Saved
Custom Bonus	Additional $0.03/kWh for custom lighting and non-lighting projects completed by 3/31/2020[68].

Data provided by APTIM showed that during PY9, there were 126 projects in New Orleans and two projects in Algiers. These projects were expected to provide a combined savings of 27,247,005 kWh and 2,118.28 kW. Count of projects, expected kWh and kW savings for the Large C&I Program are summarized in Table 13-2.

Table 13-2 Savings Expectations by Utility

Utility	***Count of Projects***[69]	***Expected kWh Savings***	***Expected kW Savings***
ENO	126	26,129,538	2,118.28
Algiers	2	1,117,468	54.70
Total	**128**	**27,247,005**	**2,172.98**

Table 13-3 Savings Expectations by Program Component ENO

Program Component	***Count of Project Components***[70]	***Expected kWh Savings***	***Expected kW Savings***
Prescriptive	55	878,736	111.07

[68] Custom projects that were initially planned to be completed and processed by 3/31/20 but were delayed directly due to COVID-19 (with written confirmation), will still receive the bonus incentive when they are processed in PY10.
[69] Independent projects, which contain all project components associate with said project.
[70] Many projects contain multiple components within the same project number. These numbers represent the total number of components.

Custom	492	25,250,801	2,007.21
Total	**547**	**26,129,538**	**2,172.98**

Table 13-4 Savings Expectations by Program Component Algiers

Program Component	***Count of Project Components***	***Expected kWh Savings***	***Expected kW Savings***
Prescriptive	0	0	0.00
Custom	4	1,117,468	54.70
Total	**4**	**1,117,468**	**54.70**

During PY9 there has been a continuing focus on increasing the adoption of non-lighting measures with a significant increase in controls/process. While staff noted that lighting was still a common project type (71.0% of PY9 expected savings came from lighting), steps had been taken to increase adoption of non-lighting measures and that the program had some success in developing non-lighting projects. In PY8 controls/process improvements contributed only 2.2% to of savings expectations however, in PY9 20.7% of kWh savings came from controls and other building automation.

Table 13-5 Savings Expectations by Measure Category

Program Component	***Count of Project Components***	***Expected kWh Savings***	***Expected kW Savings***	***Percent Savings (kWh)***
Lighting	509	19,105,663	2,000.83	70.1%
Refrigeration	1	11,283	1.29	0.0%
HVAC	11	1,807,731	138.50	6.6%
Controls	24	5,640,917	21.87	20.7%
Motors	2	109,307	0.00	0.4%
Miscellaneous	4	572,105	10.50	2.1%
Total	**551**	**27,247,005**	**2,172.98**	**100.0%**

Table 13-6 Savings Expectations by Measure Type

Program Component	Project Component	Count of Projects	Expected kWh Savings	Expected kW Savings	Percent Savings (kWh)
Lighting	Non-Linear LED Fixture	290	12,150,427	894.41	44.59%
	Linear LED Fixture	208	6,694,446	1060.93	24.57%
	LED A-Type	5	224,426	40.75	0.82%
	LED Exit Sign	6	36,363	4.74	0.13%
HVAC	Chiller	7	750,884	64.00	2.76%
	Cooling Tower	1	214,584	74.40	0.79%
	Packaged / Rooftop Unit	1	25,991	-0.20	0.10%
	Optimization	2	816,272	0.30	3.00%
Controls	BAS	21	5,496,145	21.36	20.17%
	GREM	2	142,355	0.00	0.52%
	Occupancy Sensors	1	2,417	0.51	0.01%
Motors	Pumps and Fan Motors	2	109,307	0.00	0.40%
Miscellaneous	Combined EEMs	2	572,105	10.50	2.10%
Refrigeration	ECMs	1	11,283	1.29	0.04%
Total		**549**	**27,247,005**	**2,172.98**	**100.00%**

In PY8 135 projects summing to 19,377,054 kWh and 2,199.47 kW were completed during the full 12 month program year. The PY9 program ran for 15 months, surpassing PY8 figures by 7,869,951 kWh, or 40.6%. Comparisons are shown below in Table 13-7 below:

Table 13-7 Large C&I Program Participation Summary Comparison

Project Year	# Projects	Expected kWh	kWh per Project	% kWh Non-Lighting
PY5	46	9,807,855	213,214	35.60%
PY6	41[71]	12,282,310	299,569	16.80%
PY7 (nominal)	42	9,829,550	234,037	34.00%
PY7 (normalized)	56	13,106,067	234,037	34.00%
PY8	135	19,377,054	143,534	31.74%
PY9 (total)	128	27,247,005	212,867	29.88%
PY9 (calendar)	83	17,078,303	205,763	47.67%

PY9 ran for a total of 15 months: From Jan 1 to Dec 31, 2019, plus a three-month extension from Jan 1 to April 30, 2020.

In a direct comparison of PY8 and PY9:

[71] 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.

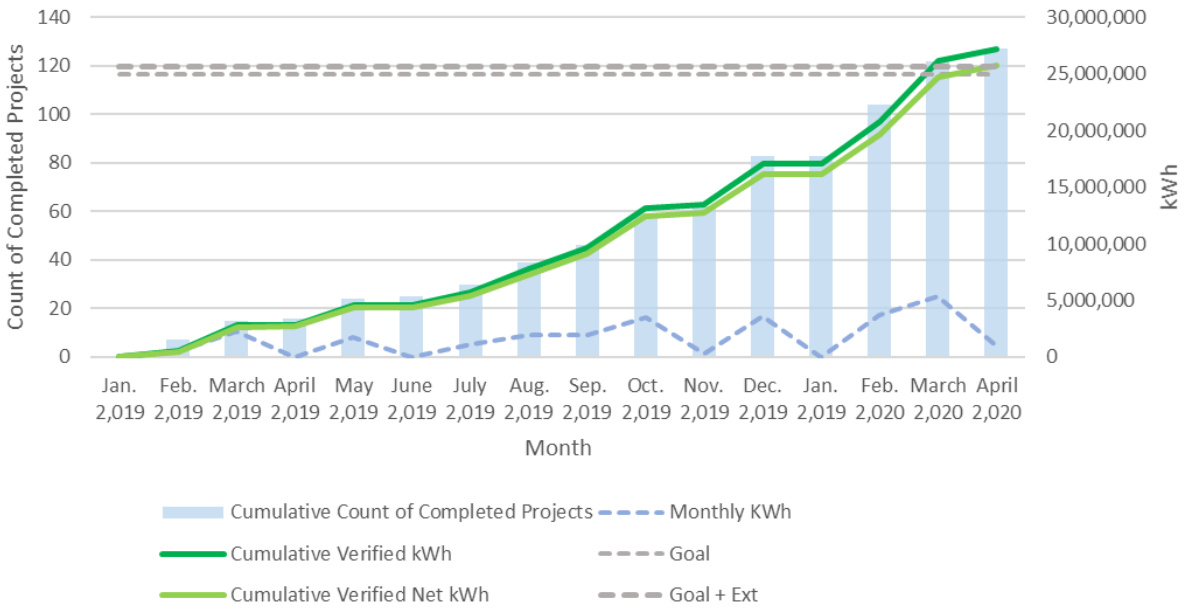
For comparison, PY8 kWh savings compared with a total PY9 expected savings (128 projects):

- Expected kWh savings have increased by 40.6%;
- Expected kW program reductions[72] have decreased by 1.2%; and
- Per-project savings has increased from an average of 143,534 to 212,867 kWh and 16.29 to 16.98 kW, representing 48.3% and 4.2% percentage changes, respectively.

Counting only savings that occurred during 2019 (83 projects) for an 'apples-to-apples' comparison:

- Expected kWh savings have decreased by 11.9%;
- Expected kW program reductions have decreased by 38.6%; and
- Per-project savings has increased from an average of 143,534 to 205,763 kWh and 16.29 to 16.27 kW, representing 43.4% and -0.1% percentage changes, respectively.

Figure 13-1 Overall Program Performance by Month



[72] Not shown.

13.1.1 Goal Achievement

Table 13-8 Large C&I Savings Goals by Utility

Utility	Year	kWh Goal	Verified kWh Savings	Percent of kWh Goal Met	kW Goal	Verified kW Reductions	Percent of kW Goal Met
New Orleans	2019	24,205,586	15,929,360	65.81%	3,914.80	2,141.72	54.71%
	2020	600,000	10,179,019	N/A			
ENO Subtotal	**Both**	**24,805,586**	**26,108,379**	**105.25%**	**3,914.80**	**2,141.72**	**54.71%**
Algiers	2019	797,046	1,117,025	140.15%	117.40	54.68	46.58%
	2020	0	0	N/A			
Algiers Subtotal	**Both**	**797,046**	**1,117,025**	**140.15%**	**117.40**	**54.68**	**46.58%**
Overall Total	**Both**	**25,602,632**	**27,225,404**	**106.34%**	**4,032.20**	**2,196.40**	**54.47%**

The program exceeded its kWh savings goal in the New Orleans territory for the 2020 period, attaining 105.3% of its goal. The Algiers territory had a single kWh goal, which was met and exceed, with verified net kWh reaching 140.15% of its kWh goal. Overall, the program attained 106.3% of the combined kWh savings goals, but did not meet any kW reductions goals.

13.2 M&V Methodology

Evaluation of the Large C&I Program requires the following:

- Stratified Random Sampling (as detailed in section (as detailed in section 2.2.1.3 Stratified Sampling) and by selecting large saving sites with certainty.
- On-site verification for two projects, desk reviews of all 16 sampled; and
- Interviewing of program participants and trade allies.

The on-site inspections were used to verify installations and to determine any changes to the operating parameters since the measures were first installed. Energy savings was estimated using proven techniques, including engineering calculations using industry standards to determine energy savings. Methods for evaluating lighting measures are described in the Small Commercial Solutions Chapter, section 12.2 M&V Methodology.

13.2.1 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 12.2.1.3 Stratified Sampling. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than simple random sampling would require by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results. The population and sample include both utilities

pooled. However, savings in this report are presented for each utility individually as well as aggregated.

The participant population was divided into five strata. Table 13-9 summarizes the strata boundaries and sample frames for the program and Table 13-10 summarizes expected savings of both the sample and population. The achieved sampling precision was ±8.51% 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 13-9 Large C&I Program Sample Design (Pooled)

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Stratum 5***	***Totals***
Strata boundaries (kWh)	< 90,000	90,001 - 200,000	200,001 - 350,000	350,001 - 600,000	> 600,001	
Number of projects	41	34	22	27	4	**128**
Total kWh savings	1,817,920	4,724,403	5,446,373	12,301,775	2,956,535	**27,247,006**
Average kWh Savings	44,340	138,953	247,562	455,621	739,134	**212,867**
Standard deviation of kWh savings	26,744	31,292	37,394	28,512	178,851	**186,489**
Coefficient of variation	0.603	0.225	0.151	0.169	0.242	**0.876**
Final design sample	4	3	3	3	3	**16**

Table 13-10 Expected Savings for Sampled and Non-Sampled Projects by Stratum

Stratum	***Sample Expected Savings***	***Total Expected Savings***
1	162,097	1,817,920
2	470,301	4,724,403
3	812,033	5,446,373
4	1,492,507	12,301,775
5	2,216,166	2,956,535
Total	**5,153,104**	**27,247,006**

13.2.2 Large C&I Parallel Path Savings

During the program year, projects expected to save more than 500,000 kWh or 100 kW, or those involving unusual technology were brought to Evaluators before program approval. These projects included the following technologies and energy savings measures:

- Water filtration systems;
- Replacing a chiller with a VFD controlled unit;
- VFDs on HVAC fan units;
- Exhaust fan sensing technology to reduce fan run speed and reduce MAU heating and cooling energy;
- BAS equipment schedule controls;

- Trane Trace energy models; and
- NEO (Net Energy Optimizer).

APTIM and the Evaluators held conference calls and communicated regularly to discuss project details, eligibility and savings methodology before project approval. Upon project completion final documents were reviewed to verify instructions had been carried out, ensuring a 100% realization rate for these projects.

13.3 Gross Impact Findings

13.3.1 Large C&I Site-Level Realization

Desk reviews of documentation for all sites chosen within each stratum were performed: All project documentation, calculations, invoices, photos, were carefully examined to verify the installation and operation of equipment. In addition, the Evaluators visited two sites to verify installation and operation of measures and collect data. Where there was uncertainly, the Evaluators contacted the implementation staff or site contacts for clarification. This information was then used to verify savings or make adjustments to ex ante estimates based on findings. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 13-11 presents realization at the stratum level.

Table 13-11 Summary of kWh Savings for Large C&I Program by Sample Stratum

Stratum	***Sample Expected kWh Savings***	***Sample Verified kWh Savings***	***Realization Rate***
1	162,098	162,097	100.0%
2	470,301	466,067	99.1%
3	812,033	821,163	101.1%
4	1,492,507	1,491,915	100.0%
5	2,216,166	2,189,606	98.8%

Table 13-12 shows the expected and verified energy savings for the program by project

Table 13-12 Expected and Verified Savings by Sampled Project

Project ID(s)	Facility Type	Expected kWh Savings	Verified kWh Savings	Realization Rate
LN9-026	Charter School	21,060	21,060	100.0%
LN9-015	Religious Gathering	34,702	34,702	100.0%
LN8-089	Parking Structure	39,313	39,313	100.0%
LN9-044	University	67,022	67,022	100.0%
LN9-053	Large Office	142,433	138,199	97.0%
LN9-103	University	145,444	145,444	100.0%
LN9-024	Large Office	182,424	182,424	100.0%
LN8-095	Large Office	214,584	214,584	100.0%
LN8-084	University	278,727	287,857	103.3%
LN9-031	Hotel	318,722	318,722	100.0%
LN9-025	Sports Field	412,637	412,637	100.0%
LN9-019	Hotel	505,127	505,124	100.0%
LN8-085	University	574,742	574,154	99.9%
LN9-004	Charter School	607,353	579,774	95.5%
LN9-086	Food Warehouse	617,225	618,243	100.2%
LN8-083	University	991,589	991,589	100.0%
Total		**5,153,104**	**5,130,848**	**99.6%**

13.3.2 Large C&I Program-Level Realization

Using the realization rates presented in Table 13-12 the Evaluators extrapolated results from sampled sites to non-sampled sites in developing program-level savings estimates. Table 13-13 presents results by stratum.

Table 13-13 Large C&I Program-Level Realization by Stratum

Stratum	# Sites	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
1	41	1,817,920	1,817,924	100.00%	162.94	166.39	102.12%
2	34	4,724,403	4,681,871	99.10%	393.37	386.17	98.17%
3	22	5,446,373	5,507,608	101.12%	741.65	756.96	102.06%
4	27	12,301,775	12,296,899	99.96%	772.00	753.81	97.64%
5	4	2,956,535	2,921,102	98.80%	103.04	133.08	129.15%
Total	**128**	**27,247,006**	**27,225,404**	**99.92%**	**2,173.00**	**2,196.41**	**101.08%**

Table 13-14 presents results by utility.

Table 13-14 Large C&I Program-Level Realization by Utility

Utility	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
ENO	26,129,538	26,108,379	99.92%	2118.28	2141.72	101.11%
Algiers	1,117,468	1,117,025	99.96%	54.70	54.68	99.96%
Total	**27,247,006**	**27,225,404**	**99.92%**	**2172.98**	**2196.40**	**101.08%**

Table 13-15 Large C&I Program-Level Realization by Utility and Calendar Year

Utility	Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
ENO	2019	15,960,835	15,929,360	99.8%	1,295.68	1,321.30	102.0%
	2020	10,168,703	10,179,019	100.1%	822.60	820.42	99.7%
ENO Subtotal	**Both**	**26,129,538**	**26,108,379**	**99.9%**	**2,118.28**	**2,141.72**	**101.1%**
Algiers	2019	1,117,468	1,117,025	100.0%	54.70	54.68	100.0%
	2020	0	0	N/A	0.00	0.00	N/A
Algiers Subtotal	**Both**	**1,117,468**	**1,117,025**	**100.0%**	**54.70**	**54.68**	**100.0%**
Overall Total	**Both**	**27,247,006**	**27,225,404**	**99.9%**	**2,172.98**	**2,196.40**	**101.1%**

Table 13-16 Large C&I Program-Level Realization by Calendar Year

Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
2019	17,078,303	17,046,385	106.8%	1,350.38	1,375.98	101.9%
2020	10,168,703	10,179,019	90.2%	822.60	820.42	99.7%
Total	**27,247,006**	**27,225,404**	**99.9%**	**2,172.98**	**2,196.40**	**101.1%**

13.3.3 Large C&I Realization by Contractor

The Evaluators extrapolated results from the program to responsible trade allies. A single lighting trade ally completed 215 projects and constituted 32.4% of expected kWh savings. One trade ally specializing in controls constituted 16.8% of expected kwh savings and averaged a 99.3% realization rate. Three lighting contractors completed 20-37 projects each, averaging 62,104 in expected kWh savings per project. Remaining contributions were made by one HVAC contractor (5.10% of total contribution), seven various contractors who completed a total of 99 projects, each averaging 42,194 kWh each, and an additional 27 various contractors who completed 132 projects in total, each averaging 23,994 kWh in expected savings. Peak kW reduction contributions were similar.

Table 13-17 Savings by Contractor

Contractor	Count of Projects	Percent of kWh Savings	Expected kWh	Verified kWh	kWh Realization Rate	Expected Peak kW	Verified Peak kW	Peak kW Realization Rate
Lighting Contractor #1	33	32.35%	8,813,973	8,811,372	100.0%	807.80	781.98	96.8%
Automation Contractor	18	16.75%	4,564,728	4,531,701	99.3%	-1.50[73]	-1.50	100.0%
Lighting Contractor #2	4	7.46%	2,033,423	2,040,269	100.3%	127.53	129.13	101.3%
Lighting Contractor #3	12	5.96%	1,623,625	1,625,710	100.1%	290.92	294.83	101.3%
Lighting Contractor #4	5	5.42%	1,477,721	1,488,652	100.7%	165.65	173.83	104.9%
HVAC Contractor	4	5.10%	1,389,134	1,392,201	100.2%	73.31	73.76	100.6%
Other Contractors: 1-3.3% each	19	15.3%	4,177,215	4,173,987	99.9%	409.16	409.62	100.1%
Other Contractors: 0-1% each	33	11.6%	3,167,186	3,161,507	99.8%	300.12	304.60	101.5%

13.3.4 Large C&I – Causes of Savings Deviations

For illustrative purposes, the Evaluators have summarized these adjustments to kWh savings in Table 13-18:

Table 13-18 Large C&I – Causes of Variance in Savings

Project ID	Expected kWh	Verified kWh	Realization Rate	Causes of Variance in Savings
LN9-053	142,433	138,199	97.0%	Large Office. The Evaluator fixed two errors in the lighting calculator: ▪ First, ex ante calculations used an energy interactive factor of 1.09 and demand interactive factor of 1.20 for all replacements, including exterior light fixtures which should be 1.00 and 1.00 since these are not conditioned spaces. ▪ Second, two line items showed a Metal Halide fixtures being replaced by a 1 W LED fixture which is not realistic. The Evaluator corrected the installed fixture wattage to a 32 based on what was actually installed on site.
LN8-085	574,742	574,154	99.9%	Education: College, University, Vocational, Day Care, and K-12 w/ Summer Session. Ex Ante calculation had eight 90W incandescent screw-in lamps replaced with 8W LED and used a baseline wattage of 90 Watts. These lamps are subject to EISA tier 1 baseline equivalence so the baseline wattage should be a 72 watt fixture.
LN9-004	607,353	579,774	95.5%	Education: K-12. Ex ante calculated savings used a proposed motor energy demand estimated as 80% speed and a fan affinity law exponent of 2.7. The Evaluator estimated the proposed motor energy demand using the VFD amperage readout, power factor, and motor efficiency.

[73] This project involved significant energy savings, however added an additional 1.50 kW during peak times.

Key issues identified in site-level analyses include:

- **Interactive effects on exterior fixtures.** In one sampled site the Evaluators found that interactive factors had been applied to exterior fixtures. Since exterior fixtures are not in conditioned areas these interactive factors do not apply. Implementors should adjust calculators to set interactive factors to 1.00 for all exterior fixtures.
- **Non-EISA baselines.** In one sampled site the Evaluators found screw-in incandescent calculations used the nominal 90W baseline in savings and peak kW reduction assumptions. These lamps are subject to EISA legislation and should have used a 73W baseline based on lumen equivalence. The Evaluators recommend that program implementors update program calculators with lumen equivalence baselines for lamps subject to EISA legislation.

For illustrative purposes, the Evaluators have summarized these adjustments to kWh savings in Table 13-18:

Table 13-19 Large C&I – Causes of Variance in kW Reductions

Project ID	Expected kW	Verified kW	Realization Rate	Causes of Variance in kW Reductions
LN9-103	13.00	8.15	62.7%	University courtyard. kW reduction calculations for all exterior fixtures used a 0.26 CF. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.

Key issues identified in site-level analyses include:

- **Erroneous peak coincidence reduction of 0.26.** For one sampled site, ex ante kW calculations assumed a peak coincidence factor of 0.26 in reduction calculations. These fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them. Implementors should adjust calculators to set coincidence factors to 0% for all exterior fixtures unless they operate continuously.

13.4 Net Impact Findings

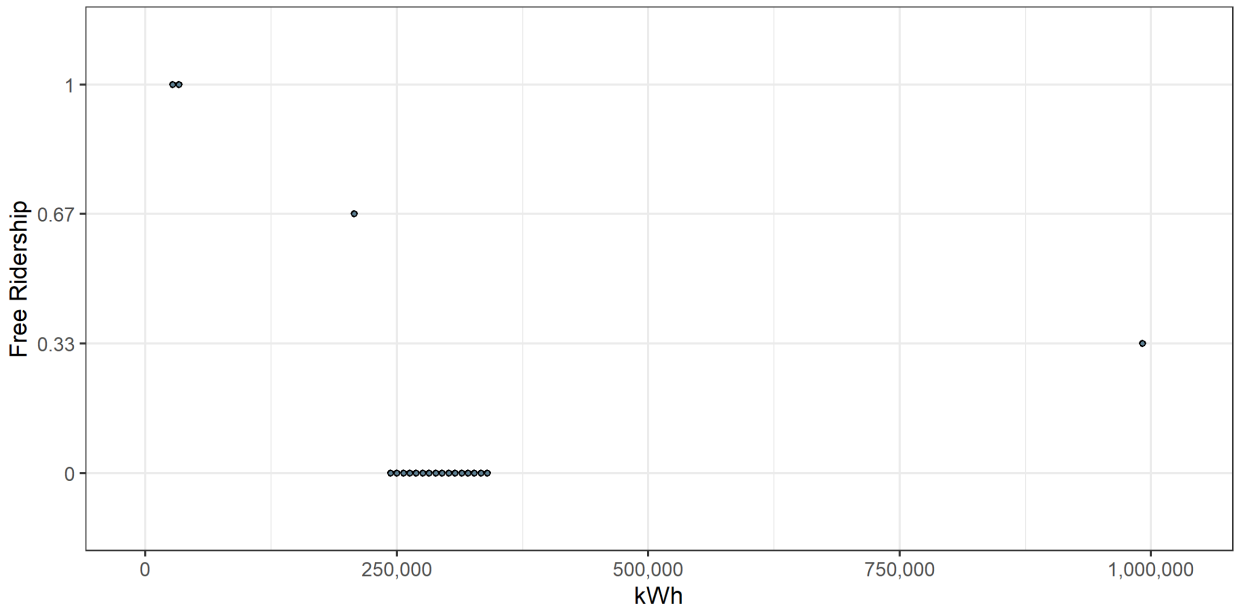
Participant survey responses were used to estimate the net energy impacts for the Large C&I Program. The methodology used is described in detail in Section 2.2.3.2.

13.4.1 Surveys and Benchmarking

Responses from 20 participant decision makers who installed efficiency projects were used to assess the net impacts of the Large C&I Program.

Figure 13-2 is a plot of project energy savings against free ridership score. As shown, there was not a strong relationship between energy savings and free ridership. However, the two projects identified as full free riders had relatively small energy savings.

Figure 13-2 Plot of Project Energy Savings and Free Ridership Score



No respondents reported quantifiable spillover measures.

The Evaluators conducted a literature review of recent NTG studies completed for large commercial and industrial programs as a secondary check for the reasonableness of the estimates of the ENO Large C&I Program. Table 13-20 summarizes the benchmark values identified. The NTG ratio estimated for ENO is within reasonably boundaries of the average values found in regional evaluations in 2017.

Table 13-20 Large C&I NTG Regional Benchmarking

Utility	*EM&V Contractor*	*Program Year*	*Net to Gross*
SWEPCO Arkansas	ADM Associates	2017	93.0%
Ameren Missouri	ADM Associates	2017	98.7%
Oklahoma Gas & Electric	ADM Associates	2017	85.7%
Public Service Company of New Mexico	Evergreen Economics	2017	71.2%
Entergy Arkansas	TetraTech	2017	93.0%
		Mean Value of Benchmark Utilities	**88.3%**
		Entergy New Orleans Value	**88.7%**

13.4.2 Net Savings Results

Table 13-21 and Table 13-22 summarize the verified net kWh savings and peak kW demand reductions of the program.

Table 13-21 Summary of Verified Net kWh Savings and Net Peak kW Reductions by Utility and Year

Utility	Year	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	2019	15,929,360	1,795,239	14,134,121	88.73%	1,321.30	87.34	1,233.96	93.39%
	2020	10,179,019	1,147,175	9,031,844	88.73%	820.42	54.23	766.19	93.39%
ENO Subtotal	**Both**	**26,108,379**	**2,942,414**	**23,165,965**	**88.73%**	**2,141.72**	**141.57**	**2,000.15**	**93.39%**
Algiers	2019	1,117,025	125,889	991,136	88.73%	54.68	3.61	51.07	93.40%
	2020	0	0	0	N/A	0.00	0.00	0.00	N/A
Algiers Subtotal	**Both**	**1,117,025**	**125,889**	**991,136**	**88.73%**	**54.68**	**3.61**	**51.07**	**93.40%**
Overall Total	**Both**	**27,225,404**	**3,068,303**	**24,157,101**	**88.73%**	**2,196.40**	**145.18**	**2,051.22**	**93.39%**

Table 13-22 Summary of Verified Net kWh Savings and Net Peak kW Reductions by Year

Year	Verified Net kWh Savings	Verified Net kW Reductions
2019	15,125,257	1,285.03
2020	9,031,844	766.19
Total	**24,157,101**	**2,051.22**

Net kWh savings totaled to 24,157,101 kWh and equal 88.7% of gross program savings. Net kW reductions totaled 2,051.22 kW and equal 93.4% of verified gross program savings.

13.5 Process Evaluation Findings

13.5.1 Summary of Program Participation

Table 13-23 summarizes program savings by measure type. As discussed in the Small Commercial Solutions chapter, custom savings are much higher than prescriptive savings.

Table 13-23 Program Activity by Measure Type

Measure Incentive Type	Measure Type	Expected Savings (kWh)	Number of Participants	$ per kWh in Expected Savings
Prescriptive	Controls	144,772	3	$0.14
Prescriptive	Lighting	722,681	29	$0.09
Prescriptive	Refrigeration	11,283	1	$0.08
Prescriptive	Refrigeration	11,283	21	$0.08
Custom	Controls	5,496,145	11	$0.11
Custom	HVAC	1,807,731	81	$0.12
Custom	Lighting	18,382,982	3	$0.10
Custom	Miscellaneous	572,105	2	$0.14

As shown in Table 13-24, two of the 128 projects were multi-measure projects.

Table 13-24 Number of Measure Types Installed at Location

Number of Measures Installed at Location*	Number of Participants
1	126
2	2

*Locations defined by account numbers

A large number of trade allies, 40, completed projects through the program in PY9 (Table 13-25). Moreover, the savings and number of projects completed were distributed across a large number of trade allies, although the two most active trade allies accounted for about 49% of program savings.

Table 13-25 Summary of Trade Ally Participation

Trade Ally	Expected Savings (kWh)	Percent of Expected Savings	Number of Participants	Average Project Size
Trade ally 1	8,813,973	32%	33	40,995
Trade ally 2	4,564,728	17%	18	253,596
Trade ally 3	2,033,423	7%	4	78,209
Trade ally 4	1,623,625	6%	12	43,882
Trade ally 5	1,477,721	5%	5	73,886
Trade ally 6	1,389,134	5%	4	347,284
Trade ally 7	811,994	3%	3	270,665
Trade ally 8	735,441	3%	5	23,724
Trade ally 9	724,294	3%	5	19,060
Trade ally 10	617,224	2%	1	77,153
All 55 other trade allies	4,455,447	16%	38	182,287

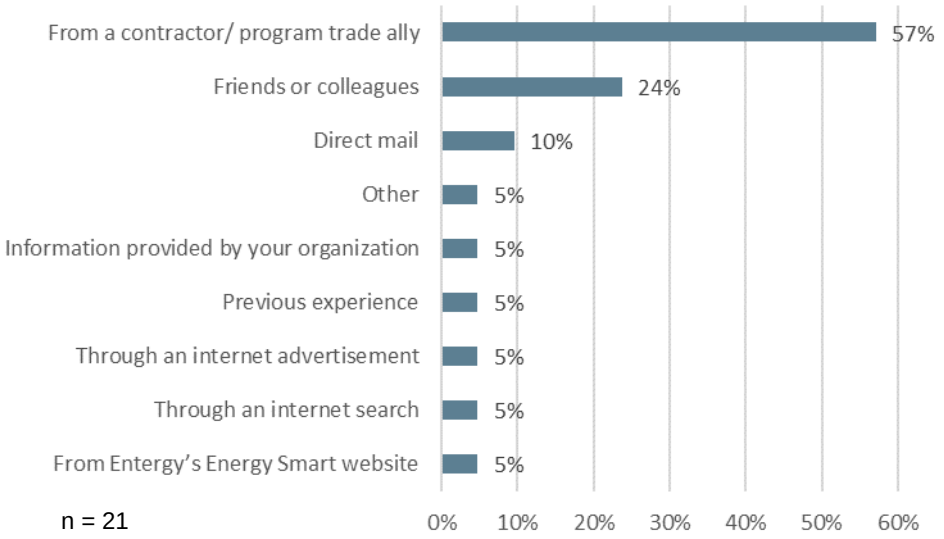
13.5.2 Participant Feedback

Twenty-one customers completed responses for a survey about the large commercial and industrial solutions program. There were a diverse range of occupations amongst those who interacted with the program ranging from a VP of Engineering to the Lead Electrician to the Purchasing Manager. Twenty-nine percent of those who responded held the position of facilities manager.

13.5.2.1 How Customers Learned of the Program

The majority of respondents learned of the program through their contractor. Fifty-seven percent of respondents learned of the program through a contractor, and 24% of respondents learned of the program through friends or colleagues. Other ways that people learned of the program included direct mail (10%) and the internet (5%). Figure 13-3 summarizes the responses.

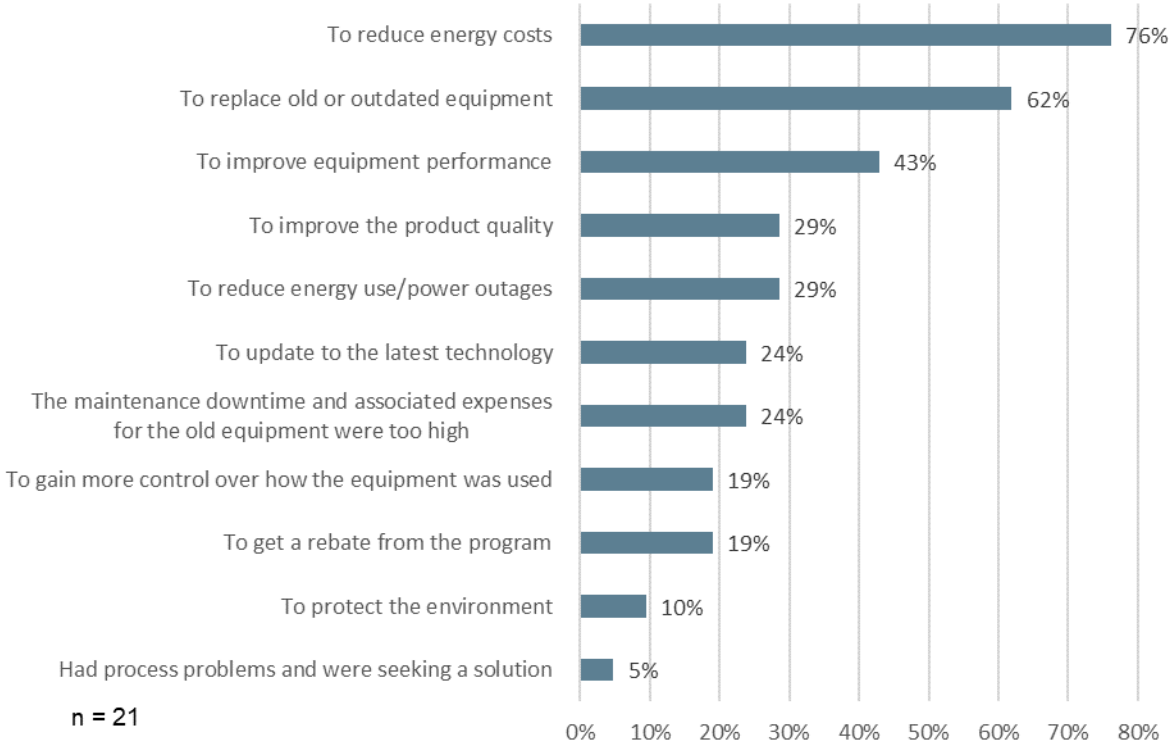
Figure 13-3 Source of Program Awareness



13.5.2.2 Motivations for Participating

The main motivations for participating in the program were to replace old or outdated equipment and to reduce energy costs. Figure 13-4 shows that 76% of participants were motivated to complete their program project to reduce their energy costs. Sixty-two percent of respondents stated that it was to replace old or outdated equipment. Other frequently mentioned motivations were to reduce energy use (29%), improve equipment performance (43%), update to the latest technology (24%), and to get a rebate from the program (19%).

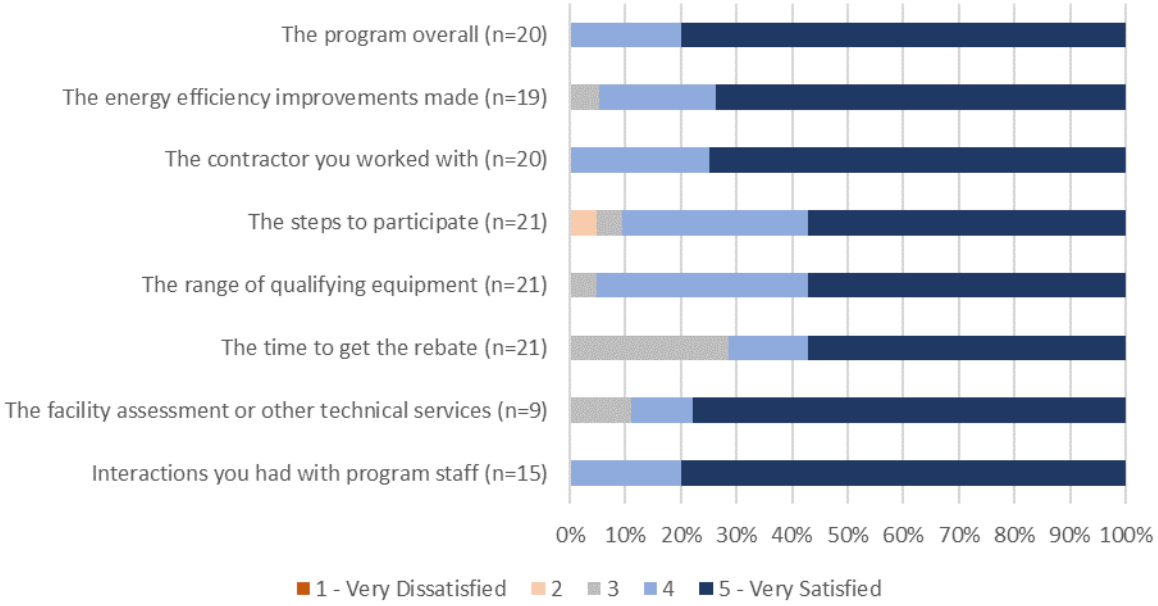
Figure 13-4 Reasons for Completing the Project



13.5.2.3 Participant Satisfaction

Overall, participants were satisfied with the program experience and various factors of the program. All respondents expressed satisfaction with the overall program experience and interactions that they had with the program staff with none expressing dissatisfaction. Furthermore, none of those surveyed expressed dissatisfaction with the facility assessment or other technical services, the time to get the rebate, the range of qualifying equipment, the contractor that they worked with, and the energy efficiency improvements made. Ninety-five percent of respondents were 'satisfied' or 'very satisfied' with the energy efficiency improvements made. One participant expressed dissatisfaction with the steps to participate in the program. Figure 13-5 summarizes the responses.

Figure 13-5 Participant Satisfaction



Participants were satisfied with Entergy as an electric service provider. Seventy-one percent reported that they were satisfied with Entergy (Table 13-26) Additionally, 71% of respondents also stated that their participation in the program either somewhat or greatly increased their satisfaction with Entergy Table 13-27.

Table 13-26 Satisfaction with Entergy

Response	***Percent of Respondents (n = 21)***
5 (Very satisfied)	33%
4	38%
3	29%
2	0%
1 (Very dissatisfied)	0%

Table 13-27 Program Impact on Satisfaction with Entergy

Response	***Percent of Respondents (n = 21)***
Greatly increased your satisfaction with Entergy	48%
Somewhat increased your satisfaction with Entergy	24%
Did not affect your satisfaction with Entergy	24%
Somewhat decreased your satisfaction with Entergy	5%
Greatly decreased your satisfaction with Entergy	0%

There is a high likelihood that participants have already recommended the program to someone else or are very likely to recommend the program to someone else. The likelihood of participants recommending the program to someone else is summarized in

Table 13-28. As shown,100% of respondents indicated they were likely to recommend the program or already had recommended it.

Table 13-28 Likelihood of Recommending the Program

Response	Percent of Respondents (n = 20)
Already have	25%
5 (Very likely)	65%
4	10%
3	0%
2	0%
1(Very unlikely)	0%

13.5.2.4 Firmographic

Most of the facilities that participated in the program were one of several locations owned by the company and were rented facilities. Thirty-three percent stated that their facility was their company's only location, but 52% stated that they were at one of several locations owned by the company. Sixty-three percent stated that they rented the property, and 21% stated that they owned the property. Also, nighty-five percent of respondents were billed directly for electricity at this location. Results are summarized in the tables below.

Table 13-29 Property Ownership

Response	Valid Percent (n = 19)
Own	21%
Rent	63%
Own and rent to someone else	16%

Table 13-30 Electricity Bills

Response	Valid Percent (n = 20)
We are billed directly for the electricity we use	95%
We are NOT billed directly for the electricity we use. Our electric bill is handled by another part of our company or a third -party service provider	5%
We are NOT billed directly for the electricity we use. The cost for our electricity is included in our rent/lease	0%

13.6 Key Findings and Conclusions

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

- **Overall kWh savings goal was met, but kW reduction goals were not met.** The program exceeded its kWh savings goal in the New Orleans territory for the 2020 period, attaining 105.3% of its goal. The Algiers territory had a single kWh goal, which was met and exceed, with verified net kWh reaching 140.15% of its kWh goal. Overall, the program attained 106.3% of the combined kWh savings goals, but did not meet any kW reductions goals.
- **Public sector entities completed projects through the Large C&I program.** The Evaluator identified a few projects completed by publicly funded entities including a university, schools, and a city park in the Large C&I Program records.
- **Retro-commissioning was launched in late PY8 but has experienced a slow start.** There has been an effort to get the program launched in PY9, but because this type of offer takes time to gain traction in the market, complete the energy studies, and implement the measures, no projects had been completed at the time of the interviews.
- **The Program will be expanding in PY10.** Staff plan to expand the Large C&I Program in PY10, offering lighting and non-lighting prescriptive measures, introducing dedicated New Construction and Commercial Real Estate programs.
- **The program has increased the proportion of non-lighting projects.** Staff indicated the program has historically relied on lighting savings, but they have been actively working to increase non-lighting projects. Training trade allies has helped the program increase the number of non-lighting projects.
- **The program has proposed to move most lighting measures from custom to prescriptive.** Program staff indicated they are focused on streamlining their program by moving all non-24/7 lighting measures from custom to prescriptive.
- **Participants are satisfied with the program.** Ninety-five percent of respondents reported that they were satisfied with the program overall. Additionally, 90% had either already recommended the program to someone else or stated that they were very likely to recommend it.

13.7 Recommendations

The Evaluators' recommendations are as follows:

- **Clarify assignment of projects to either the Publicly Funded Institutions or Large C&I program.** To improve tracking of program budgets and goals achievement, staff should develop procedures for consistent assignment of projects to one of the two programs.

- **Adjust calculators so that peak kW reductions are not attributed to fixtures which only operate during non-daylight hours.** This operating schedule precludes operation during peak times and thus peak reductions cannot be verified for these fixtures.
- **The program is exploring additional program opportunities.** Program staff plan to launch a Commercial Real Estate and dedicated New Construction programs in PY10.
- **Adjust calculators so that interactive effects are not applied to exterior fixtures.** In one sampled site the Evaluators found that interactive factors had been applied to exterior fixtures. Since exterior fixtures are not in conditioned areas these interactive factors do not apply. Implementors should adjust calculators to set interactive factors to 1.00 for all exterior fixtures.
- **Adjust calculators so that screw-in lamp baselines conform to EISA lumen equivalence baselines.** In one sampled site the Evaluators found screw-in incandescent calculations used the nominal 90W baseline in savings and peak kW reduction assumptions. These lamps are subject to EISA legislation and should have used a 73W baseline based on lumen equivalence. The Evaluators recommend that program implementors update program calculators with lumen equivalence baselines for lamps subject to EISA legislation.

14. Publicly Funded Institutions

14.1 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 are based on the total demand (kW) of the facility; above or below 100 kW. Rates for both facility demand groups are provided are summarized below in Table 14-1.

Table 14-1 Publicly Funded Institutions Summary of Program Incentives

Measure	***Incentive***	
Facility Demand	**Small (<100 kW)**	**Large (>100 kW)**
Lighting	$0.12 per kWh Saved	$0.10 per kWh Saved
Non-Lighting	$0.12 per kWh Saved	$0.12 per kWh Saved
Custom Bonus	Additional $0.03/kWh for custom lighting and non-lighting projects completed by 3/31/2020[74].	

Data provided by APTIM showed that during PY9, there were 35 project components among 16 sites. These projects were expected to provide a combined savings of 3,449,536 kWh and 90.27 kW. Count of projects, expected kWh and kW savings for the PFI Program are summarized in Table 14-1.

Table 14-2 Savings Expectations by Utility

Utility	***Count of Projects[75]***	***Expected kWh Savings***	***Expected kW Savings***
ENO	15	3,204,667	81.88
Algiers	1	244,869	8.40
Total	**16**	**3,449,536**	**90.28**

[74] Custom projects that were initially planned to be completed and processed by 3/31/20 but were delayed directly due to COVID-19 (with written confirmation), will still receive the bonus incentive when they are processed in PY10.
[75] Independent projects, which contain all project components associate with said project.

Table 14-3 Savings Expectations by Program Component ENO

Program Component	Count of Project Components[76]	Expected kWh Savings	Expected kW Savings
Prescriptive	2	16,408	1.87
Custom	26	3,188,260	80.00
Total	**28**	**3,204,668**	**81.87**

Table 14-4 Savings Expectations by Program Component Algiers

Program Component	Count of Project Components	Expected kWh Savings	Expected kW Savings
Prescriptive	1	5,345	1.06
Custom	6	239,523	7.34
Total	**7**	**244,868**	**8.40**

Table 14-5 Savings Expectations by Program Measure Category

Program Component	Count of Project Components	Expected kWh Savings	Expected kW Savings
Lighting	29	1,153,433	57.22
Controls	6	2,296,103	33.05
Total	**35**	**3,449,536**	**90.27**

Table 14-6 Savings Expectations by Measure Type

Program Component	Program Component	Count of Projects	Expected kWh Savings	Expected kW Savings	Percent Savings (kWh)
Lighting	Non-Linear LED Fixture	27	1,113,557	52.67	32.3%
	Linear LED Fixture	1	27,962	3.19	0.8%
	LED Exit Sign	1	11,914	1.36	0.3%
Controls	BAS	6	2,296,103	33.05	66.6%
Total		**35**	**3,449,536**	**90.27**	**100.0%**

In PY8, twenty projects summing to 2,898,984 kWh and 208.52 kW were completed during the twelve-month program year. The PY9 program ran for 15 months and achieved 3,449,536 in expected kWh, or 19.0% more than PY8. Comparisons are shown below in Table 14-7.

[76] Many projects contain multiple components within the same project number. These numbers represent the total number of components.

Table 14-7 Publicly Funded Institutions Participation Summary Comparison

Project Year	# Projects	Expected kWh	kWh per Project
PY7 (nominal)	3	814,317	271,439
PY7 (normalized)	4	1,085,756	271,439
PY8	20	2,898,984	144,949
PY9 (nominal)	16	3,449,5366	215,596
PY9 (normalized)	7	1,420,937	202,991

PY9 ran for a total of 15 months: From Jan 1 to Dec 31, 2019, plus a three-month extension from Jan 1 to April 30, 2020.

In a direct comparison of PY8 and PY9:

For comparison, PY8 kWh savings compared with a total PY9 expected savings (16 projects):

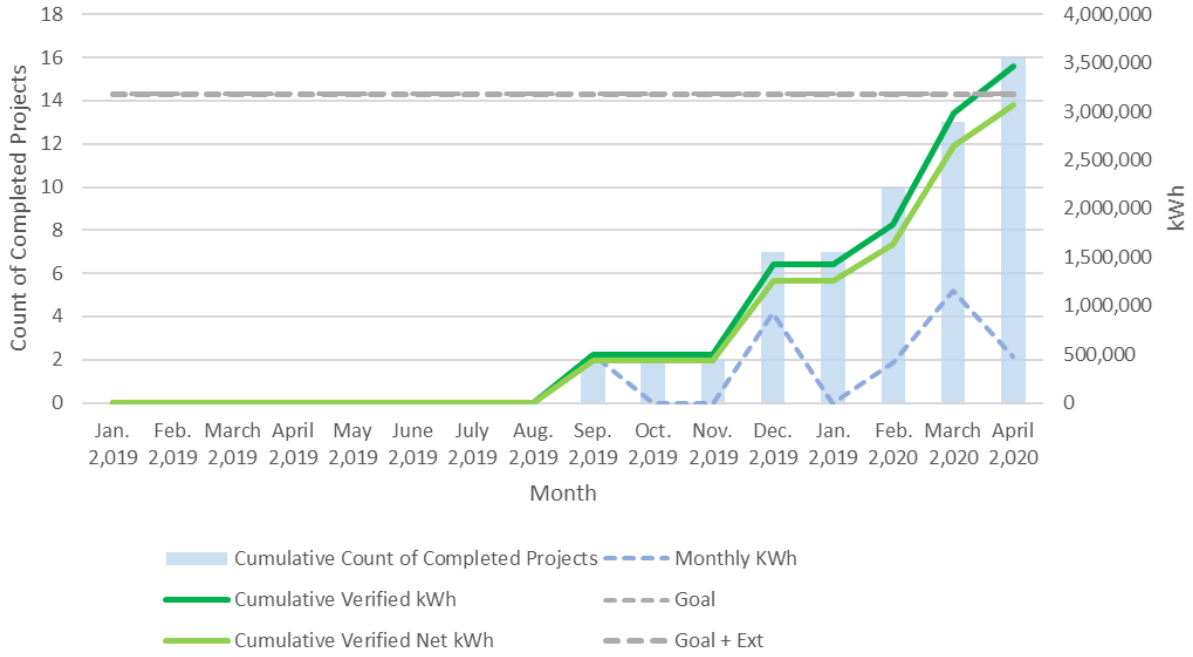
- Expected kWh savings have increased by 19.0%;
- Expected kW program reductions[77] have decreased by 56.7%; and
- Per-project savings has increased from an average of 144,949 kWh to 215,596 kWh, representing a 48.7% change.

Counting only savings that occurred during 2019 (7 projects) for an 'apples-to-apples' comparison:

- Expected kWh savings have decreased by 65.0%;
- Expected kW program reductions have decreased by 78.3%; and
- Per-project savings has increased from an average of 144,949 kWh to 202,991 kWh, representing a 40.0% change.

[77] Not shown.

Figure 14-1 Program Ex Ante Savings (kWh) by Measure Completion Month



Total verified savings and percentage of goals for the PFI program are summarized in Table 14-8:

Table 14-8 PFI Goal Achievement by Utility and year

Utility	*Year*	*kWh Goal*	*Verified kWh Savings*	*Percent of kWh Goal Met*	*kW Goal*	*Verified kW Reductions*	*Percent of kW Goal Met*
New Orleans	2019	2,927,922	1,176,066	40.17%	430.20	56.59	13.15%
	2020	0	2,041,377	N/A			
ENO	**Both**	**2,927,922**	**3,217,443**	**109.89%**	**430.20**	**56.59**	**13.15%**
Algiers	2019	251,013	244,868	97.55%	38.50	7.29	18.94%
	2020	0	0	N/A			
Algiers	**Both**	**251,013**	244,868	97.55%	**38.50**	**7.29**	**18.94%**
Overall	**Both**	**3,178,935**	**3,462,311**	**108.91%**	**468.70**	**63.88**	**13.63%**

No individual goals were met, but the New Orleans and overall kWh goal were exceeded. No kW goals were met. Overall goal achievement is 108.9% for kWh and 13.6% for kW.

14.2 M&V Methodology

Evaluation of the PFI 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 for two projects, desk reviews of all nine sampled; and

- Interviewing of program participants and trade allies.

Energy savings was estimated using proven techniques, including engineering calculations using industry standards to determine energy savings. Methods for evaluating lighting measures are described in the Small Commercial Solutions Chapter, section 12.1 M&V Methodology.

14.2.1 PFI Program Sample Design

Sampling for evaluation of ENO and Algiers' PFI program was developed using the Stratified Random Sampling procedure detailed in 2.2.1.3 Stratified Sampling. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than simple random sampling would require by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results. Table 14-9 summarizes the total participation in the PY9 PFI Program.

Table 14-9 PY8 PFI Program Participation and Sampling Summary

Utility	***# Projects***	***Expected kWh***	***Expected Peak kW***	***# Sites in Population***	***Site Visit Sample Size***
ENO	15	3,204,667	81.88	15	8
Algiers	1	244,869	8.40	1	1
Total	**16**	**3,449,536**	**90.27**	**16**	**9**

The participant population was divided into four strata. Table 14-10 summarizes the strata boundaries and sample frames for the program Table 14-11 summarizes expected savings for of both the sample and population. The achieved sampling precision was ±8.03% 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 14-10 PFI Program Sample Design (Pooled)

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Totals***
Strata boundaries (kWh)	< 100,000	100,001 - 230,000	230,001 - 500,000	500,001 - 1,000,000	
Number of projects	5	5	5	1	**16**
Total kWh savings	164,525	826,867	1,646,100	812,044	**3,449,536**
Average kWh Savings	32,905	165,373	329,220	812,044	**215,596**
Standard deviation of kWh savings	34,110	49,550	87,666	28,512	**207,366**
Coefficient of variation	1.037	0.300	0.266	0.000	**0.962**
Final design sample	2	3	3	1	**9**

Table 14-11 Expected Savings for Sampled and Non-Sampled Projects by Stratum

Stratum	Sample Expected Savings	Total Expected Savings
1	36,594	164,525
2	472,270	826,867
3	852,909	1,646,100
4	812,044	812,044
Total	**2,173,817**	**3,449,536**

14.3 Gross Impact Findings

14.3.1 PFI Site-Level Realization

Sites chosen within each stratum were visited in order to verify installation of rebated measures and to collect data needed for calculation of ex post verified savings. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 14-12 presents realization at the stratum level.

Table 14-12 Summary of kWh Savings for PFI Program by Sample Stratum (Pooled)

Stratum	Sample Expected kWh Savings	Sample Verified kWh Savings	Realization Rate
1	36,594	36,594	100.0%
2	472,270	472,269	100.0%
3	852,909	852,908	100.0%
4	812,044	824,822	101.6%

Table 14-13 shows the expected and verified energy savings for the program by project.

Table 14-13 Expected and Verified Savings by Sampled Project

Project ID(s)	Facility Type	Expected kWh Savings	Verified kWh Savings	Realization Rate
PN9-016	Education: K-12	3,053	3,053	100.0%
PN9-013	Outdoor	33,541	33,541	100.0%
PN9-007	Outdoor	113,763	113,762	100.0%
PN9-004	Outdoor	146,336	146,336	100.0%
PN9-002	Outdoor	212,171	212,171	100.0%
PA9-002	Public Order and Safety	244,869	244,868	100.0%
PN9-001	Parking Structure	271,770	271,770	100.0%
PN9-019	Small Office	336,270	336,270	100.0%
PN9-003	Public Order and Safety	812,044	824,822	101.6%
Total		**2,173,817**	**2,186,593**	**100.6%**

14.3.2 PFI Program-Level Realization

Using the realization rates presented in Table 14-13, the Evaluators extrapolated results from sampled sites to non-sampled sites in developing program-level savings estimates. Table 14-14 presents results by stratum.

Table 14-14 PFI Program-Level Realization by Stratum

Stratum	# Sites	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
1	5	164,525	164,524	100.00%	15.27	13.25	86.77%
2	5	826,867	826,866	100.00%	2.54	0.00	0.00%
3	5	1,646,100	1,646,098	100.00%	72.47	50.63	69.86%
4	1	812,044	824,823	101.57%	0.00	0.00	N/A
Total	**16**	**3,449,536**	**3,462,311**	**100.37%**	**90.28**	**63.88**	**70.76%**

Table 14-15 presents results by utility.

Table 14-15 PFI Program-Level Realization by Utility

Utility	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
ENO	3,204,667	3,217,443	100.40%	81.88	56.59	69.11%
Algiers	244,869	244,868	100.00%	8.40	7.29	86.79%
Total	**3,449,536**	**3,462,311**	**100.37%**	**90.28**	**63.88**	**70.76%**

Table 14-16 PFI Program-Level Realization by Utility and Calendar Year

Utility	Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
ENO	2019	1,176,067	1,176,066	100.00%	36.75	34.73	94.50%
	2020	2,028,600	2,041,377	100.63%	45.13	21.86	48.44%
ENO Subtotal	**Both**	**3,204,667**	**3,217,443**	**100.40%**	**81.88**	**56.59**	**69.11%**
Algiers	2019	244,869	244,868	100.00%	8.40	7.29	86.79%
	2020	0	0	N/A	0.00	0.00	N/A
Algiers Subtotal	**Both**	**244,869**	**244,868**	**100.00%**	**8.40**	**7.29**	**86.79%**
Overall Total	**Both**	**3,449,536**	**3,462,311**	**100.37%**	**90.28**	**63.88**	**70.76%**

Table 14-17 PFI Program-Level Realization by Calendar Year

Year	Expected kWh Savings	Verified kWh Savings	kWh Realization Rate	Expected kW Savings	Verified kW Savings	kW Realization Rate
2019	1,420,936	1,420,934	100.00%	45.15	42.02	93.07%
2020	2,028,600	2,041,377	100.63%	45.13	21.86	48.44%
Total	**3,449,536**	**3,462,311**	**100.37%**	**90.28**	**63.88**	**70.76%**

The overall kWh realization rate is 100.4% and the peak kW realization rate is 70.8%.

14.3.3 PFI – Causes of Savings Deviations

For illustrative purposes, the Evaluators have summarized these adjustments and others in Table 14-18.

Table 14-18 PFI – Causes of Variance in kWh Savings

Project ID	Expected kWh	Verified kWh	Realization Rate	Causes of Variance in Savings
PN9-003	812,044	824,822	101.6%	Public Order and Safety. Implementor used an estimated EMS schedule of 8 am to 4 pm every day but the original provided EMS screen shots did not match the stated operating schedule. Additional screen shots of the corrected EMS schedule showed a revised schedule of 8 am to 5 pm Monday through Friday for all the controlled equipment and 10 am to 3 pm Saturday through Sunday for most of the equipment and noon to 2 pm Saturday through Sunday for remaining equipment. The Evaluator used the revised schedule provided to calculate savings which reduced the overall annual operating schedule and increased the estimated savings.

Key issues identified in site-level analyses include:

- **Provided support documentation did not match the calculations.** In Project PN9-003, the provided support documentation did not match the information

entered into the calculator. Additionally, for this project the Implementors adjusted the EMS schedule after the application was finalized.

Table 14-19 PFI – Causes of Variance in Peak kW Reductions

Project ID	Expected kW	Verified kW	Realization Rate	Causes of Variance in kW Reductions
PA9-002	8.40	7.29	86.8%	Recreation Center. The majority of ex ante calculations for exterior spaces assumed a 0.26 CF. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.
PN9-019	33.05	12.32	37.3%	Emergency Medical Facility. The expected kW savings method calculated the savings as the difference between the maximum monthly energy demand rates from the energy simulation outputs. The issue with this method is that those numbers just represent the peak energy usage at one time and does not consider the time period or the duration of the energy usage. For this case, the maximum energy usage is in December (138.29 kW pre and 105.24 post) because of the electric heating required which is not during the peak demand period. The Evaluator demand reduction method calculated the savings as the difference in the average energy demand of the energy simulation using the hourly output results from the energy simulation model provided.

Key issues identified in site-level analyses include:

- **Erroneous peak coincidence reduction of 0.26.** For one sampled site, ex ante kW calculations assumed a peak coincidence factor of 0.26 in reduction calculations. These fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them. Implementors should adjust calculators to set coincidence factors to 0% for all exterior fixtures unless they operate continuously.

14.4 Net Impact Findings

Because none of the respondents who completed a PFI project contacted to complete the survey responded to questions involving net-to-gross questions, the Evaluator applied the net-to-gross ratio from the developed by participants in the Large C&I Program. The methodology used is described in detail in Section 2.2.3.

14.4.1 Net Savings Results

Table 14-20 and Table 14-21 summarize the verified net kWh savings and peak kW demand reductions of the program. Net kWh savings totaled to 3,273,439 kWh and 60.00 kW, and equal 94.5% of gross program savings.

Table 14-20 Summary of Verified Net kWh Savings and Peak kW Reductions by Territory and Year

Utility	Year	Verified Gross kWh Savings	kWh FR	Verified Net kWh Savings	kWh NTGR	Verified kW Reductions	kW FR	Verified Net kW Reductions	kW Net NTGR
ENO	2019	1,176,066	64,155	1,111,911	94.54%	34.73	2.11	32.62	93.92%
	2020	2,041,377	111,358	1,930,019	94.54%	21.86	1.33	20.53	93.92%
ENO Subtotal	**Both**	**3,217,443**	**175,513**	**3,041,930**	**94.54%**	**56.59**	**3.44**	**53.15**	**93.92%**
Algiers	2019	244,868	13,358	231,510	94.54%	7.29	0.44	6.85	93.96%
	2020	0	0	0	N/A	0.00	0.00	0.00	N/A
Algiers Subtotal	**Both**	**244,868**	**13,358**	**231,510**	**94.54%**	**7.29**	**0.44**	**6.85**	**93.96%**
Overall Total	**Both**	**3,462,311**	**188,871**	**3,273,440**	**94.54%**	**63.88**	**3.88**	**60.00**	**93.93%**

Table 14-21 Summary of Verified Net kWh Savings and Peak kW Reductions by Year

Year	Verified Net kWh Savings	Verified Net kW Reductions
2019	1,343,421	39.47
2020	1,930,019	20.53
Total	**3,273,440**	**60.00**

14.5 Process Evaluation Findings

14.5.1 Summary of Program Participation

Table 14-22 summarizes the expected savings and number of participants by measure type. HVAC measures generated approximately one-third of program savings.

Table 14-22 Program Activity by Measure Type

Measure Incentive Type	Measure Type	Expected Savings (kWh)	Number of Components	$ per kWh in Expected Savings
Prescriptive	Lighting	21,754	3	$0.04
Custom	Controls	1,131,680	6	$0.23
Custom	Lighting	2,296,103	26	$0.06

Table 14-23 shows the count of project components per project.

Table 14-23 Number of Measure Types Installed at Location

Number of Measure Components Installed at Location*	Number of Participants
1	11

2	0
3	1
4	2
5	0
6	1
7	1

*Locations defined by account numbers

Table 14-24 summarizes trade activity for the program. Activity was distributed across multiple trade allies.

Table 14-24 Summary of Trade Ally Participation

Trade Ally	Expected Savings (kWh)	Percent of Expected Savings	Number of Projects	Average Project Size
Trade ally 1	1,881,983	55%	6	171,089
Trade ally 2	750,680	22%	5	46,918
Trade ally 3	471,418	14%	1	471,418
Trade ally 4	223,775	6%	1	223,775
Trade ally 5	89,401	3%	1	22,350
Trade ally 6	32,278.70	1%	2	16,139

14.6 Key Findings and Conclusions

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

- **The overall kWh goal was met.** The combined New Orleans goal and overall kWh goal were exceeded. No kW goals were met. Overall goal achievement is 108.9% for kWh and 13.6% for kW. Staff indicated that projects in the pipeline and increased word-of-mouth referrals contributed to the increase in program activity. That said, the program implementation team has been active in developing projects and working with the City of New Orleans, local universities, and charter schools. These services include benchmarking, assistance with planning, and assistance with the bid process.
- **The program has a good working relationship with the City of New Orleans' property management department.** Implementation staff indicated they have established better contact at the City property management office, and this has resulted in a more robust pipeline of projects. As the program has evolved and public entities understand how to use it, projects have moved through the program easier.
- **PFI projects and the government entities who participated varied in PY9.** Some of the projects for PY9 include the lighting with the City of New Orleans, HVACs for the New Orleans Recreation Department, assessments done in public

libraries, and recovery projects for the school district. Implementation staff indicated there is an inventory of local government buildings for future potential projects. Due to the size of the territory, however, there are not many government entities that could qualify to enter the program. Green Coast indicated that most projects are mainly lighting and that HVAC projects are more challenging because the approval time can take longer.

  - **Engagement with higher education institutions.** The program challenged the higher education cohort with a 5 million kWh goal. The challenge created substantial participation among higher education institutions and motivated non-higher education institutions to also partake in the program.

- **A new data system provides billing data to Green Coast prior to building walkthroughs.** Green Coast staff now have access to customer utility bills before going on-site, which they indicated has been very helpful. This provides engineers more information on how the building is functioning and seasonal data, which gives them insight into how the HVAC system is operating.
- **The PFI program has a significant inventory of potential projects left in the territory.** Program staff stated the PFI program has the potential for projects due to the number of buildings available to cover including: 110 buildings from the property management department, 60-70 buildings that are part of the school district, 12 libraries, and 15 recreation centers with their parking garages and fields. The program has the potential to save city assets and lower utility costs.
- **Marketing and outreach efforts included lunch and learn events and individual outreach to public organizations.**
- **Government procurement processes create a barrier to participation.** Both program staff and trade allies noted that procurement process requirements present a barrier to participation. Responses from interviewed trade allies suggest that because of these types of barriers, they are reluctant to pursue working with government entities.
- **Erroneous reduction in peak coincidence of 0.26 for lighting controls.** For five sampled sites, ex ante kW calculations assumed additional sensor savings for any item that had lighting controls associated with it. For example: Assume an exterior lighting project, whose fixtures were previously controlled by photosensors and thus operating 4,319 hours annually. NLD operation precludes operation during peak times. However, when “Photosensor” controls were indicated in the ex ante calculator for said line item, a 0.26 reduction in PCF would automatically be included in ex ante savings calculations.

The Evaluators believe that this is an oversight from developing calculators to comply with TRM v1.0 section C.6.2.5.: Lighting Controls, Calculation of Deemed Savings. When applied in that scenario calculations are carried our correctly. The Evaluators recommend this error be fixed in implementor lighting calculators to prevent overestimation of savings.

- **Peak coincidence factors do not correspond to default-overridden custom hours of operation.** When deemed hours are overridden in ex ante calculators said hours are used in ex ante calculations, however the deemed peak coincidence factor is still applied. In Project PN8-009 a total of 17 lines items had lighting which were located in an "Education: College/university" deemed space. Deemed hours of operation had been overridden from 3,577 to 8,760, however the peak CF remained .69, when it should have been 1.00 to reflect the continuous lighting operation.

14.7 Recommendations

The Evaluators' recommendations are as follows:

- **Develop case studies to showcase community benefits of publicly funded projects.** The PFI program is a valuable to the community and staff should identify projects that highlight positive impacts.
- **Seek out media opportunities to increase awareness the program and of completed projects.** Market program success in the media emphasizing how its completed projects reflect the mission of the program.
- **Adjust calculators so that peak kW reductions are not attributed to fixtures which only operate during non-daylight hours (0%) and so that reductions for spaces with continuous operate continuously use 100%.** Non daylight operating schedule precludes operation during peak times and thus peak reductions cannot be verified for these fixtures, conversely continuous operation means that lighting has a 100% chance of operating during peak times.

15. Appendix A: Commercial Site Reports

15.1 Small Business Program

Project Number SN9-018
Program Small Commercial Solutions

Project Background

The participant is a religious congregational facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that a total of (180) 15W LED tubes replacing F40 T12 lamps in 2, 3 and 4-lamp configurations had been retrofitted:

- (10) 60W LED - Non-Int. Ballasts replaced (10) 4' 4-Lamp T8s
- (24) 45W LED - Non-Int. Ballasts replaced (24) 4' 3-Lamp T8s
- (10) 60W LED - Non-Int. Ballasts replaced (10) 4' 4-Lamp T8s
- (14) 30W LED - Non-Int. Ballasts replaced (14) 4' 2-Lamp T8s

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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*
Religious Gathering	Gas	3,174	1.09	1.20	0.53

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED60W	10	10	112	60	2,080	1.09	1,179	1,179	100.0%
F32T8 to LED45W	24	24	85	45	2,080	1.09	2,177	2,177	100.0%
F32T8 to LED60W	10	10	112	60	2,080	1.09	1,179	1,179	100.0%
F32T8 to LED30W	14	14	58	30	780	1.09	333	333	100.0%
						Total	**4,868**	**4,868**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED60W	10	10	112	60	0.53	1.20	0.33	0.33	100.0%
F32T8 to LED45W	24	24	85	45	0.53	1.20	0.61	0.61	100.0%
F32T8 to LED60W	10	10	112	60	0.53	1.20	0.33	0.33	100.0%
F32T8 to LED30W	14	14	58	30	0.53	1.20	0.25	0.25	100.0%
						Total	**1.52**	**1.52**	**100.0%**

Results

The kWh and kW realization rates for project SN9-018 are 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LED60W	1,179	0.33	100.0%	100.0%
F32T8 to LED45W	2,177	0.61	100.0%	100.0%
F32T8 to LED60W	1,179	0.33	100.0%	100.0%
F32T8 to LED30W	333	0.25	100.0%	100.0%
Total	**4,868**	**1.52**	**100.0%**	**100.0%**

Project Number SN9-104
Program Small Commercial Solutions

Project Background

The participant is an automotive repair shop that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified the participant had installed:

- (28) 14w led - non-int. ballasts replaced (28) 4' 1-lamp T8s
- (4) 28w led - non-int. ballasts replaced (4) 8' 1-lamp T8 54ws
- (2) 175w led - non-int. ballasts replaced (2) 400w metal halides
- Daylighting Controller (controlling < 500W) replacing No Controls

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures were calculated using prescriptive savings values listed in Section 10.2.2, which are based on the New Orleans TRM 2.0. The specific values used in calculating savings for this site are presented in the table below.

Table A, Prescriptive Savings and kW Reductions

Prescriptive Measure	***Per-Unit kWh Savings***	***Per-Unit kW Reduction***
Daylighting Controller (controlling < 500W) replacing No Controls	205.5	0.078
4' Linear LED replacing 4' Fluorescent T12/T8	39.8	0.013
LED Lamp/Fixture replacing 251 W to 400 W HID (lamp wattage)	2,413.4	0.2755
Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8	266.3	0.0304

Savings Calculations

Using values from the table above, the Evaluators calculated lighting savings as follows:

Table B, Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kWh Savings***	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***
Daylighting Controller (controlling < 500W) replacing No Controls	2	205.5	411	411	100.0%
4' Linear LED replacing 4' Fluorescent T12/T8	26	39.8	1,034	1,034	100.0%

LED Lamp/Fixture replacing 251 W to 400 W HID (lamp wattage)	2	2,413.4	4,828	4,828	100.0%
Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8	4	266.3	1,065	1,065	100.0%
		Totals:	**7,338**	**7,338**	**100.0%**

Table C, Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kW Reduction***	***Expected kW Reduction***	***Realized kW Reduction***	***kW Realization Rate***
Daylighting Controller (controlling < 500W) replacing No Controls	2	0.078	0.15	0.15	100.0%
4' Linear LED replacing 4' Fluorescent T12/T8	26	0.013	0.34	0.34	100.0%
LED Lamp/Fixture replacing 251 W to 400 W HID (lamp wattage)	2	0.276	0.55	0.55	100.0%
Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8	4	0.030	0.12	0.12	100.0%
		Totals:	**1.16**	**1.16**	**100.0%**

Results

The kWh and kW realization rates for project SN9-104 are 100%.

Table D, Verified Gross Savings & Realization Rates

Measure	**Verified**			
	kWh Savings	**kW Savings**	**kWh Realization Rate**	**kW Realization Rate**
Daylighting Controller (controlling < 500W) replacing No Controls	411	0.15	100.0%	100.0%
4' Linear LED replacing 4' Fluorescent T12/T8	1,034	0.34	100.0%	100.0%
LED Lamp/Fixture replacing 251 W to 400 W HID (lamp wattage)	4,828	0.55	100.0%	100.0%
Two (2) 4' Linear LED replacing 8' Fluorescent T12/T8	1,065	0.12	100.0%	100.0%
Total	**7,338**	**1.16**	**100.0%**	**100.0%**

Project Number SN9-123
Program Small Business Solutions

Project Background

The participant is a retail business that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified that the following had been installed:

- (8) LED A-lamp replacing (8) CFL/Incandescent Screw-In Lamp
- (1) 2' Linear LED replacing (1) 2' Fluorescent T12/T8
- (180) 4' Linear LED replacing (180) 4' Fluorescent T12/T8
- (2) LED U-tube replacing (2) U-tube Fluorescent T12/T8

Calculation Parameters

The Evaluators confirmed installation of all fixtures listed in the project application. Savings for the measures were calculated using prescriptive savings values listed in Section 10.2.2, which are based on the New Orleans TRM 2.0. The specific values used in calculating savings for this site are presented in the table below.

Table A, Prescriptive Savings and kW Reductions

Prescriptive Measure	***Per-Unit kWh Savings***	***Per-Unit kW Reduction***
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	111.7	0.036
2' Linear LED replacing 2' Fluorescent T12/T8	19.8	0.006
4' Linear LED replacing 4' Fluorescent T12/T8	39.8	0.013
LED U-tube replacing U-tube Fluorescent T12/T8	54.6	0.018

Savings Calculations

Using values from the table above, the Evaluators calculated lighting savings as follows:

Table B, Lighting Retrofit kWh Savings Calculations

Prescriptive Measure	***Measure Quantity***	***Per-Unit kWh Savings***	***Expected kWh Savings***	***Realized kWh Savings***	***kWh Realization Rate***
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	8	111.7	894	893	100.0%
LED T8/T12 Upgrade - U-tube	1	19.8	20	20	100.0%
LED replacing CFL pin-base lamp	180	39.8	7,157	7,157	100.0%
LED A-lamp	2	54.6	109	109	100.0%
		Totals:	**8,180**	**8,179**	**100.0%**

Table C, Lighting Retrofit kW Reduction Calculations

Prescriptive Measure	Measure Quantity	Per-Unit kW Reduction	Expected kW Reduction	Realized kW Reduction	kW Realization Rate
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	8	0.036	0.28	0.28	100.0%
LED T8/T12 Upgrade - U-tube	1	0.006	0.01	0.01	100.0%
LED replacing CFL pin-base lamp	180	0.013	2.33	2.33	100.0%
LED A-lamp	2	0.018	0.04	0.04	100.0%
		Totals:	**2.66**	**2.66**	**100.0%**

Results

The kWh and kW realization rates for project SN9-123 are 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
LED A-lamp replacing CFL/Incandescent Screw-In Lamp	893	0.28	100.0%	100.0%
LED T8/T12 Upgrade - U-tube	20	0.01	100.0%	100.0%
LED replacing CFL pin-base lamp	7,157	2.33	100.0%	100.0%
LED A-lamp	109	0.04	100.0%	100.0%
Total	**8,179**	**2.66**	**100.0%**	**100.0%**

Project Number SN9-030
Program Small Commercial Solutions

Project Background

The participant is a community center that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (6) 35W LED - Non-Int. Ballasts replaced (6) 4' 4-Lamp T8s
- (4) 28W LED - Non-Int. Ballasts replaced (4) 4' 4-Lamp T8s
- (6) 28W LED - Non-Int. Ballasts replaced (6) 4' 4-Lamp T8s
- (2) 247W LED - Non-Int. Ballasts replaced (2) 400W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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*
Office	Gas	5,159	1.09	1.20	0.77
Exterior	None	4,319	1.00	1.00	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED35W	6	9	142	35	5,159	1.09	3,020	3,020	100.0%
F32T8 to LED28W	4	4	142	28	5,159	1.09	2,564	2,564	100.0%
F32T8 to LED28W	6	13	142	28	5,159	1.09	2,744	2,744	100.0%
MH400 to LED247W	2	2	453	247	4,319	1.00	1,779	1,779	100.0%
						Total	**10,107**	**10,107**	**100.0%**

Table C, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_D*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED35W	6	9	142	35	0.77	1.20	0.50	0.50	100.0%
F32T8 to LED28W	4	4	142	28	0.77	1.20	0.42	0.42	100.0%
F32T8 to LED28W	6	13	142	28	0.77	1.20	0.45	0.45	100.0%

MH400 to LED247W	2	2	453	247	0.00	1.00	0.00	0.00	N/A
						Total	**1.37**	**1.37**	**100.0%**

Results

The kWh and kW realization rates for project SN9-030 are 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED35W	3,020	0.50	100.0%	100.0%
F32T8 to LED28W	2,564	0.42	100.0%	100.0%
F32T8 to LED28W	2,744	0.45	100.0%	100.0%
MH400 to LED247W	1,779	0.00	100.0%	N/A
Total	**10,107**	**1.37**	**100.0%**	**100.0%**

Project Number SN9-040
Program Small Commercial Solutions

Project Background

The participant is a beauty supply retailer that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (54) 36W LED - Non-Int. Ballasts replaced (54) 4' 4-Lamp T12s

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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*
Retail: Strip Mall	ER	3,965	0.87	1.20	0.90

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED36W	54	54	112	36	4,680	0.87	16,710	16,710	100.0%
						Total	**16,710**	**16,710**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_D*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED36W	54	54	112	36	0.90	1.20	4.43	4.43	100.0%
						Total	**4.43**	**4.43**	**100.0%**

Results

The kWh and kW realization rates for project SN9-040 are 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED36W	16,710	4.43	100.0%	100.0%
Total	**16,710**	**4.43**	**100.0%**	**100.0%**

Project Number SN9-034
Program Small Commercial Solutions

Project Background

The participant is a hardware that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. On site, the Evaluators verified that the following had been installed:

- (100) 34W LED - Non-Int. Ballasts replaced (100) 4' 4-Lamp T8s

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Office (attached to other facility)	ER	3,406	1.20	1.00	0.77

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*AOH*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED34W	100	100	118	34	2,496	0.87	18,241	18,241	100.0%
					Total		**18,241**	**18,241**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED34W	100	100	118	34	0.77	1.00	7.76	6.47	83.4%
					Total		**7.76**	**6.47**	**83.4%**

Results

The kWh realization rate for project SN9-034 is 110.0%, and the kW realization rate is 86.4%. Ex ante calculations assume a conditioned facility, though during the M&V site visit the Evaluators determined that the facility does not have air conditioning. Ex post calculations for not include AC interactive effects, resulting in a low kW realization rate.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LED34W	18,241	6.47	100.0%	83.4%
Total	**18,241**	**6.47**	**100.0%**	**83.4%**

Project Number SN9-043
Program Small Commercial Solutions

Project Background

The participant is a small food store that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and out. The Evaluators verified that the following had been installed:

- (6) 300W LED - Non-Int. Ballasts replaced (6) 1000W Metal Halides
- (8) 36W LED - Non-Int. Ballasts replaced (8) 4' 3-Lamp T12ESs
- (7) 32W LED - Non-Int. Ballasts replaced (7) 80W 1-Lamp Halogens
- (2) 36W LED - Non-Int. Ballasts replaced (2) 4' 2-Lamp T12ESs

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology of this report. Parameters for calculating kWh savings and kW reductions at this site are shown below:

Table A, Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Food Sales: Non-24-Hour Supermarket	ER	2,058	0.87	1.20	0.95
Exterior	None	4,319	1.00	1.00	0.00
Food Sales: 24-Hour Supermarket Cooler: Ref. Med (33° to 41°)	None	2,058	1.25	1.25	0.95

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1000 to LED300W	6	6	1,078	300	4,319	1.00	20,161	20,161	100.0%
F40T12/ES to LED36W	8	8	112	36	2,058	0.87	1,089	1,089	100.0%
H80 to LED32W	7	7	80	32	2,058	1.25	864	864	100.0%
F40T12/ES to LED36W	2	2	58	36	4,319	1.00	190	190	100.0%
						Total	**22,304**	**22,304**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
MH1000 to LED300W	6	6	1,078	300	0.00	1.00	0.00	0.00	N/A
F40T12/ES to LED36W	8	8	112	36	0.95	1.20	0.69	0.69	100.0%
H80 to LED32W	7	7	80	32	0.95	1.25	0.40	0.40	100.0%
F40T12/ES to LED36W	2	2	58	36	0.00	1.00	0.00	0.00	N/A
						Total	**1.09**	**1.09**	**100.0%**

Results

The kWh and realization rates for project SN9-043 are 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH1000 to LED300W	20,161	0.00	100.0%	N/A
F40T12/ES to LED36W	1,089	0.69	100.0%	100.0%
H80 to LED32W	864	0.40	100.0%	100.0%
F40T12/ES to LED36W	190	0.00	100.0%	N/A
Total	**22,304**	**1.09**	**100.0%**	**100.0%**

Project Number SN9-054
Program Small Commercial Solutions

Project Background

The participant is a driving range that received incentives from Entergy New Orleans for retrofitting energy efficient outdoors. On site, the Evaluators verified that the following had been installed:

- (15) 60W LED - Non-Int. Ballasts replaced (15) 400W Metal Halides
- (32) 24W LED - Non-Int. Ballasts replaced (32) 4' 2-Lamp T8s
- (3) 9W LED - Int. Ballasts replaced (3) 65W 1-Lamp Halogens

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH400 to LED60W	15	15	453	60	4,319	1.00	25,461	25,461	100.0%
F32T8 to LED24W	32	32	58	24	4,319	1.00	4,699	4,699	100.0%
H65 to LEDINT9W	3	3	65	9	4,319	1.00	726	726	100.%
H90 to LED17	2	2	90	17	4,319	1.00	631	-	0.0%
						Total	**31,517**	**30,885**	**98.0%**

Table C, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_D*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH400 to LED60W	15	15	453	60	0.00	1.00	0.23	0.00	0.0%
F32T8 to LED24W	32	32	58	24	0.00	1.00	0.20	0.00	0.0%
H65 to LEDINT9W	3	3	65	9	0.00	1.00	0.01	0.00	0.0%
H90 to LED17	2	2	90	17	0.00	1.00	0.01	0.00	0.0%
						Total	**0.45**	**0.00**	**0.0%**

Results

The kWh realization rate for project SN9-054 is 98.0%, and the kW realization rate is 0.0%. During the verification visit the Evaluators found that two flood fixtures were non-operational. Additionally, all fixture operated dusk to dawn, precluding them from operating during peak times, thus the peak kW reduction should be zero.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH400 to LED60W	25,461	0.00	100.0%	0.0%
F32T8 to LED24W	4,699	0.00	100.0%	0.0%
H65 to LEDINT9W	726	0.00	100.0%	0.0%
H90 to LEDINT17W	0	0.00	0.0%	0.0%
Total	**30,885**	**0.00**	**98.0%**	**0.0%**

Project Number SN9-048
Program Small Commercial Solutions

Project Background

The participant is a gas station with convenience store that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (34) 36W LED - Non-Int. Ballasts replaced (34) 4' 4-Lamp T8s
- (7) 36W LED - Non-Int. Ballasts replaced (7) 4' 4-Lamp T8s
- (2) 36W LED - Non-Int. Ballasts replaced (2) 4' 4-Lamp T8s
- (2) 36W LED - Non-Int. Ballasts replaced (2) 4' 2-Lamp T8s
- (5) 36W LED - Non-Int. Ballasts replaced (5) 4' 2-Lamp T8s
- (16) 32W LED - Non-Int. Ballasts replaced (16) 80W 1-Lamp Halogens

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology of this report. Parameters for calculating kWh savings and kW reductions at this site are shown below:

Table A, Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Food Sales: 24-Hour Supermarket	ER	8,760	0.87	1.20	1.00
Food Sales: 24-Hour Supermarket Ref. Med (33° to 41°)	None	8,760	1.25	1.25	1.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED36W	34	34	112	36	8,760	0.87	19,694	19,694	100.0%
F32T8 to LED36W	7	7	112	36	8,760	0.87	4,054	4,054	100.0%
F32T8 to LED36W	2	2	112	36	8,760	0.87	1,158	1,158	100.0%
F32T8 to LED36W	2	2	58	36	8,760	0.87	335	335	100.0%
F32T8 to LED36W	5	5	58	36	8,760	1.25	1,205	1,205	100.0%
H80 to LED32W	16	16	80	32	8,760	1.25	8,410	8,410	100.0%
						Total	**34,856**	**34,856**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED36W	34	34	112	36	0.95	1.20	2.95	3.10	105.1%
F32T8 to LED36W	7	7	112	36	0.95	1.20	0.61	0.64	104.9%
F32T8 to LED36W	2	2	112	36	0.95	1.20	0.17	0.18	105.9%
F32T8 to LED36W	2	2	58	36	0.95	1.20	0.05	0.05	100.0%
F32T8 to LED36W	5	5	58	36	0.95	1.25	0.13	0.14	107.7%
H80 to LED32W	16	16	80	32	0.95	1.25	0.91	0.96	105.5%
						Total	**4.82**	**5.07**	**105.2%**

Results

The kWh realization rate for project SN9-048 is 100.0%, and the kW realization rate is 105.2%. The project's TRM-based space type is a 'Food Sales: 24-Hour Supermarket,' which has deemed annual lighting operating hours of 6,900 and a peak coincidence factor of 0.95. Verified operation of site lighting in continuous (8,760). This is reflected in ex ante kWh savings calculations, but ex ante kW reduction calculations use the deemed 0.95. Since lighting is operating continuously at the site, there is a 100% chance that lights will be operating during peak times, thus ex post calculations use 1.00 as a peak CF, raising the realized peak kW reduction.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LED36W	19,695	3.10	100.0%	105.1%
F32T8 to LED36W	4,054	0.64	100.0%	104.9%
F32T8 to LED36W	1,158	0.18	100.0%	105.9%
F32T8 to LED36W	335	0.05	100.0%	100.0%
F32T8 to LED36W	1,205	0.14	100.0%	107.7%
H80 to LED32W	8,410	0.96	100.0%	105.5%
Total	**34,856**	**5.07**	**100.0%**	**105.2%**

Project Number SN9-038
Program Small Commercial Solutions

Project Background

The participant is a condominium association that received incentives from Entergy New Orleans for retrofitting energy efficient lighting outdoors. The Evaluators verified that the following had been installed:

- (66) 27W LED - Non-Int. Ballasts replaced (66) 175W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH175 to LED27W	66	66	208	27	4,319	1.00	51,595	51,595	100.0%
						Total	**51,595**	**51,595**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_D*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH175 to LED27W	66	66	208	27	0.00	1.00	3.00	0.00	0.0%
						Total	**3.00**	**0.00**	**0.0%**

Results

The kWh realization rate for project SN9-038 is 100.0%, and the kW realization rate is 0.0%. The Evaluators found that a 0.26 peak coincident factor was used in ex ante kW

calculations. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH175 to LED27W	51,595	0.00	100.0%	0.0%
Total	**51,595**	**0.00**	**100.0%**	**0.0%**

Project Number SN9-055
Program Small Commercial Solutions

Project Background

The participant is a warehouse that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (16) 230w led - non-int. ballasts replaced (16) 1000w metal halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	Heating Type	Annual Hours	IEF_E	IEF_D	CF
Manufacturing	(none)	5,740	1.00	1.00	0.73

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
MH1000 to LED230W	16	16	1,078	230	5,740	1.00	77,880	77,880	100.0%
						Total	**77,880**	**77,880**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
MH1000 to LED230W	16	16	1,078	230	0.73	1.00	9.90	9.90	100.0%
						Total	**9.90**	**9.90**	**100.0%**

Results

The kWh and kW realization rates for project SN9-055 are 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH1000 to LED230W	77,880	9.90	100.0%	100.0%

Total	**77,880**	**9.90**	**100.0%**	**100.0%**

Project Number SN9-026
Program Small Commercial Solutions

Project Background

The participant is a truck stop and entertainment facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (18) 313W LED - Non-Int. Ballasts replaced (18) 1000W Metal Halides
- (20) 148W LED - Non-Int. Ballasts replaced (20) 400W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***Annual Operating Hours***	***IEF_E***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
MH1000 to LED313W	18	18	1,078	313	4,319	1.00	59,473	59,473	100.0%
MH400 to LED148W	20	20	453	148	4,319	1.00	26,346	26,346	100.0%
						Total	**85,819**	**85,819**	**100.0%**

Table C, Lighting Retrofit kWh Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***IEF_D***	***Expected kW Savings***	***Realized kW Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
MH1000 to LED313W	18	18	1,078	313	0.00	1.00	0.00	0.00	N/A
MH400 to LED148W	20	20	453	148	0.00	1.00	0.00	0.00	N/A
						Total	**0.00**	**0.00**	**N/A**

Results

The kWh realization rate for project SN9-026 is 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH1000 to LED313W	59,473	0.00	100.0%	N/A
MH400 to LED148W	26,346	0.00	100.0%	N/A
Total	**85,819**	**0.00**	**100.0%**	**N/A**

Project Number SN9-021
Program Small Commercial Solutions

Project Background

The participant is a small manufacturing facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (43) 140W LED - Non-Int. Ballasts replaced (43) 400W Metal Halides
- (6) 180W LED - Non-Int. Ballasts replaced (6) 400W Metal Halides
- (19) 70W LED - Non-Int. Ballasts replaced (19) 250W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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*
Manufacturing	None	5,740	1.00	1.00	0.73
Exterior	None	4,319	1.00	1.00	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH400 to LED140W	43	42	453	140	5,740	1.00	78,059	78,059	100.0%
MH400 to LED180W	6	6	453	180	5,740	1.00	9,402	9,402	100.0%
MH250 to LED70W	19	19	288	70	4,319	1.00	17,889	17,889	100.0%
						Total	**105,350**	**105,350**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_D*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH400 to LED140W	43	42	453	140	0.73	1.00	9.93	9.93	100.0%
MH400 to LED180W	6	6	453	180	0.73	1.00	1.20	1.20	100.0%
MH250 to LED70W	19	19	288	70	0.00	1.00	1.08	0.00	0.0%
						Total	**12.21**	**11.13**	**91.2%**

Results

The kWh realization rate for project SN9-021 is 100.0%, and the kW realization rate is 91.2%. The Evaluators found that a peak CF of 0.26 was used to calculate the ex ante demand reductions for one of the exterior wall pack fixtures. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH400 to LED140W	78,059	9.93	100.0%	100.0%
MH400 to LED180W	9,402	1.20	100.0%	100.0%
MH250 to LED70W	17,889	0.00	100.0%	0.0%
Total	**105,350**	**11.13**	**100.0%**	**91.2%**

Project Number SN9-077
Program Small Commercial Solutions

Project Background

The participant is a parking garage that received incentives from Entergy New Orleans for retrofitting energy efficient lighting. The Evaluators verified the participant had installed:

- (24) 24W LED - non-int. ballasts replaced (24) 48” Fluorescent lamp
- (26) 24W LED - non-int. ballasts replaced (26) 48” Fluorescent lamps
- (27) 24W LED - non-int. ballasts replaced (27) 48” Fluorescent lamps
- (27) 24W LED - non-int. ballasts replaced (27) 48” Fluorescent lamps
- (27) 24W LED - non-int. ballasts replaced (27) 48” Fluorescent lamps
- (27) 24W LED - non-int. ballasts replaced (27) 48” Fluorescent lamps
- (27) 24W LED - non-int. ballasts replaced (27) 48” Fluorescent lamps
- (28) 24W LED - non-int. ballasts replaced (28) 48” Fluorescent lamps
- (8) 24W LED - non-int. ballasts replaced (8) 48” Fluorescent lamps
- (34) 48W LED - non-int. ballasts replaced (34) 96” Fluorescent lamps
- (21) 24W LED - non-int. ballasts replaced (21) 48” Fluorescent lamps
- (7) 48W LED - non-int. ballasts replaced (7) 8' 2-lamp t8 86w linear fluorescent
- (9) 24W LED - non-int. ballasts replaced (9) 4' 2-lamp t8 44w linear fluorescent
- (6) 30W LED - non-int. ballasts replaced (6) 150w metal halides
- (3) 27W LED - non-int. ballasts replaced (3) 150w metal halides
- (6) 48W LED - non-int. ballasts replaced (6) 48” Fluorescent lamp
- (2) 48W LED - non-int. ballasts replaced (2) 48” Fluorescent lamp

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology of this report. Parameters for calculating kWh savings and kW reductions at 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	1.00	1.00	1.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED24W	24	24	58	24	8,760	7,148	7,148	1.00	100.0%
F32T8 to LED24W	26	26	58	24	8,760	7,744	7,744	1.00	100.0%
F32T8 to LED24W	27	27	58	24	8,760	8,042	8,042	1.00	100.0%
F32T8 to LED24W	27	27	58	24	8,760	8,042	8,042	1.00	100.0%
F32T8 to LED24W	27	27	58	24	8,760	8,042	8,042	1.00	100.0%
F32T8 to LED24W	27	27	58	24	8,760	8,042	8,042	1.00	100.0%
F32T8 to LED24W	27	27	58	24	8,760	8,042	8,042	1.00	100.0%
F32T8 to LED24W	28	28	58	24	8,760	8,340	8,340	1.00	100.0%
F32T8 to LED24W	8	8	58	24	8,760	2,383	2,383	1.00	100.0%
F96T8 to LED48W	34	34	110	48	8,760	18,463	18,463	1.00	100.0%
F32T8 to LED24W	21	21	58	24	8,760	6,255	6,255	1.00	100.0%
F96T8/HO to LED48W	7	7	160	48	8,760	6,868	6,868	1.00	100.0%
F48T8/HO to LED24W	9	9	98	24	8,760	5,834	5,834	1.00	100.0%
MH150 to LED30W	6	6	183	30	8,760	8,042	8,042	1.00	100.0%
MH150 to LED27W	3	3	183	27	8,760	4,100	4,100	1.00	100.0%
F96T8 to LED48W	6	6	110	48	8,760	3,259	3,259	1.00	100.0%
F96T8 to LED48W	2	2	110	48	8,760	1,086	1,086	1.00	100.0%
					Total	**119,732**	**119,732**		**100.0%**

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 to LED24W	24	24	58	24	1.00	0.82	0.82	1.00	100.0%
F32T8 to LED24W	26	26	58	24	1.00	0.88	0.88	1.00	100.0%
F32T8 to LED24W	27	27	58	24	1.00	0.92	0.92	1.00	100.0%
F32T8 to LED24W	27	27	58	24	1.00	0.92	0.92	1.00	100.0%
F32T8 to LED24W	27	27	58	24	1.00	0.92	0.92	1.00	100.0%
F32T8 to LED24W	27	27	58	24	1.00	0.92	0.92	1.00	100.0%
F32T8 to LED24W	27	27	58	24	1.00	0.92	0.92	1.00	100.0%
F32T8 to LED24W	28	28	58	24	1.00	0.95	0.95	1.00	100.0%
F32T8 to LED24W	8	8	58	24	1.00	0.27	0.27	1.00	100.0%
F96T8 to LED48W	34	34	110	48	1.00	2.11	2.11	1.00	100.0%
F32T8 to LED24W	21	21	58	24	1.00	0.71	0.71	1.00	100.0%
F96T8/HO to LED48W	7	7	160	48	1.00	0.78	0.78	1.00	100.0%
F48T8/HO to LED24W	9	9	98	24	1.00	0.67	0.67	1.00	100.0%
MH150 to LED30W	6	6	183	30	1.00	0.92	0.92	1.00	100.0%
MH150 to LED27W	3	3	183	27	1.00	0.47	0.47	1.00	100.0%
F96T8 to LED48W	6	6	110	48	1.00	0.37	0.37	1.00	100.0%
F96T8 to LED48W	2	2	110	48	1.00	0.12	0.12	1.00	100.0%
					Total	**13.67**	**13.67**		**100.0%**

Results

The kWh realization rate for project SN9-077 is 100.0% and the kW realization rate is 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LED24W	7,148	0.82	100.0%	100.0%
F32T8 to LED24W	7,744	0.88	100.0%	100.0%
F32T8 to LED24W	8,042	0.92	100.0%	100.0%
F32T8 to LED24W	8,042	0.92	100.0%	100.0%
F32T8 to LED24W	8,042	0.92	100.0%	100.0%
F32T8 to LED24W	8,042	0.92	100.0%	100.0%
F32T8 to LED24W	8,042	0.92	100.0%	100.0%
F32T8 to LED24W	8,340	0.95	100.0%	100.0%
F32T8 to LED24W	2,383	0.27	100.0%	100.0%
F96T8 to LED48W	18,463	2.11	100.0%	100.0%
F32T8 to LED24W	6,255	0.71	100.0%	100.0%
F96T8/HO to LED48W	6,868	0.78	100.0%	100.0%
F48T8/HO to LED24W	5,834	0.67	100.0%	100.0%
MH150 to LED30W	8,042	0.92	100.0%	100.0%
MH150 to LED27W	4,100	0.47	100.0%	100.0%
F96T8 to LED48W	3,259	0.37	100.0%	100.0%
F96T8 to LED48W	1,086	0.12	100.0%	100.0%
Total	**119,732**	**13.67**	**100.0%**	**100.0%**

Project Number SN9-019
Program Small Commercial Solutions

Project Background

The participant is an automotive service facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. On site, the Evaluators verified that the following had been installed:

- (6) 31W LED - Non-Int. Ballasts replaced (6) 4' 4-Lamp T8s
- (30) 32W LED - Non-Int. Ballasts replaced (30) 4' 4-Lamp T8s
- (6) 35W LED - Non-Int. Ballasts replaced (6) 4' 4-Lamp T8s
- (3) 35W LED - Non-Int. Ballasts replaced (3) 4' 4-Lamp T8s
- (23) 92W LED - Non-Int. Ballasts replaced (23) 400W Metal Halides
- (11) 92W LED - Non-Int. Ballasts replaced (11) 400W Metal Halides
- (12) 92W LED - Non-Int. Ballasts replaced (12) 400W Metal Halides
- (11) 76W LED - Non-Int. Ballasts replaced (11) 4' 4-Lamp T8s
- (11) 75W LED - Non-Int. Ballasts replaced (11) 250W Metal Halides
- (53) 92W LED - Non-Int. Ballasts replaced (53) 4' 4-Lamp T8s
- (5) 92W LED - Non-Int. Ballasts replaced (5) 4' 6-Lamp T5HOs
- (44) 92W LED - Non-Int. Ballasts replaced (44) 4' 2-Lamp T8s
- (2) 32W LED - Non-Int. Ballasts replaced (2) 4' 4-Lamp T8s
- (1) 35W LED - Non-Int. Ballasts replaced (1) 4' 2-Lamp T8s
- (2) 35W LED - Non-Int. Ballasts replaced (2) 4' 4-Lamp T8s
- (1) 97W LED - Non-Int. Ballasts replaced (1) 250W Metal Halides
- (45) 92W LED - Non-Int. Ballasts replaced (45) 8' 3-Lamp T8s
- (6) 75W LED - Non-Int. Ballasts replaced (6) 250W Metal Halides
- (4) 97W LED - Non-Int. Ballasts replaced (4) 400W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Service: Excluding Food	Gas	3,406	1.20	1.20	0.90
Service: Excluding Food	ER	3,406	0.87	1.20	0.90
Exterior	None	4,319	1.00	1.00	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED31W	6	3	118	31	3,406	1.00	2,095	2,095	100.0%
F32T8 to LED32W	30	30	118	32	3,406	1.09	12,132	9,578	78.9%
F32T8 to LED35W	6	6	118	35	3,406	0.87	1,722	1,476	85.7%
F32T8 to LED35W	3	3	118	35	3,406	0.87	738	738	100.0%
MH400 to LED92W	23	23	453	92	3,406	1.00	28,280	28,280	100.0%
MH400 to LED92W	11	13	453	92	3,406	1.00	12,899	12,899	100.0%
MH400 to LED92W	12	10	453	92	3,406	1.00	15,381	15,381	100.0%
F32T8 to LED76W	11	11	118	76	3,406	1.00	1,574	1,574	100.0%
MH250 to LED75W	11	11	288	75	4,319	1.00	12,879	10,119	78.6%
F32T8 to LED92W	53	20	118	92	3,406	1.00	15,034	15,034	100.0%
F45T5/HO-RW to LED92W	5	5	332	92	3,406	1.00	4,087	4,087	100.0%
F32T8 to LED92W	44	20	60	92	3,406	1.00	2,725	2,725	100.0%
F32T8 to LED32W	2	2	112	32	3,406	0.87	474	474	100.0%
F32T8 to LED35W	1	1	60	35	3,406	1.00	85	85	100.2%
F32T8 to LED35W	2	2	118	35	3,406	0.87	492	492	100.0%
MH250 to LED97W	1	1	288	97	4,319	1.00	825	825	100.0%
F96T8 to LED92W	45	29	179	92	3,406	1.00	18,348	18,348	100.0%
MH250 to LED75W	6	6	288	75	4,319	1.00	5,520	5,520	100.0%
MH400 to LED97W	4	4	453	97	4,319	1.00	6,150	6,150	100.0%
						Total	**141,440**	**135,880**	**96.1%**

Table C, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED31W	6	3	118	31	0.90	1.00	0.55	0.55	100.0%
F32T8 to LED32W	30	30	118	32	0.90	1.00	3.53	2.32	65.7%
F32T8 to LED35W	6	6	118	35	0.90	1.20	0.63	0.54	85.7%
F32T8 to LED35W	3	3	118	35	0.90	1.20	0.27	0.27	100.0%
MH400 to LED92W	23	23	453	92	0.90	1.00	7.47	7.47	100.0%
MH400 to LED92W	11	13	453	92	0.90	1.00	3.41	3.41	100.0%
MH400 to LED92W	12	10	453	92	0.90	1.00	4.06	4.06	100.0%
F32T8 to LED76W	11	11	118	76	0.90	1.00	0.42	0.42	100.0%
MH250 to LED75W	11	11	288	75	0.00	1.00	0.78	0.00	0.0%
F32T8 to LED92W	53	20	118	92	0.90	1.00	3.97	3.97	100.0%
F45T5/HO-RW to LED92W	5	5	332	92	0.90	1.00	1.08	1.08	100.0%
F32T8 to LED92W	44	20	60	92	0.90	1.00	0.72	0.72	100.0%
F32T8 to LED32W	2	2	112	32	0.90	1.20	0.17	0.17	100.0%
F32T8 to LED35W	1	1	60	35	0.90	1.00	0.02	0.02	100.0%
F32T8 to LED35W	2	2	118	35	0.90	1.20	0.18	0.18	100.0%
MH250 to LED97W	1	1	288	97	0.00	1.00	0.05	0.00	0.0%
F96T8 to LED92W	45	29	179	92	0.90	1.00	4.85	4.85	100.0%
MH250 to LED75W	6	6	288	75	0.00	1.00	0.33	0.00	0.0%

MH400 to LED97W	4	4	453	97	0.00	1.00	0.37	0.00	0.0%
						Total	**32.86**	**30.03**	**91.4%**

Results

The kWh realization rate for project SN9-019 is 96.1%, and the kW realization rate is 91.4%. During the verification visit the Evaluators found that 13 fixtures had not been installed. Further, ex ante peak reduction calculations included reductions attributable to exterior fixtures which operated during non-daylight hours. This operating schedule precludes operation during peak times and thus peak reductions are not appropriate for these fixtures.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED31W	2,095	0.55	100.0%	100.0%
F32T8 to LED32W	9,578	2.32	78.9%	65.7%
F32T8 to LED35W	1,476	0.54	85.7%	85.7%
F32T8 to LED35W	738	0.27	100.0%	100.0%
MH400 to LED92W	28,280	7.47	100.0%	100.0%
MH400 to LED92W	12,899	3.41	100.0%	100.0%
MH400 to LED92W	15,381	4.06	100.0%	100.0%
F32T8 to LED76W	1,574	0.42	100.0%	100.0%
MH250 to LED75W	10,119	0.00	78.6%	0.0%
F32T8 to LED92W	15,034	3.97	100.0%	100.0%
F45T5/HO-RW to LED92W	4,087	1.08	100.0%	100.0%
F32T8 to LED92W	2,725	0.72	100.0%	100.0%
F32T8 to LED32W	474	0.17	100.0%	100.0%
F32T8 to LED35W	85	0.02	100.2%	100.0%
F32T8 to LED35W	492	0.18	100.0%	100.0%
MH250 to LED97W	825	0.00	100.0%	0.0%
F96T8 to LED92W	18,348	4.85	100.0%	100.0%
MH250 to LED75W	5,520	0.00	100.0%	0.0%
MH400 to LED97W	6,150	0.00	100.0%	0.0%
Total	**135,880**	**30.03**	**96.1%**	**91.4%**

Project Number SN9-053
Program Small Commercial Solutions

Project Background

The participant is a sports club that received incentives from Entergy New Orleans for retrofitting energy efficient outdoors. The Evaluators verified that the following had been installed:

- (48) 250W LED lamps replaced (48) Metal Halide 1500W lamps.

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1500 to LED250W	48	48	1,605	250	4,319	1.00	280,908	280,908	100%
						Total	**280,908**	**280,908**	**100%**

Table C, Lighting Retrofit kW Reduction Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_D*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1500 to LED250	48	48	1,605	250	0.00	1.00	3.12	0.00	0%
						Total	**3.12**	**0.00**	**0%**

Results

The kWh realization rate for project SN9-053 is 100%, and the kW realization rate is 0%. Ex ante calculations applied a non-zero peak coincidence factors to exterior lighting which

operates during non-daylight hours. This precludes operation during peak times, thus the peak kW reduction should be zero.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH1500/1 to LED250-FIXT	280,908	0.00	100.0%	0.00%
Total	**280,908**	**0.00**	**100.0%**	**0.00%**

Project Number SN9-073
Program Small Commercial Solutions

Project Background

The participant is a parking structure that received incentives from Entergy New Orleans for retrofitting energy efficient LED lighting. The Evaluators verified that the following had been installed:

- (12) 30w led - non-int. ballasts replaced (12) 200w hpss
- (159) 45w led - non-int. ballasts replaced (159) 175w metal halides
- (106) 45w led - non-int. ballasts replaced (106) 2-lamp 42w cfl multi 4-pins
- (3) 45w led - non-int. ballasts replaced (3) 250w metal halides
- (12) 46w led - non-int. ballasts replaced (12) 8' 2-lamp t8s
- (4) 100w led - non-int. ballasts replaced (4) 400w metal halides
- (30) 100w led - non-int. ballasts replaced (30) 400w metal halides
- (22) 35w led - non-int. ballasts replaced (22) 4' 2-lamp t8s
- (25) 35w led - non-int. ballasts replaced (25) 4' 2-lamp t8s
- (25) 35w led - non-int. ballasts replaced (25) 4' 2-lamp t8s

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	1.00	1.00	1.00
Exterior	(none)	4,319	1.00	1.00	0.26
Corridor/Hallway/Stairwell	(none)	8,760	1.00	1.00	1.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
HPS200 to LED30W	12	12	250	30	8,760	23,126	23,126	1.00	100.0%
MH175 to LED45W	159	159	208	45	8,760	227,033	227,033	1.00	100.0%
CFM42W to LED45W	106	106	93	45	8,760	44,571	44,571	1.00	100.0%
MH250 to LED45W	3	3	288	45	8,760	6,386	6,386	1.00	100.0%
F96T8 to LED46W	12	12	110	46	8,760	6,728	6,728	1.00	100.0%
MH400 to LED100W	4	4	453	100	4,319	6,098	6,098	1.00	100.0%
MH400 to LED100W	30	30	453	100	8,760	92,768	92,768	1.00	100.0%
F32T8 to LED35W	22	22	58	35	8,760	4,433	4,433	1.00	100.0%
F32T8 to LED35W	25	25	58	35	8,760	5,037	5,037	1.00	100.0%
F32T8 to LED35W	25	25	58	35	8,760	5,037	5,037	1.00	100.0%
					Total	**421,217**	**421,217**		**100.0%**

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					
HPS200 to LED30W	12	12	250	30	1.00	2.64	2.64	1.00	100.0%
MH175 to LED45W	159	159	208	45	1.00	25.90	25.90	1.00	100.0%
CFM42W to LED45W	106	106	93	45	1.00	5.09	5.09	1.00	100.0%
MH250 to LED45W	3	3	288	45	1.00	0.73	0.73	1.00	100.0%
F96T8 to LED46W	12	12	110	46	1.00	0.77	0.77	1.00	100.0%
MH400 to LED100W	4	4	453	100	0.26	0.37	0.37	1.00	100.0%
MH400 to LED100W	30	30	453	100	1.00	10.59	10.59	1.00	100.0%
F32T8 to LED35W	22	22	58	35	1.00	0.51	0.51	1.00	100.0%
F32T8 to LED35W	25	25	58	35	1.00	0.58	0.58	1.00	100.0%
F32T8 to LED35W	25	25	58	35	1.00	0.58	0.58	1.00	100.0%
					Total	**47.76**	**47.76**		**100.0%**

Results

The kWh and kW realization rates for project SN9-073 are 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
HPS200 to LED30W	23,126	2.64	100.0%	100.0%
MH175 to LED45W	227,033	25.90	100.0%	100.0%
CFM42W to LED45W	44,571	5.09	100.0%	100.0%
MH250 to LED45W	6,386	0.73	100.0%	100.0%
F96T8 to LED46W	6,728	0.77	100.0%	100.0%
MH400 to LED100W	6,098	0.37	100.0%	100.0%

MH400 to LED100W	92,768	10.59	100.0%	100.0%
F32T8 to LED35W	4,433	0.51	100.0%	100.0%
F32T8 to LED35W	5,037	0.58	100.0%	100.0%
F32T8 to LED35W	5,037	0.58	100.0%	100.0%
Total	**421,217**	**47.76**	**100.0%**	**100.0%**

Project Number SN9-059
Program Small Commercial Solutions

Project Background

The participant is an airport terminal facility that received incentives from Entergy New Orleans for a reduced lighting power density new construction lighting project. The Evaluators verified that the following lighting fixtures had been installed:

- (172) 150W LED fixtures installed in a 160,599ft2 warehouse space and
- (52) 150W LED fixtures installed in a 44,421ft2 service space.

Calculation Parameters

Savings calculations were performed using savings methodology described in section 3.6.3 of the AR TRM 7.0. With deemed annual hours and interactive effects from the New Orleans TRM 2.0. Deemed savings parameters applicable to this site are shown below and algorithms used are shown below:

Table A, Savings Parameters, New Construction

Building Type	Heating Type	LPD	Annual Hours	IEF_E	IEF_D	CF
Warehouse: Non-Refrigerated	none	0.80	2,417	1.00	1.00	0.77
Service: Excluding Food	none	1.40	3,406	1.00	1.00	0.90

New Construction:

$$kW_{savings} = \left(\left(SF \times \frac{LPD}{1000}\right) - \sum\left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000}\right]_{post}\right)\right) \times CF \times IEF_D$$

$$kWh_{savings} = \left(\left(SF \times \frac{LPD}{1000}\right) - \sum\left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000}\right]_{post}\right)\right) \times AOH \times IEF_E$$

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations, New Construction

Measure	Quantity (Fixtures)	Wattage	Annual Hours	IEF_E	SF	LPD	Expected kWh Savings	Realized kWh Savings	Realization Rate
LED150W	172	150	2,417	1.00	160,599	0.80	248,176	248,176	100.0%
LED150W	52	150	3,406	1.00	44,421	1.40	185,250	185,250	100.0%
						Total	**433,426**	**433,426**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations, New Construction

Measure	Quantity (Fixtures)	Wattage	CF	IEF_D	SF	LPD	Expected kW Savings	Realized kW Savings	Realization Rate
LED150W	172	150	0.77	1.00	160,599	0.80	79.06	79.06	100.0%
LED150W	52	150	0.90	1.00	44,421	1.40	48.95	48.95	100.0%
						Total	**128.01**	**128.01**	**100.0%**

Results

The kWh realization rate for project SN9-059 is 100.0%, and the kW realization rate is 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
LED150W	248,176	79.06	100.0%	100.0%
LED150W	185,250	48.95	100.0%	100.0%
Total	**433,426**	**128.01**	**100.0%**	**100.0%**

Project Number SN9-012
Program Small Commercial Solutions

Project Background

The participant is an advertising company that received incentives from Entergy New Orleans for retrofitting energy efficient lighting outdoors. On site the Evaluators verified that the following had been installed:

- (350) 109W LED - Non-Int. Ballasts replaced (350) 400W Metal Halides
- (5) 107W LED - Non-Int. Ballasts replaced (5) 400W Metal Halides
- (2) 146W LED - Non-Int. Ballasts replaced (2) 400W Metal Halides
- (95) 107W LED - Non-Int. Ballasts replaced (95) 400W Metal Halides
- (4) 109W LED - Non-Int. Ballasts replaced (4) 400W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH400 to LED109W	350	350	453	109	4,319	1.00	520,007	520,007	100.0%
MH400 to LED107W	5	5	453	107	4,319	1.00	7,472	7,472	100.0%
MH400 to LED146W	2	2	453	146	4,319	1.00	2,652	2,652	100.0%
MH400 to LED107W	95	95	453	107	4,319	1.00	141,966	141,966	100.0%
MH400 to LED109W	4	4	453	109	4,319	1.00	5,943	5,943	100.0%
						Total	**678,040**	**678,040**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

There are no kW reductions associated with this project.

Results

The kWh realization rate for project SN9-012 is 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH400 to LED109W	520,007	0.00	100.0%	N/A
MH400 to LED107W	7,472	0.00	100.0%	N/A
MH400 to LED146W	2,652	0.00	100.0%	N/A
MH400 to LED107W	141,966	0.00	100.0%	N/A
MH400 to LED109W	5,943	0.00	100.0%	N/A
Total	**678,040**	**0.00**	**100.0%**	**100.0%**

Project Number LN9-026
Program Large Commercial & Industrial

Project Background

The participant is a K-12 school that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. On site, the Evaluators verified that the following had been installed:

- (80) 26W LED - Non-Int. Ballasts replaced (80) 4' 2-Lamp T8s
- (30) 26W LED - Non-Int. Ballasts replaced (30) 4' 2-Lamp T8s
- (49) 26W LED - Non-Int. Ballasts replaced (49) 4' 2-Lamp T8s
- (22) 26W LED - Non-Int. Ballasts replaced (22) 4' 2-Lamp T8s

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	*Heating Type*	*Annual Hours*	*IEF_E*	*IEF_D*	*CF*
Education K-12	ER	2,333	0.87	1.20	0.90
Education K-12	ER	8,760	0.87	1.20	1.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
F32T8 to LED26W	80	80	58	26	2,333	0.87	5,196	5,196	100.0%
F32T8 to LED26W	30	30	58	26	8,760	0.87	7,316	7,316	100.0%
F32T8 to LED26W	49	49	58	26	2,333	0.87	3,183	3,183	100.0%
F32T8 to LED26W	22	22	58	26	8,760	0.87	5,365	5,365	100.0%
						Total	**21,060**	**21,060**	**100.0%**

Table C, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_D*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					

F32T8 to LED26W	80	80	58	26	0.77	1.20	1.44	2.37	164.6%
F32T8 to LED26W	30	30	58	26	1.00	1.20	0.54	1.15	213.0%
F32T8 to LED26W	49	49	58	26	0.77	1.20	0.88	1.45	164.8%
F32T8 to LED26W	22	22	58	26	1.00	1.20	0.40	0.84	210.0%
						Total	**3.26**	**5.81**	**178.2%**

Results

The kWh realization rate for project LN9-026 is 100.0%, and the kW realization rate is 178.2%. Ex ante calculations showed that two areas' operating hours were manually overwritten from an area-specific deemed value to 8,760, though peak coincidence factors remained unchanged from their associated area types. Under continuous operation there is a 100% chance that the fixtures will be in operation during the peak period, thus a 1.0 peak CF should be applied to kW reduction calculations.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED26W	5,196	2.37	100.0%	164.6%
F32T8 to LED26W	7,316	1.15	100.0%	213.0%
F32T8 to LED26W	3,183	1.45	100.0%	164.8%
F32T8 to LED26W	5,365	0.84	100.0%	210.0%
Total	**21,060**	**5.81**	**100.0%**	**178.2%**

Project Number LN9-015
Program Large Commercial & Industrial Solutions

Project Background

The participant is a church that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (141) 7W LED - Non-Int. Ballasts replaced (141) 60W incandescents
- (32) 9W LED - Non-Int. Ballasts replaced (32) 60W incandescents
- (36) 4W LED - Non-Int. Ballasts replaced (36) 40W incandescents
- (14) 11W LED - Non-Int. Ballasts replaced (14) 75W incandescents
- (70) 11W LED - Non-Int. Ballasts replaced (70) 60W incandescents

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Religious Gathering	Gas	3,174	1.09	1.20	0.53
Lodging (Hotel/Motel/Dorm): Room	Gas	3,370	1.09	1.20	0.25

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***Annual Operating Hours***	***IEF_E***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
I60 to LED7W	141	141	43	7	3,174	1.09	17,562	17,562	100.0%
I60 to LED9W	32	32	43	9	3,174	1.09	3,764	3,764	100.0%
I40 to LED4W	36	36	29	4	3,174	1.09	3,114	3,114	100.0%
I75 to LED11W	14	14	53	11	3,174	1.09	2,034	2,034	100.0%
I60 to LED11W	70	70	43	11	3,370	1.09	8,228	8,228	100.0%
						Total	**34,702**	**34,702**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
I60 to LED7W	141	141	43	7	0.53	1.20	3.23	3.23	100.0%
I60 to LED9W	32	32	43	9	0.53	1.20	0.69	0.69	100.0%
I40 to LED4W	36	36	29	4	0.53	1.20	0.57	0.57	100.0%
I75 to LED11W	14	14	53	11	0.53	1.20	0.37	0.37	100.0%
I60 to LED11W	70	70	43	11	0.25	1.20	0.67	0.67	100.0%
						Total	**5.53**	**5.53**	**100.0%**

Results

The kWh realization rate for project LN9-015 is 100.0%, and the kW realization rate is 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
I60 to LED7W	17,562	3.23	100.0%	100.0%
I60 to LED9W	3,764	0.69	100.0%	100.0%
I40 to LED4W	3,114	0.57	100.0%	100.0%
I75 to LED11W	2,034	0.37	100.0%	100.0%
I60 to LED11W	8,228	0.67	100.0%	100.0%
Total	**34,702**	**5.53**	**100.0%**	**100.0%**

Project Number LN8-089
Program Large Commercial & Industrial

Project Background

The participant is an office that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (36) 13W LED - Int. Ballasts replaced (36) 39W Metal Halides
- (13) 28W LED - Non-Int. Ballasts replaced (13) 4' 1-Lamp T5HOs
- (2) 17W LED - Int. Ballasts replaced (2) 1-Lamp 40W CFL Long Twins
- (11) 11W LED - Int. Ballasts replaced (11) 1-Lamp 26W CFL Multi 4-Pins
- (54) 15W LED - Int. Ballasts replaced (54) 1-Lamp 42W CFL Multi 4-Pins
- (5) 12W LED - Non-Int. Ballasts replaced (5) 3' 1-Lamp T8s
- (39) 17W LED - Non-Int. Ballasts replaced (39) 4' 1-Lamp T8s
- (6) 17W LED - Int. Ballasts replaced (6) 1-Lamp 40W CFL Long Twins
- (8) 13W LED - Non-Int. Ballasts replaced (8) 4' 1-Lamp T5s

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology of this report. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Office	Gas	8,760	1.09	1.20	1.00
Exterior	None	8,760	1.00	1.00	1.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***Annual Operating Hours***	***IEF_E***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
MH39 to LEDINT13W	36	36	51	13	8,760	1.09	13,062	13,062	100.0%
F54T5/HO to LED28W	13	13	64	28	8,760	1.09	4,469	4,469	100.0%
CFT40W to LEDINT17W	2	2	43	17	8,760	1.09	497	497	100.0%

CFM26W to LEDINT11W	11	11	29	11	6,132	1.09	1,323	1,323	100.0%
CFM42W to LEDINT15W	54	54	46	15	6,132	1.09	11,189	11,189	100.0%
F25T8 to LED12W	5	5	26	12	8,760	1.09	668	668	100.0%
F32T8 to LED17W	39	39	31	17	8,760	1.09	5,213	5,213	100.0%
CFT40W to LEDINT17W	6	6	43	17	8,760	1.09	1,490	1,490	100.0%
F28T5 to LED13W	8	8	33	13	8,760	1.00	1,402	1,402	100.0%
						Total	**39,313**	**39,313**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***IEF_D***	***Expected kW Savings***	***Realized kW Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
MH39 to LEDINT13W	36	36	51	13	1.00	1.20	1.28	1.66	129.7%
F54T5/HO to LED28W	13	13	64	28	1.00	1.20	0.43	0.56	130.2%
CFT40W to LEDINT17W	2	2	43	17	1.00	1.20	0.05	0.06	120.0%
CFM26W to LEDINT11W	11	11	29	11	0.26	1.20	0.06	0.06	100.0%
CFM42W to LEDINT15W	54	54	46	15	0.26	1.20	0.52	0.52	100.0%
F25T8 to LED12W	5	5	26	12	1.00	1.20	0.06	0.08	133.3%
F32T8 to LED17W	39	39	31	17	1.00	1.20	0.50	0.66	132.0%
CFT40W to LEDINT17W	6	6	43	17	1.00	1.20	0.14	0.19	135.7%
F28T5 to LED13W	8	8	33	13	1.00	1.00	0.00	0.16	N/A
						Total	**3.04**	**3.95**	**129.9%**

Results

The kWh realization rate for project LN8-089 is 100.0%, and the kW realization rate is 129.9%. Deemed lighting operating hours for this space type are 5,159 annually with a 77% chance of lighting being in operation during peak hours. Custom hours of operation were used in site analyses to reflect continuous (8,760) operation, though in ex ante calculations the peak CF was not changed from 0.77 to 1.00 to reflect continuous operation. This correction resulted in additional kW reductions.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH39 to LEDINT13W	13,062	1.66	100.0%	129.7%
F54T5/HO to LED28W	4,469	0.56	100.0%	130.2%

CFT40W to LEDINT17W	497	0.06	100.0%	120.0%
CFM26W to LEDINT11W	1,323	0.06	100.0%	100.0%
CFM42W to LEDINT15W	11,189	0.52	100.0%	100.0%
F25T8 to LED12W	668	0.08	100.0%	133.3%
F32T8 to LED17W	5,213	0.66	100.0%	132.0%
CFT40W to LEDINT17W	1,490	0.19	100.0%	135.7%
F28T5 to LED13W	1,402	0.16	100.0%	N/A
Total	**39,313**	**3.95**	**100.0%**	**129.9%**

Project Number LN9-044
Program Large Commercial & Industrial

Project Background

The participant is a university that received incentives from Entergy New Orleans for retrofitting energy efficient outdoor lighting. The Evaluators verified that the following had been installed:

- (26) 150w led - non-int. ballasts replaced (26) 150w metal halides
- (4) 100w led - non-int. ballasts replaced (4) 150w metal halides
- (2) 150w led - non-int. ballasts replaced (2) 150w metal halides
- (2) 100w led - non-int. ballasts replaced (2) 400w high pressure sodium lamp
- (5) 50w led - non-int. ballasts replaced (5) 150w metal halides
- (2) 25w led - non-int. ballasts replaced (2) 1-lamp 26w compact fluorescent
- (2) 30w led - non-int. ballasts replaced (2) 100w metal halides
- (6) 40w led - non-int. ballasts replaced (3) 2-lamp 26w compact fluorescent
- (3) 40w led - non-int. ballasts replaced (3) 2-lamp 26w compact fluorescent
- (4) 40w led - non-int. ballasts replaced (4) 100w 1-lamp halogens
- (29) 40w led - non-int. ballasts replaced (29) 100w metal halides
- (13) 35w led - non-int. ballasts replaced (13) 100w metal halides
- (14) 27w led - non-int. ballasts replaced (14) 1-lamp 26w compact fluorescent
- (10) 35w led - non-int. ballasts replaced (10) 150w metal halides
- (7) 40w led - non-int. ballasts replaced (7) 175w metal halides
- (18) 50w led - non-int. ballasts replaced (18) 4' 2-lamp t8s
- (1) 300w led - non-int. ballasts replaced (1) 1000w metal halides
- (1) 27w led - non-int. ballasts replaced (1) 2-lamp 26w compact fluorescent
- (4) 35w led - non-int. ballasts replaced (4) 150w metal halides
- (19) 16w led - non-int. ballasts replaced (19) 100w metal halides
- (2) 35w led - non-int. ballasts replaced (2) 150w metal halides
- (108) 24w led - non-int. ballasts replaced (54) 2-lamp 26w compact fluorescent

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	0.00

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					
MH150 to LED150W	26	26	163	150	4,319	1,460	1,460	1.00	100.0%
MH150 to LED100W	4	4	163	100	4,319	1,088	1,088	1.00	100.0%
MH150 to LED150W	2	2	163	150	4,319	110	110	1.00	100.0%
HPS400 to LED100W	2	2	465	100	4,319	3,153	3,153	1.00	100.0%
MH150 to LED50W	5	5	163	50	4,319	2,440	2,440	1.00	100.0%
CFM26W to LED25W	2	2	29	25	4,319	35	35	1.00	100.0%
MH100 to LED30W	2	2	108	30	4,319	674	674	1.00	100.0%
CFM26W to LED40W	6	3	51	40	4,319	803	803	1.00	100.0%
CFM26W to LED40W	3	3	51	40	4,319	143	143	1.00	100.0%
H100 to LED40W	4	4	100	40	4,319	1,037	1,037	1.00	100.0%
MH100 to LED40W	29	29	108	40	4,319	8,517	8,517	1.00	100.0%
MH100 to LED35W	13	13	108	35	4,319	4,099	4,099	1.00	100.0%
CFM26W to LED27W	14	14	29	27	4,319	121	121	1.00	100.0%
MH150 to LED35W	10	10	163	35	4,319	5,528	5,528	1.00	100.0%
MH175 to LED40W	7	7	196	40	4,319	4,716	4,716	1.00	100.0%
F32T8 to LED50W	18	18	58	50	4,319	622	622	1.00	100.0%
MH1000 to LED300W	1	1	1,067	300	4,319	3,313	3,313	1.00	100.0%
CFM26W to LED27W	1	1	51	27	4,319	104	104	1.00	100.0%
MH150 to LED35W	4	4	163	35	4,319	2,211	2,211	1.00	100.0%
MH100 to LED16W	19	19	108	16	4,319	7,550	7,550	1.00	100.0%
MH150 to LED35W	2	2	163	35	4,319	1,106	1,106	1.00	100.0%
CFM26W to LED24W	108	54	51	24	4,319	18,192	18,192	1.00	100.0%
					Total	**67,022**	**67,022**		**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

There are no claimed or realized kW reductions associated with this project.

Results

The kWh realization rate for project LN9-044 is 100%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH150 to LED150W	1,460	0.00	100.0%	N/A

MH150 to LED100W	1,088	0.00	100.0%	N/A
MH150 to LED150W	110	0.00	100.0%	N/A
HPS400 to LED100W	3,153	0.00	100.0%	N/A
MH150 to LED50W	2,440	0.00	100.0%	N/A
CFM26W to LED25W	35	0.00	100.0%	N/A
MH100 to LED30W	674	0.00	100.0%	N/A
CFM26W to LED40W	803	0.00	100.0%	N/A
CFM26W to LED40W	143	0.00	100.0%	N/A
H100 to LED40W	1,037	0.00	100.0%	N/A
MH100 to LED40W	8,517	0.00	100.0%	N/A
MH100 to LED35W	4,099	0.00	100.0%	N/A
CFM26W to LED27W	121	0.00	100.0%	N/A
MH150 to LED35W	5,528	0.00	100.0%	N/A
MH175 to LED40W	4,716	0.00	100.0%	N/A
F32T8 to LED50W	622	0.00	100.0%	N/A
MH1000 to LED300W	3,313	0.00	100.0%	N/A
CFM26W to LED27W	104	0.00	100.0%	N/A
MH150 to LED35W	2,211	0.00	100.0%	N/A
MH100 to LED16W	7,550	0.00	100.0%	N/A
MH150 to LED35W	1,106	0.00	100.0%	N/A
CFM26W to LED24W	18,192	0.00	100.0%	N/A
Total	**67,022**	**0.00**	**100.0%**	**N/A**

Project Number LN9-053
Program Large Commercial & Industrial

Project Background

The participant is an automotive service facility that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. On site, the Evaluators verified that the following had been installed:

- (26) 4' 2-Lamp T8 to 24W LED - Non-Int. Ballast
- (199) 4' 4-Lamp T8 to 48W LED - Non-Int. Ballast
- (23) 65W 1-Lamp Halogen to 10W LED - Int. Ballast
- (8) 40W 1-Lamp Halogen to 7W LED - Int. Ballast
- (15) 60W incandescent to 9W LED - Int. Ballast
- (2) 8' 2-Lamp T8 to 48W LED - Non-Int. Ballast
- (5) 5' 2-Lamp T8 to 30W LED - Non-Int. Ballast
- (2) 1-Lamp T8 U-Tube to 30W LED - Non-Int. Ballast
- (5) 250W Metal Halide to 65W LED - Non-Int. Ballast
- (2) 1000W Metal Halide to 250W LED - Non-Int. Ballast
- (3) 250W Metal Halide to 32W LED - Non-Int. Ballast
- (1) 72W 1-Lamp Halogen to 14W LED - Int. Ballast
- (5) 100W Metal Halide to 32W LED - Non-Int. Ballast

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Corridor/Hallway/Stairwell	Gas	8,760	1.09	1.2	1.00
Office	Gas	5,159	1.09	1.2	0.77
Office	Gas	8,760	1.09	1.2	1.00
Restroom (Generic)	Gas	3,516	1.09	1.2	0.90
Non-Warehouse Storage (Generic)	Gas	4,207	1.09	1.2	0.77
Exterior	None	8,760	1.00	1.00	1.00
Exterior	None	4,319	1.00	1.00	-

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED24W	6	6	58	24	8,760	1.09	1,948	1,948	100.0%
F32T8 to LED48W	1	1	112	48	5,159	1.09	360	360	100.0%
F32T8 to LED48W	1	1	112	48	5,159	1.09	360	360	100.0%
F32T8 to LED48W	1	1	112	48	5,159	1.09	360	360	100.0%
H65 to LEDINT10W	4	4	65	10	5,159	1.09	1,237	1,237	100.0%
H65 to LEDINT10W	9	9	65	10	5,159	1.09	2,784	2,784	100.0%
F32T8 to LED48W	1	1	112	48	5,159	1.09	360	360	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
H65 to LEDINT10W	10	10	65	10	5,159	1.09	3,093	3,093	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	1	1	112	48	5,159	1.09	360	360	100.0%
H40 to LEDINT7W	6	6	40	7	8,760	1.09	1,891	1,891	100.0%
F32T8 to LED48W	27	27	112	48	8,760	1.09	16,500	16,500	100.0%
F32T8 to LED48W	2	2	112	48	8,760	1.09	1,222	1,222	100.0%
F32T8 to LED48W	2	2	112	48	3,516	1.09	491	491	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	1	1	112	48	5,159	1.09	360	360	100.0%
I60 to LEDINT9W	1	1	43	9	3,516	1.09	130	130	100.0%
F32T8 to LED48W	8	8	112	48	4,207	1.09	2,348	2,348	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED24W	6	6	58	24	8,760	1.09	1,948	1,787	91.7%
F32T8 to LED48W	40	40	112	48	8,760	1.09	24,444	24,444	100.0%
H40 to LEDINT7W	2	2	40	7	8,760	1.09	630	630	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	4	4	112	48	5,159	1.09	1,440	1,440	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED48W	2	2	112	48	3,516	1.09	491	491	100.0%
F32T8 to LED48W	4	4	112	48	5,159	1.09	1,440	1,440	100.0%
F32T8 to LED48W	4	4	112	48	5,159	1.09	1,440	1,440	100.0%
F32T8 to LED48W	7	7	112	48	5,159	1.09	2,519	2,519	100.0%
F32T8 to LED48W	5	5	112	48	5,159	1.09	1,799	1,799	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F96T8 to LED48W	2	2	110	48	4,207	1.09	569	569	100.0%
F40T8 to LED30W	5	5	72	30	8,760	1.09	2,005	2,005	100.0%
F32T8 to LED24W	5	5	58	24	8,760	1.09	1,623	1,623	100.0%
F32T8 to LED48W	1	1	112	48	4,207	1.09	293	293	100.0%
F32T8 to LED48W	18	18	112	48	8,760	1.09	11,000	11,000	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%

F32T8 to LED48W	6	6	112	48	4,207	1.09	1,761	1,761	100.0%
FU31T8/6 to LED30W	2	2	59	30	3,516	1.09	222	222	100.0%
F32T8 to LED48W	3	3	112	48	5,159	1.09	1,080	1,080	100.0%
F32T8 to LED48W	6	6	112	48	8,760	1.09	3,667	3,667	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
F32T8 to LED48W	1	1	112	48	4,207	1.09	293	293	100.0%
F32T8 to LED48W	3	3	112	48	4,207	1.09	880	880	100.0%
I60 to LEDINT9W	14	14	43	9	5,159	1.09	2,677	2,677	100.0%
F32T8 to LED48W	10	10	112	48	5,159	1.09	3,599	3,599	100.0%
F32T8 to LED48W	2	2	112	48	4,207	1.09	587	587	100.0%
F32T8 to LED48W	1	1	112	48	4,207	1.09	293	293	100.0%
F32T8 to LED48W	12	12	112	48	5,159	1.09	4,319	4,319	100.0%
F32T8 to LED48W	3	3	112	48	4,207	1.09	880	880	100.0%
MH250 to LED65W	5	5	288	65	4,319	1.09	5,247	4,816	91.8%
MH1000 to LED250W	2	2	1,078	250	4,319	1.09	7,794	7,152	91.8%
MH250 to LED1W	3	3	288	32	8,760	1.09	8,220	6,728	81.8%
H72 to LEDINT14W	1	1	72	14	4,319	1.09	273	251	91.9%
MH100 to LED1W	5	5	124	32	8,760	1.09	5,872	4,392	74.8%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
						Total	**142,433**	**138,199**	**97.0%**

Table C, Lighting Retrofit kWh Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***IEF_D***	***Expected kW Savings***	***Realized kW Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED24W	6	6	58	24	1.00	1.20	0.22	0.24	109.1%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.0%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.0%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.0%
H65 to LEDINT10W	4	4	65	10	0.77	1.20	0.20	0.20	100.0%
H65 to LEDINT10W	9	9	65	10	0.77	1.20	0.46	0.46	100.0%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
H65 to LEDINT10W	10	10	65	10	0.77	1.20	0.51	0.51	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.0%
H40 to LEDINT7W	6	6	40	7	1.00	1.20	0.21	0.24	114.3%
F32T8 to LED48W	27	27	112	48	1.00	1.20	1.87	2.07	110.7%
F32T8 to LED48W	2	2	112	48	1.00	1.20	0.12	0.15	125.0%
F32T8 to LED48W	2	2	112	48	0.90	1.20	0.14	0.14	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.0%
I60 to LEDINT9W	1	1	43	9	0.90	1.20	0.04	0.04	100.0%
F32T8 to LED48W	8	8	112	48	0.77	1.20	0.47	0.47	100.0%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.0%

F32T8 to LED24W	6	6	58	24	1.00	1.20	0.00	0.20	N/A
F32T8 to LED48W	40	40	112	48	1.00	1.20	2.76	3.07	111.2%
H40 to LEDINT7W	2	2	40	7	1.00	1.20	0.07	0.08	114.3%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	4	4	112	48	0.77	1.20	0.24	0.24	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED48W	2	2	112	48	0.90	1.20	0.14	0.14	100.0%
F32T8 to LED48W	4	4	112	48	0.77	1.20	0.24	0.24	100.0%
F32T8 to LED48W	4	4	112	48	0.77	1.20	0.24	0.24	100.0%
F32T8 to LED48W	7	7	112	48	0.77	1.20	0.41	0.41	100.0%
F32T8 to LED48W	5	5	112	48	0.77	1.20	0.30	0.30	100.0%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.0%
F96T8 to LED48W	2	2	110	48	0.77	1.20	0.11	0.11	100.0%
F40T8 to LED30W	5	5	72	30	1.00	1.20	0.23	0.25	108.7%
F32T8 to LED24W	5	5	58	24	1.00	1.20	0.16	0.20	125.0%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.0%
F32T8 to LED48W	18	18	112	48	1.00	1.20	1.24	1.38	111.3%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.0%
F32T8 to LED48W	6	6	112	48	0.77	1.20	0.35	0.35	100.0%
FU31T8/6 to LED30W	2	2	59	30	0.90	1.20	0.06	0.06	100.0%
F32T8 to LED48W	3	3	112	48	0.77	1.20	0.18	0.18	100.0%
F32T8 to LED48W	6	6	112	48	1.00	1.20	0.41	0.46	112.2%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.0%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.0%
						Total	**17.53**	**18.10**	**103.3%**

Results

The kWh realization rate for project LN9-053 is 97.0%, and the kW realization rate is 103.31%. Numerous ex ante calculation errors contributed to differing kWh and kW realization rates:

- Calculations for five exterior areas included kWh and kW interactive effects.
- Ex ante calculations showed that 13 areas' operating hours were manually overwritten from an area-specific deemed value to 8,760[78], though peak coincidence factors remained unchanged from their associated area types. Under continuous operation there is a 100% chance that the fixtures will be in operation during the peak period, thus a 1.0 peak CF should be applied to kW reduction calculations.
- Calculations for three photocell-controlled exterior fixtures included a 26% peak coincidence. Photocell-controlled fixtures operate during non-daylight hours,

[78] Continuous operation

precluding operation during peak times and thus peak reductions are not appropriate for these fixtures.

- Calculations for five fixtures assumed 1W per post fixture. During the M&V site visit the Evaluators determined the actual wattage of these lamps is 32W each.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LED24W	1,948	0.24	100.0%	109.1%
F32T8 to LED48W	360	0.06	100.0%	100.0%
F32T8 to LED48W	360	0.06	100.0%	100.0%
F32T8 to LED48W	360	0.06	100.0%	100.0%
H65 to LEDINT10W	1,237	0.20	100.0%	100.0%
H65 to LEDINT10W	2,784	0.46	100.0%	100.0%
F32T8 to LED48W	360	0.06	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
H65 to LEDINT10W	3,093	0.51	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED48W	360	0.06	100.0%	100.0%
H40 to LEDINT7W	1,891	0.24	100.0%	114.3%
F32T8 to LED48W	16,500	2.07	100.0%	110.7%
F32T8 to LED48W	1,222	0.15	100.0%	125.0%
F32T8 to LED48W	491	0.14	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED48W	360	0.06	100.0%	100.0%
I60 to LEDINT9W	130	0.04	100.0%	100.0%
F32T8 to LED48W	2,348	0.47	100.0%	100.0%
F32T8 to LED24W	156	0.03	100.0%	100.0%
F32T8 to LED24W	1,787	0.20	91.7%	N/A
F32T8 to LED48W	24,444	3.07	100.0%	111.2%
H40 to LEDINT7W	630	0.08	100.0%	114.3%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED48W	1,440	0.24	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
F32T8 to LED48W	491	0.14	100.0%	100.0%
F32T8 to LED48W	1,440	0.24	100.0%	100.0%
F32T8 to LED48W	1,440	0.24	100.0%	100.0%
F32T8 to LED48W	2,519	0.41	100.0%	100.0%
F32T8 to LED48W	1,799	0.30	100.0%	100.0%
F32T8 to LED48W	720	0.12	100.0%	100.0%
F32T8 to LED24W	156	0.03	100.0%	100.0%
F96T8 to LED48W	569	0.11	100.0%	100.0%
F40T8 to LED30W	2,005	0.25	100.0%	108.7%
F32T8 to LED24W	1,623	0.20	100.0%	125.0%
F32T8 to LED48W	293	0.06	100.0%	100.0%
F32T8 to LED48W	11,000	1.38	100.0%	111.3%
F32T8 to LED24W	156	0.03	100.0%	100.0%
F32T8 to LED48W	1,761	0.35	100.0%	100.0%
FU31T8/6 to LED30W	222	0.06	100.0%	100.0%
F32T8 to LED48W	1,080	0.18	100.0%	100.0%
F32T8 to LED48W	3,667	0.46	100.0%	112.2%
F32T8 to LED24W	156	0.03	100.0%	100.0%
F32T8 to LED24W	312	0.06	100.0%	100.0%
F32T8 to LED48W	293	0.06	100.0%	100.0%
F32T8 to LED48W	880	0.18	100.0%	100.0%
I60 to LEDINT9W	2,677	0.44	100.0%	100.0%
F32T8 to LED48W	3,599	0.59	100.0%	100.0%
F32T8 to LED48W	587	0.12	100.0%	100.0%
F32T8 to LED48W	293	0.06	100.0%	100.0%
F32T8 to LED48W	4,319	0.71	100.0%	100.0%
F32T8 to LED48W	880	0.18	100.0%	100.0%
MH250 to LED65W	4,816	0.00	91.8%	0.0%
MH1000 to LED250W	7,152	0.00	91.8%	0.0%
MH250 to LED1W	6,728	0.77	81.8%	308.0%
H72 to LEDINT14W	251	0.00	91.9%	0.0%
MH100 to LED1W	4,392	0.55	74.8%	83.3%
F32T8 to LED24W	156	0.03	100.0%	100.0%
F32T8 to LED24W	312	0.06	100.0%	100.0%
Total	**138,199**	**18.10**	**97.0%**	**103.3%**

Project Number LN9-024
Program Large Commercial & Industrial Solutions

Project Background

The participant is a large office building that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (158) 39W LED - Non-Int. Ballasts replaced (158) 4' 3-Lamp T8s
- (269) 39W LED - Non-Int. Ballasts replaced (269) 4' 3-Lamp T8s
- (36) 30W LED - Non-Int. Ballasts replaced (36) 1-Lamp T8 U-Tubes
- (265) 39W LED - Non-Int. Ballasts replaced (265) 4' 3-Lamp T8s
- (12) 30W LED - Non-Int. Ballasts replaced (12) 1-Lamp T8 U-Tubes
- (2) 52W LED - Non-Int. Ballasts replaced (2) 4' 4-Lamp T8s
- (84) 39W LED - Non-Int. Ballasts replaced (84) 4' 3-Lamp T8s
- (38) 30W LED - Non-Int. Ballasts replaced (38) 1-Lamp T8 U-Tubes

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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***
Office	ER	5,159	0.87	1.20	0.77

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***Annual Operating Hours***	***IEF_E***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED39W	158	158	88	39	5,159	0.87	34,748	34,748	100.0%
F32T8 to LED39W	269	269	88	39	5,159	0.87	59,161	59,161	100.0%
FU31T8/6 to LED30W	36	36	59	30	5,159	0.87	4,686	4,686	100.0%
F32T8 to LED39W	265	265	88	39	5,159	0.87	58,281	58,281	100.0%
FU31T8/6 to LED30W	12	12	59	30	5,159	0.87	1,562	1,562	100.0%
F32T8 to LED52W	2	2	115	52	5,159	0.87	566	566	100.0%
F32T8 to LED39W	84	84	88	39	5,159	0.87	18,474	18,474	100.0%

FU31T8/6 to LED30W	38	38	59	30	5,159	0.87	4,946	4,946	100.0%
						Total	**182,424**	**182,424**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***IEF_D***	***Expected kW Savings***	***Realized kW Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED39W	158	158	88	39	0.77	1.20	7.16	7.16	100.0%
F32T8 to LED39W	269	269	88	39	0.77	1.20	12.18	12.18	100.0%
FU31T8/6 to LED30W	36	36	59	30	0.77	1.20	0.96	0.96	100.0%
F32T8 to LED39W	265	265	88	39	0.77	1.20	12.00	12.00	100.0%
FU31T8/6 to LED30W	12	12	59	30	0.77	1.20	0.32	0.32	100.0%
F32T8 to LED52W	2	2	115	52	0.77	1.20	0.12	0.12	100.0%
F32T8 to LED39W	84	84	88	39	0.77	1.20	3.80	3.80	100.0%
FU31T8/6 to LED30W	38	38	59	30	0.77	1.20	1.02	1.02	100.0%
						Total	**37.56**	**37.56**	**100.0%**

Results

The kWh realization rate for project LN9-024 is 100.0%, and the kW realization rate is 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED39W	34,748	7.16	100.0%	100.0%
F32T8 to LED39W	59,161	12.18	100.0%	100.0%
FU31T8/6 to LED30W	4,686	0.96	100.0%	100.0%
F32T8 to LED39W	58,281	12.00	100.0%	100.0%
FU31T8/6 to LED30W	1,562	0.32	100.0%	100.0%
F32T8 to LED52W	566	0.12	100.0%	100.0%
F32T8 to LED39W	18,474	3.80	100.0%	100.0%
FU31T8/6 to LED30W	4,946	1.02	100.0%	100.0%
Total	**182,424**	**37.56**	**100.0%**	**100.0%**

Project Number LN8-095
Program Large Commercial & Industrial Solutions

Project Background

The participant is a large office building that received incentives from Entergy New Orleans for replacing a 40-year-old cooling tower unit with an efficient VFD control tower. The Evaluators verified the participant had implemented:

- One-unit cooling cell unit with 40 HP fan motors with VFD controls

Calculation Parameters

Savings were calculated using an eQuest energy model to predict the savings associated with replacing the cooling towers and implementing system demand controls. The changes to the energy model between the baseline and proposed were changing the cooling equipment heat rejection from constant speed cooling tower to an optimized VFD control and the cooling equipment chilled water controls from constant setpoint to a reset curve based on outside air temperature. The energy model results are shown in Table A below.

Table A, Energy Model Results

Measure	***Baseline Energy (kWh/yr)***	***Proposed Energy (kWh/yr)***	***Savings (kWh/yr)***	***Percent Savings****
Cooling Tower Replacement with VFD Controls	11,216,342	11,001,759	214,584	1.91%
Total	**11,216,342**	**11,001,759**	**214,584**	**1.91%**
*Percent savings are related to the total cooling load only				

Savings Calculations

Savings are calculated using the following formulas:

$$kWh_{Savings} = Baseline\ Energy\ Usage - Proposed\ Energy\ Usage$$

Table B, Savings Calculations

Measure	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***	***Expected kW Savings***	***Realized kW Savings***	***Realization Rate***
Cooling Tower Replacement with VFD Controls	214,584	214,584	100.0%	74.40	78.40	105.3%
Total	**214,584**	**214,584**	**100.0%**	**74.40**	**78.40**	**105.3%**

Results

The kWh realization rate for project LN8-095 is 100.0% and kW realization rate is 105.3%. The Evaluators verified the provided energy model and trending data and corroborated savings with utility billing data.

Table C, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
Chiller Optimization	214,584	78.40	100.0%	105.0%
Total	**214,584**	**78.40**	**100.0%**	**100.0%**

Project Number LN8-084
Program Large C&I Solutions

Project Background

The participant is a university that received incentives from Entergy New Orleans for retrofitting energy efficient indoor lighting. The Evaluators verified that the following had been installed:

- (319) 13w led - non-int. ballasts replaced (1276) 4' 4-lamp t8s
- (10) 13w led - non-int. ballasts replaced (20) 4' 2-lamp t8s
- (35) 13w led - non-int. ballasts replaced (70) 4' 2-lamp t8s
- (412) 13w led - non-int. ballasts replaced (824) 4' 2-lamp t8s
- (1) 13w led - non-int. ballasts replaced (2) 4' 2-lamp t8s
- (679) 13w led - non-int. ballasts replaced (2037) 4' 3-lamp t8s
- (5) 13w led - non-int. ballasts replaced (5) 4' 3-lamp t8s
- (54) 13w led - non-int. ballasts replaced (108) 4' 2-lamp t8s
- (30) 7w led - non-int. ballasts replaced (60) 2' 2-lamp t8s
- (18) 7w led - non-int. ballasts replaced (54) 2' 3-lamp t8s
- (36) 13w led - non-int. ballasts replaced (144) 2' 4-lamp t8s
- (38) 13w led - non-int. ballasts replaced (76) 4' 2-lamp t8s
- (30) 13w led - non-int. ballasts replaced (90) 4' 3-lamp t8s
- (2) 13w led - non-int. ballasts replaced (4) 4' 2-lamp t8s
- (5) 13w led - non-int. ballasts replaced (20) 4' 4-lamp t8s
- (2) 13w led - non-int. ballasts replaced (8) 4' 4-lamp t8s

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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***
Education: College/University	Gas	3,577	1.09	1.20	0.69

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED13W	319	1,276	112	12.5	3,577	74,626	77,113	1.09	103.3%
F32T8 to LED13W	10	20	58	12.5	3,577	1,248	1,287	1.09	103.1%
F32T8 to LED13W	35	70	58	12.5	3,577	4,367	4,503	1.09	103.1%
F32T8 to LED13W	412	824	58	12.5	3,577	51,403	53,010	1.09	103.1%
F32T8 to LED13W	1	2	58	12.5	3,577	125	129	1.09	103.2%
F32T8 to LED13W	679	2,037	85	12.5	3,577	121,779	125,750	1.09	103.3%
F32T8 to LED13W	5	5	85	12.5	3,577	1,404	1,413	1.09	100.6%
F32T8 to LED13W	54	108	58	12.5	3,577	6,737	6,948	1.09	103.1%
F17T8 to LED7W	30	60	33	7	3,577	2,222	2,222	1.09	100.0%
F17T8 to LED7W	18	54	47	7	3,577	1,825	1,825	1.09	100.0%
F17T8 to LED13W	36	144	59	12.5	3,577	981	1,263	1.09	128.7%
F32T8 to LED13W	38	76	58	12.5	3,577	4,741	4,889	1.09	103.1%
F32T8 to LED13W	30	90	85	12.5	3,577	5,381	5,556	1.09	103.3%
F32T8 to LED13W	2	4	58	12.5	3,577	250	257	1.09	102.8%
F32T8 to LED13W	5	20	112	12.5	3,577	1,170	1,209	1.09	103.3%
F32T8 to LED13W	2	8	112	12.5	3,577	468	483	1.09	103.2%
Total						**278,727**	**287,857**		**103.3%**

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 to LED13W	319	1,276	112	12.5	0.69	15.85	16.38	1.20	103.3%
F32T8 to LED13W	10	20	58	12.5	0.69	0.26	0.27	1.20	103.8%
F32T8 to LED13W	35	70	58	12.5	0.69	0.93	0.96	1.20	103.2%
F32T8 to LED13W	412	824	58	12.5	0.69	10.92	11.26	1.20	103.1%
F32T8 to LED13W	1	2	58	12.5	0.69	0.03	0.03	1.20	100.0%
F32T8 to LED13W	679	2,037	85	12.5	0.69	25.86	26.71	1.20	103.3%
F32T8 to LED13W	5	5	85	12.5	0.69	0.30	0.30	1.20	100.0%
F32T8 to LED13W	54	108	58	12.5	0.69	1.43	1.48	1.20	103.5%
F17T8 to LED7W	30	60	33	7	0.69	0.47	0.47	1.20	100.0%
F17T8 to LED7W	18	54	47	7	0.69	0.39	0.39	1.20	100.0%
F17T8 to LED13W	36	144	59	12.5	0.69	0.20	0.27	1.20	135.0%
F32T8 to LED13W	38	76	58	12.5	0.69	1.01	1.04	1.20	103.0%
F32T8 to LED13W	30	90	85	12.5	0.69	1.14	1.18	1.20	103.5%
F32T8 to LED13W	2	4	58	12.5	0.69	0.05	0.05	1.20	100.0%
F32T8 to LED13W	5	20	112	12.5	0.69	0.25	0.26	1.20	104.0%

F32T8 to LED13W	2	8	112	12.5	0.69	0.10	0.10	1.20	100.0%
					Total	**59.19**	**61.15**		**103.3%**

Results

The kWh realization rate for project LN8-084 is 103.3%, and the kW realization rate is also 103.3%. The majority of lamps retrofitted in this project were 12.5 W LED tubes. Ex ante calculations used 13 watts per lamp, whereas ex post calculations used the manufacturer-specified wattage, resulting in slightly higher realized savings and peak reductions.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED13W	77,113	16.38	103.3%	103.3%
F32T8 to LED13W	1,287	0.27	103.1%	103.8%
F32T8 to LED13W	4,503	0.96	103.1%	103.2%
F32T8 to LED13W	53,010	11.26	103.1%	103.1%
F32T8 to LED13W	129	0.03	103.2%	100.0%
F32T8 to LED13W	125,750	26.71	103.3%	103.3%
F32T8 to LED13W	1,413	0.30	100.6%	100.0%
F32T8 to LED13W	6,948	1.48	103.1%	103.5%
F17T8 to LED7W	2,222	0.47	100.0%	100.0%
F17T8 to LED7W	1,825	0.39	100.0%	100.0%
F17T8 to LED13W	1,263	0.27	128.7%	135.0%
F32T8 to LED13W	4,889	1.04	103.1%	103.0%
F32T8 to LED13W	5,556	1.18	103.3%	103.5%
F32T8 to LED13W	257	0.05	102.8%	100.0%
F32T8 to LED13W	1,209	0.26	103.3%	104.0%
F32T8 to LED13W	483	0.10	103.2%	100.0%
Total	**287,857**	**61.15**	**103.3%**	**103.3%**

Project Number LN9-031
Program Large Commercial & Industrial Solutions

Project Background

The participant is a hotel that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (571) 24W LED - Non-Int. Ballasts replaced (571) 4' 2-Lamp T8s
- (229) 48W LED - Non-Int. Ballasts replaced (229) 4' 4-Lamp T8s
- (23) 30W LED - Non-Int. Ballasts replaced (23) 1-Lamp T8 U-Tubes
- (53) 9W LED - Int. Ballasts replaced (53) 60W incandescents
- (25) 20W LED - Non-Int. Ballasts replaced (25) 2' 2-Lamp T8s
- (29) 24W LED - Non-Int. Ballasts replaced (129) 4' 2-Lamp T8s
- (60) 24W LED - Non-Int. Ballasts replaced (60) 4' 2-Lamp T8s
- (10) 24W LED - Non-Int. Ballasts replaced (10) 4' 2-Lamp T8s
- (33) 9W LED - Int. Ballasts replaced (33) 13W CFLs
- (2) 30W LED - Non-Int. Ballasts replaced (2) 1-Lamp T8 U-Tubes
- (6) 250W Metal Halides were delamped
- (12) 150W 1-Lamp Halogens were delamped

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology of this report. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Corridor/Hallway/Stairwell	Gas	8,760	1.09	1.20	1.00
Office	Gas	5,159	1.09	1.20	0.77
Non-Warehouse Storage (Generic)	Gas	4,207	1.09	1.20	0.77
Restroom (Generic)	Gas	3,516	1.09	1.20	0.90
Corridor/Hallway/Stairwell	Gas	5,233	1.09	1.20	0.90
Lodging (Hotel/Motel/Dorm): Common Areas	Gas	8,760	1.09	1.20	1.00
Lodging (Hotel/Motel/Dorm): Common Areas	Gas	4,127	1.09	1.20	0.82
Exterior	None	8,760	1.00	1.00	1.00
Exterior	None	4,319	1.00	1.00	-

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED24W	29	29	58	24	8,760	1.09	9,412	9,412	100.0%
F32T8 to LED24W	34	34	58	24	8,760	1.09	11,038	11,038	100.0%
F32T8 to LED24W	30	30	58	24	8,760	1.09	9,739	9,739	100.0%
F32T8 to LED24W	2	2	58	24	5,159	1.09	382	382	100.0%
F32T8 to LED48W	5	5	112	48	5,159	1.09	1,799	1,799	100.0%
F32T8 to LED24W	14	14	58	24	4,207	1.09	2,183	2,183	100.0%
F32T8 to LED48W	1	1	112	48	4,207	1.09	293	293	100.0%
F32T8 to LED48W	23	23	112	48	5,159	1.09	8,278	8,278	100.0%
FU31T8/6 to LED30W	13	13	59	30	8,760	1.09	3,600	3,600	100.0%
I60 to LEDINT9W	2	2	43	9	4,207	1.09	312	312	100.0%
F32T8 to LED48W	13	13	112	48	5,159	1.09	4,679	4,679	100.0%
FU31T8/6 to LED30W	7	7	59	30	5,159	1.09	1,142	1,142	100.0%
F32T8 to LED48W	8	8	112	48	8,760	1.09	4,889	4,889	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
F32T8 to LED48W	1	1	112	48	4,207	1.09	293	293	100.0%
F32T8 to LED48W	3	3	112	48	5,159	1.09	1,080	1,080	100.0%
F32T8 to LED48W	2	2	112	48	5,159	1.09	720	720	100.0%
I60 to LEDINT9W	1	1	43	9	4,207	1.09	156	156	100.0%
F32T8 to LED24W	8	8	58	24	4,207	1.09	1,247	1,247	100.0%
F32T8 to LED48W	1	1	112	48	4,207	1.09	293	293	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED48W	4	4	112	48	5,159	1.09	1,440	1,440	100.0%
F17T8 to LED20W	2	2	33	20	3,516	1.09	100	100	100.0%
F32T8 to LED24W	19	19	58	24	3,516	1.09	2,476	2,476	100.0%
F17T8 to LED20W	1	1	33	20	3,516	1.09	50	50	100.0%
F32T8 to LED24W	19	19	58	24	3,516	1.09	2,476	2,476	100.0%
F32T8 to LED24W	6	6	58	24	3,516	1.09	782	782	100.0%
F17T8 to LED20W	4	4	33	20	5,233	1.09	297	297	100.0%
F32T8 to LED24W	2	2	58	24	5,233	1.09	388	388	100.0%
F32T8 to LED48W	3	3	112	48	5,159	1.09	1,080	1,080	100.0%
F32T8 to LED48W	27	27	112	48	8,760	1.09	16,500	16,500	100.0%
F32T8 to LED24W	1	1	58	24	8,760	1.09	325	325	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
F32T8 to LED48W	2	2	112	48	4,207	1.09	587	587	100.0%
F32T8 to LED48W	8	8	112	48	5,159	1.09	2,879	2,879	100.0%
F32T8 to LED48W	16	16	112	48	4,127	1.09	4,606	4,606	100.0%
F32T8 to LED24W	15	15	58	24	4,127	1.09	2,294	2,294	100.0%
F32T8 to LED48W	6	6	112	48	5,159	1.09	2,159	2,159	100.0%
F32T8 to LED24W	9	9	58	24	4,207	1.09	1,403	1,403	100.0%
F32T8 to LED12W	2	2	31	12	4,207	1.09	174	174	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
F32T8 to LED24W	3	3	58	24	8,760	1.09	974	974	100.0%
F32T8 to LED24W	3	3	58	24	8,760	1.09	974	974	100.0%

I60 to LEDINT9W	3	3	43	9	4,207	1.09	468	468	100.0%
F32T8 to LED12W	2	2	31	12	4,207	1.09	174	174	100.0%
I60 to LEDINT9W	1	1	43	9	3,516	1.09	130	130	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
F32T8 to LED48W	7	7	112	48	4,207	1.09	2,054	2,054	100.0%
F32T8 to LED24W	15	15	58	24	8,760	1.09	4,870	4,870	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED48W	7	7	112	48	4,207	1.09	2,054	2,054	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
F32T8 to LED24W	37	37	58	24	8,760	1.09	12,012	12,012	100.0%
I60 to LEDINT9W	1	1	43	9	4,207	1.09	156	156	100.0%
F17T8 to LED20W	4	4	33	20	4,127	1.09	234	234	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED24W	17	17	58	24	8,760	1.09	5,519	5,519	100.0%
F32T8 to LED48W	6	6	112	48	8,760	1.09	3,667	3,667	100.0%
F32T8 to LED24W	3	3	58	24	8,760	1.09	974	974	100.0%
F32T8 to LED12W	2	2	31	12	4,207	1.09	174	174	100.0%
I60 to LEDINT9W	2	2	43	9	4,207	1.09	312	312	100.0%
F32T8 to LED24W	68	68	58	24	8,760	1.09	22,076	22,076	100.0%
F32T8 to LED24W	3	3	58	24	4,127	1.09	459	459	100.0%
F32T8 to LED24W	4	4	58	24	5,159	1.09	765	765	100.0%
F17T8 to LED20W	14	14	33	20	4,127	1.09	819	819	100.0%
F32T8 to LED48W	10	10	112	48	8,760	1.09	6,111	6,111	100.0%
F32T8 to LED24W	8	8	58	24	8,760	1.09	2,597	2,597	100.0%
F32T8 to LED24W	16	16	58	24	4,207	1.09	2,495	2,495	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED48W	5	5	112	48	8,760	1.09	3,055	3,055	100.0%
F32T8 to LED24W	2	2	58	24	8,760	1.09	649	649	100.0%
F32T8 to LED48W	11	11	112	48	8,760	1.09	6,722	6,722	100.0%
F32T8 to LED48W	6	6	112	48	5,159	1.09	2,159	2,159	100.0%
FU31T8/6 to LED30W	1	1	59	30	5,159	1.09	163	163	100.0%
F32T8 to LED24W	4	4	58	24	4,207	1.09	624	624	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
F32T8 to LED24W	3	3	58	24	4,127	1.09	459	459	100.0%
F32T8 to LED24W	2	2	58	24	4,207	1.09	312	312	100.0%
F32T8 to LED36W	7	7	85	36	4,127	1.09	1,543	1,543	100.0%
F32T8 to LED24W	2	2	58	24	4,127	1.09	306	306	100.0%
F32T8 to LED12W	1	1	31	12	4,207	1.09	87	87	100.0%
F32T8 to LED24W	3	3	58	24	4,207	1.09	468	468	100.0%
F32T8 to LED36W	10	10	85	36	5,159	1.09	2,755	2,755	100.0%
F32T8 to LED36W	5	5	85	36	4,207	1.09	1,123	1,123	100.0%
FU31T8/6 to LED30W	1	1	59	30	5,159	1.09	163	163	100.0%
F32T8 to LED48W	9	9	112	48	5,159	1.09	3,239	3,239	100.0%
F32T8 to LED48W	4	4	112	48	4,207	1.09	1,174	1,174	100.0%
F32T8 to LED48W	2	2	112	48	8,760	1.09	1,222	1,222	100.0%
F32T8 to LED12W	2	2	31	12	8,760	1.09	363	363	100.0%
F32T8 to LED24W	3	3	58	24	4,207	1.09	468	468	100.0%
I60 to LEDINT9W	7	7	43	9	3,516	1.09	912	912	100.0%
F32T8 to LED12W	1	1	31	12	4,207	1.09	87	87	100.0%
F32T8 to LED24W	9	9	58	24	4,207	1.09	1,403	1,403	100.0%

F32T8 to LED24W	3	3	58	24	4,207	1.09	468	468	100.0%
F32T8 to LED48W	21	21	112	48	4,207	1.09	6,163	6,163	100.0%
F32T8 to LED24W	24	24	58	24	8,760	1.09	7,791	7,791	100.0%
F32T8 to LED48W	2	2	112	48	4,207	1.09	587	587	100.0%
F32T8 to LED24W	7	7	58	24	4,207	1.09	1,091	1,091	100.0%
MH175 to LED40W	8	8	208	40	8,760	1.00	11,773	11,773	100.0%
F32T8 to LED36W	11	11	85	36	4,207	1.09	2,472	2,472	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED24W	8	8	58	24	3,516	1.09	1,042	1,042	100.0%
F32T8 to LED24W	4	4	58	24	4,207	1.09	624	624	100.0%
F32T8 to LED48W	14	14	112	48	5,159	1.09	5,038	5,038	100.0%
F32T8 to LED24W	3	3	58	24	5,159	1.09	574	574	100.0%
FU31T8/6 to LED30W	1	1	59	30	5,159	1.09	163	163	100.0%
F32T8 to LED36W	7	7	85	36	4,207	1.09	1,573	1,573	100.0%
F32T8 to LED36W	8	8	85	36	4,207	1.09	1,798	1,798	100.0%
F32T8 to LED24W	1	1	58	24	4,207	1.09	156	156	100.0%
F32T8 to LED36W	12	12	85	36	4,207	1.09	2,696	2,696	100.0%
F32T8 to LED24W	26	26	58	24	4,207	1.09	4,054	4,054	100.0%
F32T8 to LED12W	4	4	31	12	4,207	1.09	349	349	100.0%
MH175 to LED40W	1	1	208	40	8,760	1.09	1,604	1,604	100.0%
F32T8 to LED24W	8	8	58	24	8,760	1.09	2,597	2,597	100.0%
F32T8 to LED24W	6	6	58	24	8,760	1.09	1,948	1,948	100.0%
F32T8 to LED24W	6	6	58	24	4,207	1.09	935	935	100.0%
F32T8 to LED48W	2	2	112	48	4,207	1.09	587	587	100.0%
MH250 to LED1W	6	0	288	1	4,319	1.00	7,463	7,463	100.0%
H150 to LED1W	12	0	150	1	4,319	1.00	7,774	7,774	100.0%
F32T8 to LED12W	36	36	31	12	4,207	1.09	3,137	3,137	100.0%
F32T8 to LED24W	27	27	58	24	8,760	1.09	8,765	8,765	100.0%
I60 to LEDINT9W	18	18	43	9	3,516	1.09	2,345	2,345	100.0%
I60 to LEDINT9W	18	18	43	9	4,207	1.09	2,806	2,806	100.0%
F32T8 to LED24W	9	9	58	24	4,127	1.09	1,377	1,377	100.0%
F32T8 to LED12W	79	79	31	12	8,760	1.09	14,332	14,332	100.0%
F32T8 to LED24W	29	29	58	24	8,760	1.09	9,415	9,415	100.0%
MH175 to LED40W	1	1	208	40	4,319	1.00	726	726	100.0%
CF13W to LEDINT9W	17	17	13	9	3,516	1.09	261	261	100.0%
CF13W to LEDINT9W	16	16	13	9	3,516	1.09	245	245	100.0%
FU31T8/6 to LED30W	2	2	59	30	4,207	1.09	266	266	100.0%
						Total	**318,722**	**318,722**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***IEF_D***	***Expected kW Savings***	***Realized kW Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
F32T8 to LED24W	29	29	58	24	1.00	1.20	1.06	1.18	111.32%
F32T8 to LED24W	34	34	58	24	1.00	1.20	1.25	1.39	111.20%
F32T8 to LED24W	30	30	58	24	1.00	1.20	1.1	1.22	110.91%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED48W	5	5	112	48	0.77	1.20	0.3	0.3	100.00%
F32T8 to LED24W	14	14	58	24	0.77	1.20	0.44	0.44	100.00%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.00%

F32T8 to LED48W	23	23	112	48	0.77	1.20	1.36	1.36	100.00%
FU31T8/6 to LED30W	13	13	59	30	1.00	1.20	0.41	0.45	109.76%
I60 to LEDINT9W	2	2	43	9	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED48W	13	13	112	48	0.77	1.20	0.77	0.77	100.00%
FU31T8/6 to LED30W	7	7	59	30	0.77	1.20	0.19	0.19	100.00%
F32T8 to LED48W	8	8	112	48	1.00	1.20	0.55	0.61	110.91%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED48W	3	3	112	48	0.77	1.20	0.18	0.18	100.00%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.00%
I60 to LEDINT9W	1	1	43	9	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED24W	8	8	58	24	0.77	1.20	0.25	0.25	100.00%
F32T8 to LED48W	1	1	112	48	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED48W	4	4	112	48	0.77	1.20	0.24	0.24	100.00%
F17T8 to LED20W	2	2	33	20	0.90	1.20	0.03	0.03	100.00%
F32T8 to LED24W	19	19	58	24	0.90	1.20	0.7	0.7	100.00%
F17T8 to LED20W	1	1	33	20	0.90	1.20	0.01	0.01	100.00%
F32T8 to LED24W	19	19	58	24	0.90	1.20	0.7	0.7	100.00%
F32T8 to LED24W	6	6	58	24	0.90	1.20	0.22	0.22	100.00%
F17T8 to LED20W	4	4	33	20	0.90	1.20	0.06	0.06	100.00%
F32T8 to LED24W	2	2	58	24	0.90	1.20	0.07	0.07	100.00%
F32T8 to LED48W	3	3	112	48	0.77	1.20	0.18	0.18	100.00%
F32T8 to LED48W	27	27	112	48	1.00	1.20	1.7	2.07	121.76%
F32T8 to LED24W	1	1	58	24	1.00	1.20	0.03	0.04	133.33%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.00%
F32T8 to LED48W	8	8	112	48	0.77	1.20	0.47	0.47	100.00%
F32T8 to LED48W	16	16	112	48	0.82	1.20	1.01	1.01	100.00%
F32T8 to LED24W	15	15	58	24	0.82	1.20	0.5	0.5	100.00%
F32T8 to LED48W	6	6	112	48	0.77	1.20	0.35	0.35	100.00%
F32T8 to LED24W	9	9	58	24	0.77	1.20	0.28	0.28	100.00%
F32T8 to LED12W	2	2	31	12	0.77	1.20	0.04	0.04	100.00%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED24W	3	3	58	24	1.00	1.20	0.11	0.12	109.09%
F32T8 to LED24W	3	3	58	24	1.00	1.20	0.11	0.12	109.09%
I60 to LEDINT9W	3	3	43	9	0.77	1.20	0.09	0.09	100.00%
F32T8 to LED12W	2	2	31	12	0.77	1.20	0.04	0.04	100.00%
I60 to LEDINT9W	1	1	43	9	0.90	1.20	0.04	0.04	100.00%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED48W	7	7	112	48	0.77	1.20	0.41	0.41	100.00%
F32T8 to LED24W	15	15	58	24	1.00	1.20	0.55	0.61	110.91%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED48W	7	7	112	48	0.77	1.20	0.41	0.41	100.00%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED24W	37	37	58	24	1.00	1.20	1.24	1.51	121.77%
I60 to LEDINT9W	1	1	43	9	0.77	1.20	0.03	0.03	100.00%
F17T8 to LED20W	4	4	33	20	0.82	1.20	0.05	0.05	100.00%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED24W	17	17	58	24	1.00	1.20	0.57	0.69	121.05%

F32T8 to LED48W	6	6	112	48	1.00	1.20	0.38	0.46	121.05%
F32T8 to LED24W	3	3	58	24	1.00	1.20	0.11	0.12	109.09%
F32T8 to LED12W	2	2	31	12	0.77	1.20	0.04	0.04	100.00%
I60 to LEDINT9W	2	2	43	9	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED24W	68	68	58	24	1.00	1.20	2.28	2.77	121.49%
F32T8 to LED24W	3	3	58	24	0.82	1.20	0.1	0.1	100.00%
F32T8 to LED24W	4	4	58	24	0.77	1.20	0.13	0.13	100.00%
F17T8 to LED20W	14	14	33	20	0.82	1.20	0.18	0.18	100.00%
F32T8 to LED48W	10	10	112	48	1.00	1.20	0.63	0.77	122.22%
F32T8 to LED24W	8	8	58	24	1.00	1.20	0.29	0.33	113.79%
F32T8 to LED24W	16	16	58	24	0.77	1.20	0.5	0.5	100.00%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED48W	5	5	112	48	1.00	1.20	0.35	0.38	108.57%
F32T8 to LED24W	2	2	58	24	1.00	1.20	0.07	0.08	114.29%
F32T8 to LED48W	11	11	112	48	1.00	1.20	0.69	0.84	121.74%
F32T8 to LED48W	6	6	112	48	0.77	1.20	0.35	0.35	100.00%
FU31T8/6 to LED30W	1	1	59	30	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED24W	4	4	58	24	0.77	1.20	0.13	0.13	100.00%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED24W	3	3	58	24	0.82	1.20	0.1	0.1	100.00%
F32T8 to LED24W	2	2	58	24	0.77	1.20	0.06	0.06	100.00%
F32T8 to LED36W	7	7	85	36	0.82	1.20	0.34	0.34	100.00%
F32T8 to LED24W	2	2	58	24	0.82	1.20	0.07	0.07	100.00%
F32T8 to LED12W	1	1	31	12	0.77	1.20	0.02	0.02	100.00%
F32T8 to LED24W	3	3	58	24	0.77	1.20	0.09	0.09	100.00%
F32T8 to LED36W	10	10	85	36	0.77	1.20	0.45	0.45	100.00%
F32T8 to LED36W	5	5	85	36	0.77	1.20	0.23	0.23	100.00%
FU31T8/6 to LED30W	1	1	59	30	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED48W	9	9	112	48	0.77	1.20	0.53	0.53	100.00%
F32T8 to LED48W	4	4	112	48	0.77	1.20	0.24	0.24	100.00%
F32T8 to LED48W	2	2	112	48	1.00	1.20	0.14	0.15	107.14%
F32T8 to LED12W	2	2	31	12	1.00	1.20	0.04	0.05	125.00%
F32T8 to LED24W	3	3	58	24	0.77	1.20	0.09	0.09	100.00%
I60 to LEDINT9W	7	7	43	9	0.90	1.20	0.26	0.26	100.00%
F32T8 to LED12W	1	1	31	12	0.77	1.20	0.02	0.02	100.00%
F32T8 to LED24W	9	9	58	24	0.77	1.20	0.28	0.28	100.00%
F32T8 to LED24W	3	3	58	24	0.77	1.20	0.09	0.09	100.00%
F32T8 to LED48W	21	21	112	48	0.77	1.20	1.24	1.24	100.00%
F32T8 to LED24W	24	24	58	24	1.00	1.20	0.88	0.98	111.36%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.00%
F32T8 to LED24W	7	7	58	24	0.77	1.20	0.22	0.22	100.00%
MH175 to LED40W	8	8	208	40	1.00	1.00	0.35	1.34	382.86%
F32T8 to LED36W	11	11	85	36	0.77	1.20	0.5	0.5	100.00%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED24W	8	8	58	24	0.90	1.20	0.29	0.29	100.00%
F32T8 to LED24W	4	4	58	24	0.77	1.20	0.13	0.13	100.00%
F32T8 to LED48W	14	14	112	48	0.77	1.20	0.83	0.83	100.00%
F32T8 to LED24W	3	3	58	24	0.77	1.20	0.09	0.09	100.00%
FU31T8/6 to LED30W	1	1	59	30	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED36W	7	7	85	36	0.77	1.20	0.32	0.32	100.00%

F32T8 to LED36W	8	8	85	36	0.77	1.20	0.36	0.36	100.00%
F32T8 to LED24W	1	1	58	24	0.77	1.20	0.03	0.03	100.00%
F32T8 to LED36W	12	12	85	36	0.77	1.20	0.54	0.54	100.00%
F32T8 to LED24W	26	26	58	24	0.77	1.20	0.82	0.82	100.00%
F32T8 to LED12W	4	4	31	12	0.77	1.20	0.07	0.07	100.00%
MH175 to LED40W	1	1	208	40	1.00	1.20	0.18	0.2	111.11%
F32T8 to LED24W	8	8	58	24	1.00	1.20	0.29	0.33	113.79%
F32T8 to LED24W	6	6	58	24	1.00	1.20	0.22	0.24	109.09%
F32T8 to LED24W	6	6	58	24	0.77	1.20	0.19	0.19	100.00%
F32T8 to LED48W	2	2	112	48	0.77	1.20	0.12	0.12	100.00%
MH250 to LED1W	6	0	288	1	0.00	1.00	0.45	0	0.00%
H150 to LED1W	12	0	150	1	0.00	1.00	0.47	0	0.00%
F32T8 to LED12W	36	36	31	12	0.77	1.20	0.63	0.63	100.00%
F32T8 to LED24W	27	27	58	24	1.00	1.20	0.99	1.1	111.11%
I60 to LEDINT9W	18	18	43	9	0.90	1.20	0.66	0.66	100.00%
I60 to LEDINT9W	18	18	43	9	0.77	1.20	0.57	0.57	100.00%
F32T8 to LED24W	9	9	58	24	0.82	1.20	0.3	0.3	100.00%
F32T8 to LED12W	79	79	31	12	1.00	1.20	1.51	1.8	119.21%
F32T8 to LED24W	29	29	58	24	1.00	1.20	1.06	1.18	111.32%
MH175 to LED40W	1	1	208	40	0.00	1.00	0.04	0	0.00%
CF13W to LEDINT9W	17	17	13	9	0.90	1.20	0.07	0.07	100.00%
CF13W to LEDINT9W	16	16	13	9	0.90	1.20	0.07	0.07	100.00%
FU31T8/6 to LED30W	2	2	59	30	0.77	1.20	0.05	0.05	100.00%
						Total	**43.27**	**46.30**	**107.0%**

Results

The kWh realization rate for project LN9-031 is 100.0%, and the kW realization rate is 107.0%. Calculations for (516) fixtures in “Corridor/Hallway/Stairwell” and “Lodging (Hotel/Motel/Dorm)” areas used custom, continuous lighting hours of operation to develop savings estimates. Peak coincidence factors in calculations for these areas were not updated from deemed values to 1.00 to account for continuous lighting. Ex post calculations reflect the continuous operation with a 1.00 peak CF, raising realized kW reductions. Conversely, ex ante calculations for (13) exterior fixtures included peak CFs >0. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them. This slightly decreased the overall kW reduction for this project.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED24W	9,412	1.18	100.0%	111.32%
F32T8 to LED24W	11,038	1.39	100.0%	111.20%
F32T8 to LED24W	9,739	1.22	100.0%	110.91%
F32T8 to LED24W	382	0.06	100.0%	100.00%

F32T8 to LED48W	1,799	0.3	100.0%	100.00%
F32T8 to LED24W	2,183	0.44	100.0%	100.00%
F32T8 to LED48W	293	0.06	100.0%	100.00%
F32T8 to LED48W	8,278	1.36	100.0%	100.00%
FU31T8/6 to LED30W	3,600	0.45	100.0%	109.76%
I60 to LEDINT9W	312	0.06	100.0%	100.00%
F32T8 to LED48W	4,679	0.77	100.0%	100.00%
FU31T8/6 to LED30W	1,142	0.19	100.0%	100.00%
F32T8 to LED48W	4,889	0.61	100.0%	110.91%
F32T8 to LED24W	312	0.06	100.0%	100.00%
F32T8 to LED48W	293	0.06	100.0%	100.00%
F32T8 to LED48W	1,080	0.18	100.0%	100.00%
F32T8 to LED48W	720	0.12	100.0%	100.00%
I60 to LEDINT9W	156	0.03	100.0%	100.00%
F32T8 to LED24W	1,247	0.25	100.0%	100.00%
F32T8 to LED48W	293	0.06	100.0%	100.00%
F32T8 to LED24W	156	0.03	100.0%	100.00%
F32T8 to LED48W	1,440	0.24	100.0%	100.00%
F17T8 to LED20W	100	0.03	100.0%	100.00%
F32T8 to LED24W	2,476	0.7	100.0%	100.00%
F17T8 to LED20W	50	0.01	100.0%	100.00%
F32T8 to LED24W	2,476	0.7	100.0%	100.00%
F32T8 to LED24W	782	0.22	100.0%	100.00%
F17T8 to LED20W	297	0.06	100.0%	100.00%
F32T8 to LED24W	388	0.07	100.0%	100.00%
F32T8 to LED48W	1,080	0.18	100.0%	100.00%
F32T8 to LED48W	16,500	2.07	100.0%	121.76%
F32T8 to LED24W	325	0.04	100.0%	133.33%
F32T8 to LED24W	312	0.06	100.0%	100.00%
F32T8 to LED48W	587	0.12	100.0%	100.00%
F32T8 to LED48W	2,879	0.47	100.0%	100.00%
F32T8 to LED48W	4,606	1.01	100.0%	100.00%
F32T8 to LED24W	2,294	0.5	100.0%	100.00%
F32T8 to LED48W	2,159	0.35	100.0%	100.00%
F32T8 to LED24W	1,403	0.28	100.0%	100.00%
F32T8 to LED12W	174	0.04	100.0%	100.00%
F32T8 to LED24W	312	0.06	100.0%	100.00%
F32T8 to LED24W	974	0.12	100.0%	109.09%
F32T8 to LED24W	974	0.12	100.0%	109.09%
I60 to LEDINT9W	468	0.09	100.0%	100.00%
F32T8 to LED12W	174	0.04	100.0%	100.00%
I60 to LEDINT9W	130	0.04	100.0%	100.00%
F32T8 to LED24W	312	0.06	100.0%	100.00%

F32T8 to LED48W	2,054	0.41	100.0%	100.00%
F32T8 to LED24W	4,870	0.61	100.0%	110.91%
F32T8 to LED24W	156	0.03	100.0%	100.00%
F32T8 to LED48W	2,054	0.41	100.0%	100.00%
F32T8 to LED24W	312	0.06	100.0%	100.00%
F32T8 to LED24W	12,012	1.51	100.0%	121.77%
I60 to LEDINT9W	156	0.03	100.0%	100.00%
F17T8 to LED20W	234	0.05	100.0%	100.00%
F32T8 to LED24W	156	0.03	100.0%	100.00%
F32T8 to LED24W	5,519	0.69	100.0%	121.05%
F32T8 to LED48W	3,667	0.46	100.0%	121.05%
F32T8 to LED24W	974	0.12	100.0%	109.09%
F32T8 to LED12W	174	0.04	100.0%	100.00%
I60 to LEDINT9W	312	0.06	100.0%	100.00%
F32T8 to LED24W	22,076	2.77	100.0%	121.49%
F32T8 to LED24W	459	0.1	100.0%	100.00%
F32T8 to LED24W	765	0.13	100.0%	100.00%
F17T8 to LED20W	819	0.18	100.0%	100.00%
F32T8 to LED48W	6,111	0.77	100.0%	122.22%
F32T8 to LED24W	2,597	0.33	100.0%	113.79%
F32T8 to LED24W	2,495	0.5	100.0%	100.00%
F32T8 to LED24W	156	0.03	100.0%	100.00%
F32T8 to LED48W	3,055	0.38	100.0%	108.57%
F32T8 to LED24W	649	0.08	100.0%	114.29%
F32T8 to LED48W	6,722	0.84	100.0%	121.74%
F32T8 to LED48W	2,159	0.35	100.0%	100.00%
FU31T8/6 to LED30W	163	0.03	100.0%	100.00%
F32T8 to LED24W	624	0.13	100.0%	100.00%
F32T8 to LED24W	312	0.06	100.0%	100.00%
F32T8 to LED24W	459	0.1	100.0%	100.00%
F32T8 to LED24W	312	0.06	100.0%	100.00%
F32T8 to LED36W	1,543	0.34	100.0%	100.00%
F32T8 to LED24W	306	0.07	100.0%	100.00%
F32T8 to LED12W	87	0.02	100.0%	100.00%
F32T8 to LED24W	468	0.09	100.0%	100.00%
F32T8 to LED36W	2,755	0.45	100.0%	100.00%
F32T8 to LED36W	1,123	0.23	100.0%	100.00%
FU31T8/6 to LED30W	163	0.03	100.0%	100.00%
F32T8 to LED48W	3,239	0.53	100.0%	100.00%
F32T8 to LED48W	1,174	0.24	100.0%	100.00%
F32T8 to LED48W	1,222	0.15	100.0%	107.14%
F32T8 to LED12W	363	0.05	100.0%	125.00%
F32T8 to LED24W	468	0.09	100.0%	100.00%

I60 to LEDINT9W	912	0.26	100.0%	100.00%
F32T8 to LED12W	87	0.02	100.0%	100.00%
F32T8 to LED24W	1,403	0.28	100.0%	100.00%
F32T8 to LED24W	468	0.09	100.0%	100.00%
F32T8 to LED48W	6,163	1.24	100.0%	100.00%
F32T8 to LED24W	7,791	0.98	100.0%	111.36%
F32T8 to LED48W	587	0.12	100.0%	100.00%
F32T8 to LED24W	1,091	0.22	100.0%	100.00%
MH175 to LED40W	11,773	1.34	100.0%	382.86%
F32T8 to LED36W	2,472	0.5	100.0%	100.00%
F32T8 to LED24W	156	0.03	100.0%	100.00%
F32T8 to LED24W	1,042	0.29	100.0%	100.00%
F32T8 to LED24W	624	0.13	100.0%	100.00%
F32T8 to LED48W	5,038	0.83	100.0%	100.00%
F32T8 to LED24W	574	0.09	100.0%	100.00%
FU31T8/6 to LED30W	163	0.03	100.0%	100.00%
F32T8 to LED36W	1,573	0.32	100.0%	100.00%
F32T8 to LED36W	1,798	0.36	100.0%	100.00%
F32T8 to LED24W	156	0.03	100.0%	100.00%
F32T8 to LED36W	2,696	0.54	100.0%	100.00%
F32T8 to LED24W	4,054	0.82	100.0%	100.00%
F32T8 to LED12W	349	0.07	100.0%	100.00%
MH175 to LED40W	1,604	0.2	100.0%	111.11%
F32T8 to LED24W	2,597	0.33	100.0%	113.79%
F32T8 to LED24W	1,948	0.24	100.0%	109.09%
F32T8 to LED24W	935	0.19	100.0%	100.00%
F32T8 to LED48W	587	0.12	100.0%	100.00%
MH250 to LED1W	7,463	0	100.0%	0.00%
H150 to LED1W	7,774	0	100.0%	0.00%
F32T8 to LED12W	3,137	0.63	100.0%	100.00%
F32T8 to LED24W	8,765	1.1	100.0%	111.11%
I60 to LEDINT9W	2,345	0.66	100.0%	100.00%
I60 to LEDINT9W	2,806	0.57	100.0%	100.00%
F32T8 to LED24W	1,377	0.3	100.0%	100.00%
F32T8 to LED12W	14,332	1.8	100.0%	119.21%
F32T8 to LED24W	9,415	1.18	100.0%	111.32%
MH175 to LED40W	726	0	100.0%	0.00%
CF13W to LEDINT9W	261	0.07	100.0%	100.00%
CF13W to LEDINT9W	245	0.07	100.0%	100.00%
FU31T8/6 to LED30W	266	0.05	100.0%	100.00%
Total	**318,722**	**46.30**	**100.0%**	**107.00%**

Project Number LN9-025
Program Large Commercial & Industrial Solutions

Project Background

The participant is a city park that received incentives from Entergy New Orleans for retrofitting energy efficient lighting outdoors. The Evaluators verified that the following had been installed:

- (68) 200W LED - Non-Int. Ballasts replaced (68) 1500W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
MH1500 to LED200W	68	68	1,605	200	4,319	1.00	412,637	412,637	100.0%
						Total	**412,637**	**412,637**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
MH1500 to LED200W	68	68	1,605	200	0.00	1.00	24.84	0.00	0.0%
						Total	**24.84**	**0.00**	**0.0%**

Results

The kWh realization rate for project LN9-025 is 100.0%, and the kW realization rate is 0.0%. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH1500 to LED200W	412,637	0.00	100.0%	0.0%
Total	**412,637**	**0.00**	**100.0%**	**0.0%**

Project Number LN9-019
Program Large Commercial and Industrial

Project Background

The participant is a hotel that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (70) 9w LED - int. ballasts replaced (70) 26w CFLs
- (35) 14w LED tube lamps replaced (70) 4' 2-lamp T8s
- (35) 9w LED tube lamps replaced (70) 2-lamp 26w CFL multi 4-pins
- (630) 9w LED tube lamps replaced (630) 1-lamp 26w CFL multi 4-pins
- (105) 14w LED tube lamps replaced (105) 4' 1-lamp T8s
- (35) 9w LED tube lamps replaced (35) 2' 1-lamp T8s
- (90) 9w LED tube lamps replaced (90) 2' 1-lamp T8s
- (90) 9w LED tube lamps replaced (90) 2' 1-lamp T8s
- (64) 14w LED tube lamps replaced (64) 4' 1-lamp T8s
- (16) 14w LED tube lamps replaced (32) 4' 2-lamp T8s
- (128) 9w LED tube lamps replaced (128) 1-lamp 26w CFL multi 4-pins
- (176) 9w LED tube lamps replaced (352) 2-lamp 26w CFL multi 4-pins
- (44) 9w LED tube lamps replaced (44) 2' 1-lamp T8s
- (44) 9w LED tube lamps replaced (44) 2' 1-lamp T8s
- (6) 80w LED tube lamps replaced (6) 400w metal halides
- (13) 14w LED tube lamps replaced (26) 4' 2-lamp T8s
- (3) 14w LED tube lamps replaced (3) 4' 1-lamp T8s
- (2) 42w LED tube lamps replaced (2) 175w metal halides
- (15) 14w LED tube lamps replaced (30) 4' 2-lamp T8s
- (17) 14w LED tube lamps replaced (34) 4' 2-lamp T8s
- (2) 42w LED tube lamps replaced (2) 175w metal halides
- (25) 14w LED tube lamps replaced (50) 4' 2-lamp T8s
- (3) 42w LED tube lamps replaced (3) 175w metal halides
- (2) 42w LED tube lamps replaced (2) 175w metal halides
- (12) 14w LED tube lamps replaced (24) 4' 2-lamp T8s
- (2) 42w LED tube lamps replaced (2) 175w metal halides
- (13) 14w LED tube lamps replaced (26) 4' 2-lamp T8s
- (18) 14w LED tube lamps replaced (36) 4' 2-lamp T8s
- (1) 42w LED tube lamps replaced (1) 175w metal halides
- (14) 14w LED tube lamps replaced (28) 4' 2-lamp T8s
- (2) 42w LED tube lamps replaced (2) 175w metal halides
- (24) 14w LED tube lamps replaced (48) 4' 2-lamp T8s

- (12) 14w LED tube lamps replaced (12) 4' 1-lamp T8s
- (4) 42w LED tube lamps replaced (4) 175w metal halides
- (14) 14w LED tube lamps replaced (28) 4' 2-lamp T8s
- (4) 42w LED tube lamps replaced (4) 175w metal halides
- (34) 42w LED tube lamps replaced (34) 175w metal halides
- (13) 14w LED tube lamps replaced (26) 4' 2-lamp T8s
- (2) 42w LED tube lamps replaced (2) 175w metal halides
- (13) 14w LED tube lamps replaced (26) 4' 2-lamp T8s
- (2) 42w LED tube lamps replaced (2) 175w metal halides
- (6) 14w LED tube lamps replaced (6) 4' 1-lamp T8s
- (29) 14w LED tube lamps replaced (58) 4' 2-lamp T8s
- (6) 14w LED tube lamps replaced (24) 4' 4-lamp T8s
- (4) 42w LED tube lamps replaced (4) 175w metal halides
- (2) 14w LED tube lamps replaced (4) 4' 2-lamp T8s
- (3) 14w LED tube lamps replaced (3) 4' 1-lamp T8s
- (2) 14w LED tube lamps replaced (8) 4' 4-lamp T8s
- (2) 42w LED tube lamps replaced (2) 175w metal halides

- (3) 119w LED tube lamps replaced (3) 400w metal halides

- (12) 180w LED tube lamps replaced (12) 400w metal halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***
Corridor/Hallway/Stairwell	Gas	8,760	1.09	1.20	1.00
Parking Structure	(none)	8,760	1.00	1.00	1.00
Exterior	(none)	8,760	1.00	1.00	1.00
Exterior	(none)	4,319	1.00	1.00	0.00

8,760 annual hours and 1.00 CF are based on verified continuous lighting hours of operation.

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***Annual Operating Hours***	***IEF_E***	***Expected kWh Savings***	***Realized kWh Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					

CF26W to LEDINT9W	70	70	26	9	8,760	1.09	11,363	11,363	100.0%
F32T8 to LED14W	35	70	58	14	8,760	1.09	10,026	10,026	100.0%
CFM26W to LED9W	35	70	51	9	8,760	1.09	11,028	11,028	100.0%
CFM26W to LED9W	630	630	29	9	8,760	1.09	120,310	120,310	100.0%
F32T8 to LED14W	105	105	31	14	8,760	1.09	17,044	17,044	100.0%
F17T8 to LED9W	35	35	18	9	8,760	1.09	3,008	3,008	100.0%
F17T8 to LED9W	90	90	18	9	8,760	1.09	7,734	7,734	100.0%
F17T8 to LED9W	90	90	18	9	8,760	1.09	7,734	7,734	100.0%
F32T8 to LED14W	64	64	31	14	8,760	1.09	10,389	10,389	100.0%
F32T8 to LED14W	16	32	58	14	8,760	1.09	4,583	4,583	100.0%
CFM26W to LED9W	128	128	29	9	8,760	1.09	24,444	24,444	100.0%
CFM26W to LED9W	176	352	51	9	8,760	1.09	55,457	55,457	100.0%
F17T8 to LED9W	44	44	18	9	8,760	1.09	3,781	3,781	100.0%
F17T8 to LED9W	44	44	18	9	8,760	1.09	3,781	3,781	100.0%
MH400 to LED80W	6	6	453	80	8,760	1.00	19,605	19,605	100.0%
F32T8 to LED14W	13	26	58	14	8,760	1.00	3,416	3,416	100.0%
F32T8 to LED14W	3	3	31	14	8,760	1.00	447	447	100.0%
MH175 to LED42W	2	2	208	42	8,760	1.00	2,908	2,908	100.0%
F32T8 to LED14W	15	30	58	14	8,760	1.00	3,942	3,942	100.0%
F32T8 to LED14W	17	34	58	14	8,760	1.00	4,468	4,468	100.0%
MH175 to LED42W	2	2	208	42	8,760	1.00	2,908	2,908	100.0%
F32T8 to LED14W	25	50	58	14	8,760	1.00	6,570	6,570	100.0%
MH175 to LED42W	3	3	208	42	8,760	1.00	4,362	4,362	100.0%
MH175 to LED42W	2	2	208	42	8,760	1.00	2,908	2,908	100.0%
F32T8 to LED14W	12	24	58	14	8,760	1.00	3,154	3,154	100.0%
MH175 to LED42W	2	2	208	42	8,760	1.00	2,908	2,908	100.0%
F32T8 to LED14W	13	26	58	14	8,760	1.00	3,416	3,416	100.0%
F32T8 to LED14W	18	36	58	14	8,760	1.00	4,730	4,730	100.0%
MH175 to LED42W	1	1	208	42	8,760	1.00	1,454	1,454	100.0%
F32T8 to LED14W	14	28	58	14	8,760	1.00	3,679	3,679	100.0%
MH175 to LED42W	2	2	208	42	8,760	1.00	2,908	2,908	100.0%
F32T8 to LED14W	24	48	58	14	8,760	1.00	6,307	6,307	100.0%
F32T8 to LED14W	12	12	31	14	8,760	1.00	1,787	1,787	100.0%
MH175 to LED42W	4	4	208	42	8,760	1.00	5,817	5,817	100.0%
F32T8 to LED14W	14	28	58	14	8,760	1.00	3,679	3,679	100.0%
MH175 to LED42W	4	4	208	42	8,760	1.00	5,817	5,817	100.0%
MH175 to LED42W	34	34	208	42	8,760	1.00	49,441	49,441	100.0%
F32T8 to LED14W	13	26	58	14	8,760	1.00	3,416	3,416	100.0%
MH175 to LED42W	2	2	208	42	8,760	1.00	2,908	2,908	100.0%
F32T8 to LED14W	13	26	58	14	8,760	1.00	3,416	3,416	100.0%
MH175 to LED42W	2	2	208	42	8,760	1.00	2,908	2,908	100.0%
F32T8 to LED14W	6	6	31	14	8,760	1.00	894	894	100.0%
F32T8 to LED14W	29	58	58	14	8,760	1.00	7,621	7,621	100.0%
F32T8 to LED14W	6	24	112	14	8,760	1.00	2,943	2,943	100.0%
MH175 to LED42W	4	4	208	42	8,760	1.00	5,817	5,817	100.0%
F32T8 to LED14W	2	4	58	14	8,760	1.00	526	526	100.0%
F32T8 to LED14W	3	3	31	14	8,760	1.00	447	447	100.0%
F32T8 to LED14W	2	8	112	14	8,760	1.00	981	981	100.0%
MH175 to LED42W	2	2	208	42	8,760	1.00	2,909	2,908	100.0%
MH400 to LED119W	3	3	453	119	4,319	1.00	4,329	4,328	100.0%

MH400 to LED180W	12	12	453	180	8,760	1.00	28,699	28,698	100.0%
						Total	**505,127**	**505,124**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
CF26W to LEDINT9W	70	70	26	9	1.00	1.20	1.29	1.43	110.9%
F32T8 to LED14W	35	70	58	14	1.00	1.20	1.13	1.26	111.5%
CFM26W to LED9W	35	70	51	9	1.00	1.20	1.25	1.39	111.2%
CFM26W to LED9W	630	630	29	9	1.00	1.20	13.61	15.12	111.1%
F32T8 to LED14W	105	105	31	14	1.00	1.20	1.93	2.14	110.9%
F17T8 to LED9W	35	35	18	9	1.00	1.20	0.34	0.38	111.8%
F17T8 to LED9W	90	90	18	9	1.00	1.20	0.87	0.97	111.5%
F17T8 to LED9W	90	90	18	9	1.00	1.20	0.87	0.97	111.5%
F32T8 to LED14W	64	64	31	14	1.00	1.20	1.18	1.31	111.0%
F32T8 to LED14W	16	32	58	14	1.00	1.20	0.52	0.58	111.5%
CFM26W to LED9W	128	128	29	9	1.00	1.20	2.76	3.07	111.2%
CFM26W to LED9W	176	352	51	9	1.00	1.20	6.27	6.97	111.2%
F17T8 to LED9W	44	44	18	9	1.00	1.20	0.43	0.48	111.6%
F17T8 to LED9W	44	44	18	9	1.00	1.20	0.43	0.48	111.6%
MH400 to LED80W	6	6	453	80	1.00	1.00	2.24	2.24	100.0%
F32T8 to LED14W	13	26	58	14	1.00	1.00	0.39	0.39	100.0%
F32T8 to LED14W	3	3	31	14	1.00	1.00	0.05	0.05	100.0%
MH175 to LED42W	2	2	208	42	1.00	1.00	0.33	0.33	100.0%
F32T8 to LED14W	15	30	58	14	1.00	1.00	0.45	0.45	100.0%
F32T8 to LED14W	17	34	58	14	1.00	1.00	0.51	0.51	100.0%
MH175 to LED42W	2	2	208	42	1.00	1.00	0.33	0.33	100.0%
F32T8 to LED14W	25	50	58	14	1.00	1.00	0.75	0.75	100.0%
MH175 to LED42W	3	3	208	42	1.00	1.00	0.50	0.50	100.0%
MH175 to LED42W	2	2	208	42	1.00	1.00	0.33	0.33	100.0%
F32T8 to LED14W	12	24	58	14	1.00	1.00	0.36	0.36	100.0%
MH175 to LED42W	2	2	208	42	1.00	1.00	0.33	0.33	100.0%
F32T8 to LED14W	13	26	58	14	1.00	1.00	0.39	0.39	100.0%
F32T8 to LED14W	18	36	58	14	1.00	1.00	0.54	0.54	100.0%
MH175 to LED42W	1	1	208	42	1.00	1.00	0.17	0.17	100.0%
F32T8 to LED14W	14	28	58	14	1.00	1.00	0.42	0.42	100.0%
MH175 to LED42W	2	2	208	42	1.00	1.00	0.33	0.33	100.0%
F32T8 to LED14W	24	48	58	14	1.00	1.00	0.72	0.72	100.0%
F32T8 to LED14W	12	12	31	14	1.00	1.00	0.20	0.20	100.0%
MH175 to LED42W	4	4	208	42	1.00	1.00	0.66	0.66	100.0%
F32T8 to LED14W	14	28	58	14	1.00	1.00	0.42	0.42	100.0%
MH175 to LED42W	4	4	208	42	1.00	1.00	0.66	0.66	100.0%
MH175 to LED42W	34	34	208	42	1.00	1.00	5.64	5.64	100.0%
F32T8 to LED14W	13	26	58	14	1.00	1.00	0.39	0.39	100.0%
MH175 to LED42W	2	2	208	42	1.00	1.00	0.33	0.33	100.0%
F32T8 to LED14W	13	26	58	14	1.00	1.00	0.39	0.39	100.0%
MH175 to LED42W	2	2	208	42	1.00	1.00	0.33	0.33	100.0%
F32T8 to LED14W	6	6	31	14	1.00	1.00	0.10	0.10	100.0%
F32T8 to LED14W	29	58	58	14	1.00	1.00	0.87	0.87	100.0%

F32T8 to LED14W	6	24	112	14	1.00	1.00	0.34	0.34	100.0%
MH175 to LED42W	4	4	208	42	1.00	1.00	0.66	0.66	100.0%
F32T8 to LED14W	2	4	58	14	1.00	1.00	0.06	0.06	100.0%
F32T8 to LED14W	3	3	31	14	1.00	1.00	0.05	0.05	100.0%
F32T8 to LED14W	2	8	112	14	1.00	1.00	0.11	0.11	100.0%
MH175 to LED42W	2	2	208	42	1.00	1.00	0.33	0.33	100.0%
MH400 to LED119W	3	3	453	119	0.00	1.00	0.00	0.00	N/A
MH400 to LED180W	12	12	453	180	1.00	1.00	0.00	3.28	N/A
						Total	**53.56**	**60.51**	**113.0%**

Results

The kWh realization rate for project LN9-019 is 100.0%, and the kW realization rate is 113.0%. For interior, air-conditioned spaces a 1.08 IEF_D was used in ex ante calculations. This was corrected to 1.09, resulting in higher realized kW reductions.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
CF26W to LEDINT9W	11,363	1.43	100.0%	110.9%
F32T8 to LED14W	10,026	1.26	100.0%	111.5%
CFM26W to LED9W	11,028	1.39	100.0%	111.2%
CFM26W to LED9W	120,310	15.12	100.0%	111.1%
F32T8 to LED14W	17,044	2.14	100.0%	110.9%
F17T8 to LED9W	3,008	0.38	100.0%	111.8%
F17T8 to LED9W	7,734	0.97	100.0%	111.5%
F17T8 to LED9W	7,734	0.97	100.0%	111.5%
F32T8 to LED14W	10,389	1.31	100.0%	111.0%
F32T8 to LED14W	4,583	0.58	100.0%	111.5%
CFM26W to LED9W	24,444	3.07	100.0%	111.2%
CFM26W to LED9W	55,457	6.97	100.0%	111.2%
F17T8 to LED9W	3,781	0.48	100.0%	111.6%
F17T8 to LED9W	3,781	0.48	100.0%	111.6%
MH400 to LED80W	19,605	2.24	100.0%	100.0%
F32T8 to LED14W	3,416	0.39	100.0%	100.0%
F32T8 to LED14W	447	0.05	100.0%	100.0%
MH175 to LED42W	2,908	0.33	100.0%	100.0%
F32T8 to LED14W	3,942	0.45	100.0%	100.0%
F32T8 to LED14W	4,468	0.51	100.0%	100.0%
MH175 to LED42W	2,908	0.33	100.0%	100.0%
F32T8 to LED14W	6,570	0.75	100.0%	100.0%
MH175 to LED42W	4,362	0.50	100.0%	100.0%
MH175 to LED42W	2,908	0.33	100.0%	100.0%

F32T8 to LED14W	3,154	0.36	100.0%	100.0%
MH175 to LED42W	2,908	0.33	100.0%	100.0%
F32T8 to LED14W	3,416	0.39	100.0%	100.0%
F32T8 to LED14W	4,730	0.54	100.0%	100.0%
MH175 to LED42W	1,454	0.17	100.0%	100.0%
F32T8 to LED14W	3,679	0.42	100.0%	100.0%
MH175 to LED42W	2,908	0.33	100.0%	100.0%
F32T8 to LED14W	6,307	0.72	100.0%	100.0%
F32T8 to LED14W	1,787	0.20	100.0%	100.0%
MH175 to LED42W	5,817	0.66	100.0%	100.0%
F32T8 to LED14W	3,679	0.42	100.0%	100.0%
MH175 to LED42W	5,817	0.66	100.0%	100.0%
MH175 to LED42W	49,441	5.64	100.0%	100.0%
F32T8 to LED14W	3,416	0.39	100.0%	100.0%
MH175 to LED42W	2,908	0.33	100.0%	100.0%
F32T8 to LED14W	3,416	0.39	100.0%	100.0%
MH175 to LED42W	2,908	0.33	100.0%	100.0%
F32T8 to LED14W	894	0.10	100.0%	100.0%
F32T8 to LED14W	7,621	0.87	100.0%	100.0%
F32T8 to LED14W	2,943	0.34	100.0%	100.0%
MH175 to LED42W	5,817	0.66	100.0%	100.0%
F32T8 to LED14W	526	0.06	100.0%	100.0%
F32T8 to LED14W	447	0.05	100.0%	100.0%
F32T8 to LED14W	981	0.11	100.0%	100.0%
MH175 to LED42W	2,908	0.33	100.0%	100.0%
MH400 to LED119W	4,328	0.00	100.0%	N/A
MH400 to LED180W	28,698	3.28	100.0%	N/A
Total	**505,124**	**60.51**	**100.0%**	**113.0%**

Project Number LN8-085
Program Large C&I Solutions

Project Background

The participant is a university that received incentives from Entergy New Orleans for retrofitting energy efficient outdoor lighting. The Evaluators verified that the following had been installed:

- (135) 67W LED lamps replaced (135) 250W high pressure sodium lamps
- (1) 67W LED lamp replaced (1) 250W metal halide lamp
- (8) 63W LED lamps replaced (12) 250W high pressure sodium lamps
- (152) 445W LED lamps replaced 1525) 1,000W high pressure sodium lamps
- (8) 8W LED lamps replaced (8) 90W incandescent lamps

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	0.00

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*					
HPS250 to LED67W	5	5	295	67	4,319	4,924	4,924	1.00	100.0%
HPS250 to LED67W	5	5	295	67	4,319	4,924	4,924	1.00	100.0%
HPS250 to LED67W	2	2	295	67	4,319	1,969	1,969	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	2	2	295	67	4,319	1,969	1,969	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	4	4	295	67	4,319	3,939	3,939	1.00	100.0%
HPS250 to LED67W	5	5	295	67	4,319	4,924	4,924	1.00	100.0%
HPS250 to LED67W	5	5	295	67	4,319	4,924	4,924	1.00	100.0%

HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
I90 to LEDINT8W	6	6	73	8	4,319	2,125	1,684	1.00	79.2%
I90 to LEDINT8W	2	2	73	8	4,319	708	561	1.00	79.2%
HPS250 to LED67W	2	2	295	67	4,319	1,969	1,969	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	2	2	295	67	4,319	1,969	1,969	1.00	100.0%
HPS250 to LED67W	6	6	295	67	4,319	5,908	5,908	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	2	2	295	67	4,319	1,969	1,969	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	2	2	295	67	4,319	1,969	1,969	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	4	4	295	67	4,319	3,939	3,939	1.00	100.0%
HPS250 to LED67W	10	10	295	67	4,319	9,847	9,847	1.00	100.0%
HPS250 to LED67W	5	5	295	67	4,319	4,924	4,924	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	4	4	295	67	4,319	3,939	3,939	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	4	4	295	67	4,319	3,939	3,939	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED63W	8	8	295	63	4,319	8,016	8,016	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
MH250 to LED67W	1	1	288	67	4,319	954	954	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	4	4	295	67	4,319	3,939	3,939	1.00	100.0%
HPS1000 to LED445W	152	152	1,100	445	4,319	430,000	430,000	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	3	3	295	67	4,319	2,954	2,954	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
HPS250 to LED67W	1	1	295	67	4,319	985	985	1.00	100.0%
					Total	**574,742**	**574,154**		**99.9%**

Table C, Lighting Retrofit kW Reductions Calculations

There are no kW reductions associated with this project.

Results

The kWh realization rate for project LN8-085 is 99.9%, there are no kW savings. Ex ante calculations for eight (8) 8W LED screw-in lamps which replaced 90W incandescent screw-in lamps used a 90W baseline. These lamps are subject to EISA tier I baseline equivalence, and ex post calculations used 73W as baseline, slightly lowering the realized savings.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
HPS250 to LED67W	4,924	0.00	100.0%	N/A
HPS250 to LED67W	4,924	0.00	100.0%	N/A
HPS250 to LED67W	1,969	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	1,969	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	3,939	0.00	100.0%	N/A
HPS250 to LED67W	4,924	0.00	100.0%	N/A
HPS250 to LED67W	4,924	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
I90 to LEDINT8W	1,684	0.00	79.2%	N/A
I90 to LEDINT8W	561	0.00	79.2%	N/A
HPS250 to LED67W	1,969	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	1,969	0.00	100.0%	N/A
HPS250 to LED67W	5,908	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	1,969	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A

HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	1,969	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	3,939	0.00	100.0%	N/A
HPS250 to LED67W	9,847	0.00	100.0%	N/A
HPS250 to LED67W	4,924	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	3,939	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	3,939	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED63W	8,016	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
MH250 to LED67W	954	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	3,939	0.00	100.0%	N/A
HPS1000 to LED445W	430,000	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	2,954	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
HPS250 to LED67W	985	0.00	100.0%	N/A
Total	**574,154**	**0.00**	**99.9%**	**N/A**

Project Number LN9-004
Program Large Commercial & Industrial Solutions

Project Background

The participant is school that received incentives from Entergy New Orleans for installing a Building Automation System and VFDs to control their (12) air handling units.

Calculation Parameters

Savings were calculated using an Excel based calculator. The savings associated with the VFD installation were calculated by using the motor nameplate information and taking the current that is displayed on the VFD display screen to be used in the motor power (kW) calculations. This motor power (kW) was then compared to the baseline power (kW) that was calculated using the onetime power measurement taken before the VFDs were installed. The savings associated with the building automation system come from the reduction of run hours for the supply fans in the air handler units. The baseline run hours of the air handler units was assumed to be 8,760 hours per year and with the new BAS schedule, the air handler units have a runtime of 3,129 hours per year.

Savings Calculations

Savings are calculated using the following formulas:

$$kW = \frac{V * I * PF * \sqrt{3}}{1000}$$

Where:

V= Voltage

I= Measured Current

PF= Nameplate Power Factor

$$kWh = kW * AOH$$

Where:

AOH= Annual Operating Hours

$$kWh_{Savings} = Baseline\ Energy\ Usage - Proposed\ Energy\ Usage$$

Table A, Savings Calculations

Measure	Expected kWh Savings	Realized kWh Savings	Realization Rate	Expected kW Savings	Realized kW Savings	Realization Rate
BAS with VFD Upgrades	607,353	579,774	95%	0.00	30.12	N/A
Total	**607,353**	**579,774**	**95%**	**0.00**	**30.12**	**N/A**

Results

The kWh realization rate for project LN9-004 is 95% and kW realization rate is N/A. The lower kWh realization rate is from the Evaluators using the provided VFD amp read outs whereas the provided calculator used an estimated 80% speed reduction and a fan affinity law exponent of 2.7. This was the original estimated reduction but did not take the actual operating power of each VFD after they were installed. There were no expected peak kW reductions however, the Evaluators reviewed the provided calculators and project documentation found that this project did not take into account the impact that the VFDs would have on the peak demand reduction. Ex post calculations took these into account, resulting in a 30.12 kW peak demand reduction.

Table B, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
BAS with VFD Upgrades	579,774	30.12	95%	N/A
Total	**579,774**	**30.12**	**95%**	**N/A**

Project Number LN9-086
Program Large Commercial and Industrial

Project Background

The participant is a warehouse that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (1) 135w LED fixtures with occupancy sensors replaced (1) 400w metal halides
- (24) 30w LED tube lamps replaced (24) 4' 2-lamp T8s
- (4) 30w LED fixtures with occupancy sensors replaced (4) 4' 2-lamp T8s
- (3) 135w LED fixtures replaced (3) 400w metal halides
- (52) 60w LED tube lamps replaced (52) 4' 4-lamp T8s
- (1) 30w LED tube lamps replaced (1) 4' 2-lamp T8s
- (7) 135w LED fixtures with occupancy sensors replaced (7) 400w metal halides
- (40) 30w LED tube lamps replaced (40) 4' 2-lamp T8s
- (18) 30w LED tube lamps replaced (18) 4' 2-lamp T8s
- (3) 45w LED tube lamps replaced (3) 4' 3-lamp T8s
- (61) 147w LED fixtures with occupancy sensors replaced (61) 400w metal halides
- (10) 147w LED tube lamps with fixture occupancy sensors replaced (10) 4' 6-lamp T5HOs
- (1) 30w LED fixtures replaced (1) 4' 2-lamp T12HOs
- (13) 30w LED tube lamps replaced (13) 4' 2-lamp T8s
- (78) 30w LED tube lamps replaced (78) 4' 2-lamp T8s
- (11) 30w LED tube lamps replaced (11) 4' 2-lamp T8s
- (2) 135w LED fixtures replaced (2) 400w metal halides
- (2) 30w LED tube lamps replaced (2) 4' 2-lamp T12HOs
- (53) 30w LED tube lamps replaced (53) 4' 2-lamp T8s
- (4) 135w LED fixtures with occupancy sensors replaced (4) 400w metal halides
- (22) 30w LED tube lamps replaced (22) 4' 2-lamp T8s
- (16) 60w LED tube lamps replaced (16) 4' 4-lamp T8s
- (17) 135w LED fixtures with occupancy sensors replaced (17) 400w metal halides
- (21) 30w LED tube lamps replaced (21) 4' 2-lamp T8s
- (35) 30w LED tube lamps replaced (35) 4' 2-lamp T8s
- (36) 135w LED fixtures with occupancy sensors replaced (36) 400w metal halides
- (3) 30w LED tube lamps replaced (3) 4' 2-lamp T12HOs
- (6) 135w LED fixtures replaced (6) 400w metal halides
- (13) 30w LED tube lamps replaced (13) 4' 2-lamp T12HOs

- (4) 60w LED tube lamps replaced (4) 4' 4-lamp T8s
- (1) 49w LED fixtures replaced (1) 250w metal halides
- (10) 30w LED tube lamps replaced (10) 4' 2-lamp T8s
- (120) 30w LED tube lamps replaced (120) 4' 2-lamp T8s
- (10) 30w LED tube lamps replaced (10) 4' 2-lamp T8s
- (3) 30w LED tube lamps replaced (3) 4' 2-lamp T12HOs
- (2) 30w LED tube lamps replaced (2) 4' 2-lamp T8s
- (10) 135w LED fixtures with occupancy sensors replaced (10) 400w metal halides
- (41) 30w LED tube lamps replaced (41) 4' 2-lamp T8s
- (2) 30w LED tube lamps replaced (2) 4' 2-lamp T8s
- (1) 30w LED tube lamps with occupancy sensors replaced (1) 4' 2-lamp T8s
- (3) 30w LED tube lamps replaced (3) 4' 2-lamp T8s
- (3) 30w LED tube lamps replaced (3) 4' 2-lamp T8s
- (11) 60w LED tube lamps replaced (11) 4' 4-lamp T8s
- (1) 30w LED tube lamps replaced (1) 4' 2-lamp T8s
- (96) 60w LED tube lamps replaced (96) 4' 4-lamp T8s
- (2) 30w LED tube lamps replaced (2) 4' 2-lamp T8s
- (1) 135w LED fixtures replaced (1) 400w metal halides
- (42) 30w LED tube lamps replaced (42) 4' 2-lamp T8s
- (4) 60w LED tube lamps replaced (4) 4' 4-lamp T8s
- (2) 30w LED tube lamps replaced (2) 4' 2-lamp T12HOs
- (25) 135w LED fixtures with occupancy sensors replaced (25) 400w metal halides
- (11) 135w LED fixtures with occupancy sensors replaced (11) 400w metal halides
- (1) 30w LED tube lamps replaced (1) 4' 2-lamp T8s
- (5) 45w LED tube lamps replaced (5) 4' 3-lamp T8s
- (2) 45w LED tube lamps replaced (2) 4' 3-lamp T8s
- (2) 45w LED tube lamps replaced (2) 4' 3-lamp T8s
- (4) 30w LED tube lamps replaced (4) 4' 2-lamp T8s
- (5) 30w LED tube lamps replaced (5) 4' 2-lamp T8s

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	***Heating Type***	***Annual Hours***	***IEF_E***	***IEF_D***	***CF***

Warehouse: Non-Refrigerated	(none)	6,552[79]	1.00	1.00	0.77

For the occupancy sensors installed with a portion of the new fixtures, energy savings and peak kW reductions were calculated as follows:

$$kW_{savings} = N_{fixt} \times \frac{W_{fixt}}{1000} \times CF \times IEF_D$$

$$kWh_{savings} = N_{fixt} \times \frac{W_{fixt}}{1000} \times (1 - PAF) \times AOH \times IEF_E$$

Where:

N_{fixt} = Number of fixtures

W_{fixt} = Rated wattage of post-retrofit fixtures

PAF = Stipulated power adjustment factor based on control type (0.7 for occupancy sensors)

CF = Peak demand coincidence factor = 0.26

AOH = Annual operating hours for specified building type

IEF_D = Interactive effects factor for demand savings

IEF_E = Interactive effects factor for energy savings

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		AOH	IEF_E	PAF	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post						
MH400 to LED135W	1	1	453	135	6,552	0.70	0.70	2,349	2,349	100.0%
F32T8 to LED30W	24	24	58	30	6,552	1.00	1.00	4,403	4,403	100.0%
F32T8 to LED30W	4	4	58	30	6,552	1.00	1.00	734	734	100.0%
MH400 to LED135W	3	3	453	135	6,552	0.70	0.70	7,047	7,047	100.0%
F32T8 to LED60W	52	52	112	60	6,552	1.00	1.00	17,362	17,717	102.0%
F32T8 to LED30W	1	1	58	30	6,552	1.00	1.00	180	183	102.0%
MH400 to LED135W	7	7	453	135	6,552	0.70	0.70	16,442	16,442	100.0%
F32T8 to LED30W	40	40	58	30	6,552	1.00	1.00	7,338	7,338	100.0%
F32T8 to LED30W	18	18	58	30	6,552	1.00	1.00	3,302	3,302	100.0%
F32T8 to LED45W	3	3	85	45	6,552	1.00	1.00	786	786	100.0%
MH400 to LED147W	61	61	453	147	6,552	0.70	0.70	139,925	139,925	100.0%

[79] 6,552 hours of operation were developed via custom calculation based on actual of lighting hours of operation at the site.

F54T5/HO to LED147W	10	10	351	147	6,552	0.70	0.70	16,256	16,256	100.0%
F42T12/HO/ES to LED30W	1	1	135	30	6,552	1.00	1.00	183	183	100.0%
F32T8 to LED30W	13	13	58	30	6,552	1.00	1.00	2,385	2,385	100.0%
F32T8 to LED30W	78	78	58	30	6,552	1.00	1.00	14,310	14,310	100.0%
F32T8 to LED30W	11	11	58	30	6,552	1.00	1.00	2,018	2,018	100.0%
MH400 to LED135W	2	2	453	135	6,552	1.00	1.00	4,167	4,167	100.0%
F42T12/HO/ES to LED30W	2	2	135	30	6,552	1.00	1.00	367	367	100.0%
F32T8 to LED30W	53	53	58	30	6,552	1.00	1.00	9,723	9,723	100.0%
MH400 to LED135W	4	4	453	135	6,552	0.70	0.70	9,396	9,396	100.0%
F32T8 to LED30W	22	22	58	30	6,552	1.00	1.00	4,036	4,036	100.0%
F32T8 to LED60W	16	16	112	60	6,552	1.00	1.00	5,451	5,451	100.0%
MH400 to LED135W	17	17	453	135	6,552	0.70	0.70	39,931	39,931	100.0%
F32T8 to LED30W	21	21	58	30	6,552	1.00	1.00	3,853	3,853	100.0%
F32T8 to LED30W	35	35	58	30	6,552	1.00	1.00	6,421	6,421	100.0%
MH400 to LED135W	36	36	453	135	6,552	0.70	0.70	84,560	84,560	100.0%
F42T12/HO/ES to LED30W	3	3	135	30	6,552	1.00	1.00	550	550	100.0%
MH400 to LED135W	6	6	453	135	6,552	1.00	1.00	12,501	12,501	100.0%
F42T12/HO/ES to LED30W	13	13	135	30	6,552	1.00	1.00	2,385	2,385	100.0%
F32T8 to LED60W	4	4	112	60	6,552	1.00	1.00	1,363	1,363	100.0%
MH250 to LED49W	1	1	288	49	6,552	0.70	0.70	1,662	1,662	100.0%
F32T8 to LED30W	10	10	58	30	6,552	1.00	1.00	1,835	1,835	100.0%
F32T8 to LED30W	120	120	58	30	6,552	1.00	1.00	22,015	22,015	100.0%
F32T8 to LED30W	10	10	58	30	6,552	1.00	1.00	1,835	1,835	100.0%
F42T12/HO/ES to LED30W	3	3	135	30	6,552	1.00	1.00	550	550	100.0%
F32T8 to LED30W	2	2	58	30	6,552	1.00	1.00	367	367	100.0%
MH400 to LED135W	10	10	453	135	6,552	0.70	0.70	23,489	23,489	100.0%
F32T8 to LED30W	41	41	58	30	6,552	1.00	1.00	7,522	7,522	100.0%
F32T8 to LED30W	2	2	58	30	6,552	1.00	1.00	367	367	100.0%
F32T8 to LED30W	1	1	58	30	6,552	1.00	1.00	183	183	100.0%
F32T8 to LED30W	3	3	58	30	6,552	1.00	1.00	550	550	100.0%
F32T8 to LED30W	3	3	58	30	6,552	1.00	1.00	550	550	100.0%
F32T8 to LED60W	11	11	112	60	6,552	1.00	1.00	3,748	3,748	100.0%
F32T8 to LED30W	1	1	58	30	6,552	1.00	1.00	183	183	100.0%
F32T8 to LED60W	96	96	112	60	6,552	1.00	1.00	32,053	32,708	102.0%
F32T8 to LED30W	2	2	58	30	6,552	1.00	1.00	360	367	102.0%
MH400 to LED135W	1	1	453	135	6,552	0.70	0.70	2,349	2,349	100.0%
F32T8 to LED30W	42	42	58	30	6,552	1.00	1.00	7,705	7,705	100.0%
F32T8 to LED60W	4	4	112	60	6,552	1.00	1.00	1,363	1,363	100.0%

F42T12/HO/ES to LED30W	2	2	135	30	6,552	1.00	1.00	367	367	100.0%
MH400 to LED135W	25	25	453	135	6,552	0.70	0.70	58,722	58,722	100.0%
MH400 to LED135W	11	11	453	135	6,552	0.70	0.70	25,838	25,838	100.0%
F32T8 to LED30W	1	1	58	30	6,552	1.00	1.00	183	183	100.0%
F32T8 to LED45W	5	5	85	45	6,552	1.00	1.00	1,140	1,140	100.0%
F32T8 to LED45W	2	2	85	45	6,552	1.00	1.00	456	456	100.0%
F32T8 to LED45W	2	2	85	45	6,552	1.00	1.00	456	456	100.0%
F32T8 to LED30W	4	4	58	30	6,552	1.00	1.00	734	734	100.0%
F32T8 to LED30W	5	5	58	30	6,552	1.00	1.00	917	917	100.0%
						Total		**617,224**	**618,243**	**100.2%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	***Quantity (Fixtures)***		***Wattage***		***CF***	***IEF_D***	***Expected kW Savings***	***Realized kW Savings***	***Realization Rate***
	Base	***Post***	***Base***	***Post***					
MH400 to LED135W	1	1	453	135	0.77	1.00	0.28	0.28	100.0%
F32T8 to LED30W	24	24	58	30	0.77	1.00	0.52	0.52	100.0%
F32T8 to LED30W	4	4	58	30	0.77	1.00	0.09	0.09	100.0%
MH400 to LED135W	3	3	453	135	0.77	1.00	0.84	0.84	100.0%
F32T8 to LED60W	52	52	112	60	0.77	1.20	2.50	2.50	100.0%
F32T8 to LED30W	1	1	58	30	0.77	1.20	0.03	0.03	100.0%
MH400 to LED135W	7	7	453	135	0.77	1.00	1.96	1.96	100.0%
F32T8 to LED30W	40	40	58	30	0.77	1.00	0.86	0.86	100.0%
F32T8 to LED30W	18	18	58	30	0.77	1.00	0.39	0.39	100.0%
F32T8 to LED45W	3	3	85	45	0.77	1.00	0.09	0.09	100.0%
MH400 to LED147W	61	61	453	147	0.77	1.00	16.70	16.70	100.0%
F54T5/HO to LED147W	10	10	351	147	0.77	1.00	1.95	1.95	100.0%
F42T12/HO/ES to LED30W	1	1	135	30	0.77	1.00	0.02	0.02	100.0%
F32T8 to LED30W	13	13	58	30	0.77	1.00	0.28	0.28	100.0%
F32T8 to LED30W	78	78	58	30	0.77	1.00	1.68	1.68	100.0%
F32T8 to LED30W	11	11	58	30	0.77	1.00	0.24	0.24	100.0%
MH400 to LED135W	2	2	453	135	0.77	1.00	0.49	0.49	100.0%
F42T12/HO/ES to LED30W	2	2	135	30	0.77	1.00	0.04	0.04	100.0%
F32T8 to LED30W	53	53	58	30	0.77	1.00	1.14	1.14	100.0%
MH400 to LED135W	4	4	453	135	0.77	1.00	1.12	1.12	100.0%
F32T8 to LED30W	22	22	58	30	0.77	1.00	0.47	0.47	100.0%
F32T8 to LED60W	16	16	112	60	0.77	1.00	0.64	0.64	100.0%
MH400 to LED135W	17	17	453	135	0.77	1.00	4.76	4.76	100.0%
F32T8 to LED30W	21	21	58	30	0.77	1.00	0.45	0.45	100.0%
F32T8 to LED30W	35	35	58	30	0.77	1.00	0.75	0.75	100.0%
MH400 to LED135W	36	36	453	135	0.77	1.00	10.08	10.05	99.7%
F42T12/HO/ES to LED30W	3	3	135	30	0.77	1.00	0.06	0.06	100.0%

MH400 to LED135W	6	6	453	135	0.77	1.00	1.47	1.47	100.0%
F42T12/HO/ES to LED30W	13	13	135	30	0.77	1.00	0.28	0.28	100.0%
F32T8 to LED60W	4	4	112	60	0.77	1.00	0.16	0.16	100.0%
MH250 to LED49W	1	1	288	49	0.77	1.00	0.20	0.17	85.0%
F32T8 to LED30W	10	10	58	30	0.77	1.00	0.22	0.22	100.0%
F32T8 to LED30W	120	120	58	30	0.77	1.00	2.59	2.59	100.0%
F32T8 to LED30W	10	10	58	30	0.77	1.00	0.22	0.22	100.0%
F42T12/HO/ES to LED30W	3	3	135	30	0.77	1.00	0.06	0.06	100.0%
F32T8 to LED30W	2	2	58	30	0.77	1.00	0.04	0.04	100.0%
MH400 to LED135W	10	10	453	135	0.77	1.00	2.80	2.80	100.0%
F32T8 to LED30W	41	41	58	30	0.77	1.00	0.88	0.88	100.0%
F32T8 to LED30W	2	2	58	30	0.77	1.00	0.04	0.04	100.0%
F32T8 to LED30W	1	1	58	30	0.77	1.00	0.02	0.02	100.0%
F32T8 to LED30W	3	3	58	30	0.77	1.00	0.06	0.06	100.0%
F32T8 to LED30W	3	3	58	30	0.77	1.00	0.06	0.06	100.0%
F32T8 to LED60W	11	11	112	60	0.77	1.00	0.44	0.43	97.7%
F32T8 to LED30W	1	1	58	30	0.77	1.00	0.02	0.02	100.0%
F32T8 to LED60W	96	96	112	60	0.77	1.20	4.61	4.60	99.8%
F32T8 to LED30W	2	2	58	30	0.77	1.20	0.05	0.05	100.0%
MH400 to LED135W	1	1	453	135	0.77	1.00	0.28	0.28	100.0%
F32T8 to LED30W	42	42	58	30	0.77	1.00	0.91	0.91	100.0%
F32T8 to LED60W	4	4	112	60	0.77	1.00	0.16	0.16	100.0%
F42T12/HO/ES to LED30W	2	2	135	30	0.77	1.00	0.04	0.04	100.0%
MH400 to LED135W	25	25	453	135	0.77	1.00	7.00	7.00	100.0%
MH400 to LED135W	11	11	453	135	0.77	1.00	3.12	3.12	100.0%
F32T8 to LED30W	1	1	58	30	0.77	1.00	0.02	0.02	100.0%
F32T8 to LED45W	5	5	85	45	0.77	1.20	0.18	0.18	100.0%
F32T8 to LED45W	2	2	85	45	0.77	1.20	0.07	0.07	100.0%
F32T8 to LED45W	2	2	85	45	0.77	1.00	0.07	0.07	100.0%
F32T8 to LED30W	4	4	58	30	0.77	1.00	0.09	0.09	100.0%
F32T8 to LED30W	5	5	58	30	0.77	1.00	0.11	0.11	100.0%
						Total	**74.70**	**74.64**	**99.9%**

Results

The kWh realization rate for project LN9-086 is 100.2% and the kW realization rate is 99.9%. For four spaces, ex ante calculations assumed a 0.98 IEF_E (unknown) for spaces with no heating. Ex post calculations used 1.00. Small differences in realization can be attributed to rounding differences between expected and verified savings estimates. Verified savings used all significant digits prior to printing figures in report tables.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***

MH400 to LED135W	2,349	0.28	100.0%	100.0%
F32T8 to LED30W	4,403	0.52	100.0%	100.0%
F32T8 to LED30W	734	0.09	100.0%	100.0%
MH400 to LED135W	7,047	0.84	100.0%	100.0%
F32T8 to LED60W	17,717	2.50	102.0%	100.0%
F32T8 to LED30W	183	0.03	102.0%	100.0%
MH400 to LED135W	16,442	1.96	100.0%	100.0%
F32T8 to LED30W	7,338	0.86	100.0%	100.0%
F32T8 to LED30W	3,302	0.39	100.0%	100.0%
F32T8 to LED45W	786	0.09	100.0%	100.0%
MH400 to LED147W	139,925	16.70	100.0%	100.0%
F54T5/HO to LED147W	16,256	1.95	100.0%	100.0%
F42T12/HO/ES to LED30W	183	0.02	100.0%	100.0%
F32T8 to LED30W	2,385	0.28	100.0%	100.0%
F32T8 to LED30W	14,310	1.68	100.0%	100.0%
F32T8 to LED30W	2,018	0.24	100.0%	100.0%
MH400 to LED135W	4,167	0.49	100.0%	100.0%
F42T12/HO/ES to LED30W	367	0.04	100.0%	100.0%
F32T8 to LED30W	9,723	1.14	100.0%	100.0%
MH400 to LED135W	9,396	1.12	100.0%	100.0%
F32T8 to LED30W	4,036	0.47	100.0%	100.0%
F32T8 to LED60W	5,451	0.64	100.0%	100.0%
MH400 to LED135W	39,931	4.76	100.0%	100.0%
F32T8 to LED30W	3,853	0.45	100.0%	100.0%
F32T8 to LED30W	6,421	0.75	100.0%	100.0%
MH400 to LED135W	84,560	10.05	100.0%	99.9%
F42T12/HO/ES to LED30W	550	0.06	100.0%	100.0%
MH400 to LED135W	12,501	1.47	100.0%	100.0%
F42T12/HO/ES to LED30W	2,385	0.28	100.0%	100.0%
F32T8 to LED60W	1,363	0.16	100.0%	100.0%
MH250 to LED49W	1,662	0.17	100.0%	95.0%
F32T8 to LED30W	1,835	0.22	100.0%	100.0%
F32T8 to LED30W	22,015	2.59	100.0%	100.0%
F32T8 to LED30W	1,835	0.22	100.0%	100.0%
F42T12/HO/ES to LED30W	550	0.06	100.0%	100.0%
F32T8 to LED30W	367	0.04	100.0%	100.0%
MH400 to LED135W	23,489	2.80	100.0%	100.0%
F32T8 to LED30W	7,522	0.88	100.0%	100.0%
F32T8 to LED30W	367	0.04	100.0%	100.0%
F32T8 to LED30W	183	0.02	100.0%	100.0%
F32T8 to LED30W	550	0.06	100.0%	100.0%
F32T8 to LED30W	550	0.06	100.0%	100.0%
F32T8 to LED60W	3,748	0.43	100.0%	100.0%
F32T8 to LED30W	183	0.02	100.0%	100.0%

F32T8 to LED60W	32,708	4.60	102.0%	100.0%
F32T8 to LED30W	367	0.05	102.0%	100.0%
MH400 to LED135W	2,349	0.28	100.0%	100.0%
F32T8 to LED30W	7,705	0.91	100.0%	100.0%
F32T8 to LED60W	1,363	0.16	100.0%	100.0%
F42T12/HO/ES to LED30W	367	0.04	100.0%	100.0%
MH400 to LED135W	58,722	7.00	100.0%	100.0%
MH400 to LED135W	25,838	3.12	100.0%	100.0%
F32T8 to LED30W	183	0.02	100.0%	100.0%
F32T8 to LED45W	1,140	0.18	100.0%	100.0%
F32T8 to LED45W	456	0.07	100.0%	100.0%
F32T8 to LED45W	456	0.07	100.0%	100.0%
F32T8 to LED30W	734	0.09	100.0%	100.0%
F32T8 to LED30W	917	0.11	100.0%	100.0%
Total	**618,243**	**74.64**	**100.2%**	**99.9%**

Project Number LN8-083
Program Large C&I Solutions

Project Background

The participant is a university that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. The Evaluators verified that the following had been installed:

- (86) 13w led - non-int. ballasts replaced (344) 4' 4-lamp t8s
- (10) 13w led - non-int. ballasts replaced (20) 4' 2-lamp t8s
- (172) 13w led - non-int. ballasts replaced (344) 4' 2-lamp t8s
- (48) 13w led - non-int. ballasts replaced (96) 4' 2-lamp t8s
- (67) 13w led - non-int. ballasts replaced (134) 4' 2-lamp t8s
- (24) 7w led - non-int. ballasts replaced (24) 2' 1-lamp t8s
- (18) 13w led - non-int. ballasts replaced (54) 4' 3-lamp t8s
- (57) 13w led - non-int. ballasts replaced (171) 4' 3-lamp t8s
- (116) 7w led - non-int. ballasts replaced (348) 2' 3-lamp t8s
- (109) 13w led - non-int. ballasts replaced (109) 4' 3-lamp t8s
- (83) 13w led - non-int. ballasts replaced (332) 4' 4-lamp t8s
- (142) 400w led - non-int. ballasts replaced (142) 1000w metal halides
- (12) 500w led - non-int. ballasts replaced (12) 1500w metal halides
- (48) 400w led - non-int. ballasts replaced (48) 1000w metal halides
- (97) 55w led - non-int. ballasts replaced (97) 100w mercury vapors
- (23) 55w led - non-int. ballasts replaced (23) 100w mercury vapors
- (120) 55w led - non-int. ballasts replaced (120) 100w mercury vapors
- (119) 55w led - non-int. ballasts replaced (119) 100w mercury vapors
- (1) 55w led - non-int. ballasts replaced (1) 100w mercury vapors
- (48) 445w led - non-int. ballasts replaced (48) 1000w metal halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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***
Education: College/University	Gas	4,368	1.09	1.20	0.69
Education: College/University	Gas	3,577	1.09	1.20	0.69
Exterior	(none)	4,319	1.00	1.00	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	Expected kWh Savings	Realized kWh Savings	IEF_E	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED13W	86	344	112	13	4,368	24,567	24,567	1.09	100.0%
F32T8 to LED13W	10	20	58	13	3,577	1,248	1,248	1.09	100.0%
F32T8 to LED13W	172	344	58	13	3,577	21,460	21,460	1.09	100.0%
F32T8 to LED13W	48	96	58	13	3,577	5,989	5,989	1.09	100.0%
F32T8 to LED13W	67	134	58	13	3,577	8,359	8,359	1.09	100.0%
F17T8 to LED7W	24	24	18	7	3,577	1,029	1,029	1.09	100.0%
F32T8 to LED13W	18	54	85	13	3,577	3,228	3,228	1.09	100.0%
F32T8 to LED13W	57	171	85	13	3,577	10,223	10,223	1.09	100.0%
F17T8 to LED7W	116	348	47	7	3,577	11,759	11,759	1.09	100.0%
F32T8 to LED13W	109	109	85	13	3,577	30,599	30,599	1.09	100.0%
F32T8 to LED13W	83	332	112	13	3,577	19,417	19,417	1.09	100.0%
MH1000 to LED400W	142	142	1,078	400	4,319	415,816	415,816	1.00	100.0%
MH1500 to LED500W	12	12	1,605	500	4,319	57,270	57,270	1.00	100.0%
MH1000 to LED400W	48	48	1,078	400	4,319	140,558	140,558	1.00	100.0%
MV100 to LED55W	97	97	125	55	4,319	29,326	29,326	1.00	100.0%
MV100 to LED55W	23	23	125	55	4,319	6,954	6,954	1.00	100.0%
MV100 to LED55W	120	120	125	55	4,319	36,280	36,280	1.00	100.0%
MV100 to LED55W	119	119	125	55	4,319	35,977	35,977	1.00	100.0%
MV100 to LED55W	1	1	125	55	4,319	302	302	1.00	100.0%
MH1000 to LED445W	48	48	1,078	445	4,319	131,228	131,228	1.00	100.0%
					Total	**991,589**	**991,589**		**100.0%**

Table C, Lighting Retrofit kW Reduction Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW Savings	Realized kW Savings	IEFD	Realization Rate
	Base	Post	Base	Post					
F32T8 to LED13W	86	344	112	13	0.69	4.27	4.27	1.20	100.0%
F32T8 to LED13W	10	20	58	13	0.69	0.26	0.26	1.20	100.0%
F32T8 to LED13W	172	344	58	13	0.69	4.56	4.56	1.20	100.0%
F32T8 to LED13W	48	96	58	13	0.69	1.27	1.27	1.20	100.0%
F32T8 to LED13W	67	134	58	13	0.69	1.78	1.78	1.20	100.0%
F17T8 to LED7W	24	24	18	7	0.69	0.22	0.22	1.20	100.0%
F32T8 to LED13W	18	54	85	13	0.69	0.69	0.69	1.20	100.0%
F32T8 to LED13W	57	171	85	13	0.69	2.17	2.17	1.20	100.0%
F17T8 to LED7W	116	348	47	7	0.69	2.50	2.50	1.20	100.0%
F32T8 to LED13W	109	109	85	13	0.69	6.50	6.50	1.20	100.0%
F32T8 to LED13W	83	332	112	13	0.69	4.12	4.12	1.20	100.0%
MH1000 to LED400W	142	142	1,078	400	0.00	0.00	0.00	1.00	N/A
MH1500 to LED500W	12	12	1,605	500	0.00	0.00	0.00	1.00	N/A
MH1000 to LED400W	48	48	1,078	400	0.00	0.00	0.00	1.00	N/A
MV100 to LED55W	97	97	125	55	0.00	0.00	0.00	1.00	N/A
MV100 to LED55W	23	23	125	55	0.00	0.00	0.00	1.00	N/A

MV100 to LED55W	120	120	125	55	0.00	0.00	0.00	1.00	N/A
MV100 to LED55W	119	119	125	55	0.00	0.00	0.00	1.00	N/A
MV100 to LED55W	1	1	125	55	0.00	0.00	0.00	1.00	N/A
MH1000 to LED445W	48	48	1,078	445	0.00	0.00	0.00	1.00	N/A
					Total	**28.34**	**28.34**		**100.0%**

Results

The kWh and kW realization rates for project LN8-083 are 100%.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
F32T8 to LED13W	24,567	4.27	100.0%	100.0%
F32T8 to LED13W	1,248	0.26	100.0%	100.0%
F32T8 to LED13W	21,460	4.56	100.0%	100.0%
F32T8 to LED13W	5,989	1.27	100.0%	100.0%
F32T8 to LED13W	8,359	1.78	100.0%	100.0%
F17T8 to LED7W	1,029	0.22	100.0%	100.0%
F32T8 to LED13W	3,228	0.69	100.0%	100.0%
F32T8 to LED13W	10,223	2.17	100.0%	100.0%
F17T8 to LED7W	11,759	2.50	100.0%	100.0%
F32T8 to LED13W	30,599	6.50	100.0%	100.0%
F32T8 to LED13W	19,417	4.12	100.0%	100.0%
MH1000 to LED400W	415,816	0.00	100.0%	N/A
MH1500 to LED500W	57,270	0.00	100.0%	N/A
MH1000 to LED400W	140,558	0.00	100.0%	N/A
MV100 to LED55W	29,326	0.00	100.0%	N/A
MV100 to LED55W	6,954	0.00	100.0%	N/A
MV100 to LED55W	36,280	0.00	100.0%	N/A
MV100 to LED55W	35,977	0.00	100.0%	N/A
MV100 to LED55W	302	0.00	100.0%	N/A
MH1000 to LED445W	131,228	0.00	100.0%	N/A
Total	**991,589**	**28.34**	**100.0%**	**100.0%**

15.3 Publicly Funded Institutions

Project Number PN9-016
Program Publicly Funded Institutions

Project Background

The participant is a K-12 school that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (8) 100w LED lamps replaced (8) 250w metal halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom savings parameters applicable to this site are shown below:

Table A, Savings Parameters

Building Type	Heating Type	Annual Hours	IEF_E	IEF_D	CF
Education: K-12	ER	2,333	0.87	1.20	0.47

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
MH250 to LED100W	8	8	288	100	2,333	0.87	3,053	3,053	100.0%
						Total	**3,053**	**3,053**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
MH250 to LED100W	8	8	288	100	0.47	1.20	0.85	0.85	100.0%
						Total	**0.85**	**0.85**	**100.0%**

Results

The kWh and kW realization rates for project PN9-016 are 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified

	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
MH250 to LED100W	3,053	0.85	100.0%	100.0%
Total	**3,053**	**0.85**	**100.0%**	**100.0%**

Project Number PN9-013
Program Publicly Funded Institutions

Project Background

The participant is a park that received incentives from Entergy New Orleans for retrofitting energy efficient lighting outdoors. The Evaluators verified that the following had been installed:

- (22) 100W LED Lamps replaced (22) 400W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
MH400 to LED100W	22	22	453	100	4,319	1.00	33,541	33,541	100.0%
						Total	**33,541**	**33,541**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
MH400 to LED100W	22	22	453	100	0	1.00	2.02	0.00	0%
						Total	2.02	0.00	**0%**

Results

The kWh realization rate for project PN9-013 is 100%, and the kW realization rate is 0%. Ex ante calculations assumed a 0.26 peak CF. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH400 to LED100W	33,541	0	100%	0%
Total	**33,541**	**0**	**100%**	**0%**

Project Number PN9-007
Program Publicly Funded Institutions

Project Background

The participant is a public park that received incentives from Entergy New Orleans for retrofitting energy efficient lighting outdoors. The Evaluators verified that the following had been installed:

- (30) 200w LED lamps replaced (30) 1,000w metal halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom 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	1.20	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Annual Operating Hours	IEF_E	Expected kWh Savings	Realized kWh Savings	Realization Rate
	Base	Post	Base	Post					
MH1000 to LED200W	30	30	1,078	200	4,319	1.00	113,763	113,762	100.0%
						Total	**113,763**	**113,762**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
MH1000 to LED200W	30	30	1,078	200	0.00	1.00	0.00	0.00	N/A
						Total	**0.00**	**0.00**	**N/A**

Results

The kWh realization rate for project PN9-007 is 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate

MH1000 to LED200W	113,762	0.00	100.0%	N/A
Total	**113,762**	**0.00**	**100.0%**	**N/A**

Project Number PN9-004
Program Publicly Funded Institutions

Project Background

The participant is a playground that received incentives from Entergy New Orleans for retrofitting energy efficient outdoor lighting. The Evaluators verified that the following had been installed:

- (29) 200W LED - Non-Int. Ballasts replaced (29) 1000W Metal Halides
- (10) 100W LED - Non-Int. Ballasts replaced (10) 400W Metal Halides
- (5) 100W LED - Non-Int. Ballasts replaced (5) 1000W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM. Deemed and custom 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1000 to LED200W	29	29	1,078	200	4,319	1.00	109,970	109,970	100.0%
MH400 to LED100W	10	10	453	100	4,319	1.00	15,246	15,246	100.0%
MH1000 to LED100W	5	5	1,078	100	4,319	1.00	21,120	21,120	100.0%
						Total	**146,336**	**146,336**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

There are no kW reductions associated with this project.

Results

The kWh realization rate for project PN9-004 is 100%.

Table D, Verified Gross Savings & Realization Rates

Measure	*Verified*

	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
MH1000 to LED200W	109,970	0.00	100.0%	N/A
MH400 to LED100W	15,246	0.00	100.0%	N/A
MH1000 to LED100W	21,120	0.00	100.0%	N/A
Total	**146,336**	**0.00**	**100.0%**	**N/A**

Project Number PN9-002
Program Publicly Funded Institutions

Project Background

The participant is a playground that received incentives from Entergy New Orleans for retrofitting energy efficient outdoor lighting. The Evaluators verified that the following had been installed:

- (44) 200w led - non-int. ballasts replaced (44) 1000w metal halides
- (3) 45w led - non-int. ballasts replaced (3) 250w metal halides
- (4) 100w led - non-int. ballasts replaced (4) 400w metal halide
- (9) 150w led - non-int. ballasts replaced (9) 1000w metal halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1000 to LED200W	44	44	1,078	200	4,319	1.00	166,852	166,852	100.0%
MH250 to LED45W	3	3	288	45	4,319	1.00	3,149	3,149	100.0%
MH400 to LED100W	4	4	453	100	4,319	1.00	6,098	6,098	100.0%
MH1000 to LED150W	9	9	1,078	150	4,319	1.00	36,072	36,072	100.0%
						Total	**212,171**	**212,171**	**100.0%**

Table C, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*CF*	*IEF_D*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH1000 to LED200W	44	44	1,078	200	0.00	1.00	0.00	0.00	0.0%
MH250 to LED45W	3	3	288	45	0.00	1.00	0.00	0.00	0.0%
MH400 to LED100W	4	4	453	100	0.00	1.00	0.37	0.00	0.0%
MH1000 to LED150W	9	9	1,078	150	0.00	1.00	2.17	0.00	0.0%
						Total	**2.54**	**0.00**	**0.0%**

Results

The kWh realization rate for project PN9-002 is 100.0% and the kW realization rate is 0.0%. Two line items in ex ante calculations assumed a 0.26 peak CF. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.

Table D, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
MH1000 to LED200W	166,852	0.00	100.0%	0.0%
MH250 to LED45W	3,149	0.00	100.0%	0.0%
MH400 to LED100W	6,098	0.00	100.0%	0.0%
MH1000 to LED150W	36,072	0.00	100.0%	0.0%
Total	**212,171**	**0.00**	**100.0%**	**0.0%**

Project Number PA9-002
Program Publicly Funded Institution Solutions

Project Background

The participant is a recreation center that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors and outdoors. On site, the Evaluators verified that the following had been installed:

- (35) 60W LED - Non-Int. Ballasts replaced (35) 250W Metal Halides
- (12) 19W LED - Int. Ballasts replaced (12) 150W incandescents
- (3) 27W LED - Non-Int. Ballasts replaced (3) 70W Metal Halides
- (18) 30W LED - Non-Int. Ballasts replaced (18) 100W HPSs
- (6) 100W LED - Non-Int. Ballasts replaced (6) 400W Metal Halides
- (50) 200W LED - Non-Int. Ballasts replaced (50) 1000W Metal Halides
- (18) 19W LED - Non-Int. Ballasts replaced (18) 70W Metal Halides

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 Commercial Lighting Efficiency of the New Orleans TRM 2.0. For reference, this methodology is presented in 12.2 M&V Methodology 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	3,120	1.09	1.20	0.56
Exterior	None	4,319	1.00	1.00	0.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
MH250 to LED60W	35	35	288	60	3,120	1.09	27,139	27,139	100.0%
I150 to LEDINT19W	12	12	150	19	3,120	1.09	5,346	5,346	100.0%
MH70 to LED27W	3	3	91	27	4,319	1.00	829	829	100.0%
HPS100 to LED30W	18	18	138	30	4,319	1.00	8,396	8,396	100.0%
MH400 to LED100W	6	6	453	100	4,319	1.00	9,148	9,148	100.0%
MH1000 to LED200W	50	50	1,078	200	4,319	1.00	189,604	189,603	100.0%
MH70 to LED19W	18	18	91	19	3,120	1.09	4,407	4,407	100.0%
						Total	**244,869**	**244,868**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
MH250 to LED60W	35	35	288	60	0.56	1.20	5.36	5.36	100.0%
I150 to LEDINT19W	12	12	150	19	0.56	1.20	1.06	1.06	100.0%
MH70 to LED27W	3	3	91	27	0.00	1.00	0.05	0.00	0.00%
HPS100 to LED30W	18	18	138	30	0.00	1.00	0.51	0.00	0.00%
MH400 to LED100W	6	6	453	100	0.00	1.00	0.55	0.00	0.00%
MH1000 to LED200W	50	50	1,078	200	0.00	1.00	0.00	0.00	N/A
MH70 to LED19W	18	18	91	19	0.56	1.20	0.87	0.87	100.0%
						Total	**8.40**	**7.29**	**86.8%**

Results

The kWh realization rate for project PA9-002 is 100.0%, and the kW realization rate is 86.8%. The majority of ex ante calculations for exterior spaces assumed a 0.26 CF. Exterior fixtures operate during non-daylight hours, thus precluding them from operating during peak times, thus no peak kW reductions can be attributed to them.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
MH250 to LED60W	27,138	5.36	100.0%	100.0%
I150 to LEDINT19W	5,346	1.06	100.0%	100.0%
MH70 to LED27W	829	0.00	100.0%	0.00%
HPS100 to LED30W	8,396	0.00	100.0%	0.00%
MH400 to LED100W	9,148	0.00	100.0%	0.00%
MH1000 to LED200W	189,603	0.00	100.0%	N/A
MH70 to LED19W	4,407	0.87	100.0%	100.0%
Total	**244,868**	**7.29**	**100.0%**	**86.8%**

Project Number PN9-001
Program Publicly Funded Institution Solutions

Project Background

The participant is a parking garage that received incentives from Entergy New Orleans for retrofitting energy efficient lighting indoors. The Evaluators verified that the following had been installed:

- (136) 30W LED - Non-Int. Ballasts replaced (136) 150W HPSs
- (114) 30W LED - Non-Int. Ballasts replaced (114) 4' 2-Lamp T8s
- (40) 1-Lamp 2W LED Exits replaced (40) 1-Lamp 40W incandescent Exits
- (3) 22W LED - Non-Int. Ballasts replaced (3) 250W HPSs
- (8) 22W LED - Non-Int. Ballasts replaced (8) 150W HPSs
- (4) 22W LED - Non-Int. Ballasts replaced (4) 150W HPSs
- (9) 3W LED - Int. Ballasts replaced (9) 60W CFLs
- (10) 22W LED - Non-Int. Ballasts replaced (10) 150W HPSs

Calculation Parameters

Savings calculations were performed using savings methodology described in section D.6.3 of the New Orleans TRM 2.0. Deemed and custom 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	1.00	1.00	1.00

Savings Calculations

Table B, Lighting Retrofit kWh Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Annual Operating Hours*	*IEF_E*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
	Base	*Post*	*Base*	*Post*					
HPS150 to LED30W	136	136	188	30	8,760	1.00	188,234	188,234	100.0%
F32T8 to LED30W	114	114	58	30	8,760	1.00	27,962	27,962	100.0%
I40 to LED2W	40	40	40	6	8,760	1.00	11,914	11,914	100.0%
HPS250 to LED22W	3	3	295	22	8,760	1.00	7,174	7,174	100.0%
HPS150 to LED22W	8	8	188	22	8,760	1.00	11,633	11,633	100.0%
HPS150 to LED22W	4	4	188	22	8,760	1.00	5,817	5,817	100.0%
CF60W to LEDINT3W	9	9	60	3	8,760	1.00	4,494	4,494	100.0%
HPS150 to LED22W	10	10	188	22	8,760	1.00	14,542	14,542	100.0%
						Total	**271,770**	**271,770**	**100.0%**

Table C, Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	IEF_D	Expected kW Savings	Realized kW Savings	Realization Rate
	Base	Post	Base	Post					
HPS150 to LED30W	136	136	188	30	1.00	1.00	21.49	21.49	100.0%
F32T8 to LED30W	114	114	58	30	1.00	1.00	3.19	3.19	100.0%
I40 to LED2W	40	40	40	6	1.00	1.00	1.36	1.36	100.0%
HPS250 to LED22W	3	3	295	22	1.00	1.00	0.82	0.82	100.0%
HPS150 to LED22W	8	8	188	22	1.00	1.00	1.33	1.33	100.0%
HPS150 to LED22W	4	4	188	22	1.00	1.00	0.66	0.66	100.0%
CF60W to LEDINT3W	9	9	60	3	1.00	1.00	0.51	0.51	100.0%
HPS150 to LED22W	10	10	188	22	1.00	1.00	1.66	1.66	100.0%
						Total	**31.02**	**31.02**	**100.0%**

Results

The kWh and kW realization rates for project PN9-001 are 100.0%, and the kW realization rate is 100.0%.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
HPS150 to LED30W	188,234	21.49	100.0%	100.0%
F32T8 to LED30W	27,962	3.19	100.0%	100.0%
I40 to LED2W	11,914	1.36	100.0%	100.0%
HPS250 to LED22W	7,174	0.82	100.0%	100.0%
HPS150 to LED22W	11,633	1.33	100.0%	100.0%
HPS150 to LED22W	5,817	0.66	100.0%	100.0%
CF60W to LEDINT3W	4,494	0.51	100.0%	100.0%
HPS150 to LED22W	14,542	1.66	100.0%	100.0%
Total	**271,770**	**31.02**	**100.0%**	**100.0%**

Project Number PN9-019
Program Publicly Funded Institutions

Project Background

The participant is an emergency medical facility that received incentives from Entergy New Orleans for installing a Building Automation System (BAS) and performing a facility retro commissioning process to diagnose potential high energy equipment waste. The Evaluators verified the participant had implemented:

- One Building Automation System with reset schedule

Calculation Parameters

Savings were calculated using an eQuest energy model to predict the savings associated with implementing a supply air temperature reset schedule based on outside air temperature and reducing the required VAV airflow to the spaces to allow them to close when the space in not occupied. The changes to the energy model between the baseline and proposed were to implement the supply air temperature rest and reduce the minimum space airflow from 65% to 0%. The energy model results are shown in Table A below.

Table A, Energy Model Results

Measure	*Baseline Energy (kWh/yr)*	*Proposed Energy (kWh/yr)*	*Savings (kWh/yr)*	*Percent Savings*
BAS with commissioning	634,517	298,247	336,270	53%
Total	**634,517**	**298,247**	**336,270**	**53%**

Savings Calculations

Savings are calculated using the following formulas:

$$kWh_{Savings} = Baseline\ Energy\ Usage - Proposed\ Energy\ Usage$$

$$kW_{Savings} = kW_{peak,pre} - kW_{peak,post}$$

Table B, Savings Calculations

Measure	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*	*Expected kW Savings*	*Realized kW Savings*	*Realization Rate*
BAS with commissioning	336,270	336,270	100%	33.05	12.32	37%
Total	**336,270**	**336,270**	**100%**	**33.05**	**12.32**	**37%**

The energy model was verified using the utility bills and the expected savings are substantiated using a billing regression model. The current issue with the billing

regression analysis is that they savings are not fully realized at the site yet because the EMS is still being adjusted. The implementor is still troubleshooting an issue with the EMS airflow numbers not matching the actual flow amounts with the actual flow amounts being around 50% higher than reported in the EMS. Once this airflow balance is resolved there will be a significant energy savings. This savings will be realized from a reduction in airflow with will reduce fan energy, reduce cooling energy required, and reduce reheat energy required by reducing simultaneous heating and cooling needs. The billing regression showed a 30% drop in expected energy usage and along with the expected additional savings with the corrected EMS airflow balancing the realized savings should match the energy model expected savings.

The peak demand savings are calculated using the model hourly output reports and a peak demand period of July through September weekdays from 4-5 pm. Savings are calculated as the difference in the average energy demand during the peak demand period.

Results

The kWh realization rate for project PN9-019 is 100.0% and kW realization rate is 37%. The Evaluators verified the provided energy model and corroborated savings with utility billing data.

The kW savings are much lower than expected because of a difference in peak demand calculation method. The expected kW savings method calculated the savings as the difference between the maximum monthly energy demand rates from the energy simulation outputs. The issue with this method is that those numbers just represent the peak energy usage at one time and does not consider the time period or the duration of the energy usage. For this case, the maximum energy usage is in December (138.29 kW pre and 105.24 post) because of the electric heating required which is not during the peak demand period. The Evaluator demand reduction method calculated the savings as the difference in the average energy demand of the energy simulation using the hourly output results from the energy simulation model provided. This method calculated an average demand rate of 78.97 kW pre and 66.65 kW post with a kW savings of 12.32.

Table C, Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
BAS with commissioning	336,270	12.32	100%	37%
Total	**336,270**	**12.32**	**100%**	**37%**

Project Number PN9-003
Program Publicly Funded Institutions

Project Background

The participant is a city court facility that received incentives from Entergy New Orleans for installing a Building Automation System (BAS) to control the Heating and Cooling systems to operate based on a set schedule. The Evaluators verified that the following had been installed:

- (1) Building Automation System with designated operating schedules

Calculation Parameters

Savings are calculated using the equipment nameplate information, BAS schedules, and an estimated airflow based on outdoor air temperature. All hours are separated into 5 degree temperature bins to estimate the equipment operating load and then use the following formulas:

$$kWh_{Savings} = \sum kW_{pre,motor} \times Hours - \sum kW_{post,motor} \times Hours$$

$$kW_{motor} = \frac{HP_{motor} \times LF \times 0.746}{Eff_{motor}} \times \%Load$$

Where:

kW_{motor}= The estimated full load motor energy demand

Hours= Total annual operating hours by temperature range

HP= Motor nameplate horsepower

LF= Load factor of the motor at full load

0.746= Conversion factor from HP to kW

Eff= Motor nameplate efficiency or NEMA rated if unknown

%Load= Estimated load percentage based on the temperature

Savings come from a change in the operating schedule from operating 24/7 to 8 am to 5 pm Monday through Friday and 10 am to 3 pm Saturday through Sunday for most of the equipment and 8 am to 5 pm Monday through Friday and noon to 2 pm Saturday through Sunday for AHU 4, 6, 7, 8, 9, 10, 12, 20, 33, 36, 50, and 51. The hours are calculated based on the stated schedule, type of equipment and number of hours in each temperature bin. The following table is a list of all the equipment being controlled by the BAS.

Table A, BAS Control Equipment Parameters

Equipment Type	Unit ID	HP	Eff	LF	kW
Air Handling Unit	AHU-1	5	86.5	1	3.23
	AHU-2	2	84	2	1.33
	AHU-3	2	84	3	1.33
	AHU-4	5	86.5	4	3.23
	AHU-5	2	84	5	1.33
	AHU-6	3	85.5	6	1.96
	AHU-7	3	85.5	7	1.96
	AHU-8	1	82.5	8	0.68
	AHU-9	1	82.5	9	0.68
	AHU-10	1	82.5	10	0.68
	AHU-12	5	89.5	12	3.13
	AHU-16	5	90.2	16	3.10
	AHU-20	3	86.5	20	1.94
	AHU-33	10	91.7	33	6.10
	AHU-36	7.5	91.7	36	4.58
	AHU-50	0.75	79	50	0.53
	AHU-51	1	85	51	0.66
Chilled Water Pump	CHWP-1	7.5	88.5	0.75	4.74
	CHWP-2	7.5	88.5	0.75	4.74
	CHWP-3	7.5	88.5	0.75	4.74
	CHWSP-1	15	91	0.75	9.22
	CHWSP-2	15	91	0.75	9.22
	CHWSP-3	15	91	0.75	9.22
Heating Hot Water Pump	HWP-1	0.75	79	0.75	0.53
	HWP-2	0.75	79	0.75	0.53
	HWPP-1	0.75	68	0.75	0.62
	HWPP-2	0.75	81.8	0.75	0.51
	HWPP-3	0.75	68	0.75	0.62
	HWPP-4	0.75	72	0.75	0.58
Cooling Tower Fan Motor	CTFM-1	7.5	91	0.85	5.23
	CTFM-2	7.5	91	0.85	5.23
Condenser Water Pump	CWP-1	20	91	0.79	12.95
	CWP-2	20	91	0.79	12.95
	CWP-3	20	93	0.81	12.99

Table B, BAS Controlled Chiller Parameters

Equipment Type	Make & Model	Tonnage	IPLV(kW/ton)	kW
Chiller	Mcquay WSC63-DAAA	160	**0.596**	**95.36**
	Mcquay WSC63-DAAA	160	**0.596**	**95.36**

Savings Calculations

Table C, BAS Control kWh Savings Calculations

Equipment Type	Expected kWh Savings	Realized kWh Savings	Realization Rate
Air Handling Units	145,369	152,708	105%
Chilled Water Pumps	176,240	177,665	101%
Heating Hot Water Pumps	5,541	5,599	101%
Cooling Tower Fan Motors	19,943	20,142	101%
Condenser Water Pumps	164,066	165,392	101%
Chillers	300,885	303,316	101%
Total	**812,044**	**824,822**	**102%**

Results

The kWh realization rate for project PN9-003 is 101.57% and there is no kW savings expected. The reason for the high realization rate is caused by a difference in EMS operating schedules. The expected savings are calculated assuming a baseline operating schedule of always on and an EMS operating schedule of 8 am to 4 pm Sunday through Saturday. The EMS screen captures provided in the application did not match what was stated so additional details were requested. The finalized EMS operating schedule according to the new EMS screen captures is 8 am to 5 pm Monday through Friday and 10 am to 3 pm Saturday through Sunday for most of the equipment. The EMS screen captures showed a different weekend schedule is used for AHU 4, 6, 7, 8, 9, 10, 12, 20, 33, 36, 50, and 51 with a schedule of noon to 2 pm Saturday through Sunday. This adjustment to the schedule reduced the total annual hours from 2,920 to 2,869 for most of the equipment and 2,557 for the stated AHUs.

Table D, Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
BAS Controls	824,822	0.00	101.6%	-
Total	**824,822**	**0.00**	**101.6%**	**-**

16. Appendix B: Survey Instruments & Interview Guides

This appendix contains the survey instruments and interview guides used in this evaluation.

16.1 Energy Smart Residential Participant Survey

1. Program records indicate that your household [PROJECT_DESC] through the [PROGRAM_LONG] program at [ADDRESS]. Do you recall this?

    1. Yes
    2. Yes, but information is incorrect
    3. No

[DISPLAY Q2 IF Q1 =2]

2. What do you think is incorrect about our records?

3. The first few questions about how you heard about the program. The rest of the survey will use the abbreviated name of the [PROGRAM_LONG] which is also known as the [PROGRAM_SHORT] program.

    How did you learn of the [PROGRAM_SHORT] program? (Select all that apply)

    1. Contractor
    2. Home energy consultant
    3. Program representative
    4. Program website
    5. Friend, family member, or colleague
    6. Bill insert or utility mailer
    7. Email from [UTILITY_SHORT]
    8. Social media post (e.g., Facebook, Twitter, Flickr)
    9. Through an internet search (e.g., Google search)
    10. Through an internet advertisement
    11. A radio or television advertisement
    12. A print advertisement
    13. Through a retailer
    15. Other (please explain)
    98. Don’t know

[DISPLAY Q4 IF PROGRAM = 1, 2, 4, 5]

4. Why did you decide to participate in the program? (Select all that apply)

    1. Save money on energy bills
    2. Improve the comfort of your home
    3. Conserve energy/Protect the environment
    4. Improve the value of the residence

5. Become as energy efficient as my friends or neighbors
6. Find out if there were any structural problems with my home
7. Get the free equipment/discount/rebate
8. Other (Please describe)
98. Don't know

[DISPLAY Q5 IF PROGRAM = 1 OR 2]

5. According to our records you received a home energy assessment through the program. Is that correct?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q6 IF Q5 = 1]

6. Were you planning on having an energy assessment of your home BEFORE you learned about the program?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q7 IF Q5 = 1]

7. On a scale of 1 to 5, where 1 is "very difficult" and 5 is "very easy," how would you rate the process of scheduling your home energy assessment?

    1. 1 - Very difficult
    2. 2
    3. 3
    4. 4
    5. 5 - Very easy
    98. Don't know

[DISPLAY Q8 IF Q7 < 3]

8. Why do you say that?

[DISPLAY Q9 IF Q5 = 1]

9. When you had your home energy assessment, did the assessor. . .

    1. Yes
    2. No
    98. Don't know

a) Ask you if there were any specific issues with your home you wanted to address?
b) Provide an energy assessment report with energy efficiency recommendations?
c) Discuss with you the potential energy savings you might achieve by implementing those recommendations in your home?

d) Install energy efficient measures on the day of the assessment?
e) Identify any potential health and safety issues with your home?
f) Explain the next steps for additional measures to be installed by an approved Trade Ally contractor?
g) Leave behind any printed program materials?

[DISPLAY Q10 IF 9B)= 1]

10. You confirmed that you received a home energy assessment report as part of your home energy assessment experience. On a scale of 1 to 5, where 1 is "not at all helpful" and 5 is "very helpful," how helpful was that report to you?

    1. 1 - Not at all helpful
    2. 2
    3. 3
    4. 4
    5. 5 - Very helpful
    98. Don't know

[DISPLAY Q11 IF Q10 < 3]

11. Why do you think the home energy assessment report was not helpful?

[DISPLAY Q12 IF Q5 = 1]

12. Since the assessment, would you say you have completed all of the recommended energy efficiency improvements, completed some of them, or not completed any?

    1. Completed all
    2. Completed some but not all
    3. Have not completed any
    98. Don't know

[DISPLAY Q13 IF Q12 = 2 OR 3]

13. What were the energy efficient improvements recommended to you that you have not implemented?

    [RECORD VERBATIM]

[DISPLAY Q14 IF Q12 = 2 OR 3]

14. What were the primary reasons you have not implemented these improvements? (Select all that apply) **[MULTISELECT]**

    1. Cost
    2. Do not have time
    3. Waiting for equipment to fail
    4. Do not feel they need to be done/will save energy
    5. Do not own the property
    6. Need more information
    7. Still planning to implement in the future

8. Other (Please describe)
98. Don't know

[DISPLAY Q15 IF MEASURE_NUM_1 = 1, 2, 3,4, OR 5] (APPLIANCES OR HVAC)

15. Why did you select this model or type of [MEASURE_1_NOEFF]? **[MULTISELECT]**

    1. It was a good price
    2. There was a rebate for it
    3. It costs less to operate it
    4. It's good for the environment
    5. It was all that was available/only choice
    6. The contractor/retailer recommended it
    7. It had features I wanted
    8. It was the right size, color
    9. Wanted that brand
    10. It had an ENERGY STAR label
    11. Other (Please specify)
    98. Don't know

[DISPLAY Q16 IF MEASURE_NUM_1 = 1, 2, 3,4, OR 5] (APPLIANCES OR HVAC)

16. When you were deciding to purchase the [MEASURE_1_NOEFF], from where did you get information about what to buy? **[MULTI-SELECT]**

    1. Retailers
    2. Installation contractors
    3. Friend, neighbor, relative or co-worker
    4. Utility
    5. Internet
    6. Consumer reports or other product magazines
    7. Newspaper
    8. Radio
    9. Television
    10. Other (Please specify)
    11. Did not look for any information about what to buy
    98. Don't know

[DISPLAY Q17 IF MEASURE_NUM_1 = 1, 2, 3, OR 4] (APPLIANCES ONLY)

17. What type of store, or from what sort of contractor did you purchase the [MEASURE_1_NOEFF]?

    1. Appliance store
    2. Home improvement store
    3. Heating/ cooling contractor
    4. Swimming pool contractor
    5. Local hardware store
    6. Internet
    7. Other (Please specify)

98. Don’t know

[DISPLAY Q18 IF MEASURE_NUM_1= 6 OR MEASURE_NUM_2 = 6]

18. Just to confirm, did you receive an Energy Smart Air-Conditioning Tune-Up as part of your program participation?

    1. Yes
    2. No
    98. Don’t know

[DISPLAY Q19 IF Q18 = 1]

19. Prior to participating in the program, did you have regular tune-ups conducted by a heating and cooling contractor?

    1. Yes
    2. No
    98. Don’t know

[DISPLAY Q20 IF Q19 = 1]

20. Did you have those tune-ups completed as part of a maintenance agreement or plan?

    1. Yes
    2. No
    98. Don’t know

[DISPLAY Q21 IF Q19 = 1]

21. Did the same company that completed the Energy Smart tune-up perform the tune-ups you had done before receiving the Energy Smart tune-up?

    1. Yes, same company
    2. No, different company
    98. Don’t know

[DISPLAY Q22 IF Q19 = 1]

22. Approximately how often do you get a tune up?

    1. Every year
    2. Once every two years
    3. Three to five years
    4. More than five years
    5. Only as needed for repairs
    6. Other (specify)
    98. Don’t know

[DISPLAY Q23 IF Q19 <> 1]

23. When, if ever, was your last tune up?

    1. Less than one year ago
    2. 1-2 years ago
    3. 3-5 years ago
    4. More than 5 years ago
    5. Never had a tune up
    98. Don't know

[DISPLAY PAGE IF MAJMEAS_QUANT > 0 & PROGRAM <> 2 (IQ) AND REPEAT ONCE IF MAJMEAS_QUANT > 1 & PROGRAM <> 2 (IQ)]

[DISPLAY Q24 IF Q5 =1]

24. Was the [EFF_MEASURE_1/2] recommended during the home energy assessment?

    1. Yes
    2. No
    98. Don't know

25. Prior to learning about the [PROGRAM_SHORT] Program, did you have plans to [INSTALL_COMPLETE_1/2] the [EFF_MEASURE_1/2]?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q26 IF Q25= 1 AND [MEAUSURE_NUM_1/2= ONE OF 1, 2, 3, 4, 5, 6]]

26. Just to be clear, did you have plans to specifically [INSTALL_COMPLETE_1/2] an [[EFF_MEASURE_1/2] as opposed to a standard efficiency [MEASURE_NOEFF_1/2]?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q27 IF Q24 = 1]

27. How likely is it that you would have [INSTALLED_COMPLETED_1/2] the same [EFF_MEASURE_1/2] if it was not recommended through the home energy assessment? Would you say...

    1. Very likely
    2. Somewhat likely
    3. Neither likely nor unlikely
    4. Somewhat unlikely
    5. Very unlikely
    98. Don't know

28. Would you have been financially able to [INSTALL_COMPLETE_1/2] the [EFF_MEASURE_1/2] without the financial assistance provided through the program?

    1. Yes
    2. No
    98. Don't know

29. How likely is it that you would have [INSTALLED_COMPLETED_1/2] the same [EFF_MEASURE_1/2] if the financial assistance was not available? Would you say...

    1. Very likely
    2. Somewhat likely
    3. Neither likely nor unlikely
    4. Somewhat unlikely
    5. Very unlikely
    98. Don't know

[DISPLAY Q30 IF MEASURE_NUM_1/2 = 3 OR 6]

30. Did the contractor that you worked with provide you with information, marketing material or a recommendation to purchase or install the [EFF_MEASURE_1/2]?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q31 IF Q30 = 1]

31. On a scale where 0 means "not at all influential" and 10 means "extremely influential," how influential was the information, marketing material, or recommendation provided by this contractor in your decision to purchase the [EFF_MEASURE_1/2]?

    1. (Record 0 -10)
    98. Don't know

32. Did you [INSTALL_COMPLETE_1/2] the [EFF_MEASURE_1/2] sooner than you would have if the information and financial assistance from the program had not been available?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q33 IF Q32 = 1]

33. When might you have purchased or installed the same [EFF_MEASURE_1/2] if you had not participated in the program? Would you say …

    1. Within 6 months of when you [INSTALLED_COMPLETED_1/2 it
    2. Between 6 months and 1 year
    3. In more than 1 year to 2 years
    4. In 2 to 3 years
    5. In more than 3 years
    6. Never
    98. Don't know

[DISPLAY PAGE IF DI_MEASURE_FLAG = 1]

34. Had you purchased and installed any [DIMEASURE] before you received them for free through the program?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q35 IF Q34 = 2]

35. How familiar were you with [DIMEASURE] as a technology to save energy before you participated in the [PROGRAM_SHORT] Program? Would you say…

    1. Very unfamiliar
    2. Somewhat unfamiliar
    3. Neither familiar nor unfamiliar
    4. Somewhat familiar
    5. Very familiar
    98. Don't know

36. Did you have plans to purchase and install any [DIMEASURE] before you learned that you could get them for free through the [PROGRAM_SHORT] Program?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q37 IF , =1 & Q36 = 1]

37. Just to be clear, did you have plans to purchase an energy saving power strip or plans to purchase a standard power strip?

    1. An energy saving power strip
    2. A standard power strip
    98. Don't know

[DISPLAY Q38 IF DIMEASURE_QUANT > 1 & Q36 = 1]

38. How many of the [DIMEASURE_QUANT] [DIMEASURE] that you received for free had you already planned to purchase?

39. If you had not received the free [DIMEASURE], how likely is it that you would have installed them anyway within 12 months of when you received them? Would you say…

    1. Very likely
    2. Somewhat likely
    3. Neither particularly likely nor unlikely
    4. Somewhat unlikely
    5. Very unlikely
    98. Don't know

SPILLOVER [DISPLAY IF PROGRAM <> 2]

40. We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive or rebate for.

    Since participating in the [PROGRAM_SHORT] Program, have you installed any ADDITIONAL energy efficient items in a household in [UTILITY]'s service territory without receiving an incentive or rebate?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q41 IF Q40 = 1]

41. We would like to know what you purchased and installed because of your experience with the program that you did not get a rebate or discount for.

    Since participating in the program in [YEAR] have you done any of the following? **[MULTISELECT]**

    1. Installed CFLs (Compact Fluorescent Light bulbs)
    2. Installed LED Light Bulbs
    3. Purchased an ENERGY STAR appliance such as a refrigerator, freezer, dehumidifier, dishwasher, clothes washer, or clothes dryer
    4. Installed water heater pipe insulation
    5. Installed water Heater jacket, blanket, or insulation
    6. Installed low flow faucet aerators
    7. Installed low flow showerhead
    8. Installed an ENERGY STAR room air conditioner
    9. Installed an energy efficient water heater
    10. Installed an ENERGY STAR central air conditioner or heat pump unit
    11. Installed an ENERGY STAR pool pump
    12. Something else
    98. Don't know

[DISPLAY Q42 IF Q40 = 1]

42. Why did you not get a [UTILITY] incentive rebate or discount for that energy saving equipment?

[DISPLAY Q43 IF Q41 = 1]

43. How many CFLs did you purchase and install?

[DISPLAY Q44 IF Q41 = 2]

44. How many LEDs did you purchase and install?

[DISPLAY Q45 IF Q41 = 3]

45. What kind of appliance did you purchase? **[MULTISELECT]**

1. Refrigerator
2. Freezer
3. Dehumidifier
4. Dishwasher
5. Clothes washer
6. Clothes dryer (Is it electric or gas?)
7. Other (Please describe)
98. Don't know

[DISPLAY Q46 IF Q41 = 3]

46. How do you know it is an energy efficient appliance?

[DISPLAY Q47 IF Q45 = 6]

47. Is the dryer a gas or electric dryer?

1. Gas
2. Electric
98. Don't know

[DISPLAY Q48 IF Q41 = 4]

48. About how many feet of water heater pipe insulation you purchased and installed?

[DISPLAY Q49 IF Q41 = 6]

49. How many low flow faucet aerators did you install in bathroom sinks?

[DISPLAY Q50 IF Q41 = 6]

50. How many low flow faucet aerators did you install in kitchen sinks?

[DISPLAY Q51 IF Q41 = 7]

51. How many low flow shower heads did you install?

[DISPLAY Q52 IF Q41 = 8]

52. How many ENERGY STAR room air conditioners did you install?

[DISPLAY Q53 IF Q41 = 8]

53. How many square feet is the room that the ENERGY STAR air conditioner is installed in? (If multiple units installed, ask how many square feet on average are the rooms you installed the air conditioners in)

[DISPLAY Q54 IF Q41 = 9]

54. How do you know that the water heater you installed is an energy efficient water heater?

[DISPLAY Q55 IF Q41 =9]

55. What type of water heater did you install? Was it a…

    1. Natural gas storage tank water heater
    2. Electric storage tank water heater
    3. Heat pump water heater
    4. A natural gas tank less water heater
    5. Some other type of water heater (Specify)
    98. Don't know

[DISPLAY Q56 IF Q41 =10]

56. Did you install an ENERGY STAR central air conditioner or an ENERGY STAR heat pump?

    1. Central air conditioner
    2. Heat pump
    98. Don't know

[DISPLAY Q57 IF Q41 =10]

57. How many square feet is the house that is cooled by the air conditioner or heat pump?

[DISPLAY Q58 IF Q41 =11]

58. Did you install a variable speed or multispeed pool pump?

    1. Variable speed
    2. Multispeed
    98. Don't know

[DISPLAY Q59 IF Q41 =11]

59. What is the rated horsepower of the pool pump?

[DISPLAY Q60 IF Q41 = 10]

60. What other energy efficient items did you install?

[DISPLAY Q61 IF Q41 = 1 - 10]

61. In approximately what month and year did you install the energy efficient items that you did not receive an incentive for?

[DISPLAY Q62 IF Q41 = 1 - 10]

62. On a scale of 0 to 10, where 0 represents "not at all important" and 10 represents "extremely important", how important was the experience with the program in your decision to purchase the items you just mentioned?

    1. (Record 0-10)
    98. Don't know

[DISPLAY Q63 IF Q41 = 1 - 10]

63. On a scale of 0 to 10, where 0 represents "not at all likely" and 10 represents "extremely likely," how likely would you have been to purchase those additional items if you had not participated in the program?

    1. (Record 0-10)
    98. Don't know

64. These next few questions ask about your satisfaction with several aspects of the program. Using a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied", how would you rate your satisfaction with the following? [RANDOMIZE A-G]

    [SCALE: 1 = 1 (Very dissatisfied), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Very satisfied = 5), 98 = Don't know]

    a. [DISPLAY IF PROGRAM = 1, 2, 5] Interactions you had with program staff
    b. [DISPLAY IF PROGRAM = 1, 2, 4, 5] The quality of the installation contractors work
    c. The performance of the equipment installed or the energy efficient improvements that were made
    d. The savings on your monthly utility bills
    e. The effort required for the application process
    f. [DISPLAY IF PROGRAM =1, 2] Scheduling the home energy assessment
    g. [DISPLAY IF PROGRAM =1, 2]] The information provided by the home energy assessment
    h. Overall program experience

[DISPLAY Q65 IF Q64 < 3]

65. Why were you dissatisfied with those aspects of the program you mentioned?

66. Using the same scale, how satisfied are you with [UTILITY] as your electricity service provider?

    [SCALE: 1 = 1 (Very dissatisfied), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Very satisfied = 5), 98 = Don't know]

67. The next few questions are about this residence. These are anonymous and will be used solely for the purpose of combining different customers' responses. It is okay to not answer any of these questions.

    Which of the following best describes this residence?

    1. Single family detached home
    2. Townhome
    3. Duplex or Triplex
    3. Mobile or manufactured home
    4. Apartment building with 2-4 units
    5. Apartment building with 5-10 units
    6. Apartment building with more than 10 units
    98. Don't know
    99. Prefer not to state

68. When was this residence built?

    1. Before 1970's
    2. 1970's
    3. 1980's
    4. 1990's
    5. 2000-2009
    6. 2010 or newer
    98. Don't know
    99. Prefer not to state

69. What is the approximate square footage of this residence?

    1. Less than 1,000
    2. 1,001-1,500
    3. 1,501-2,000
    4. 2,001-2,500
    5. Greater than 2,500
    98. Don't know
    99. Prefer not to state

70. Do you own, rent, or own and rent to someone else the property located at [LOCATION]?

    1. Own
    2. Rent
    3. Own and rent to someone else
    98. Don't know
    99. Prefer not to state

71. What is the main fuel used for heating your home?

1. Natural gas
2. Electricity
3. Propane
4. Other (Please describe)
5. Don't heat the home
98. Don't know
99. Prefer not to state

[DISPLAY Q72 IF Q71 <> 5]

72. What is the main type of heating equipment used to provide heat for your home?

1. Heat pump
2. Central forced air furnace
3. Built-in baseboard heater
4. Building-in wall heater
5. Something else (Please describe)
6. Don't heat the home
98. Don't know
99. Prefer not to state

[DISPLAY Q73 IF MEASURE_NUM_1/2 <> 3]

73. Do you use a central air conditioning system in your home?

1. Yes
2. No
98. Don't know
99. Prefer not to state

[DISPLAY Q74 IF Q73 = 1]

74. Is the central air conditioning system a heat pump?

1. Yes
2. No
98. Don't know
99. Prefer not to state

[DISPLAY Q75 IF Q73 = 1]

75. How old is the central air conditioning system in your home?

1 Less than 2 years old
2 2 to 4 years
3 5 to 9 years
4 10 to 14 years
5 15 to 19 years
6 20 or more years old
98 Don't know
99 Prefer not to state

76. What type of water heater does this residence have?

1. Natural gas water heater
2. Electric water heater
3. Other (Please describe)
98. Don't know
99. Prefer not to state

77. Including yourself, how many people currently live in this residence year-round?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8 or more
98. Don't know
99. Prefer not to state

78. Including all money earned from wages, salaries, tips, commissions, workers' compensation, unemployment insurance, child support, or other sources, about how much was your total annual household income before taxes in 2018?

    1. Less than $10,000
    2. $10,000 to less than $20,000
    3. $20,000 to less than $30,000
    4. $30,000 to less than $40,000
    5. $40,000 to less than $50,000
    6. $50,000 to less than $75,000
    7. $75,000 to less than $100,000
    8. $100,000 to less than $150,000
    9. $150,000 to less than $200,000
    10. $200,000 or more
    98. Don't know
    99. Prefer not to state

79. What's the highest level of education a person living in your household has completed?

    1. Less than high school
    2. High school graduate
    3. Associates degree, vocational/technical school, or some college
    4. Four-year college degree
    5. Graduate or professional degree
    98. Don't know
    99. Prefer not to state

16.2 Energy Smart Kits Survey

1. Our records indicate that your household located at [LOCATION] received a free energy saving kit from [UTILITY]. This kit included a bathroom faucet aerator, a kitchen faucet aerator, an energy savings low-flow showerhead, and four LED light bulbs.

   Do you recall receiving this kit?

   1. Yes
   2. No (TERMINATE SURVEY AFTER Q**2**)

[DISPLAY Q2 IF Q1= 2]

2. Do you recall requesting the kit from Entergy?

   1. Yes
   2. No

3. Thank you for confirming that.

   For each of the following items, please mark if it is currently installed in your home.

   [SCALE: 1 = Currently installed, 2 = Not installed, 98 = Not sure]

   a. The energy saving low-flow bathroom aerator
   b. The energy saving low-flow kitchen aerator
   c. The energy saving low-flow showerhead

[DISPLAY Q4 IF Q3A = 2]

4. Why is the energy saving low-flow bathroom aerator not installed in your home?

   1. Do not like low-flow devices
   2. Have not had time to install it
   3. Need help / don’t know how to install it
   4. Gave it to someone else
   5. Doesn’t fit on your faucet
   6. For some other reason (Please explain)

[DISPLAY Q5 IF Q3B = 2]

5. Why is the energy saving low-flow kitchen aerator not installed in your home?

   1. Do not like low-flow devices
   2. Have not had time to install it
   3. Need help / don’t know how to install it
   4. Gave it to someone else
   5. Doesn’t fit on your faucet
   6. For some other reason (Please explain)

[DISPLAY Q5 IF Q3C = 2]

6. Why is the energy saving low-flow showerhead not installed in your home?

   1. Do not like low-flow devices
   2. Have not had time to install it
   3. Need help / don't know how to install it
   4. Gave it to someone else
   5. Doesn't fit your shower
   6. For some other reason (Please explain)

7. Are all, some, or none of the four LED lightbulbs currently installed in your home?

   1. All are currently installed
   2. Some are currently installed
   3. None are currently installed
   98. Not sure

[DISPLAY Q8 IF Q7 = 2]

8. How many of the four LED lightbulbs that you received are currently installed in your home?

   0. None are installed
   1. 1 is installed
   2. 2 are installed
   3. 3 are installed
   4. All 4 are installed

[DISPLAY Q9 IF Q7 = 2 OR 3 AND Q8 <> 4]

9. Why are some of the LED bulbs not currently installed in your home? (Select all that apply) **[MULTISELECT]**

   1. Did not like the light or appearance of the bulbs
   2. They were broken or burnt out
   3. Have not had time to install them
   4. Waiting for bulbs to burn out
   5. Gave to someone else
   6. For some other reason (Please explain)

[DISPLAY PAGE IF Q3A = 1 OR Q3B = 1 OR Q3C = 1 OR Q7 = 1 OR 2]

10. Before you received them for free in the energy saving kit, had you installed any of the following items in your home?

    [SCALE: 1 = Yes, had previously installed, 2 = No, 98 = Not sure]

    a. **[DISPLAY IF Q3A = 1]** Energy saving low-flow bathroom aerators
    b. **[DISPLAY IF Q3B = 1]** Energy saving low-flow kitchen aerators
    c. **[DISPLAY IF Q3C = 1]** Energy saving low-flow showerhead
    d. **[DISPLAY IF Q7 = 1 OR 2]** LED lightbulbs

11. Did you have plans to purchase and install any of the free kit items before you learned that you could get them for free in the energy saving kit?

    [SCALE: 1 = Yes, had planned to purchase, 2 = No, 98 = Not sure]

    a. **DISPLAY IF Q3A = 1]** Energy saving low-flow bathroom aerators
    b. **DISPLAY IF Q3B = 1]** Energy saving low-flow kitchen aerators
    c. **DISPLAY IF Q3C = 1]** Energy saving low-flow showerhead
    d. **[DISPLAY IF Q7 = 1 OR 2]** LED lightbulbs

[DISPLAY Q12 IF Q11 = 1]

12. How many of the four LED lightbulbs that you received for free do you think you would have purchased if they were not provided for free through the program?

    0. None of them
    1. 1
    2. 2
    3. 3
    4. All 4

13. Please rate how likely you would have been to purchase and install each of the following kit items in the next 12 months if they had not been provided for free through the program.

    [SCALE: 1 = Very unlikely, 2 = Somewhat unlikely, 3 = Neither particularly likely nor unlikely, 4 = Somewhat likely, 5 = Very likely, 98 = Don't know]

    a. **DISPLAY IF Q3A = 1]** Energy saving low-flow bathroom aerators
    b. **DISPLAY IF Q3B = 1]** Energy saving low-flow kitchen aerators
    c. **DISPLAY IF Q3C = 1]** Energy saving low-flow showerhead
    d. **[DISPLAY IF Q7 = 1 OR 2]** LED lightbulbs

14. Did you participate in any [UTILITY] energy efficiency programs BEFORE you requested the energy efficiency kit?

    1. Yes
    2. No
    98. Don't recall

[DISPLAY Q15 IF Q14 = 1]

15. When did you last participate in an [UTILITY] energy efficiency program?

    1. 2019
    2. 2018
    3. 2017
    3. 2016
    4. 2015
    5. Before 2015
    98. Do not recall

16. Have you participated in any [UTILITY] energy efficiency programs AFTER you received the energy efficiency kit?

    1. Yes
    2. No
    98. Not sure

[DISPLAY Q17 IF Q16 = 1]

17. Which program(s) did you participate in after you received the kit? (Select all that apply) **[MULTISELECT]**

    1. Home Performance with ENERGY STAR
    2. Multifamily
    3. Income Qualified Weatherization
    4. A/C Tune-Up
    5. Central Air-Conditioner Units
    6. EasyCool
    7. Instore lighting discounts
    8. Appliance rebates
    9. Scorecard
    98. Don’t know

[DISPLAY Q18 IF Q16 = 1]

18. Did you learn about any of the programs that you participated in from the information included in the energy efficiency kit?

    1. Yes
    2. No
    98. Not sure

19. Would you like the Energy Smart Program team to contact you about energy efficiency opportunities for you and your home?

    1. Yes
    2. No

[DISPLAY Q20 IF Q19 = 1]

20. Please provide the name and contact information of the best person to contact about additional energy efficiency opportunities.

    Name:
    Telephone:
    Email:

21. The next few questions about the residence located at [LOCATION]. These are anonymous and will be used solely for the purpose of combining different customers' responses. It is okay to not answer any of these questions.

    Which of the following best describes this residence?

    1. Single family detached home
    2. Townhome
    3. Duplex or Triplex
    3. Mobile or manufactured home
    4. Apartment building with 2-4 units
    5. Apartment building with 5-10 units
    6. Apartment building with more than 10 units
    98. Don't know/prefer not to state

22. When was this residence built?

    1. Before 1970's
    2. 1970's
    3. 1980's
    4. 1990's
    5. 2000-2009
    6. 2010 or newer
    98. Don't know/prefer not to state

23. What is the approximate square footage of this residence?

    1. Less than 1,000
    2. 1,001-1,500
    3. 1,501-2,000
    4. 2,001-2,500
    5. Greater than 2,500
    98. Don't know/prefer not to state

24. Do you own, rent, or own and rent to someone else the property located at [LOCATION]?

    1. Own
    2. Rent
    3. Own and rent to someone else
    98. Don't know/prefer not to state

25. What is the main fuel used for heating your home?

1. Natural gas
2. Electricity
3. Propane
4. Other (Please describe)
5. Don’t heat the home
98. Don’t know/prefer not to state

26. What type of water heater does this residence have?

1. Natural gas water heater
2. Electric water heater
3. Other (Please describe)
98. Don’t know/prefer not to state

27. Including yourself, how many people currently live in this residence year-round?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8 8 or more
98. Don’t know/prefer not to state

28. Including all money earned from wages, salaries, tips, commissions, workers' compensation, unemployment insurance, child support, or other sources, about how much was your total annual household income before taxes in 2018?

    1. Less than $10,000
    2. $10,000 to less than $20,000
    3. $20,000 to less than $30,000
    4. $30,000 to less than $40,000
    5. $40,000 to less than $50,000
    6. $50,000 to less than $75,000
    7. $75,000 to less than $100,000
    8. $100,000 to less than $150,000
    9. $150,000 to less than $200,000
    10. $200,000 or more
    98. Don't know/prefer not to state

29. What's the highest level of education a person living in your household has completed?

    1. Less than high school
    2. High school graduate
    3. Associates degree, vocational/technical school, or some college
    4. Four-year college degree
    5. Graduate or professional degree
    98. Don't know/prefer not to state

16.3 Energy Smart Multifamily Owner Survey

1. Program records indicate that your property implemented [MEASURES_ALL] through the [PROGRAM_SHORT] program around [DATE] at the [PROPERTY_NAME] property. Were you involved in the decision to participate in this program?

    1. Yes **[SKIP TO Q5]**
    2. Yes, but information is incorrect
    3. Not involved in the decision(THANK AND TERMINATE)

[DISPLAY Q2 IF Q1 =2]

2. Please tell me what you think is incorrect about our records.

[DISPLAY Q3 IF Q1 = 3]

3. Is there someone else we could speak with who was involved in the decision to participate in the [PROGRAM_SHORT] program?

    1. Yes
    2. No(THANK AND TERMINATE)
    98. DON'T KNOW(THANK AND TERMINATE)
    99. REFUSED(THANK AND TERMINATE)

[DISPLAY Q4 IF Q3 = 1]

4. May I please speak with that person? (ASK FOR CONTACT INFORMATION IF NOT AVAILABLE)

    1. Yes (BEGIN SURVEY WITH NEW RESPONDENT)
    2. No (THANK AND TERMINATE)
    98. DON'T KNOW (THANK AND TERMINATE)
    99. REFUSED(THANK AND TERMINATE)

5. Thank you for providing that information. How did you learn about the energy efficiency improvements available through [UTILITY]'s [PROGRAM_SHORT] Program? **[MULTISELECT]** (DO NOT READ)

    1. Program representative spoke with them
    2. Referred by someone within their company
    3. Program website
    4. Friend, family member, or colleague
    5. Through property management group
    6. Referred by a tenant
    7. Bill insert or utility mailer
    8. Email from [UTILITY_SHORT]
    9. Social media post (e.g., Facebook, Twitter, Flickr)
    10. Through an internet search (e.g., Google search)
    11. Through an internet advertisement
    12. A radio or television advertisement
    13. A print advertisement
    14. Other (please explain)
    98. DON'T KNOW
    99. REFUSED

6. What were the main reason(s) for deciding to complete the efficiency improvements at the property? (Select all that apply) **[MULTISELECT]** (DO NOT READ)

    1. Improve tenant comfort and satisfaction
    2. Reduce tenant utility bills
    3. Reduce property utility bills
    4. To take advantage of rebates/no-cost efficiency improvements
    5. To replace old or non-functioning equipment
    6. To make the units more attractive to prospective tenants
    7. Some other reason – please describe:
    98. DON'T KNOW
    99. REFUSED

[DISPLAY PAGE IF MAJMEAS_QUANT > 0]

Now I have a few questions about the energy efficiency improvements that were made at the [PROPERTY_NAME] property.

7. Prior to learning about the [PROGRAM_SHORT] Program, did you have plans to [INSTALL/COMPLETE1] the [EFF_MEASURE1]?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q8 IF Q7 = 1 AND STAND_OPT = 1]

8. Just to be clear, did you have plans to specifically [INSTALL/COMPLETE1] the [EFF_MEASURE1] as opposed to standard efficiency [STAND_MEASURE1]?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

9. Was the [EFF_MEASURE1] recommended during an energy assessment of the property?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

10. Would you have been financially able to [INSTALL/COMPLETE1] the [EFF_MEASURE1] without the financial assistance provided through the program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q11 IF Q10= 2]

11. To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?

    1. Yes, that is correct.
    2. No, that is not correct.
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q12 IF Q11 = 2]

12. In your own words, can you tell me what your organization would have likely done if the financial incentive was not available from the program?

13. How likely is it that you would have [INSTALLED/COMPLETED1] the same [EFF_MEASURE1] if the financial assistance was not available? Would you say...

    5. Very likely
    4. Somewhat likely
    3. Neither particularly likely nor unlikely
    2. Somewhat unlikely
    1. Very unlikely
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q14 IF Q9 = 1]

14. How likely is it that you would have [INSTALLED/COMPLETED1] the same [EFF_MEASURE1] if it was not recommended through the energy assessment? Would you say...

    1. Very likely
    2. Somewhat likely
    3. Neither particularly likely nor unlikely
    4. Somewhat unlikely
    5. Very unlikely
    98. DON'T KNOW
    99. REFUSED

15. Did you [INSTALL/COMPLETE1] the [EFF_MEASURE1] sooner than you would have if the information and financial assistance from the program had not been available?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q16 IF Q15 = 1]

16. When might you have [INSTALLED/COMPLETED1] the same [EFF_MEASURE1] if you had not participated in the program? Would you say … (READ LIST)

    1. Within 6 months of when you purchased or installed it
    2. Between 6 months and 1 year
    3. In more than 1 year to 2 years
    4. In 2 to 3 years
    5. In more than 3 years
    6. Never (Do not read)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY IF MAJMEAS_QUANT > 1]

17. Our records show that this property also received a rebate or discount from the [UTILITY_SHORT] [PROGRAM_SHORT] for a [EFF_MEASURE2].

    Was the decision making process for that project the same as for the [EFF_MEASURE1] project?

    1. Yes
    2. No **[REPEAT Q7– Q17 FOR SECOND MEASURE]**
    98. DON'T KNOW
    99. REFUSED

[DISPLAY PAGE IF DIMEAS_QUANT > 0] [REPEAT FOR UP TO THREE MEASURES]

Now I have a few questions about the energy efficient equipment installed at no cost in the tenant units at the [PROPERTY_NAME] property.

18. Had you purchased and installed any [DIMEASURE1] in tenant units for this property before you received them for free through the program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

19. Did you have plans to purchase and install any [DIMEASURE1] at the [PROPERTY_NAME] property before you learned about the [PROGRAM_SHORT] Program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q20 IF Q19 = 1]

20. If you had not received them through the program, would you have purchased & installed all of the measures, some of them, or none of them within 12 months of when you received them for free?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q21 IF Q20 = 2]

21. What percent of the [DIMEASURE1] that you received for free would you have purchased and installed?

    (Record Percent)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q22 IF Q19 = 1]

22. When do you think you would have purchased and installed those [DIMEASURE1] if they had not been provided for free through the [PROGRAM_SHORT] Program? (READ LIST)

    1. Within 6 months of when you received them
    2. Between 6 months and 1 year
    3. In more than 1 year to 2 years
    4. In 2 to 3 years
    5. In more than 3 years
    6. (Never)
    98. DON'T KNOW
    99. REFUSED

23. Would you have been financially able to install the [DIMEASURE1] if they had not been provided for free through the program?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q24 IF Q23= 2]

24. To confirm, your organization would NOT have allocated the funds to install the [DIMEASURE1] if they were not provide for free through the program. Is that correct?

    1. Yes, that is correct.
    2. No, that is not correct.
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q25 IF Q24 = 2]

25. In your own words, can you tell me what your organization would have likely done if the [DIMEASURE1] were not available for free from the program?

26. If you had not received the [DIMEASURE1] for free, how likely is it that you would have installed them anyway? Would you say… (READ LIST)

    5. Very likely
    4. Somewhat likely
    3. Neither particularly likely nor unlikely
    2. Somewhat unlikely
    1. Very unlikely
    98. DON'T KNOW
    99. REFUSED

27. We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive for.

    Since participating in the [PROGRAM_SHORT] Program has your organization installed any ADDITIONAL energy efficiency measures at this property or at other properties within [UTILITY]'s service territory that did NOT receive incentives through [UTILITY]'s programs?

    1. Yes
    2. No
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q28 IF Q27 = 1]

28. What additional equipment did you install without receiving a rebate or incentive?

[DISPLAY Q29 IF Q27 = 1]

29. Why didn't you apply for or receive incentives for those items? **[MULTI SELECT]**

    1. Didn't know whether equipment qualified for financial incentives
    2. Equipment did not qualify for financial incentives
    3. Too much paperwork for the financial incentive application
    4. Financial incentive was insufficient
    5. Didn't have time to complete paperwork for financial incentive application
    6. Didn't know about financial incentives until after equipment was purchased
    7. We did apply for an incentive [**SKIP TO SATISFACTION SECTION**]
    8. Other [OPEN ENDED]
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q30 IF Q27 = 1]

30. Using a scale where 0 means "not at all important" and 10 means "very important", how important was your experience with the [PROGRAM_SHORT] Program in your decision to install this equipment?

    (RECORD 0-10)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q32 IF Q27 = 1]

31. Using a scale where 0 means "definitely would NOT have installed" and 10 means "definitely would have installed", how likely is it that your organization would have installed this equipment if you had NOT participated in the [PROGRAM_SHORT] Program?

    (RECORD 0-10)
    98. DON'T KNOW
    99. REFUSED

[DISPLAY Q32 IF Q30=0,1,2,3 AND Q31=0,1,2,3 OR IF Q30=8,9,10 AND Q31=8,9,10

32. You scored the importance of your program experience to your decision to implement the additional equipment with [Q30 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing the additional equipment if your organization had not participated in the program with [Q31 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

    [OPEN ENDED]

[DISPLAY Q33 IF Q27 = 1]

33. We may want to follow up with someone to get additional details about the equipment that you installed without an incentive. Can you provide me the name, phone number, and email of the person would be best to speak to about the specific details on the equipment that was installed without an incentive?

34. Using a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied," how would you rate your satisfaction with the following? [RANDOMIZE ORDER OF A-F] (RECORD 97 IF NOT APPLICABLE, 98 IF DON'T KNOW, 99 IF REFUSED)

    a) Interactions you had with [UTILITY] staff
    b) The quality of installation work
    c) The process of having the equipment installed
    d) The performance of the equipment installed
    e) The effort required for the application process
    f) The wait-time to receive the services
    g) Overall program experience

[DISPLAY Q35 IF Q34 A- G < 3]

35. Why were you dissatisfied with those aspects of the program you mentioned?

    [OPEN ENDED]

36. I have just a few more questions about the [PROPERTY_NAME] property? Which of the following is the primary fuel type used for space heating the tenant units?

    1. Electricity
    2. Natural gas
    3. Oil
    4. Something else (please specify)
    98. DON’T KNOW
    99. REFUSED

37. Which of the following is the primary fuel type used for water heating the tenant units?

    1. Electricity
    2. Natural gas
    3. Oil
    4. Something else (please specify)
    98. DON'T KNOW
    99. REFUSED

38. Is air conditioning centrally supplied to the tenant units?

    1 Yes
    2 No
    98. DON'T KNOW
    99. REFUSED

39. I now have a few questions about this residence. These are anonymous and will be used solely for the purpose of combining different customers' responses. If you do not want to answer any of these, let me know. It is okay to not answer any of these questions.

    Which of the following best describes this residence? (READ LIST)

    1. Townhome
    2. Duplex or Triplex
    3. Apartment building with 2-4 units
    4. Apartment building with 5-10 units
    5. Apartment building with more than 10 units
    98. DON'T KNOW
    99. REFUSED

40. When was this property built? (IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE)

    1. Verbatim____
    2. Before 1970's
    3. 1970's
    4. 1980's
    5. 1990's
    7. 2000-2009
    8. 2010 or newer
    98. DON'T KNOW
    99. REFUSED

41. Do the tenants at this property own or rent the residences?

    1. Own
    2. Rent
    3. Some own and some rent
    98. DON'T KNOW
    99. REFUSED

42. Does your company own or manage this property?

1. Own
2. Manage
3. Own and manage
98. DON'T KNOW
99. REFUSED

43. Do tenants pay their own electric bills or are electricity costs included in the rent?

1. Yes, tenant pay their own bills
2. Electricity costs are included as part of the rent
3. There is another type of arrangement (Please describe)
98. DON'T KNOW
99. REFUSED

44. Are any of the units at the [PROPERTY_NAME] property receiving some type of federal, state, or other housing assistance?

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q45 IF Q44 = 1]

45. Approximately what percent of the units are receiving housing assistance?

46. Do you or your company own or manage any other properties in [UTILITY]'s service territory that have not participated in an [UTILITY] efficiency program?

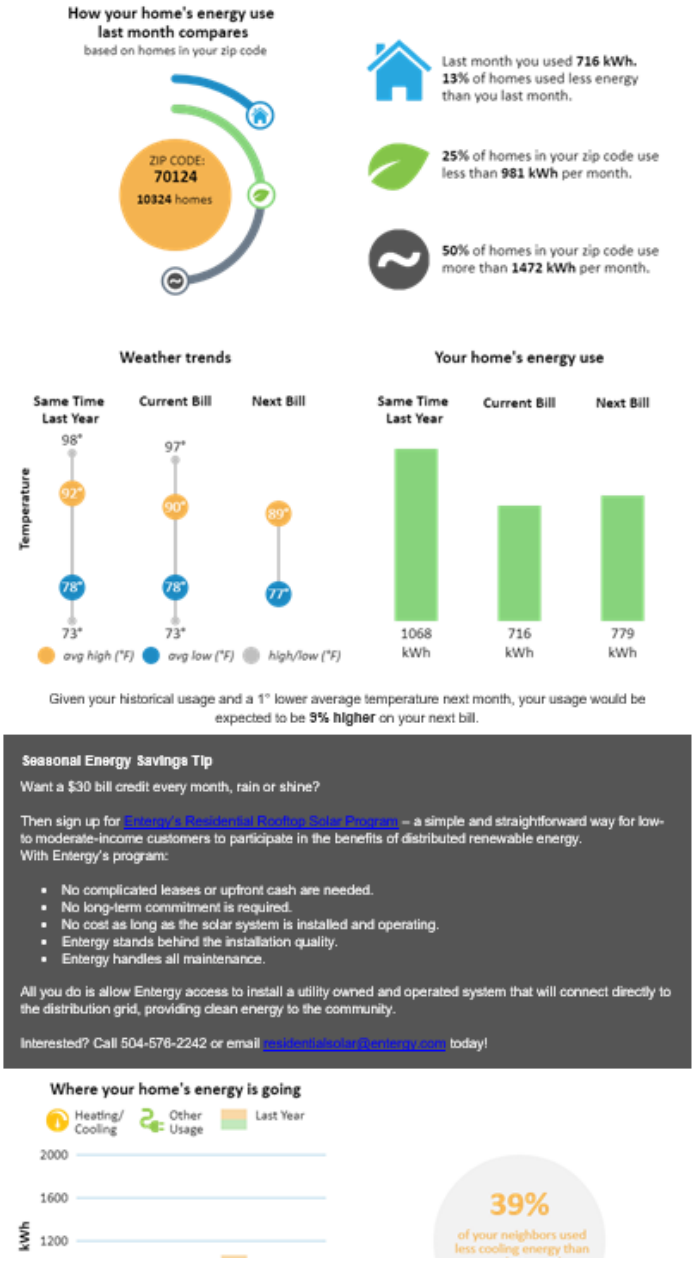
1. Yes
2. No
98. DON'T KNOW
99. REFUSED

[DISPLAY Q47 IF Q46 = 1]

47. How many properties?

16.4 Energy Smart Scorecard Survey

1. According to our records you received emails with your Energy Smart Scorecard. The Energy Smart Scorecard provides information on your home's energy use and tips on how you can save energy. An example is shown below.



Do you recall receiving these emails in 2019?

1. Yes
2. No **[TERMINATE SURVEY]**

98. Not sure **[TERMINATE SURVEY]**

2. How frequently do you open and view your Energy Smart Scorecard?

    1. Every month
    2. Every other month
    3. Every 2 – 3 months
    4. Every 4 – 6 months
    5. Once or twice per year
    6. I have never viewed my Energy Smart Scorecard [TERMINATE SURVEY]
    98. Don't know

3. When did you first view your Energy Smart Scorecard?

    1. Before January 2019
    2. Between January but not before May (2019)
    3. After May 2019
    98. Don't know

4. Are you the only person in your household who views the Energy Smart Scorecard?

    1. Yes
    2. No
    98. Don't know

5. Thinking back to when you first viewed your Energy Smart Scorecard, what were you interested in learning?

    [OPEN]

6. Thinking about the information provided in the Scorecard, how accurate or inaccurate do you think the comparison of your home's energy to other homes was?

    1. Very inaccurate
    2. Somewhat inaccurate
    3. Somewhat accurate
    4. Very accurate
    98. Don't know

7. Do you recall viewing any energy saving tips or recommendations provided in the Energy Smart Scorecard?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q8 IF Q7 = 1]

8. How useful were the recommendations that were provided?

   1.Very useful
   2.Somewhat useful
   3.Slightly useful
   4.Not at all useful
   98.Don't know

[DISPLAY Q9 IF Q8 = 3 or 4]

9. Why were the recommendations not very useful? (Mark all that apply)

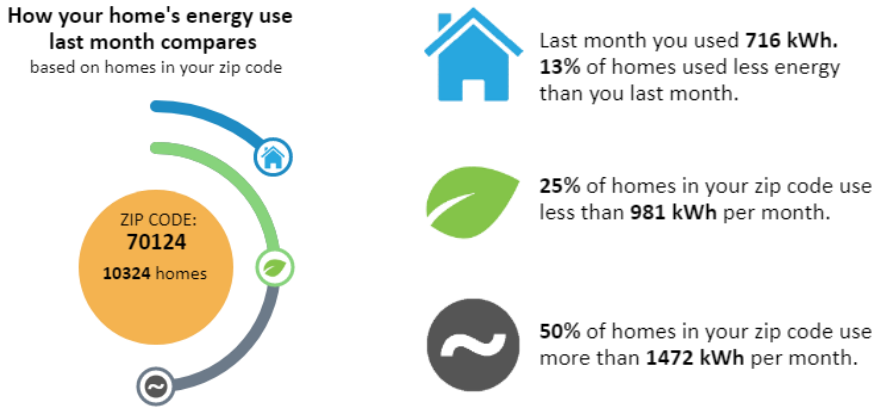
   1.I didn't understand them
   2.They didn't make sense for my home
   3.Condo or rental restricts prevented me from taking the recommended actions
   4.I was already doing the things recommended
   5.Taking the recommended actions would make the home less comfortable
   6.Too generic
   7.Some other reason (Please explain)
   98.Don't know

[DISPLAY Q10 IF Q8 = 1 or 2]

10. What was useful about the recommendations that you received?
    1.They made sense for my home
    2.They were practical
    3.Seemed likely to reduce our energy use
    4.Some other reason (Please explain)
    98.Don't know

11. The next few images are examples of images from a Scorecard report.

Please answer the following two questions based on your opinions of the image below.



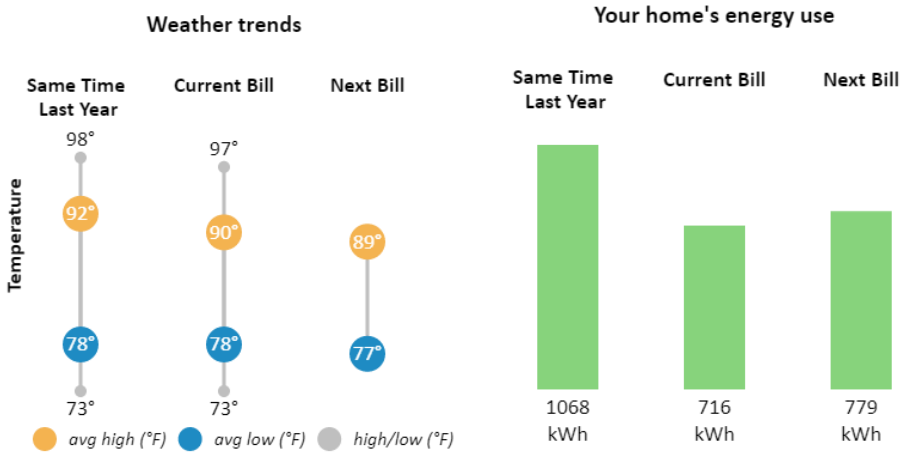
a. How clear is the information on the home's energy use?

[SCALE: 1 = 1 (Not at all clear); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Completely clear); 98 = Don't know]

b. How helpful is the information for understanding the home's energy use?

[SCALE: 1 = 1 (Not at all helpful); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Very helpful); 98 = Don't know]

12. Please answer the following two questions based on your opinions of the image below.



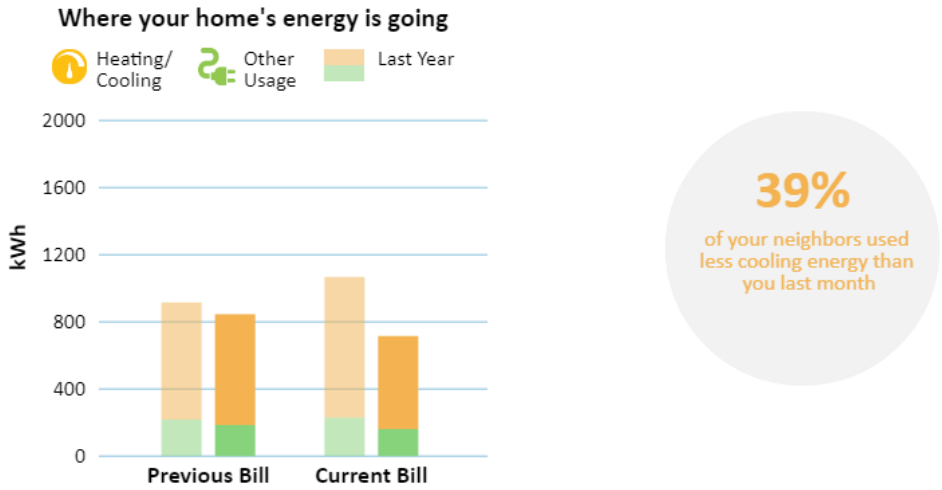
a. How clear is the information on the weather trends and the home's energy use?

[SCALE: 1 = 1 (Not at all clear); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Completely clear); 98 = Don't know]

b. How helpful is the information for understanding weather trends and the home's energy use?

[SCALE: 1 = 1 (Not at all helpful); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Very helpful); 98 = Don't know]

13. Please answer the following two questions based on your opinions of the image below.



a. How clear is the information for understanding how energy is being used in the home?

[SCALE: 1 = 1 (Not at all clear); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Completely clear); 98 = Don't know]

b. How helpful is the information for understanding how energy is being used in the home?

[SCALE: 1 = 1 (Not at all helpful); 2 = 2; 3 = 3; 4 = 4; 5 = 5 (Very helpful); 98 = Don't know]

[DISPLAY Q14 IF Q11a-b OR Q12a-b OR Q13a-b = 1 or 2]

14. Do you have any suggestions for how the information presented in the Scorecard could be improved?

    [OPEN]

15. The next few questions are about energy saving actions that you may have taken in your home.

    In the last 12 months, did you take any of the following actions to reduce energy use in your home? (Select all that apply) **[RANDOMIZE 1-12] [MULTISELECT]**

    1. Installed LED light bulbs
    2. Replaced the air filters for your air conditioner or heating system
    3. Changed computer stand-by energy use settings to reduce energy use
    4. Reduced air conditioner use by increasing the temperature setting in the summer
    5. Reduced heater use by decreasing the temperature setting in the winter
    6. Sealed air leaks in the home by installing weather stripping, caulking, and/or spray foam
    7. Turned down the water heater temperature
    8. Installed low-flow faucet aerators
    9. Purchased an ENERGY STAR air conditioner or heat pump
    10. Purchased an ENEGY STAR pool pump
    11. Purchased an ENERGY STAR refrigerator
    12. Make energy saving home improvements like adding insulation or sealing air leaks
    0. Have not taken any of these actions

16. Did you apply for an Entergy rebate for the following energy saving purchases that you mentioned?

    [SCALE: 1 = Yes ; 2 = No; 98 = Don't know]

    1. **[DISPLAY IF Q15 = 9]** Purchased an ENERGY STAR air conditioner or heat pump
    2. **[DISPLAY IF Q15 = 10]** Purchased an ENERGY STAR pool pump
    3. **[DISPLAY IF Q15 = 11]** Purchased an ENERGY STAR refrigerator
    4. **[DISPLAY IF Q15 = 12]** Make energy saving home improvements like adding insulation or sealing air leaks

[DISPLAY Q17 IF Q15 = 1]

17. Did you purchase any of those LED lightbulbs from one of the following retailers? (Select all that apply) [MULTISELECT]

    1.The Home Depot
    2.Costco Warehouse
    3.Dollar Tree
    4.Dollar General
    5.Lowes
    6. Walmart
    7.The Green Project
    8.Rouses Market
    9.Walgreens
    10.No, did not purchase LED light bulbs from these retailers
    98.Don't know

[DISPLAY Q18 IF Q17 = 1- 7]

18. About how many LED light bulbs did you purchase from those retailers in the past 12 months?

    1. [TEXT BOX]
    98. Don't know

19. Using the scale below, please indicate how much more or less often you do the following since you began receiving the Scorecard?

    [SCALE: 1 = 1 (A lot less often), 2 = 2 (Somewhat less often), 3 =3 (No change), 4 = 4 (Somewhat more often), 5 = 5 (A lot more often), 98 = Don't know] [RANDOMIZE LIST]

    a.Turn off lights in a room when it is unoccupied
    b.Use task lighting instead of overhead lighting
    c.Air dry clothes instead of using the dryer
    d.Wash clothes with cold water
    e.Run the clothes washer with a full load
    f.Close window shades or blinds in the daytime during the summer
    g.Close window shades or blinds in the nighttime during the winter
    h.Run the dishwasher with a full load
    i.Unplug electronics when not in use or done charging
    j.Unplug small appliances when not in use

[DISPLAY Q20 IF ANY IN Q19> 3 OR ANY SELECTED IN Q15= 1-15

20. What motivated you to save electricity in your home? (Select all that apply) [MULTISELECT]

    1.Reduce electricity costs / reduce electric bill
    2.Conservation / good for environment
    3.Make my usage more similar to my neighbors
    4.Improve the comfort of my home
    5. The information provided on my Scorecard
    6.Other (Please specify)
    98.Don't know

21. Using the scale below, how much did the Scorecard increase your knowledge of ways to save energy in your home?

    1. 1 (No increase)
    2. 2 (Little increase)
    3. 3 (Moderate increase)
    4. 4 (Large increase)
    98. Not sure

22. Do you think you receive too few, the right number, or too many Scorecards?

    1. Too few
    2. The right number
    3. Too many
    98. Don't know

[DISPLAY Q23 IF Q22 = 1 OR 3]

23. Ideally, how many scorecards would you like to receive each year?

24. How would you rate the overall visual display of the Energy Smart Scorecard?

    [SCALE: 1 = 1(Not at all visually appealing, 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Very visually appealing), 98 = Don't know]

25. Did you learn about other Energy Smart programs from your Scorecard?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q26 IF Q25 = 1]

26. What other Energy Smart programs did you learn about?

27. Using the scale below, how satisfied or dissatisfied are you with the Energy Smart Scorecard service overall?

    [SCALE: 1 = Very dissatisfied, 2 = Somewhat dissatisfied, 3 = Neither satisfied nor dissatisfied, 4 = Somewhat satisfied, 5 = Very satisfied, 98 = Don't know]

[DISPLAY Q28 IF Q26 = 1 OR 2]

28. Why are you dissatisfied?

    [OPEN TEXT]

29. Do you have any suggestions to help Entergy improve their Energy Smart Scorecard?

    [OPEN TEXT]

30. Using the scale below, how satisfied or dissatisfied would you say you are with Entergy as your electrical service provider?

    1. Very dissatisfied
    2. Somewhat dissatisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat satisfied
    5. Very satisfied
    98. Don't know

31. The next few questions are about this residence. These are anonymous and will be used solely for the purpose of combining different customers' responses. It is okay to not answer any of these questions.

    Which of the following best describes this residence?

    1. Single family detached home
    2. Townhome
    3. Duplex or Triplex
    3. Mobile or manufactured home
    4. Apartment building with 2-4 units
    5. Apartment building with 5-10 units
    6. Apartment building with more than 10 units
    98. Don't know/Prefer not to state

32. Do you own, rent, or own and rent your home?

    1. Own
    2. Rent
    3. Own and rent to someone else
    98. Don't know/Prefer not to state

33. Including yourself, how many people currently live in this residence year-round?

    1. 1
    2. 2
    3. 3
    4. 4
    5. 5
    6. 6
    7. 7
    8. 8 or more
    98. Don't know/Prefer not to state

34. Please indicate which range your total household income falls into. Is the total annual income of your household:

    1. Less than $10,000
    2. $10,000 to less than $20,000
    3. $20,000 to less than $30,000
    4. $30,000 to less than $40,000
    5. $40,000 to less than $50,000
    6. $50,000 to less than $75,000
    7. $75,000 to less than $100,000
    8. $100,000 to less than $150,000
    9. $150,000 to less than $200,000
    10. $200,000 or more
    98. Don't know/Prefer not to state

35. What's the highest level of education you've completed?

    1. Did not graduate high school
    2. High school graduate
    3. Associates degree, vocational/technical school, or some college
    4. Four-year college degree
    5. Graduate or professional degree
    98. Don't know/Prefer not to state

36. What type of heating system does this residence have?

    1. Natural gas heating
    2. Heat pump
    3. Electric furnace
    4. Combination of types (Please describe)
    5. Other (Please describe)
    98. Don't know/Prefer not to state

37. What type of water heater does this residence have?

    1. Natural gas water heater
    2. Electric water heater
    3. Other (Please describe)
    98. Don't know/Prefer not to state

38. We will select one survey respondent at random to win a $100 Amazon gift card. The gift card will be sent by postal mail to the winner.

    Please provide your name and the address where the gift card should be sent to if you are the selected winner.

    Name:
    Street Address:
    City:
    State:
    Zip code:

16.5 Energy Smart Nonresidential Participant Survey

1. Did your organization receive an incentive or discount through [UTILITY_SHORT]'s [PROGRAM_NAME] for [IMPLEMENTING] [MEASURE_Q1] at [LOCATION]?

    1. Yes
    2. No **[TERMINATE]**
    98. DON'T KNOW **[TERMINATE]**

2. Our records indicate you are the main contact for the energy efficiency project(s) completed at [LOCATION] in [YEAR].

    Several of the following questions are about your organization's decision to complete this project and participate in the program. Were you involved in the decision to complete this project?

    1. Yes, I was involved in the decision to complete the project
    2. No, I was involved in the project but not the decision to complete the project.
    3. No, I do not work for [ORGANIZATION] but provided services for the project.

[DISPLAY Q3 IF Q2=2 OR 3]

3. Could you please provide the name and contact information of the person most knowledgeable about the decision to complete this project?

    Contact name:
    Contact phone:
    Contact email:

[TERMINATE SURVEY IF Q2 = 2 OR 3]

4. What is your job title or role?

    1. Facilities Manager
    2. Energy Manager
    3. Other facilities management/maintenance position
    4. Chief Financial Officer
    5. Other financial/administrative position
    6. Proprietor/Owner
    7. President/CEO
    8. Manager
    9. Other (Specify)

5. How did you learn about [UTILITY_SHORT]'s [PROGRAM_NAME] Program incentives for efficient equipment or upgrades? **[RANDOMIZE 1- 10] [MULTISELECT]**

    1. From an [UTILITY_SHORT] Account Representative
    2. From a contractor/ program trade ally
    3. Friends or colleagues
    4. From Entergy's Energy Smart website
    5. Social media post (e.g., Facebook, Twitter, LinkedIn)
    6. From a [UTILITY_SHORT]'s customer service representative
    7. Through an internet search (e.g., online search engine)
    8. Through an internet advertisement
    9. At a trade show/event
    10. Direct mail
    11. Other (please explain)
    98. DON'T KNOW

6. Did you receive any technical services such as a facility assessment or other assistance with identifying and selecting equipment from an [PROGRAM_NAME] Program representative?

    1. Yes
    2. No
    98. DON'T KNOW

7. Not including the [MEASURE] project that you received a rebate or incentive for, has your organization completed any significant energy efficiency projects in the last three years?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q8 IF Q7 = 1]

8. Did you complete any of those projects without receiving a program incentive or rebate?

    1. Yes
    2. No
    98. DON'T KNOW

9. Now I would like to ask you some questions about your decision to [IMPLEMENT] the [MEASURE] at [LOCATION].

   In deciding to do a project of this type, there are usually a number of reasons why it may be undertaken. What were the reasons for doing this project?

   1. To replace old or outdated equipment
   2. As part of a planned remodeling, build-out, or expansion
   3. To gain more control over how the equipment was used
   4. The maintenance downtime and associated expenses for the old equipment were too high
   5. Had process problems and were seeking a solution
   6. To improve equipment performance
   7. To improve the product quality
   8. To comply with codes set by regulatory agencies
   9. To comply with organizational policies regarding regular/normal maintenance/replacement policy
   10. To get a rebate from the program
   11. To protect the environment
   12. To reduce energy costs
   13. To reduce energy use/power outages
   14. To update to the latest technology
   15. Other (Please specify)
   98. DON'T KNOW

10. Which of the following financial methods, if any, did your organization use to evaluate the energy efficiency project(s) that you completed? (Select all that apply) **[MULTI SELECT] [RANDOMIZE 1 – 4]**

    1. Initial Cost
    2. Simple payback
    3. Internal rate of return
    4. Life cycle cost
    5. Do not typically use financial methods to evaluate efficiency projects
    98. DON'T KNOW

[DISPLAY Q11 IF Q10 = 2]

11. What payback time did you target when assessing this project? Please enter the number of years and months.

    1. (#) Years
    2. (#) Months
    98. DON'T KNOW

[DISPLAY Q12 IF Q10 = 3]

12. What rate of return did you target when assessing this project?

    1. (Please specify)
    98. DON'T KNOW

13. Did you complete any energy efficient equipment or project similar to the [MEASURE] at the facility located at [ADDRESS] BEFORE participating in the [PROGRAM_NAME] Program?

    1. Yes
    2. No
    98. DON'T KNOW

14. Did you have plans to [IMPLEMENT] the [MEASURE] that you received an incentive for in [YEAR] before deciding to participate in the [PROGRAM_NAME] Program?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q15 IF Q14 = 1]

15. Would you have gone ahead with this planned project even if you had not received a rebate through [UTILITY_SHORT]'s program?

    1. Yes
    2. No
    98. DON'T KNOW

16. Did you have previous experience with the [PROGRAM_NAME] Program prior to [IMPLEMENTING] the [MEASURE] in [YEAR]?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q17 IF Q16 = 1]

17. How important was your previous experience with the program in making your decision to [IMPLEMENT] the [MEASURE] at your facility? Would you say that it was…

    1. Very important
    2. Somewhat important
    3. Only slightly important
    4. Not at all important
    98. DON'T KNOW

18. Did a [PROGRAM_NAME] representative or other [UTILITY_SHORT] representative recommend that you [IMPLEMENT] the [MEASURE] at your facility?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q19 IF Q6= 1]

19. Was the [MEASURE] project recommended through the technical support or facility assessment that your received?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q20 IF [Q18 = 1 OR Q19=1]

20. How likely is it that you would have [IMPLEMENTED] the [MEASURE] if it had not been recommended? Would you say that you…

    1. Definitely would have
    2. Probably would have
    3. Probably would not have
    4. Definitely would not have
    98. DON'T KNOW

21. Would you have been financially able to [IMPLEMENT] the [MEASURE] at your facility if the rebates from the [PROGRAM_NAME] Program were not available?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q22 IF Q21 = 2]

22. To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?

    1. Yes, that is correct.
    2. No, that is not correct.
    98. DON'T KNOW

[DISPLAY Q23 IF Q22 = 2]

23. What do you think your organization would have done if the financial incentive was not available from the program?

24. If the rebates from the [PROGRAM_NAME] Program had not been available, how likely is it that you would have [IMPLEMENTED] the [MEASURE] at your facility anyway? Would you say that you…

1 Definitely would have
2 Probably would have
3 Probably would not have
4 Definitely would not have
98. DON'T KNOW

[DISPLAY Q25 IF MEAS_QUANT >1]

25. We would like to know whether the availability of information and rebates through the [PROGRAM_NAME] Program affected the quantity (or number of units) of [MEASURE] that you [IMPLEMENT] at your facility.

Did you [IMPLEMENT] more [MEASURE] than you otherwise would have without the program?

1. Yes
2. No
98. DON'T KNOW

[DISPLAY Q26 IF Q25 = 1]

26. How many more units in percentage terms did you install because of the program? Your best guess is fine.

1. % more units of equipment
98. DON'T KNOW

[DISPLAY Q27 IF ENERGY_USING = 1]

27. We would like to know whether the availability of information and rebates through the [PROGRAM_NAME] Program affected the level of energy efficiency you chose for the [MEASURE2] at your facility.

Did you choose equipment that was more energy efficient than you would have chosen had you not participated in the program?

1. Yes
2. No
98. DON'T KNOW

[DISPLAY Q28 IF Q27 =1]

28. What type of equipment, if any, would you have installed if you had not participated in the program?

29. We would like to know whether the availability of information and rebates through the [PROGRAM_NAME] Program affected the timing of your [MEASURE] project at your facility.

    Did you [IMPLEMENT] the [MEASURE] earlier than you otherwise would have without the program?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q30 IF Q29 = 1]

30. When would you otherwise have [IMPLEMENTED] the [MEASURE]? Would you have done it …

    1 within 6 months
    2 7 months to 1 year
    3 more than 1 year up to 2 years
    4 more than 2 years up to 3 years
    5 more than 3 years up to 5 years
    6 More than 5 years
    98 DON'T KNOW

31. We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive or rebate for.

    Since participating in the [PROGRAM_NAME] Program has your organization installed any ADDITIONAL energy efficient equipment at this facility or another in the Entergy New Orleans or Entergy Algiers service territory without receiving an incentive or rebate?

    1. Yes
    2. No
    98. DON'T KNOW

[DISPLAY Q32 if Q31= 1]

32. What additional energy efficient equipment have you installed? **[MULTI SELECT]**

1. Lighting
2. Lighting controls or occupancy sensors
3. Unitary or split air conditioning system or chiller
4. ENERGY STAR Room air conditioners
5. Efficient motors
6. Refrigeration equipment (including LED case lighting)
7. Kitchen equipment
8. Something else [OPEN ENDED]

96. Didn't implement any measures [SKIP TO SATISFACTION]
98. Don't know [SKIP TO SATISFACTION]

[DISPLAY Q33 IF Q32= 1]

33. Why didn't you receive incentives for those items? **[MULTI SELECT RANDOMIZE ORDER, BUT FIX OTHER AND DON'T KNOW]**

1. Didn't know whether equipment qualified for financial incentives
2. Equipment did not qualify for financial incentives
3. Too much paperwork for the financial incentive application
4. Financial incentive was insufficient
5. Didn't have time to complete paperwork for financial incentive application
6. Didn't know about financial incentives until after equipment was purchased
7. We did receive an incentive **[SKIP TO FIRMOGRAPHICS]**
8. Other (Please specify) [OPEN ENDED]

98. Don't know

[DISPLAY Q34 IF Q32= 1]

34. Did you work with a contractor to install that efficient equipment or did your company's staff install the equipment?

1. Worked with a contractor
2. Company self-installed the equipment
3. Both

98. Don't know

[DISPLAY Q35 IF Q32 = 1]

35. What type of lighting did you install? **[MULTI-SELECT]**

1. T8 Fluorescent linear lamps – Single (1) lamps
2. T8 Fluorescent linear lamps – 2 lamp fixtures
3. T8 Fluorescent linear lamps – 4 lamp fixtures
4. T8 Fluorescent linear lamps – 6 lamp fixtures
5. T5 Fluorescent linear lamps – Single (1) lamps
6. T5 Fluorescent linear lamps – 2 lamp fixtures
7. T5 Fluorescent linear lamps – 4 lamp fixtures
8. T5 Fluorescent linear lamps – 6 lamp fixtures
9. LED Screw-in BAR/R/ER bulbs
10. LED Screw-in Interior PAR/MR bulbs
11. LED Screw-in omnidirectional A-line bulbs
12. LED 2-foot linear replacement lamps
13. LED 4-foot linear replacement lamps
14. LED exterior flood or spot luminaires
15. LED 1x4 panel or troffer
16. LED 2x2 panel or troffer
17. LED 2x4 panel or troffer
18. LED high-bay lighting
19. LED exit signs
20. Another type
98. Don’t know

[DISPLAY Q36 IF Q35 = 20]

36. What other type of lighting equipment did you install?

[TEXT BOX]

[REPEAT Q37 - Q40 FOR EACH TYPE SELECTED IN Q35]

37. How many [Q35 RESPONSE] did you install?

[TEXT BOX] Watts

38. What was the average wattage of the [Q35 RESPONSE]?

[TEXT BOX]

39. Were the [Q35 RESPONSE] installed inside a building, outside, or in a parking garage?

1. Inside
2. Outside
3. Parking garage
98. Don’t know

[DISPLAY Q40 IF Q39 = 1]

40. What type of building did you install the [Q35 RESPONSE] in?

1. Assembly
2. College
3. Fast food restaurant
4. Restaurant (not fast food)
5. Grocery
6. Health clinic
7. Large office
8. Lodging
9. Religious worship
10. Retail
11. Other (Please describe)
98. Don't know

[DISPLAY Q41 IF Q39 = 1]

41. Is the inside space heated, cooled, or both?

1. Heated
2. Cooled
3. Both
98. Don't know

42. What type of lighting did the [Q35 RESPONSE] replace?

1. T12s (linear fluorescents)
2. T8s (linear fluorescents)
3. Metal-halide / High-intensity discharge
4. Incandescent
5. **[DISPLAY IF Q35 = 9, 11, OR 12]** Compact fluorescent (CFL)
6. Something else [OPEN]
98. Don't know

43. What was the average wattage of the old lamps or bulbs?

44. How many of the old lamps or bulbs did you remove?

[DISPLAY Q45 IF Q35 = 20]

45. Did you install single-sided, double-sided, or both single and double-sided LED exit signs?

1. Single-sided exit signs
2. Double-sided exit signs
3. Both single and double-sided exit signs
98. Don't know

[DISPLAY Q46 IF Q45 = 1 OR Q45 = 3]

46. How many single-sided LED exit signs did you install?

[DISPLAY Q47 IF Q45 = 1 OR Q45 = 3]

47. How many double-sided LED exit signs did you install?

[DISPLAY Q48 IF Q45 = 98]

48. How many LED exit signs did you install?

[DISPLAY Q49 IF Q32 =1]

49. How important was your experience with the program in your decision to install this lighting equipment?

    [SCALE 0 "Not at all important" - 10 "Very important"]
    98. Don't know

[DISPLAY Q50 IF Q32 =1]

50. If you had NOT participated in the program, how likely is it that your organization would still have installed this lighting equipment?

    [SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"]
    98. Don't know

[DISPLAY Q51 IF [Q49=0,1,2,3 AND Q50=0,1,2,3]

OR IF [Q49=8,9,10 AND Q50=8,9,10]

51. You scored the importance of your program experience to your decision to implement additional lighting measures with [Q49 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing additional lighting measures if your organization had not participated in the program with [Q50 RESPONSE] out of 10 possible points.

Can you please explain the role the program made in your decision to implement this measure?

[DISPLAY Q52 IF Q32 = 2]

52. How many fixtures are being controlled by the lighting controls?

    [TEXT BOX]

[DISPLAY Q53 IF Q32 = 2]

53. On average, how many lamps or bulbs does each fixture contain?

    [TEXT BOX]

[DISPLAY Q54 IF Q32 = 2]

54. What is the average wattage of these lamps?

[TEXT BOX]

[DISPLAY Q55 IF Q32 = 2]

55. Are any of the lighting controls that you installed central time clock controls?

1. Yes
2. No

98. Don't know

[DISPLAY Q56 IF Q55 = 1]

56. How many of the fixtures are controlled by the central time clock?

[TEXT BOX]

[DISPLAY Q57 IF Q32 = 2]

57. What type of building did you install the lighting controls in?

1. Assembly
2. College
3. Fast food restaurant
4. Restaurant (not fast food)
5. Grocery
6. Health clinic
7. Large office
8. Lodging
9. Religious worship
10. Retail
11. Other (Please describe)

98. Don't know

[DISPLAY Q58 IF Q32 = 2]

58. How important was your experience with the program in your decision to install lighting controls?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q59 IF Q32 = 2]

59. If you had NOT participated in the program, how likely is it that your organization would still have installed lighting controls?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q60 IF [Q58=0,1,2,3 AND Q59=0,1,2,3]

OR [Q58=8,9,10 AND Q59=8,9,10]]

60. You scored the importance of your program experience to your decision to implement lighting controls with [Q58 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing lighting controls if your organization had not participated in the program with [Q59 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q61 IF Q32 = 3]

61. What types of energy efficient equipment did you install as part of the HVAC project? [MULTI SELECT]

1. Split air conditioning system (An A/C system that has an evaporator indoors and the compressor and condenser outdoors.)
2. Packaged air conditioning system (A type of central air conditioning that contains both the air handler fan, compressor and condenser in a single unit. These are typically mounted on the roof.)
3. Heat pump (An electric heating and cooling system)
4. Air cooled chiller (A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
5. Water cooled chiller (A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
6. Another type
98. Don't know

[DISPLAY Q62 IF Q61 = 6]

62. What other type of HVAC equipment did you install?

[TEXT BOX]

[REPEAT Q63 – Q64 FOR EACH SELECTED IN Q61]

63. We would like to know more about the rated efficiency and number of units of the [Q61 RESPONSE](s) that you installed.

For each level of efficiency of the equipment you installed, please provide the rated efficiency and the number of units.

64. What type of building did you install the heating/cooling equipment in?

1. Fast Food
2. Grocery
3. Health Clinic
4. Large Office
5. Lodging
6. Full Menu Restaurant
7. Retail
8. School
9. Small Office
10. University
11. Other (Please specify)
98. Don't know

[DISPLAY Q65 IF Q61 = 1-7]

65. How important was your experience with the program in your decision to install the energy efficient HVAC equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q66 IF Q61 = 1-7]

66. If you had NOT participated in the program, how likely is it that your organization would still have installed the energy efficient HVAC equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q67 IF [Q65=0,1,2,3 AND Q66=0,1,2,3] OR [Q65=8,9,10 AND Q66=8,9,10]]

67. You scored the importance of your program experience to your decision to implement energy efficient HVAC equipment with [Q65 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing the energy efficient HVAC equipment if your organization had not participated in the program with [Q66 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q68 IF Q32 = 4]

68. How many ENERGY STAR room air conditioners did you install?

[TEXT BOX]

[DISPLAY Q69 IF Q32 = 4]

69. What type of building did you install the heating/cooling equipment in?

1. Grocery
2. High School
3. Hospital
4. Light Industrial
5. Office - Large
6. Office - Small
7. Primary School
8. Religious Worship
9. Restaurant - Fast Food
10. Restaurant - Full Service
11. Retail - Big Box
12. Retail - Large
13. Retail - Small
14. University
15. Warehouse
16. Other
98. Don't know

[DISPLAY Q70 IF Q32 = 4]

70. How important was your experience with the program in your decision to install the heating/cooling equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q71 IF Q32 = 4]

71. If you had NOT participated in the program, how likely is it that your organization would still have installed the heating/cooling equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q72 IF [Q70=0,1,2,3 AND Q71=0,1,2,3] OR [Q70=8,9,10 AND Q71=8,9,10]]

72. You scored the importance of your program experience to your decision to install the energy efficient air conditioners with [Q70 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of installing the energy efficient air conditioners if your organization had not participated in the program with [Q71 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q73 IF Q32 = 5]

73. How many efficient motors did you install?

    [TEXT BOX]

[DISPLAY Q74 IF Q32 = 5]

74. What is the approximate average horsepower of the new motors? That is, what is the average across all of the motors you installed without an incentive?

    [TEXT BOX]

[DISPLAY Q75 IF Q32 = 5]

75. What is the approximate average efficiency of the new motors? That is, what is the average efficiency across all of the new motors?

    [TEXT BOX] Rated efficiency (%)

[DISPLAY Q76 IF Q32 = 5]

76. On average, how many hours per day do the motors operate? That is, what the average number of hours the motors you installed operate?

    [TEXT BOX] hours per day

[DISPLAY Q77 IF Q32 = 5]

77. How important was your experience with the program in your decision to install efficient motors?

    [SCALE 0 "Not at all important" - 10 "Very important"]
    98. Don't know

[DISPLAY Q78 IF Q32 = 5]

78. If you had NOT participated in the program, how likely is it that your organization would still have installed the efficient motors?

    [SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
    98. Don't know

[DISPLAY Q79 IF [Q77=0,1,2,3 AND Q78=0,1,2,3] OR [Q77=8,9,10 AND Q78=8,9,10]]

79. You scored the importance of your program experience to your decision to implement efficient motors with [Q77 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing the efficient motors if your organization had not participated in the program with [Q78 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

    [TEXT BOX]

[DISPLAY Q80 IF Q32 = 6]

80. What types of energy efficient refrigeration equipment did you install?

1. ENERGY STAR Commercial freezer
2. ENERGY STAR Commercial refrigerator
3. Anti-sweat heater controls
4. LED refrigerated case lighting
5. Refrigerated case covers
6. Some other type of refrigeration equipment

98. Don't know

[DISPLAY Q81 IF Q80 = 6]

81. What other type of energy efficient refrigeration equipment did you install?

[TEXT BOX]

[DISPLAY Q82 IF Q80 = 1]

82. How many ENERGY STAR commercial freezers did you install?

[TEXT BOX]

[DISPLAY Q83 IF Q82 = 1, REPEAT FOR EACH UP TO THREE TIMES]

83. What is the volume in cubic feet of the first freezer?

[TEXT BOX]

[DISPLAY Q84 IF Q82 = 1, REPEAT FOR EACH UP TO THREE TIMES]

84. Does this freezer have a solid door or a glass door?

1. Solid door
2. Glass door

98. Don't know

[DISPLAY Q85 IF Q82 = 1, REPEAT FOR EACH UP TO THREE TIMES]

85. Is this a vertical freezer or a chest type freezer?

1. Vertical
2. Chest

98. Don't know

[DISPLAY Q86 IF Q80 = 2]

86. How many ENERGY STAR commercial refrigerators did you install?

[TEXT BOX] refrigerators

[DISPLAY Q87 IF Q86 = 2, REPEAT FOR EACH UP TO THREE TIMES]

87. What is the volume in cubic feet of the first refrigerator?

[TEXT BOX] cubic feet

[DISPLAY Q88 IF Q86 = 2, REPEAT FOR EACH UP TO THREE TIMES]

88. Does this refrigerator have a solid door or a glass door?

1. Solid door
2. Glass door
98. Don't know

[DISPLAY Q89 IF Q86 = 2, REPEAT FOR EACH UP TO THREE TIMES]

89. Is this a vertical refrigerator or a chest type refrigerator?

1. Vertical
2. Chest
98. Don't know

[DISPLAY Q90 IF Q80 = 3]

90. Did you install humidity-based controls or conductivity-based controls, or both types?

1. Humidity-based controls
2. Conductivity-based controls
3. Both types
98. Don't know

[DISPLAY Q91 IF Q90= 1 OR 3]

91. How many humidity-based controls did you install?

[TEXT BOX]

[DISPLAY Q92 IF Q90= 1 OR 3]

92. What is the total number of freezer or refrigerator doors controlled by the humidity-based controls?

[TEXT BOX]

[DISPLAY Q93 IF Q90= 2 OR 3]

93. How many conductivity-based controls did you install?

[TEXT BOX]

[DISPLAY Q94 IF Q90= 2 OR 3]

94. What is the total number of freezer or refrigerator doors controlled by the conductivity-based controls?

[TEXT BOX]

[DISPLAY Q95 IF Q90 = 98]

95. How many anti-sweat heater controls did you install?

[TEXT BOX]

[DISPLAY Q96 IF Q90 = 98]

96. What is the total number of freezer or refrigerator doors controlled by the anti-sweat heater controls?

[TEXT BOX]

[DISPLAY Q97 IF Q80 = 4]

97. How many linear feet in total of LED case lighting did you install?

[TEXT BOX]

[DISPLAY Q98 IF Q80 = 5]

98. How many linear feet of refrigerated case covers did you install?

[TEXT BOX]

[DISPLAY Q99 IF Q32=6]

99. How important was your experience with the program in your decision to install the energy efficient refrigeration equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q100 IF Q32=6]

100. If you had NOT participated in the program, how likely is it that your organization would still have installed this energy efficient refrigeration equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q101 IF [Q99=0,1,2,3 AND Q100=0,1,2,3] AND [Q99=8,9,10 AND Q100=8,9,10]]

101. You scored the importance of your program experience to your decision to implement energy efficient refrigeration equipment with [Q99 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing energy efficient refrigeration equipment if your organization had not participated in the program with [Q100 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q102 IF Q32 = 7]

102. What type of kitchen equipment did you install?

1. Low flow pre-rinse spray valves
2. ENERGY STAR Commercial fryers
3. ENERGY STAR Commercial steam cookers
4. ENERGY STAR hot food holding cabinets
5. ENERGY STAR commercial griddles
6. ENERGY STAR commercial convection ovens
7. ENERGY STAR commercial combination ovens
8. Some other type of kitchen equipment

98. Don't know

[DISPLAY Q103 IF Q102 = 8]

103. What other type of kitchen equipment did you install?

[TEXT BOX]

[DISPLAY Q104 IF Q102 = 1]

104. Is the flow rate for any of the spray valves you installed equal to or less than 1.6 gallons per minute?

1. Yes
2. No

98. Don't know

[DISPLAY Q105 IF Q102 = 1]

105. How many pre-rinse spray valves with a flow rate equal to or less than 1.6 gallons per minute did you install?

[TEXT BOX]

[DISPLAY Q106 IF Q102 = 1]

106.Did you install the pre-rinse spray valves that the [LOCATION] location?

1. Yes
2. No
98. Don't know

[DISPLAY Q107 IF Q102 = 2]

107.How many ENERGY STAR commercial fryers did you install?

[TEXT BOX]

[DISPLAY Q108 IF Q102 = 3]

108.How many ENERGY STAR commercial steam cookers did you install?

1. Number of 3 pan steam cookers [NUMERIC]
2. Number of 4 pan steam cookers [NUMERIC]
3. Number of 5 pan steam cookers [NUMERIC]
4. Number of 6 pan steam cookers [NUMERIC]
98. Don't know

[DISPLAY Q109 IF Q102 = 4]

109.How many ENERGY STAR hot food holding cabinets did you install?

[TEXT BOX]

[DISPLAY Q110 IF Q102 = 5]

110.How many ENERGY STAR commercial griddles did you install?

[TEXT BOX]

[DISPLAY Q111 IF Q102 = 6]

111.How many ENERGY STAR commercial convection ovens did you install?

[TEXT BOX]

[DISPLAY Q112 IF Q102 = 7]

112.How many ENERGY STAR commercial combination ovens did you install?

[TEXT BOX]

[DISPLAY Q113 IF Q32= 1 AND Q102=1-8]

113. How important was your experience with the program in your decision to install this kitchen equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q114 IF Q32= 1 AND Q102=1-8]

114. If you had NOT participated in the program, how likely is it that your organization would still have installed this kitchen equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q101 IF [Q113=0,1,2,3 AND Q114=0,1,2,3] OR [Q113=8,9,10 AND Q114=8,9,10]]

You scored the importance of your program experience to your decision to implement energy efficient kitchen equipment with [Q113 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing energy efficient kitchen equipment if your organization had not participated in the program with [Q114 RESPONSE] out of 10 possible points.

115. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

116. Did you speak with an [PROGRAM_NAME] program staff person while completing your efficiency project?

1. Yes
2. No
98. DON'T KNOW
99. REFUSED

117. Using a scale of one to five, where one is "very dissatisfied", five is "very satisfied", please rate how satisfied or dissatisfied you are with each of the following ….**[ASK A AND B FIRST, ASK C – F IN RANDOM ORDER], ASK G AND H LAST]**

[RECORD 1 – 5]
98. DON'T KNOW

a. **[DISPLAY IF Q116=1]** …the [PROGRAM_NAME] staff member who assisted you with your project
b. **[DISPLAY IF Q6=1]** …the facility assessment or other technical services received from the [PROGRAM_NAME] staff person
c. …the amount of time it took to get the rebate or incentive after the completed application was submitted
d. …the range of equipment that qualifies for the program
e. …the steps you had to take to get through the program
f. …the contractor or trade ally that provided the service
g. …the energy efficiency improvement(s) you completed
h. …the program overall

[DISPLAY Q118 IF ANY IN Q117 <3]

118. You indicated some dissatisfaction. Why were you dissatisfied?

119. Using a scale of one to five, where one is "very dissatisfied", five is "very satisfied", and a please rate your level of satisfaction with [UTILITY_SHORT] as your electricity service provider?

[RECORD 1 – 5]

98. DON'T KNOW

120. Would you say that your participation in [UTILITY_SHORT]'s [PROGRAM_NAME] Program has:

1. Greatly increased your satisfaction with [UTILITY_SHORT]
2. Somewhat increased your satisfaction with [UTILITY_SHORT]
3. Did not affect your satisfaction with [UTILITY_SHORT]
4. Somewhat decreased your satisfaction with [UTILITY_SHORT]
5. Greatly decreased your satisfaction with [UTILITY_SHORT]

98. DON'T KNOW

121. Using a scale of 1 to 5, where 1 is very unlikely and 5 is very likely, how likely are you to:

a. …initiate another energy efficiency improvement in the next 12 months?
b. …recommend this program to others?

[RECORD 1 – 5]
97. ALREADY HAVE
98. DON'T KNOW

[DISPLAY Q122 IF ANY IN Q121A >3]

122. Would you like the Energy Smart Program team contact you about other energy efficiency opportunities?

1. Yes
2. No
98. DON'T KNOW

123. [UTILITY_SHORT] also offers programs to help its residential customers who live in New Orleans to save energy. Do you live in New Orleans and would you like the Energy Smart Program team to contact you about energy efficiency opportunities for residential customers?

1. Yes, I live in New Orleans and would like Energy Smart to contact me
2. No
98. Don't know

[DISPLAY Q124 IF Q123 = 1]

124. Please provide the contact information of the best person to contact about residential energy efficiency improvements in your home.

Name:
Telephone:
Email:

Thank you for your responses. There are just a few more questions about your facility.

125. Which best describes your facility at [LOCATION]? Would you say the facility is:

1. Your company's only location
2. One of several locations owned by your company
3. The headquarter location of a company with several locations
98. DON'T KNOW

126. Does your company rent or own and occupy, or own and rent the facility to someone else at this location?

1. Rent
2. Own and occupy
3. Own and rent to someone else
98. DON'T KNOW

127. Which of the following best describes how your organization is billed for electricity used at this location?

1. We are billed directly by [UTILITY_SHORT for the electricity we use
2. We are NOT billed directly by [UTILITY_SHORT] for the electricity we use. Our electric bill is handled by another part of our company or a third party service provider
3. We are NOT billed directly by [UTILITY_SHORT] for the electricity we use. The cost for our electricity is included in our rent/lease

98. DON'T KNOW

128. What type of business is at this location?

1. Assembly
2. College
3. Fast food restaurant
4. Restaurant (not fast food)
5. Grocery
6. Health clinic
7. Large office
8. Lodging
9. Religious worship
10. Retail
11. Other (Please describe)
98. Don't know

129. Please tell us more about your experience with the program and any suggestions for improvement.

130. Would your company be willing to participate in program marketing such as providing quotes about your experience to be used on the Energy Smart website or other materials?

1. Yes
2. No

98. DON'T KNOW

[DISPLAY Q131 IF Q130 = 1]

131. Please provide the contact information for the best person to contact about participating in program marketing?

Name:
Phone:
Email:

17. Appendix C: Behavioral Analysis Support

17.1 Propensity Score Matching

The Evaluators conducted propensity score matching for each of the three groups to attempt to create a post-hoc control group that is statistically similar in pre-period usage to the treatment group. Propensity score matching allows the Evaluators to calculate nonparticipant households' propensity or likeliness to participate in the program based on their seasonal pre-period usage. The Evaluators attempted several different matching methods available, but none were able to provide a statistically valid match on all 12 pre-period months between the treatment and control groups for each the Initial, Second, and Third groups. The following sections detail the methodology and results of propensity score matching for each group.

17.1.1 Methodology

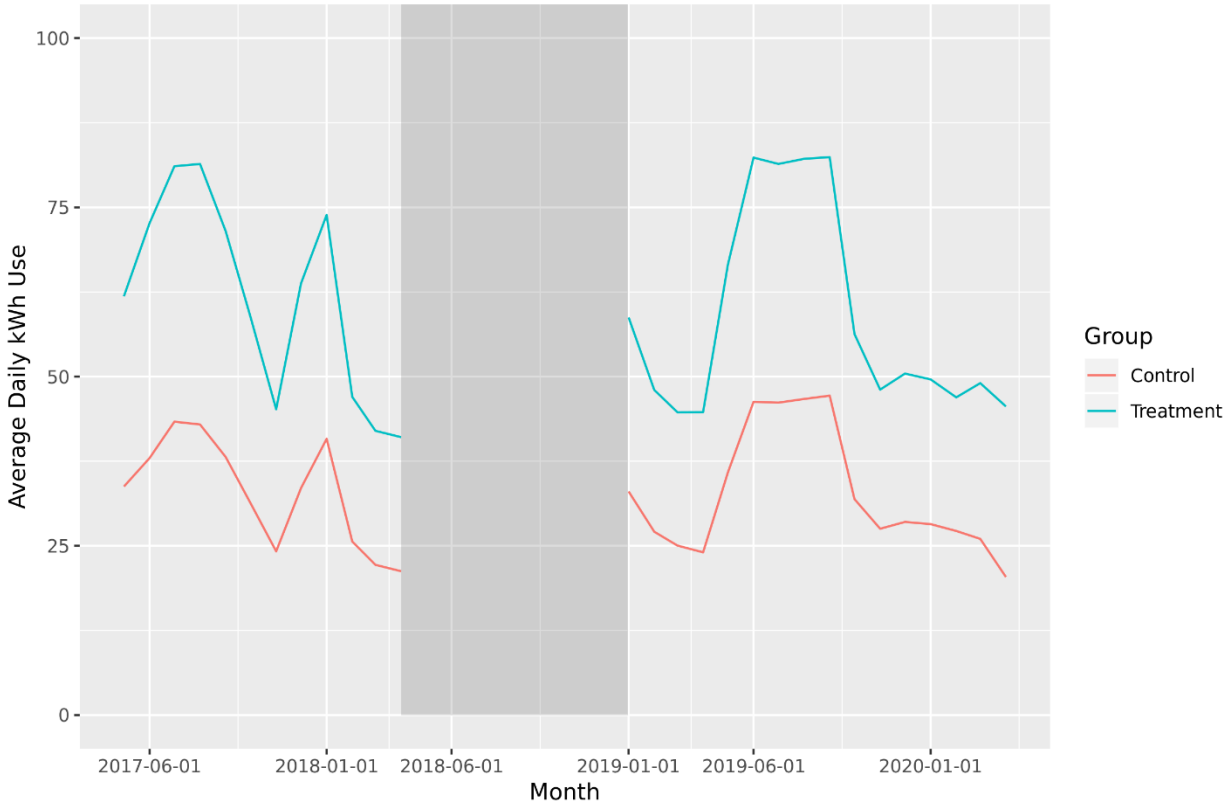
AI provided 265,987 unique nonparticipant household billing data. The billing data ranged between the same dates provided for the participant household billing data. The Evaluators employed the same billing cleaning methods on this dataset, to employ in propensity score matching for each of the Initial, Second, and Third group.

In order to employ propensity score matching, the Evaluators first calculated pre-period seasonal usage based on the 12 pre-period months immediately previous to the intervention date for the treatment and control group for all three groups. The Evaluators then employed a propensity score matching package "MatchIt" in the open software R. Several different methods of matching were employed, including changing the ratio of customers to which a single treatment customer was matched (i.e. two control customers matched to one treatment customer, or one control customer matched to one treatment customer), as well as the algorithm in which it is matched (k-nearest neighbors or optimal matching). However, t-tests following the PSM revealed that the nearest matches were still statistically similar to the treatment group. The following sections summarize the propensity score matching and t-tests for each of the three groups.

17.1.2 Initial Group

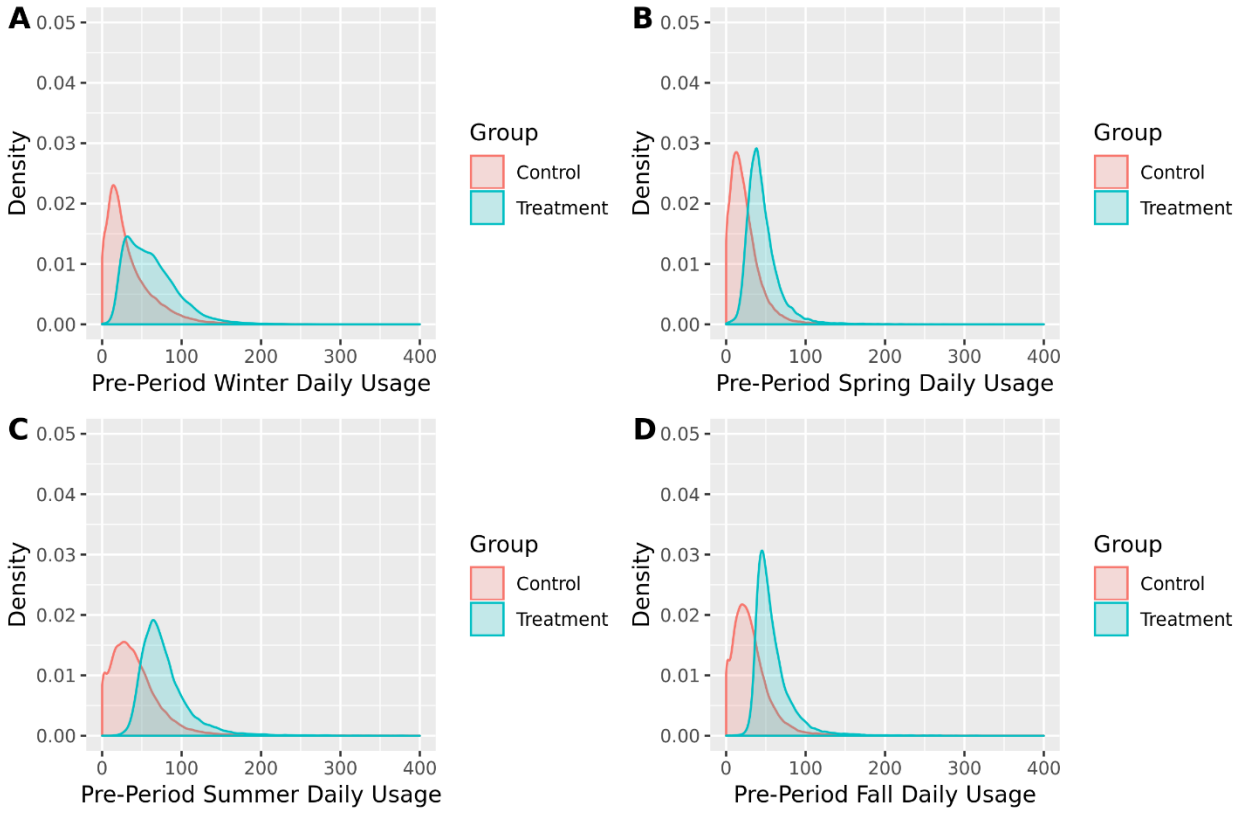
The Initial group comprised of some of the highest energy users in the territory. This is demonstrated in the figure below, comparing the treatment group's average daily electric usage to the available nonparticipant (control) group average daily electric usage. The gray bar in the middle defines the period of months discarded from analysis (the months occurring after the intervention date, but before January 1, 2019), and separates the pre-period and the post-period.

Figure 17-1 Initial Group Average Participant and Nonparticipant Usage



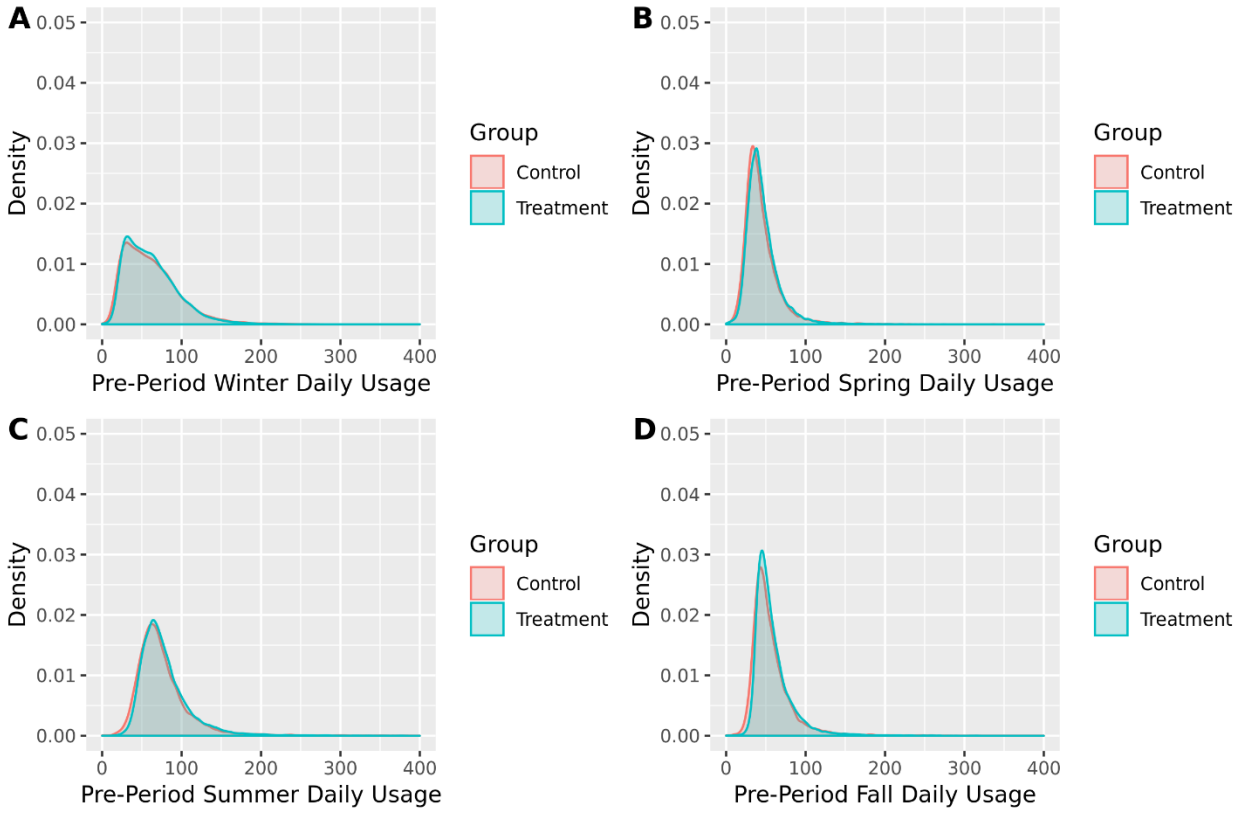
The following figure displays the density of average daily usage for each of the four seasons in the pre-period between groups before PSM. The difference in the peak density curves signifies that the majority of customers display different average daily usage. The customers that exist in the area where the two curves overlap signify potential matches.

Figure 17-2 Initial Group Seasonal Participant and Nonparticipant Density Curves Before PSM



The following figure displays the density of average daily usage for each of the four seasons in the pre-period between groups after PSM. The curves are now much more overlapped, displaying that the matched control group is closer in average seasonal usage to the treatment group than before matching.

Figure 17-3 Initial Group Seasonal Participant and Nonparticipant Density Curves After PSM



Although the seasonal curves are much more similar between groups, a monthly t-test is necessary to test if the treatment and control groups are statistically similar at the 95% confidence interval. The table below displays the average daily kWh usage between the treatment group and the matched control group for each of the 12 pre-period months, as well as difference between average daily usage between the groups, and the p-value from the t-tests. P-values lower than 0.05 display statistically significant differences between usage in the groups, and therefore the group is rejected. The Initial group rejected five out of the 12 pre-period months after PSM.

Table 17-1 Initial Group PSM Monthly Pre-Period T-Test

Month-Year	Control Mean	Treatment Mean	Difference	PR > T	Reject Null Hypothesis
May-17	59.27	61.87	-2.60	1.02E-08	*
Jun-17	71.83	72.66	-0.83	2.15E-02	*
Jul-17	80.34	81.06	-0.72	6.62E-02	-
Aug-17	80.71	81.38	-0.67	9.00E-02	-
Sep-17	70.42	71.45	-1.03	4.43E-03	*
Oct-17	58.27	58.78	-0.51	1.07E-01	-
Nov-17	45.20	45.16	0.04	8.70E-01	-
Dec-17	64.43	63.74	0.69	1.18E-01	-
Jan-18	77.27	73.87	3.41	2.31E-09	*
Feb-18	48.25	46.98	1.27	1.63E-05	*
Mar-18	42.11	41.98	0.12	6.00E-01	-
Apr-18	41.17	41.05	0.13	6.61E-01	-
*statistically significant if p<0.05					

After PSM matching, the matched control group was still not a valid match in terms of pre-period usage. Therefore, the Evaluators were unable to use the matched control group in a regression analysis for the Initial group, and instead used the remaining RCT control group of 1,825 control customers in the PPR model, as that group was still a valid match as displayed by t-tests.

17.1.3 Second Group

The Second group PSM efforts also resulted in significant differences between the treatment group and matched control group, even though the Evaluators employed several methods for matching. The results are displayed below.

The Second treatment group displayed lower average daily usage than the Initial group, and the available nonparticipant households displayed similar usage, although slightly higher than the treatment group.

Figure 17-4 Second Group Average Participant and Nonparticipant Usage

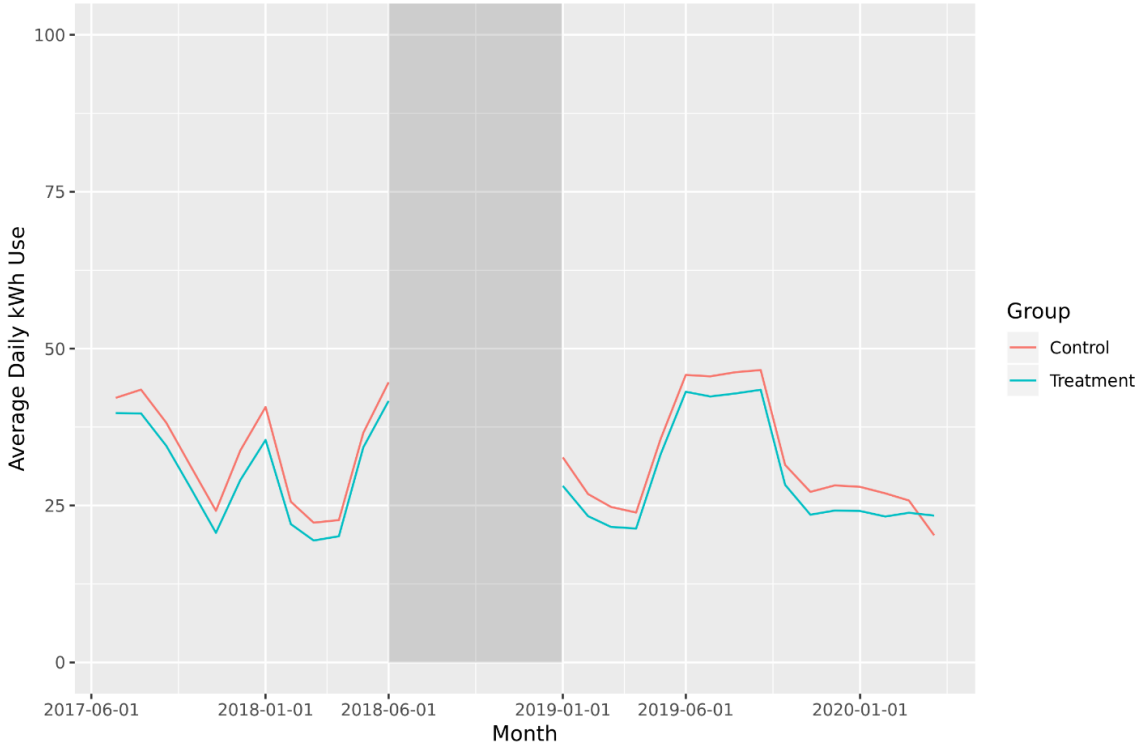


Figure 17-5 Second Group Seasonal Participant and Nonparticipant Density Curves Before PSM

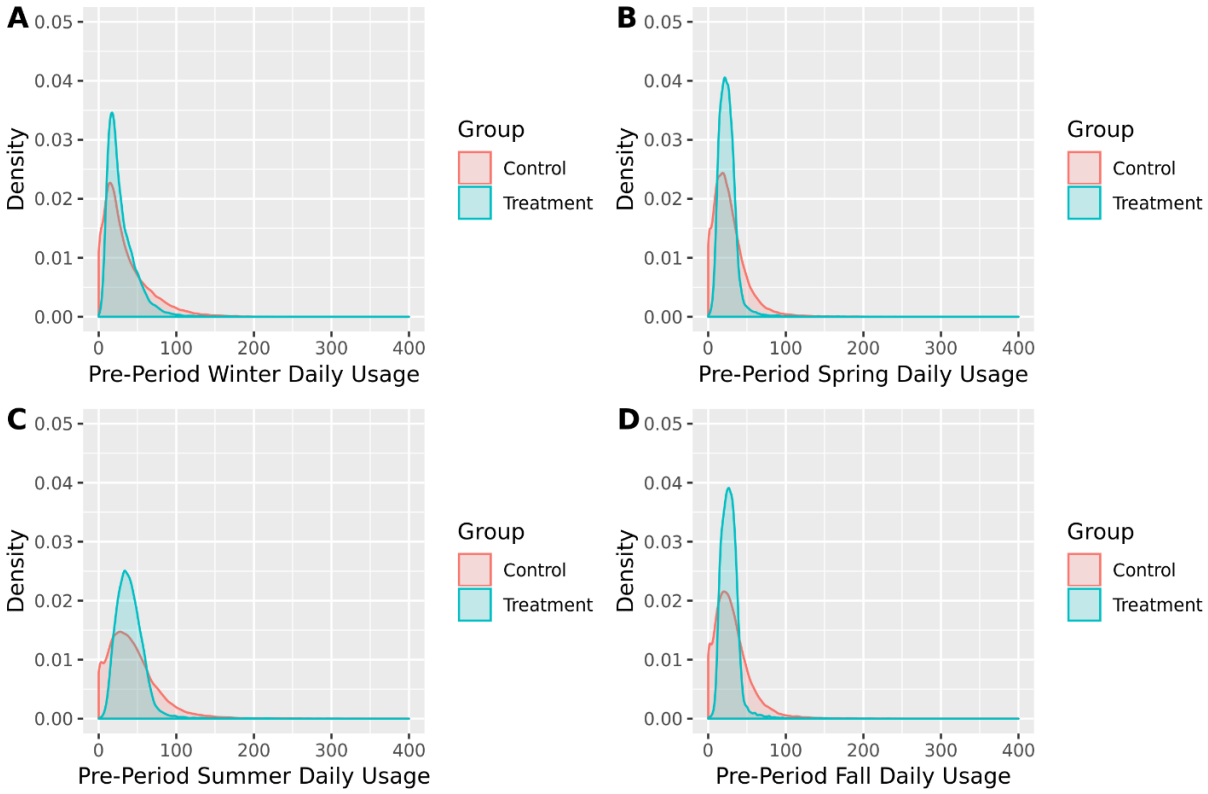


Figure 17-6 Second Group Seasonal Participant and Nonparticipant Density Curves After PSM

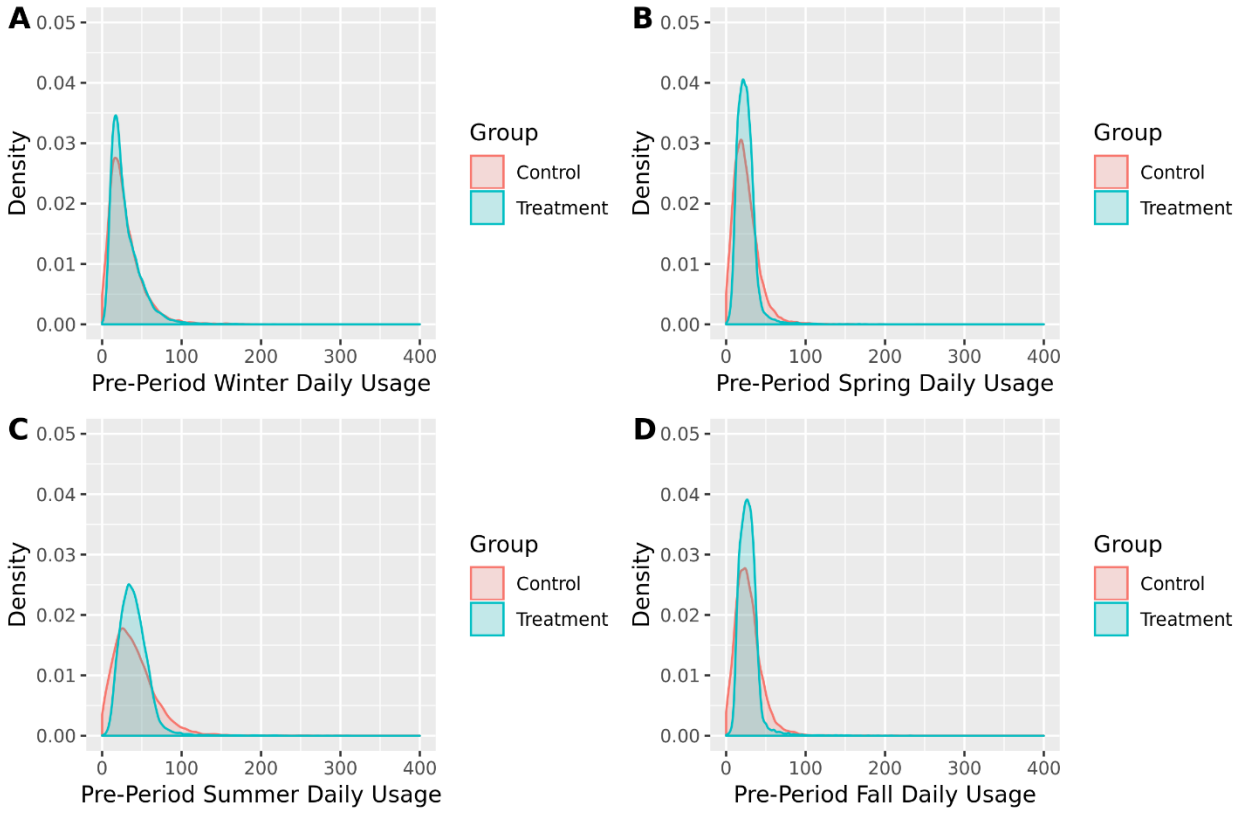


Table 17-2: Second Group PSM Monthly Pre-Period T-Test

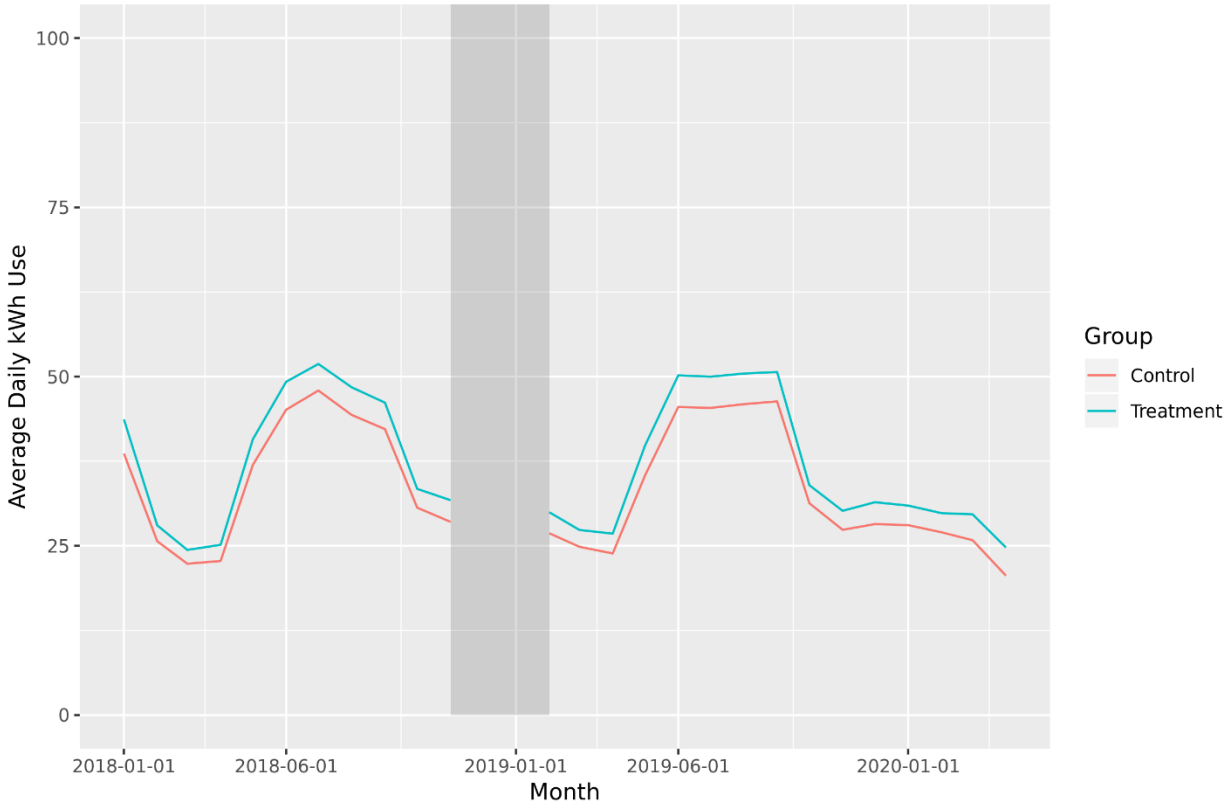
Month-Year	Control Mean	Treatment Mean	Difference	PR > T	Reject Null Hypothesis
Jul-17	37.16	39.73	-2.57	2.28E-01	-
Aug-17	40.31	39.67	0.64	1.10E-02	*
Sep-17	35.08	34.52	0.56	9.29E-03	*
Oct-17	28.25	27.77	0.48	4.74E-03	*
Nov-17	20.67	20.65	0.02	8.80E-01	-
Dec-17	28.33	29.07	-0.73	1.33E-03	*
Jan-18	34.34	35.45	-1.11	1.59E-04	*
Feb-18	22.18	22.03	0.15	3.24E-01	-
Mar-18	19.59	19.42	0.17	1.69E-01	-
Apr-18	20.19	20.10	0.09	4.99E-01	-
May-18	33.68	34.27	-0.59	6.52E-03	*
Jun-18	41.71	41.66	0.05	8.44E-01	-
*statistically significant if p<0.05					

The matched control group for the Second group rejected six of the 12 pre-period months and therefore were not used in PPR modeling. The Evaluators instead employed a treatment-only model, as no valid control group was available for regression.

17.1.4 Third Group

The Third group also displayed similar usage between the participant and nonparticipant groups. However, the treatment group displayed slightly higher average usage.

Figure 17-7 Third Group Average Participant and Nonparticipant Usage



The Third group participant and nonparticipant groups displayed similar seasonal usage, as displayed in the figure below. PSM was still employed despite these similarities, in efforts to select the closest match.

Figure 17-8 Third Group Seasonal Participant and Nonparticipant Density Curves Before PSM

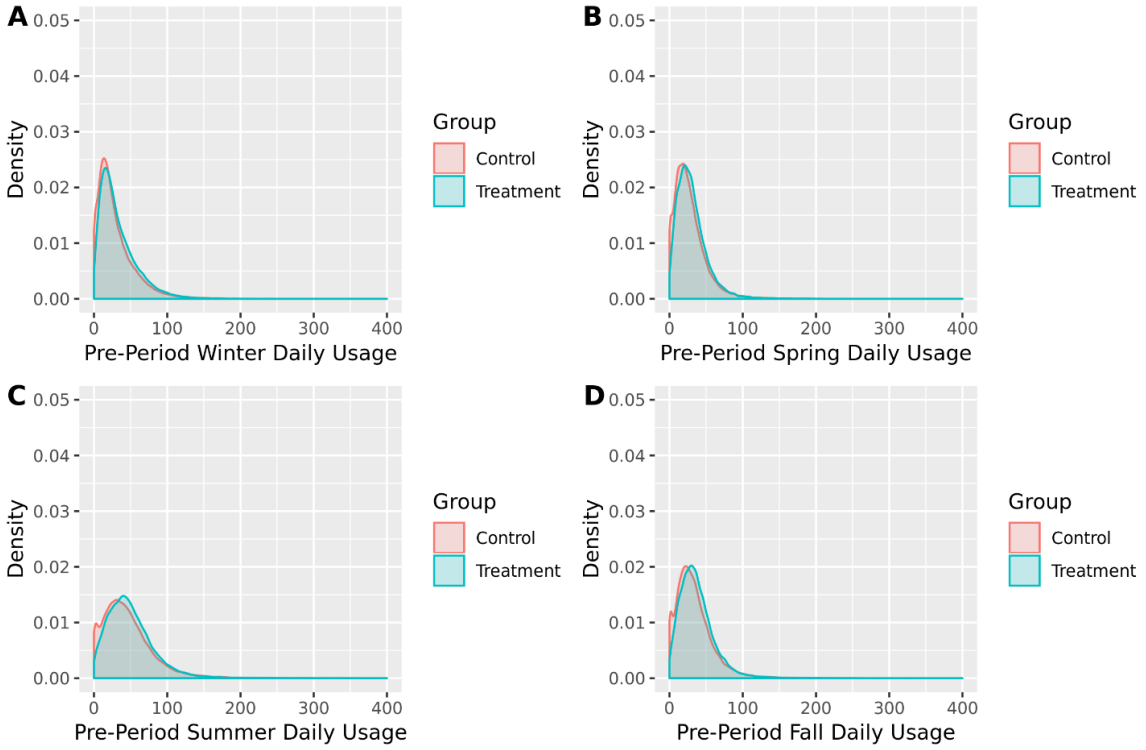


Figure 17-9 Third Group Seasonal Participant and Nonparticipant Density Curves After PSM

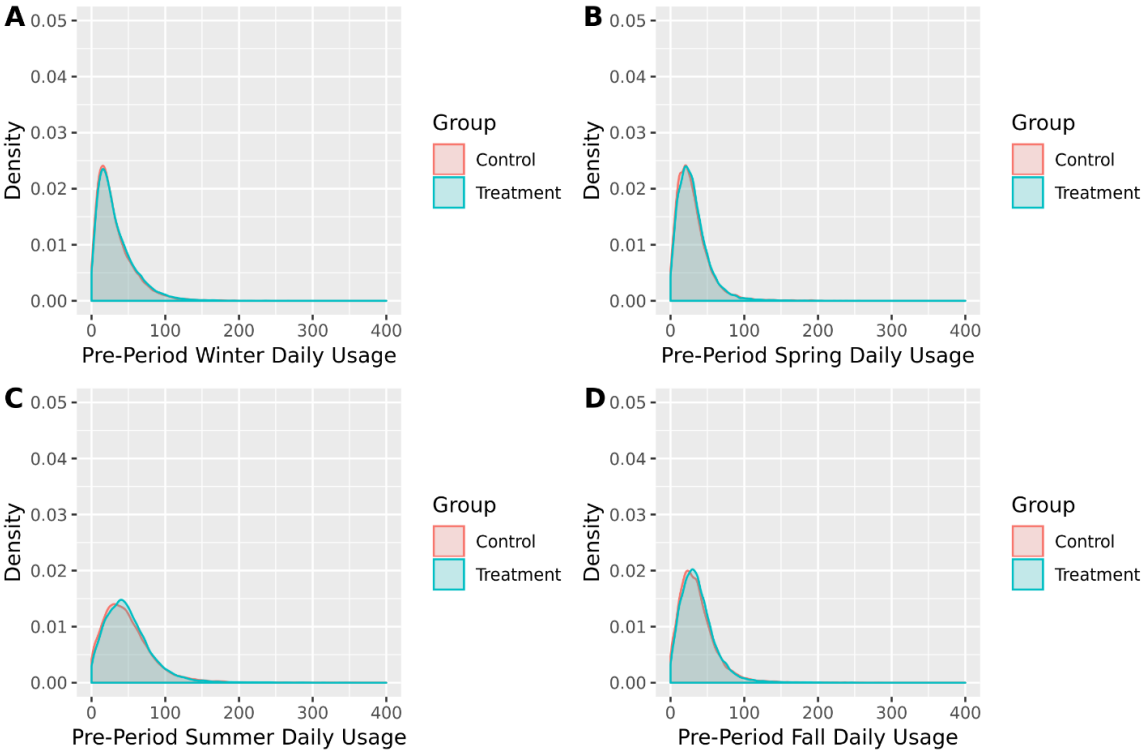


Table 17-3: Third Group PSM Monthly Pre-Period T-Test

Month-Year	Control Mean	Treatment Mean	Difference	PR > T	Reject Null Hypothesis
Jan-18	43.18	43.67	-0.49	2.48E-01	-
Feb-18	28.69	28.02	0.67	5.70E-05	*
Mar-18	24.87	24.38	0.50	2.62E-04	*
Apr-18	25.27	25.14	0.13	3.73E-01	-
May-18	40.71	40.73	-0.02	9.24E-01	-
Jun-18	49.50	49.22	0.28	2.77E-01	-
Jul-18	52.52	51.85	0.67	1.16E-02	*
Aug-18	48.60	48.40	0.20	4.28E-01	-
Sep-18	46.31	46.14	0.17	4.66E-01	-
Oct-18	33.67	33.40	0.27	1.33E-01	-
Nov-18	31.89	31.73	0.16	3.90E-01	-
Dec-18	32.94	32.28	0.66	3.50E-02	*
*statistically significant if p<0.05					

T-tests revealed that the matched control group was still not statistically similar to the treatment group, as four of the 12 pre-period months were rejected. The Evaluators therefore employed a treatment-only model, as no valid control group was available for this group.

17.2 Appendix B: Double Counting Analysis

To avoid double-counting of savings, program savings from other energy efficiency programs due to Scorecard participation must be counted toward either the Scorecard program or the other energy efficiency programs but not both. The double-counted savings, positive or negative, are subtracted from the net savings estimates from the regression analysis to get total verified savings.

Customer ID and address fields were used to identify Scorecard treatment and control participants who had also enrolled in the Home Performance with ENERGY STAR (HPwES) and Low-Income Qualified Weatherization (LIW), Energy Smart AC Tune-up (Tune-up), Energy Smart Multifamily (MF) and Energy Smart Residential Lighting and Appliances (L&A)[80] programs. These programs savings were categorized as: Appliances, Building Shell, Direct Install, HVAC, Lighting, and Water Heating.

17.2.1 Double Counting Adjustment Factor

As stated above, an adjustment factor was also used to calculate would-be control Other Program savings for the Second group and Third Group.

The following table demonstrates the calculation of the double counting adjustment factor:

Table 17-4 Treatment-Only Model Adjustment Factor

Term	*Algiers*	*New Orleans*
Initial Group Control Group Other Program Savings	15	45
Initial Group Treatment Group Other Program Savings	74	114
Adjustment Factor	0.2019	0.3922

17.2.2 Double Counting Results

Table 17-5 details the 2018 and 2019 other program savings. The double counting savings are higher than before because it includes both the 2018 and 2018 program years, in order to net out any installed measures that were installed between the pre-period and the post-period. Each measure installed during the 2018 program year was assigned one full year of savings. The measures installed during the 2019 program year were normalized to the number of days since the install date, and for HVAC measures, normalized to the number of heating degree days since install, as a proportion of the annual heating degree days in the typical meteorological year (TMY).

The adjustment factor above was applied to simulate a control group's other program savings for the Second and Third groups. The double counting savings are separated by Algiers and New Orleans territory, and then aggregated by group. In 2019, HVAC aggregated savings were the highest of all measure types.

[80] This analysis includes appliances rebated in this program but does not include lighting from upstream rebates.

Table 17-5: PY8 Other Program Savings (kWh) by Group and Treatment Status

Measurement Type	Initial Group		Second Group		Third Group	
	Control	Treatment	Control	Treatment	Control	Treatment
Appliances	56	4,822	0	2,236	0	3,832
Building Shell	3,949	243,415	0	158,395	0	499,118
Direct Install	2,945	94,356	0	57,823	0	144,044
HVAC	38,599	1,528,800	0	533,901	0	1,553,534
Lighting	7,394	224,165	0	119,986	0	331,710
Water Heating	0	1,384	0	0	0	1,561
Total	**52,942**	**2,096,941**	**0**	**872,342**	**0**	**2,533,800**

Table 17-6: PY9 Other Program Savings (kWh) by Group and Treatment Status

Measurement Type	Initial Group		Second Group		Third Group	
	Control	Treatment	Control	Treatment	Control	Treatment
Appliances	0	1,119	0	621	0	4,536
Building Shell	0	108,749	0	21,129	0	111,332
Direct Install	3,597	157,412	0	118,351	0	274,608
HVAC	15,310	358,441	0	178,832	0	536,993
Lighting	4,056	109,410	0	59,038	0	146,126
Water Heating	0	684	0	0	0	4,394
Total	**22,963**	**735,814**	**0**	**377,972**	**0**	**1,077,988**

By participation, lighting had the highest number of treatment and control customers across all Groups in PY8 and direct install had the highest number of treatment and control customers across all Groups in PY9 as detailed in Table 17-7.

Table 17-7: PY8 Other Program Participants by Group and Treatment Status

Measurement Type	Initial Group		Second Group		Third Group	
	Control	Treatment	Control	Treatment	Control	Treatment
Appliances	1	19	0	8	0	36
Building Shell	4	85	0	37	0	124
Direct Install	19	841	0	630	0	1,362
HVAC	14	436	0	209	0	512
Lighting	23	931	0	682	0	1,502
Water Heating	0	1	0	0	0	3
Total	**61**	**2,313**	**0**	**1,566**	**0**	**3,539**

Table 17-8: PY9 Other Program Participants by Group and Treatment Status

Measurement Type	Initial Group		Second Group		December Group	
	Control	Treatment	Control	Treatment	Control	Treatment
Appliances	0	16	0	10	0	30
Building Shell	0	28	0	8	0	35
Direct Install	21	885	0	690	0	1,582
HVAC	7	222	0	134	0	352
Lighting	7	186	0	110	0	286
Water Heating	0	2	0	0	0	8
Total	**35**	**1,339**	**0**	**952**	**0**	**2,293**

Table 17-9 and Table 17-10: New Orleans Double Counting Calculation details the double counting calculations of the 2018 and 2019 program years for the one full annual PY9. The adjustment factors listed above were multiplied to the Second and Third group treatment group kWh per customer. The difference between the product of that calculation and the treatment group kWh per customer was extrapolated by the total weighted number of treatment customers in the post-period.

Table 17-9: Algiers Double Counting Calculation

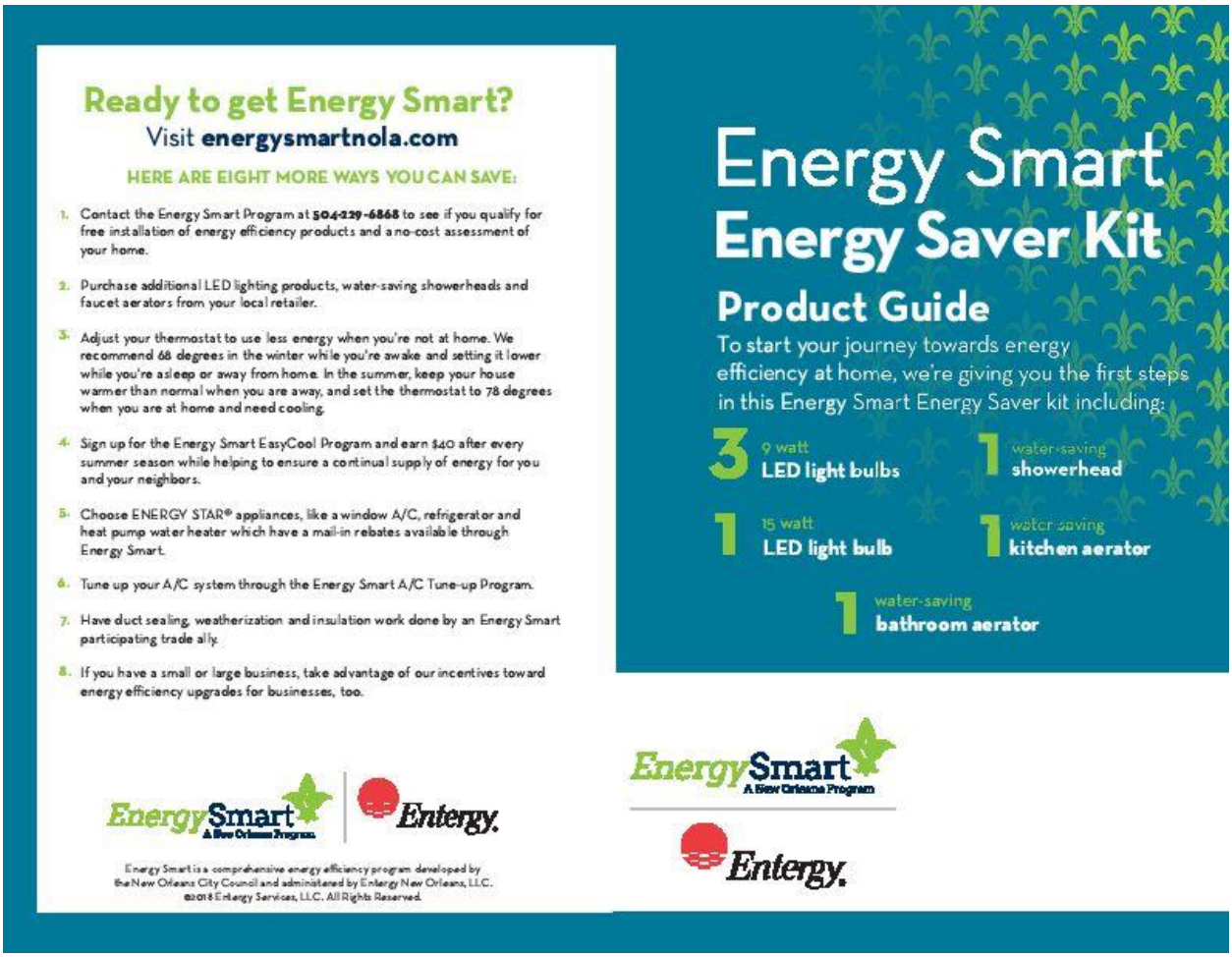
Group		Total Double counting	# Accounts	Avg. Double Counting (kWh per customer)	Total Weighted Customers	MWh
Initial	Control	2,771	186	14.90	-	-
	Treatment	266,427	3,612	73.76	3,081	181.36
Second	Control	-	-	8.93	-	-
	Treatment	119,186	2,696	44.21	2,225	78.50
Third	Control	-	-	8.93	-	-
	Treatment	233,534	6,550	44.21	5,670	161.33

Table 17-10: New Orleans Double Counting Calculation

Group		Total Double counting	# Accounts	Avg. Double Counting (kWh per customer)	Total Weighted Customers	MWh
Initial	Control	73,134	1,639	44.62	-	-
	Treatment	2,566,329	22,557	113.77	18,260	1,262.67
Second	Control	-	-	19.85	-	-
	Treatment	1,131,128	22,349	50.61	17,787	547.16
Third	Control	-	-	19.85	-	-
	Treatment	3,378,254	54,829	50.61	45,251	1,694.61

Double counting savings for the extended program year were calculated by multiplying the per-household differences above by the total weighted number of customers for the extended program year.

18. Appendix D: Energy Smart Energy Saver Kit Product Guide



WHAT IS ENERGY SMART?

Energy Smart helps conserve the amount of energy (from electricity and water) we use at home and at businesses throughout our communities. The small amounts saved add up quickly, as well as help the environment. You can start saving immediately with these complimentary items in your Energy Smart Energy Saver Kit.

Congratulations

You took the first step on your energy efficiency journey with the Energy Smart Energy Saver Kit Program. You've cut down on your energy use and started lowering your energy costs. So why stop now? Call **504-229-6868** to schedule your assessment.

Questions?

For more information, visit **energysmartnola.com**, call **504-229-6868** or email **info@energysmartnola.com.**

And make sure to tell your friends and family that are Entergy New Orleans customers about these energy-saving options.

EnergySmart A New Orleans Program | Entergy.

LED LIGHT BULBS

Light-emitting diodes, or LEDs, are another great energy saving light source. These bulbs can last for up to 25,000 hours, 15 times longer than incandescents. Standard incandescents use up to 80 percent more energy than energy-efficient LED light bulbs.

WATER-SAVING SHOWERHEAD

A **water-saving showerhead** can save energy by using up to 75 percent less water than most standard showerheads. It provides a powerful, flow rate regardless of water pressure and helps reduce water use in a big way.

WATER-SAVING AERATORS

These **aerators** can be installed on most kitchen and bathroom sink faucets in order to save water and energy. They produce powerful streams of water at a reduced flow rate, regardless of available water pressure. Plus, there's an additional bonus: less energy is required to heat hot water.

19. Appendix E: 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.

19.1 Cost Effectiveness Summary

This appendix covers all verified electricity and peak demand savings, and associated program costs incurred in the implementation of the Companies' PY9 energy efficiency portfolio.

The cost-effectiveness of the Companies' PY9 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.[81]

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)[82] 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 PY9, the Companies' overall portfolio is cost-effective based on both the UCT and TRC.

[81] 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

[82] The UCT is also referred to as the Program Administrator Cost Test (PACT).

Table 19-1 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	590.36	2,538,456	$2,485,123	2.24	2.06
LIA&Wx	560.97	2,105,784			
Multifamily	294.55	1,184,526			
Green Light Direct Install	7.43	35,943			
Retail Lighting and Appliances	976.82	4,719,481	$578,297	6.98	4.48
High Efficiency Tune-Up	754.10	2,158,495	$517,370	4.65	4.12
Energy Smart School Kits	115.41	723,047	$430,052	0.79	0.73
Scorecard Behavioral	1,856.83	9,848,470	$305,344	2.07	2.07
Direct Load Control	3,699.77	0	$853,033	0.26	0.21
Small Commercial Solutions	837.87	7,396,935	$1,842,329	1.91	2.27
Large C&I	2,000.15	23,165,965	$5,419,306	1.89	2.27
Publicly Funded Institutions	53.15	3,041,930	$909,328	1.18	1.46
Total	**11,747.41**	**56,919,032**	**$13,340,182**	**2.01**	**2.16**

Table 19-2 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	115.19	485,807	$199,812	3.65	3.37
LIA&Wx	59.37	203,350			
Multifamily	12.32	59,984			
Green Light Direct Install	1.25	6,041			
Retail Lighting and Appliances	52.93	255,334	$45,418	4.15	2.72
High Efficiency Tune-Up	98.40	269,790	$46,166	6.49	5.83
Energy Smart School Kits	23.85	149,420	$107,512	0.66	0.60
Scorecard Behavioral	312.41	1,598,066	$44,118	2.34	2.34
Direct Load Control	374.53	0	$65,107	0.34	0.28
Small Commercial Solutions	55.97	458,855	$189,481	1.19	1.39
Large C&I	51.07	991,136	$292,397	1.51	1.69
Publicly Funded Institutions	6.85	231,510	$83,527	1.01	1.24
Total	**1,164.14**	**4,709,293**	**$1,073,538**	**1.92**	**1.97**

19.2 Energy Efficiency Program Results

The Companies' energy efficiency portfolio in PY9 consisted of twelve programs. Total spending in PY9 equaled $13,340,182 for ENO and $1,073,538 for Algiers ($14,413,720 overall).

19.2.1 Home Performance with ENERGY STAR / LIA&Wx / Multifamily/Green Light NOLA

These programs are filed in aggregate and are combined for cost-effectiveness testing.

Table 19-3 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	**2.06**	**2.24**	**0.64**	**2.86**	**6.27**
Total Benefits	$5,129,085	$5,129,085	$5,129,085	$6,540,637	$7,554,604
Total Costs	$2,485,123	$2,284,773	$8,054,198	$2,284,773	$1,204,628

Table 19-4 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	**3.37**	**3.65**	**0.73**	**0.00**	**9.97**
Total Benefits	$673,996	$673,996	$673,996	$0	$904,577
Total Costs	$199,812	$184,561	$922,908	$0	$90,696

19.2.2 Lighting & Appliances

Table 19-5 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	**4.48**	**6.98**	**0.47**	**9.24**	**37.45**
Total Benefits	$2,591,824	$2,591,824	$2,591,824	$3,427,614	$5,963,139
Total Costs	$578,297	$371,110	$5,566,867	$371,110	$159,248

Table 19-6 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	**2.72**	**4.15**	**0.39**	**0.00**	**27.57**
Total Benefits	$123,705	$123,705	$123,705	$0	$329,969
Total Costs	$45,418	$29,791	$314,975	$0	$11,969

19.2.3 Residential Heating & Cooling

Table 19-7 HETU 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	**4.12**	**4.65**	**0.86**	**5.87**	**9.32**
Total Benefits	$2,130,568	$2,130,568	$2,130,568	$2,690,352	$2,499,029
Total Costs	$517,370	$458,506	$2,490,950	$458,506	$268,047

Table 19-8 HETU Benefit/Cost Tests - Algiers

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost Test	Participant Cost Test
Benefit/Cost Ratio	**5.83**	**6.49**	**0.93**	**0.00**	**14.52**
Total Benefits	$269,339	$269,339	$269,339	$0	$293,840
Total Costs	$46,166	$41,508	$290,754	$0	$20,239

19.2.4 School Kits & Education

Table 19-9 SK&E 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	**0.73**	**0.79**	**0.29**	**0.98**	**13.39**
Total Benefits	$313,551	$313,551	$313,551	$386,107	$803,884
Total Costs	$430,052	$394,867	$1,073,843	$394,867	$60,015

Table 19-10 SK&E Benefit/Cost Tests - Algiers

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost Test	Participant Cost Test
Benefit/Cost Ratio	**0.60**	**0.66**	**0.27**	**0.00**	**11.35**
Total Benefits	$64,796	$64,796	$64,796	$0	$170,252
Total Costs	$107,512	$98,716	$240,554	$0	$15,004

19.2.5 Scorecard Behavioral

Table 19-11 Scorecard Behavioral 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	**2.07**	**2.07**	**0.53**	**2.07**	**0.00**
Total Benefits	$632,517	$632,517	$632,517	$632,517	$894,241
Total Costs	$305,344	$305,344	$1,199,585	$305,344	$0

Table 19-12 Scorecard Behavioral Benefit/Cost Tests - Algiers

Metric	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Societal Cost Test	Participant Cost Test
Benefit/Cost Ratio	**2.34**	**2.34**	**0.55**	**0.00**	**0.00**
Total Benefits	$103,179	$103,179	$103,179	$0	$145,104
Total Costs	$44,118	$44,118	$189,222	$0	$0

19.2.6 Direct Load Control

Table 19-13 EASYCOOL PROGRAM 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	**0.21**	**0.26**	**0.21**	**0.26**	**0.00**
Total Benefits	$180,822	$180,822	$180,822	$180,822	$159,960
Total Costs	$853,033	$693,073	$853,033	$693,073	$0

Table 19-14 EASYCOOL PROGRAM 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	**0.28**	**0.34**	**0.28**	**0.00**	**0.00**
Total Benefits	$18,305	$18,305	$18,305	$0	$12,040
Total Costs	$65,107	$53,067	$65,107	$0	$0

19.2.7 Small Commercial Solutions

Table 19-15 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	**2.27**	**1.91**	**0.55**	**2.24**	**4.72**
Total Benefits	$4,174,346	$4,174,346	$4,174,346	$4,893,913	$6,992,951
Total Costs	$1,842,329	$2,187,749	$7,533,065	$2,187,749	$1,481,725

Table 19-16 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	**1.39**	**1.19**	**0.48**	**0.00**	**3.40**
Total Benefits	$263,021	$263,021	$263,021	$0	$468,981

Total Costs	$189,481	$221,604	$542,495	$0	$137,798

19.2.8 Large Commercial & Industrial Solutions

Table 19-17 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	**2.27**	**1.89**	**0.53**	**2.22**	**4.82**
Total Benefits	$12,301,803	$12,301,803	$12,301,803	$14,403,524	$21,787,762
Total Costs	$5,419,306	$6,494,955	$23,065,481	$6,494,955	$4,521,376

Table 19-18 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	**1.69**	**1.51**	**0.47**	**0.00**	**6.03**
Total Benefits	$493,425	$493,425	$493,425	$0	$898,210
Total Costs	$292,397	$327,816	$1,047,373	$0	$148,881

19.2.9 Publicly Funded Institutions

Table 19-19 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	**1.46**	**1.18**	**0.42**	**1.35**	**4.03**
Total Benefits	$1,326,076	$1,326,076	$1,326,076	$1,525,988	$2,685,892
Total Costs	$909,328	$1,128,206	$3,160,122	$1,128,206	$665,760

Table 19-20 PFI Benefit/Cost Tests - Algiers

Metric	*Utility Cost Test*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Societal Cost Test*	*Participant Cost Test*
Benefit/Cost Ratio	**1.24**	**1.01**	**0.41**	**0.00**	**3.66**
Total Benefits	$103,529	$103,529	$103,529	$0	$208,715
Total Costs	$83,527	$102,292	$254,827	$0	$57,077

19.2.10 Whole-Portfolio

Table 19-21 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	**2.16**	**2.01**	**0.54**	**2.42**	**5.90**
Total Benefits	$28,780,592	$28,780,592	$28,780,592	$34,681,475	$49,341,462
Total Costs	$13,340,182	$14,318,581	$52,997,143	$14,318,581	$8,360,797

Table 19-22 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	**1.97**	**1.92**	**0.55**	**0.00**	**7.12**
Total Benefits	$2,113,296	$2,113,296	$2,113,296	$0	$3,431,689
Total Costs	$1,073,538	$1,103,473	$3,868,216	$0	$481,664