

Kevin T. Boleware Manager – Regulatory Affairs Entergy New Orleans, LLC 504-670-3567 | kbolewa@entergy.com 1600 Perdido Street, New Orleans, LA 70112

November 16, 2023

VIA ELECTRONIC MAIL ONLY

Ms. Lora W. Johnson, CMC, LMMC Clerk of Council City Hall - Room 1E0 1300 Perdido Street New Orleans, LA 70112

Re: Filing of Entergy New Orleans, LLC's Energy Smart Program Year 12 Annual Program Report and Evaluation, Measurement and Verification Report for Demand Response Programs (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. Resolution R-19-516 approved the continuance of Energy Smart for Program Years 10-12. Council Resolution R-20-51 adopted on February 20, 2020, approved the Program Year 10-12 Implementation Plan with APTIM, Environmental and Infrastructure ("APTIM") as the Third-Party Administrator and ADM Associates, Inc. ("ADM") as the Third-Party Evaluator.

On behalf of APTIM and ADM, Entergy New Orleans, LLC ("ENO") submits this Energy Smart Annual Program Report and Annual Evaluation, Measurement and Verification Report for Demand Response Programs for the period of January 1, 2022 to December 31, 2022 and requests that you file this submission in accordance with Council regulations. The Energy Efficiency portion of these reports was filed separately on October 6, 2023. Should you have any questions regarding this filing, please contact my office at (504) 670-3680.

Sincerely,

Kevin T. Boleware

Enclosure

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

Annual Report



Energy Smart

1100 Poydras Street, Suite 2060 New Orleans, LA 70163

p. 504.229.6868

info@energysmartnola.com www.energysmartnola.com

Program Year 12

January 1, 2022-December 31, 2022

PARTNER OF THE YEAR Sustained Excellence

ENERGY STAR

AWARD 2022

Table of Contents

I.	Demand Response Executive Summary	3
	Offerings Overview	
П.	Program Performance & Activity	3
Ш.	EasyCool for Residents	4
	Offering Description4	
	Offering Highlights4	
	Offering Budget and Savings5	
	Planned or Proposed Changes5	
IV.	Commercial & Industrial Demand Response Portfolio	6
V.	EasyCool for Business	7
	Offering Description7	
	Offering Highlights7	
	Program Budget and Savings7	
VI.	Large Commercial & Industrial Demand Response	9
	Offering Description9	
	Offering Highlights9	
	Offering Performance9	
VII.	Incentive Budget	10
VIII.	Net Savings Summary	10

Demand Response Executive Summary

The Energy Smart Program (Program) was developed by the New Orleans City Council (Council), is administered by Entergy New Orleans, LLC (ENO) and is implemented by APTIM, the Third-Party Administrator (TPA). This report contains performance data and activities for the Demand Response Program for the period of January 1, 2022 - December 31, 2022. This report contains data on the Program and evaluation results from ENO's Third-Party Evaluator's (TPE) Evaluation, Measurement and Verification (EM&V) report.

APTIM has engaged EnergyHub as an implementation subcontractor for the EasyCool Bring Your Own Thermostat demand response program. Honeywell is also subcontracted by Entergy New Orleans for demand response implementation.

Offerings Overview

Residential

Demand Response

• EasyCool for Residents

Commercial & Industrial

Demand Response

- Large Commercial & Industrial Demand Response
- EasyCool for Business

Program Performance & Activity

Table 2.1

	kWh SAVINGS	kWh GOAL*	% TO GOAL	kW SAVINGS	kW GOAL*	% TO GOAL	INCENTIVES	BUDGET	% TO BUDGET
Commercial & Industrial - Demand Response	16,989	-	N/A	1,290.8	4,642	28%	\$102,611	\$252,158	41%
Residential - Demand Response	-	-	N/A	3,076.85	4,032	76%	\$260,679	\$197,110	132%
Total	16,989		N/A	4,367.65	8,674	50%	\$363,290	\$449,268	81%

*Goals are reflective of the revised Energy Smart Implementation Plan PY 10-12 approved 2/13/2020. Summary tables show savings achieved and incentive spend from 1/1/2022 through 12/31/2022.

EasyCool for Residents

Offering Description

The residential Bring Your Own Thermostat (BYOT) DR offering taps into the existing installed base of connected thermostats in the ENO territory. Through technical integrations with the leading thermostat manufacturers in the industry, ENO will have the ability to enroll, monitor, and control connected thermostats and leverage the enrolled aggregation as a capacity resource for peak demand reduction. When a DR event is dispatched, targeted devices will experience a temperature adjustment (an "offset" or "setback") that will in turn curtail HVAC usage during the peak period.

Offering Highlights

The EasyCool for Residents offering enrolled 2,965 smart thermostats in PY12, 105% of the enrollment target. New Orleans experienced record-breaking heat in the month of June, which resulted in higher electricity demands. The Program Team dispatched four events in June, detailed in table 3.1. All events included 60 minutes of pre-cooling by two degrees, followed by increase in set temperature by three degrees. Customers could "opt-out" of the event at any time by changing the temperature setting on their thermostat. All seven events produced full participation rates between 50-60%. Customers are counted as full participants if they do not "opt-out" of the event at any time.

Table 3.1: EasyCool BYOT Events

	SMART THERMOSTAT EVENTS											
Date	6/9/2022	6/17/2022	6/23/2022	6/24/2022	8/15/2022	9/1/2022	9/22/2022					
Start Time	3:00	3:00	2:00	3:00	4:00	3:00	3:00					
End Time	6:00	6:00	6:00	5:00	7:00	6:30	7:00					
# Devices Targeted	3,936	3,984	3,974	3,806	4,506	4,649	4,816					
Cooling Offset	3°	3°	3°	3°	3°	3°	3°					
Setpoint Ceiling	85°	85°	85°	85°	85°	85°	85°					
Pre-cooling	2° 60 min	2° 60 min	2° 60 min	2° 60 min	2° 60 min	2° 60 min	2° 60 min					

- A total of 2,965 new devices were enrolled during the program year.
- A total of 4,660 devices participated during the program year.
- The offering reached 76% of the kW target, achieving 3,076.85 kW.

Offering Budget and Savings

Table 3.2

DEMAND REDUCTION (kW)			ENROLLMENT BUDGET			PARTICIPATION BUDGET		
kW Savings	kW Target	% to Target	Incentives Spent	Incentive Budget	% to Budget	Incentives Spent	Incentive Budget*	% to Budget
3,076.85	4,032.00	76%	\$74,275	\$70,725	105%	\$186,400	\$229,480	81%

*In combining DLC and BYOT offerings Implementation funds were reallocated to incentives.

Planned or Proposed Changes

The Energy Smart Online Marketplace will add the capability to pre-enroll smart thermostats, with the customer's approval, in the EasyCool program at the time of check-out. The combination of energy efficiency and demand response incentives will ensure several smart thermostat brands are available on the Online Marketplace at little or no cost to the customer.

Commercial & Industrial Demand Response Portfolio

OFFERING	kWh SAVINGS	kWh GOAL*	% TO GOAL	kW SAVINGS	kW TARGET *	% TO GOAL	INCENTIVES	BUDGET	% TO BUDGET		
Large Commercial & Industrial Demand Response	16,989	-	N/A	1,225.8	3,731	33%	\$95,876	\$219,203	44%		
EasyCool for Business	-	-	N/A	65.0	911	7%	\$6,735	\$32,955	20%		
TOTAL	16,989		N/A	1,290.80	4,642	28%	\$102,611	\$252,158	41%		

Table 4.1

*Goals are reflective of the revised Energy Smart Implementation Plan PY 10-12 approved 2/13/2020. Summary tables show savings achieved and incentive spend from 1/1/2022 through 12/31/2022.

EasyCool for Business

Offering Description

The EasyCool for Business offering is a Bring Your Own Thermostat (BYOT) demand response offering that leverages the built-in capabilities of many connected thermostats to slightly adjust the HVAC temperature setbacks of enrolled customers' thermostats. In response to a peak load event called in advance by Entergy New Orleans, participants' thermostats will be adjusted during the peak event, and in the aggregate will shave load during peak periods. Small businesses participating in the offering will receive an incentive upon enrollment, as well as an additional annual incentive upon confirmation of ongoing involvement.

Offering Highlights

In PY12 the Energy Smart team created campaigns focused on raising awareness of the EasyCool for Business offering. Eligible customers were encouraged to order a qualified thermostat from the Small Business Online Store. Customers that ordered a smart thermostat or included a smart thermostat measure on a prescriptive project application were contacted directly to enroll in the EasyCool for Business offering. This year 134 small business customers participated in the summer season with 52 small business customers enrolling in the EasyCool for Business offering.

Table 5.1: EasyCool BYOT Events

SMART THERMOSTAT EVENTS										
Date	6/9/2022	6/17/2022	6/23/2022	6/24/2022	8/15/2022	9/1/2022	9/22/2022			
Start Time	3:00	3:00	2:00	3:00	4:00	3:00	3:00			
End Time	6:00	6:00	6:00	5:00	7:00	6:30	7:00			
Cooling Offset	3°	3°	3°	3°	3°	3°	3°			
Setpoint Ceiling	85°	85°	85°	85°	85°	85°	85°			
Pre-cooling	2° 60 min									

Program Budget and Savings

Table 5.2

DEMAND REDUCTION (KW)			ENRO		OGET	PARTICIPATION BUDGET			
kW Reductio	kW on Target	% to Target	Incentives Spent	Incentive Budget	% to Budget	Incentives Spent	Incentive Budget	% to Budget	
65.0	911.00	7%	\$1,375	\$8,675	16%	\$5,360	\$24,280	22%	

Planned or Proposed Changes Offering

In PY13, EasyCool for Business will no longer be a standalone offering. Small commercial customer enrollments were low in comparison with residential enrollments in the Bring Your Own Thermostat model. The program team has determined the more cost-effective option is to expand the EasyCool for residents offering and eliminate EasyCool for Business as a standalone offering. However, small commercial customers will have additional access to smart thermostats with a no-cost direct installation option in the Small Business Energy Assessment, a new offering within small commercial energy efficiency.

Large Commercial & Industrial Demand Response

Offering Description

In PY 12, the Large Commercial & Industrial Demand Response (DR) offering launched with an objective to secure a total of 9.3 megawatts (MW) of commercial demand shed over the term of the program cycle. To reach that goal, large commercial customers (exceeding 100kW peak demand) are being recruited and enrolled for an automated turn-key DR solution.

An advanced software platform, Concerto®, was deployed for dispatch, control and optimization of all DR resources enrolled in the offering. Concerto is utilized to advance goals of maximizing customer satisfaction for participants in the offering while being adaptable to new and changing technologies that are flexible and reliable, such as batteries, electric vehicles and distributed solar.

Offering Highlights

The Program Team conducted 33 site surveys including a casino, hotels, film production studio, processing plants, commercial office space, university and hospitals totaling a potential of 8,903 kW. The offering finished the year with 16 customers participating totaling 2,914 kW. Four additional projects are in the installation and testing phase totaling 4,303 kW.

In 2022, Entergy New Orleans called 10 events, one during the non-summer season, and nine during the summer season.

Additional Entergy New Orleans electric meters were equipped with energy monitoring equipment for real time energy demand and performance reporting. This allows Concerto® to produce same day consumption and demand baselines to monitor customer performance in the program offering. Daily monitoring allows the customer, and in turn the program team, to maximize energy savings.

Offering outreach included quarterly email campaigns, digital marketing campaigns, direct customer outreach as well as two business journals, New Orleans City Business and Biz New Orleans. Honeywell joined additional local industry organizations to further conduct outreach and promote the multiple benefits of program participation in the Energy Smart and the Large C&I DR offering.

Offering Performance

DEMA		ON (kW)	BUDGET			
kW Savings*	kW Target	% to Target	Incentives Spent	Incentive Budget	% to Budget	

Table 6.1

Planned or Proposed Changes Offering

The Team will continue to cross promote all Entergy New Orleans and Energy Smart offerings to maximize customer exposure and benefits.

Incentive Budget

Table 7.1								
DEMAND RESPONSE OFFERING	INCENTIVES	BUDGET*	% TO BUDGET					
Large Commercial & Industrial Demand Response	\$95,876	\$219,203	44%					
EasyCool For Business	\$6,735	\$32,955	20%					
EasyCool - Bring Your Own Thermostat	\$260,679	\$197,110	132%					
TOTAL	\$363,290	\$449,268	81%					

*Budgets are reflective of the revised Energy Smart Implementation Plan PY 10-12 approved 2/13/2020. Summary tables show savings achieved and incentive spend from 1/1/2022 through 12/31/2022.

Net Savings Summary

Entergy's Third-Party Evaluator, ADM, conducted the program evaluation to verify the gross energy savings of each offering. Additionally, ADM estimated program net-to-gross ratios (NTGRs) through evaluation of free-ridership and spillover effects. The Energy Smart program achieved a Net-to-Gross Ratio (NTGR) of 100% in Net kW reductions.

	NET kWh SAVINGS	kWh GOAL*	% TO SAVINGS GOAL	NET kW REDUCTIONS	kW TARGET*	% TO kW TARGET			
Large Commercial & Industrial Demand Response	16,989	N/A	N/A	1,225.81	3,731	33%			
EasyCool - Small Commercial & Industrial	0	N/A	N/A	64.96	911	7%			
EasyCool - Bring Your Own Thermostat	0	N/A	N/A	3,076.84	4,032	76%			
Total	16,989	N/A	N/A	4,367.61	8,674	50%			

Table 8.1

*Goals are reflective of the revised Energy Smart Implementation Plan PY 10-12 approved 2/13/2020. Savings reflect verified net energy savings as documented in ADM's Evaluation, Measurement and Verification (EM&V) report.

EVALUATION, MEASUREMENT & VERIFICATION OF THE PROGRAM YEAR TWELVE ENTERGY NEW ORLEANS DEMAND RESPONSE PROGRAMS

SUBMITTED TO: ENTERGY NEW ORLEANS SUBMITTED ON: NOVEMBER 16, 2023 SUBMITTED BY: ADM ASSOCIATES, INC.

ADM Associates, Inc. 140 SW Arthur St., Suite 201 Portland, OR, 97211

ACKNOWLEDGEMENTS

ADM Associates, Inc. (ADM) would like to acknowledge the many talented individuals who contributed to this evaluation, measurement, and verification (EM&V) report for program year 12 (PY12).

The Entergy New Orleans, LLC (ENO) staff participated in ongoing evaluation deliverable reviews and discussions, attended regular meetings, and responded to follow-up questions, data requests and document requests. They are an ongoing partner in our evaluation efforts.

We also wish to thank the implementation firms: APTIM and Honeywell, and their staff for their insights and information.

Additionally, we would like the evaluation staff who supported the creation of this report.

ADM Team

Melissa Kosla | Senior Analyst Chris Johnson | Senior Analyst Jeremy Offenstein, Ph.D. | Director Melissa Culbertson | Director Adam Thomas, PMP | Principal

TABLE OF CONTENTS

1	E	EXECUTIVE SUMMARY	11
	1.1	Overview	
	1.2	EVALUATION OBJECTIVES	11
	1.3	Energy Smart Portfolio Overview	11
2	E	EVALUATION FINDINGS	15
	2 1		15
	2.1	SUMMARY OF EVALUATION EFFORT	15
3	E	EVALUATION METHODOLOGY	22
	3.2	INTRODUCTION	22
	3.3	GLOSSARY OF TERMINOLOGY	22
	3.4	OVERVIEW OF METHODOLOGY	24
	3.5	IMPACT EVALUATION	26
	3.6	PROCESS EVALUATION	44
	3.7	COST-EFFECTIVENESS EVALUATION	47
4	E	EASYCOOL BRING YOUR OWN THERMOSTAT	48
	4.1	Summary	48
	4.2	Program Description	49
	4.3	EM&V METHODOLOGY	50
	4.4	Evaluation Findings	52
	4.5	DATA TRACKING REVIEW	54
	4.6	Key Findings and Conclusions	55
	4.7	RECOMMENDATIONS	55
5	E	EASYCOOL FOR BUSINESS	56
	5.1	Summary	56
	5.2	PROGRAM DESCRIPTION	56
	5.3	EM&V METHODOLOGY	57
	5.4	Evaluation Findings	59
	5.5	DATA TRACKING REVIEW	61
	5.6	Key Findings and Conclusions	61
	5.7	RECOMMENDATIONS	61
6	L	LARGE C&I DEMAND RESPONSE	62
	6.1	SUMMARY	62
	6.2	Program Description	63
	6.3	EM&V METHODOLOGY	64
	6.4	Evaluation Findings	66

	6.5	DATA TRACKING REVIEW	.72
	6.6	Key Findings and Conclusions	.72
	6.7	RECOMMENDATIONS	.72
_			
7	APPE	INDIX A: COST-EFFECTIVNESS	.74
	7.1	SUMMARY	.74
	7.2	METHODS	.74
	7.3	Findings	.77
	· · -		

TABLE OF TABLES

Table A-1 Acronyms/Abbreviations	8
Table A-2 Savings Types	10
Table 1-1 PY12 Energy Smart Portfolio of Programs	12
Table 1-2 Energy Savings (kWh) Goals and Demand Reduction (kW) Targets by DR Program	14
Table 2-1 Portfolio EM&V Expenditures	15
Table 2-2 Summary of Process Primary Data collection	16
Table 2-3 Summary of Impact Primary Data Collection	16
Table 2-4 Summary of Staff Interviews	16
Table 2-5 Survey Response Information	17
Table 2-6 Portfolio Energy Savings (kWh) Results by DR Program	17
Table 2-7 Portfolio Demand Reductions (kW) Results by DR Program	18
Table 2-8 Participation and Incentive Spend by Program	18
Table 2-9 Budgets and Actual spend Summary	18
Table 2-10 Cost Test Results by Program	20
Table 2-11 Avoided Replacement Cost Summary by Program	21
Table 3-1 Stratified Sampling Summary	25
Table 3-2 Summary of Net Savings Approaches	26
Table 3-3 Savings Estimation Approaches for Energy Smart Programs	27
Table 3-4 Summary of Net Savings Approaches	29
Table 3-5 Summary of Literature Review-Based Net-to-Gross Values	30
Table 3-6 Upstream Lighting NTG Literature Review Summary	30
Table 3-7 Marketplace LED NTG Literature Review Summary	30
Table 3-8 Advanced Power Strips NTG Literature Review Summary	31
Table 3-9 Faucet Aerator NTG Literature Review Summary	31
Table 3-10 Showerhead NTG Literature Review Summary	31
Table 3-11 Water Cooler NTG Literature Review Summary	32
Table 3-12 Pipe Insulation NTG Literature Review Summary	32
Table 3-13 Free ridership Scores for Combinations of Indicator Variable Responses	40
Table 3-14 General Overview of Process Evaluation Guidance	45
Table 3-15 Key Process Evaluation Activities	46
Table 4-1 PY12 EasyCool BYOT Energy Savings (kWh)	48
Table 4-2 PY12 EasyCool BYOT Demand Reductions (kW)	48
Table 4-3 PY12 EasyCool BYOT Lifetime Savings Summary	48
Table 4-4 PY12 EasyCool BYOT Participation and Incentive Summary	48
Table 4-5 PY12 EasyCool BYOT NEB Summary	49

Table 4-7 Evaluators' MISO CBL Models52Table 4-8 Event Dates and Times52Table 4-9 Model Fit and Bias54Table 4-10 Total Gross EasyCool BYOT Demand Reductions54Table 4-11 TOTAL EASYCOOL BYOT NET DEMAND REDUCTION RESULTS54Table 5-1 PY12 EasyCool for Business Energy Savings (kWh)56Table 5-2 PY12 EasyCool for Business Demand Reductions (kW)56Table 5-3 PY12 EasyCool for Business Lifetime Savings Summary56Table 5-4 PY12 EasyCool for Business Participation and Incentive Summary56Table 5-5 EasyCool for Business Performance Towards Goal57Table 5-6 Evaluators' MISO CBL Models59Table 5-7 Event Dates and Times60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions.62Table 6-3 PY12 Large C&I DR Demand Reductions62Table 6-4 PY12 Large C&I DR Performance Towards Goal62Table 6-5 Large C&I DR Demand Reductions62Table 6-6 Evaluators' MISO CBL Models62Table 6-7 PY12 Large C&I DR Demand Reductions62Table 6-6 Evaluators' MISO CBL Models62Table 6-6 Evaluators' MISO CBL Models63Table 6-7 Event Dates and Times62Table 6-6 Evaluators' MISO CBL Models63Table 6-7 Event Dates and Times66Table 6-6 Evaluators' MISO CBL Models63Table 6-7 Event Dates and Times66Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-7 Even
Table 4-8 Event Dates and Times52Table 4-9 Model Fit and Bias54Table 4-10 Total Gross EasyCool BYOT Demand Reductions54Table 4-11 TOTAL EASYCOOL BYOT NET DEMAND REDUCTION RESULTS54Table 5-1 PY12 EasyCool for Business Energy Savings (kWh)56Table 5-2 PY12 EasyCool for Business Demand Reductions (kW)56Table 5-2 PY12 EasyCool for Business Demand Reductions (kW)56Table 5-3 PY12 EasyCool for Business Lifetime Savings Summary56Table 5-4 PY12 EasyCool for Business Performance Towards Goal57Table 5-5 EasyCool for Business Demand Reductions60Table 5-6 Evaluators' MISO CBL Models59Table 5-7 Event Dates and Times60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Demand Reductions (kW)62Table 6-4 PY12 Large C&I DR Performance Towards Goal63Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models62Table 6-7 Event Dates and Times62Table 6-6 PY12 Large C&I DR Demand Reductions (kW)62Table 6-6 PY12 Large C&I DR Performance Towards Goal63Table 6-7 Event Dates and Times66Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-8 Site Level Results67Table 6-8 Site Level Results67Table 6-8 Site Level Results67Tabl
Fable 4-9 Model Fit and Bias54Fable 4-10 Total Gross EasyCool BYOT Demand Reductions54Fable 4-11 TOTAL EASYCOOL BYOT NET DEMAND REDUCTION RESULTS54Fable 5-1 PY12 EasyCool for Business Energy Savings (kWh)56Fable 5-2 PY12 EasyCool for Business Demand Reductions (kW)56Fable 5-3 PY12 EasyCool for Business Lifetime Savings Summary56Fable 5-4 PY12 EasyCool for Business Participation and Incentive Summary56Fable 5-5 EasyCool for Business Performance Towards Goal57Fable 5-6 Evaluators' MISO CBL Models59Fable 5-7 Event Dates and Times60Fable 6-1 PY12 Large C&I DR Energy Savings (kWh)62Fable 6-2 PY12 Large C&I DR Energy Savings (kWh)62Fable 6-3 PY11 Large C&I DR Demand Reductions (kW)62Fable 6-4 PY12 Large C&I DR Demand Reductions (kW)62Fable 6-5 Large C&I DR Participation and Incentive Summary62Fable 6-5 Large C&I DR Performance Towards Goal63Fable 6-6 Evaluators' MISO CBL Models62Fable 6-7 Event Dates and Times62Fable 6-8 Site Level Results63Fable 6-5 Large C&I DR Participation and Incentive Summary62Fable 6-6 Evaluators' MISO CBL Models66Fable 6-7 Event Dates and Times66Fable 6-8 Site Level Results67Fable 6-7 Event Dates and Times66Fable 6-7 Event Dates and Times66Fable 6-7 Event Dates and Times67Fable 6-8 Site Level Results67Fable 6-9 Model Fit70
Table 4-10 Total Gross EasyCool BYOT Demand Reductions54TABLE 4-11 TOTAL EASYCOOL BYOT NET DEMAND REDUCTION RESULTS54Table 5-1 PY12 EasyCool for Business Energy Savings (kWh)56Table 5-2 PY12 EasyCool for Business Demand Reductions (kW)56Table 5-3 PY12 EasyCool for Business Lifetime Savings Summary56Table 5-4 PY12 EasyCool for Business Participation and Incentive Summary56Table 5-5 EasyCool for Business Performance Towards Goal57Table 5-6 Evaluators' MISO CBL Models59Table 5-7 Event Dates and Times60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Energy Savings (kWh)62Table 6-3 PY11 Large C&I DR Demand Reductions (kW)62Table 6-4 PY12 Large C&I DR Demand Reductions (kW)62Table 6-5 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models62Table 6-7 Event Dates and Times62Table 6-8 Site Level Results63Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Eit70
TABLE 4-11 TOTAL EASYCOOL BYOT NET DEMAND REDUCTION RESULTS 54 Table 5-1 PY12 EasyCool for Business Energy Savings (kWh) 56 Table 5-2 PY12 EasyCool for Business Demand Reductions (kW) 56 Table 5-3 PY12 EasyCool for Business Lifetime Savings Summary 56 Table 5-4 PY12 EasyCool for Business Participation and Incentive Summary 56 Table 5-5 EasyCool for Business Performance Towards Goal 57 Table 5-6 Evaluators' MISO CBL Models 59 Table 5-7 Event Dates and Times 60 Table 6-1 PY12 Large C&I DR Energy Savings (kWh) 62 Table 6-2 PY12 Large C&I DR Demand Reductions (kW) 62 Table 6-3 PY11 Large C&I DR Demand Reductions (kW) 62 Table 6-4 PY12 Large C&I DR Participation and Incentive Summary 62 Table 6-5 Large C&I DR Performance Towards Goal 63 Table 6-6 Evaluators' MISO CBL Models 62 Table 6-7 Event Dates and Times 62 Table 6-8 PY12 Large C&I DR Performance Towards Goal 62 Table 6-5 Large C&I DR Performance Towards Goal 63 Table 6-6 Evaluators' MISO CBL Models 66 Table 6-7 Event Dates and Times 66 Table 6-7 Event Dates and Times 66 <td< td=""></td<>
Fable 5-1 PY12 EasyCool for Business Energy Savings (kWh)56Fable 5-2 PY12 EasyCool for Business Demand Reductions (kW)56Fable 5-3 PY12 EasyCool for Business Lifetime Savings Summary56Fable 5-4 PY12 EasyCool for Business Participation and Incentive Summary56Fable 5-5 EasyCool for Business Performance Towards Goal57Fable 5-6 Evaluators' MISO CBL Models59Fable 5-7 Event Dates and Times60Fable 5-8 Total EasyCool for Business Demand Reductions60Fable 6-1 PY12 Large C&I DR Energy Savings (kWh)62Fable 6-2 PY12 Large C&I DR Demand Reductions (kW)62Fable 6-3 PY11 Large C&I DR Participation and Incentive Summary62Fable 6-4 PY12 Large C&I DR Participation and Incentive Summary62Fable 6-5 Large C&I DR Performance Towards Goal63Fable 6-6 Evaluators' MISO CBL Models66Fable 6-7 Event Dates and Times62Fable 6-8 Site Level Results66Fable 6-9 Model Fit70
Table 5-2 PY12 EasyCool for Business Demand Reductions (kW)56Table 5-3 PY12 EasyCool for Business Lifetime Savings Summary56Table 5-4 PY12 EasyCool for Business Participation and Incentive Summary56Table 5-5 EasyCool for Business Performance Towards Goal57Table 5-6 Evaluators' MISO CBL Models59Table 5-7 Event Dates and Times60Table 5-8 Total EasyCool for Business Demand Reductions60Table 5-8 Total EasyCool for Business Demand Reductions60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Demand Reductions (kW)62Table 6-4 PY12 Large C&I DR Demand Reductions (kW)62Table 6-5 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 5-3 PY12 EasyCool for Business Lifetime Savings Summary56Table 5-4 PY12 EasyCool for Business Participation and Incentive Summary56Table 5-5 EasyCool for Business Performance Towards Goal57Table 5-6 Evaluators' MISO CBL Models59Table 5-7 Event Dates and Times60Table 5-8 Total EasyCool for Business Demand Reductions60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Demand Reductions (kW)62Table 6-4 PY12 Large C&I DR Demand Reductions (kW)62Table 6-5 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models63Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 5-4 PY12 EasyCool for Business Participation and Incentive Summary.56Table 5-5 EasyCool for Business Performance Towards Goal57Table 5-6 Evaluators' MISO CBL Models59Table 5-7 Event Dates and Times60Table 5-8 Total EasyCool for Business Demand Reductions.60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Demand Reductions (kW)62Table 6-4 PY12 Large C&I DR Lifetime Savings Summary62Table 6-5 Large C&I DR Participation and Incentive Summary62Table 6-6 Evaluators' MISO CBL Models63Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 5-5 EasyCool for Business Performance Towards Goal57Table 5-6 Evaluators' MISO CBL Models59Table 5-7 Event Dates and Times60Table 5-8 Total EasyCool for Business Demand Reductions60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Lifetime Savings Summary62Table 6-4 PY12 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 5-6 Evaluators' MISO CBL Models59Table 5-7 Event Dates and Times60Table 5-8 Total EasyCool for Business Demand Reductions60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Lifetime Savings Summary62Table 6-4 PY12 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 5-7 Event Dates and Times60Table 5-8 Total EasyCool for Business Demand Reductions60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Lifetime Savings Summary62Table 6-4 PY12 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 5-8 Total EasyCool for Business Demand Reductions.60Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Lifetime Savings Summary62Table 6-4 PY12 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times67Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 6-1 PY12 Large C&I DR Energy Savings (kWh)62Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Lifetime Savings Summary62Table 6-4 PY12 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 6-2 PY12 Large C&I DR Demand Reductions (kW)62Table 6-3 PY11 Large C&I DR Lifetime Savings Summary62Table 6-4 PY12 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 6-3 PY11 Large C&I DR Lifetime Savings Summary62Table 6-4 PY12 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 6-4 PY12 Large C&I DR Participation and Incentive Summary62Table 6-5 Large C&I DR Performance Towards Goal63Table 6-6 Evaluators' MISO CBL Models66Table 6-7 Event Dates and Times66Table 6-8 Site Level Results67Table 6-9 Model Fit70
Table 6-5 Large C&I DR Performance Towards Goal 63 Table 6-6 Evaluators' MISO CBL Models 66 Table 6-7 Event Dates and Times 66 Table 6-8 Site Level Results 67 Table 6-9 Model Fit 70
Fable 6-6 Evaluators' MISO CBL Models 66 Fable 6-7 Event Dates and Times 66 Fable 6-8 Site Level Results 67 Fable 6-9 Model Fit 70
Table 6-7 Event Dates and Times 66 Table 6-8 Site Level Results 67 Table 6-9 Model Fit 70
Table 6-8 Site Level Results 67 Table 6-9 Model Fit 70
Table 6-9 Model Fit
able 6-10 Verified Gross Impacts
able 7-1 PY12 Cost-Effectiveness Results
able 7-2 Questions Addressed by the Various Cost Tests
able 7-3 Benefits and Costs Included in each Cost-Effectiveness Test
Table 7-4 Economic Inputs for Cost Effectiveness Analysis 77
Table 7-5 PY12 Cost-Effectiveness Results by Program
able 7-6 PY12 Cost-Effectiveness Benefits by Program
able 7-7 PY12 Cost-Effectiveness Costs by Program
able 7-8 PY12 Cost-Effectiveness Net Benefits by Program

TABLE OF FIGURES

Figure 2-1 Demand Reductions (kW) Summary by DR Program	17
Figure 3-1 Major Measure Free Ridership Scoring	34
Figure 3-2 HPwES Direct Install Free Ridership Scoring Methodology	35
Figure 3-3 Multifamily Direct Install Free Ridership Assessment	35
Figure 3-4 UMP Net-to-Gross Calculation Methodology	38
Figure 12-1 EasyCool BYOT Proxy Day Load Shapes	53
Figure 12-2 EasyCool BYOT Event Day Load Shapes	53
Figure 14-1 Proxy Day Load Shapes	68
Figure 14-2 Event Day Load Shapes	69

ACRONYMS/ABBREVIATIONS

TABLE A-1 ACRONYMS/ABBREVIATIONS

Acronym	Term
AC	Air Conditioner
АОН	Annual operating hours
APS	Advanced Power Strip
AR&R	Appliance Recycling & Replacement
BP	Behavioral Program
BYOT	Bring Your Own Thermostat
C&I	Commercial and Industrial
CEE	Consortium for Energy Efficiency
CF	Coincidence factor
CFL	Compact fluorescent lamp (bulb)
CFM	Cubic feet per minute
CRE	Commercial Real Estate
DI	Direct install
DLC	Direct Load Control
DLC	Design Lights Consortium
EER	Energy efficiency ratio
EFLH	Equivalent full-load hours
EISA	Energy Independence and Security Act
EL	Efficiency loss
EM&V	Evaluation, Measurement, and Verification
ES	ENERGY STAR®
EUL	Estimated Useful Life
GPM	Gallons per minute
HDD	Heating degree days
HID	High intensity discharge
HOU	Hours of Use
НР	Heat pump
HPwES	Home Performance with ENERGY STAR
HSPF	Heating seasonal performance factor
HVAC	Heating, Ventilation, and Air Conditioning
IEER	Integrated Energy Efficiency Ratio
IEF	Interactive Effects Factor
IPLV	Integrated part load value
IQW	Income Qualified Weatherization
ISR	In-Service Rate
kW	Kilowatt

Acronym	Term
kWh	Kilowatt-hour
LCA	Lifecycle Cost Adjustment
LED	Light Emitting Diode
M&V	Measurement and Verification
MFS	Multifamily Solutions
MW	Megawatt
MWh	Megawatt-hour
NC	New Construction
NTG	Net-to-Gross
РСТ	Participant Cost Test
PFI	Publicly Funded Institutions
PY	Program Year
QA	Quality Assurance
QC	Quality Control
RCA	Refrigerant charge adjustment
RIM	Ratepayer Impact Measure
RLA	Retail Lighting and Appliances
ROB	Replace on Burnout
RR	Realization Rate
RUL	Remaining Useful Life
SEER	Seasonal Energy Efficiency Ratio
SK&E	School Kits and Education
ТА	Trade Ally
TRC	Total Resource Cost Test
TRM	Technical Reference Manual
UCT	Utility Cost Test
VFD	Variable Frequency Drive

SAVINGS TYPES

TABLE A-2 SAVINGS TYPES

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

1 EXECUTIVE SUMMARY

1.1 Overview

This report provides a summary of the evaluation effort of the 2022 ("Program Year 12" or "PY12") demand response programs in the Energy Smart portfolio by Entergy New Orleans, LLC ("ENO"). The Energy Smart Programs are administered between January 01, 2022, and December 31, 2022. The evaluation was led by ADM Associates Inc. (herein known as "ADM", or "the Evaluators").

1.2 Evaluation Objectives

The following activities were performed through the PY12 EM&V effort:

- Verified program tracking data and correctly applied the New Orleans Technical Reference Manual Version 5.0 ("NO TRM V5.0") to calculate savings and estimate program year 12 ("PY12") gross and net energy and demand impacts at the measure, program, and portfolio levels.
- Adjusted program-reported gross savings using the results of evaluation research, relying primarily on tracking system and engineering desk reviews, metered data analysis, on-site verification, and equipment metering and achieved a minimum precision of ±10% of the gross realized savings estimate with 90% confidence;
- Consulted with the Advisors to estimate net-to-gross ("NTG") values, which were performed following the NO TRM V5.0 and provided complete documentation of all evaluated savings estimates, and where relevant, compare with TRM calculations, as recommended;
- Provided ongoing technical reviews and provided guidance to implementers and ENO throughout the evaluation cycle and reviewed tracking system data to assess data captured for new measure offerings following TRM protocols;
- Conducted EM&V research to support possible updates for the next version of the TRM, which may
 include information on commercial and residential envelope measures, business type lighting hours of
 use, and persistence of behavioral savings; and
- Completed process evaluations, limited or full, of the energy efficiency and demand response programs, as participation allowed.

1.3 Energy Smart Portfolio Overview

In PY12, the ENO Energy Smart portfolio included the following programs. The table below shows each programs' sector, type and who implemented the program for ENO.

Program Name	Found in the Report As	Sector	Program Type	Third-Party Implementor
Home Performance with ENERGY STAR	HPwES	Res	EE	APTIM/Franklin
Income Qualified Weatherization	IQW	Res	EE	APTIM/Franklin
Multifamily Solutions	MF Solutions	Res	EE	APTIM/Franklin
A/C Solutions	A/C Solutions	Res	EE	APTIM/Franklin
Retail Lighting and Appliances	RLA	Res	EE	APTIM/Franklin
School Kits and Education	SK&E	Res	EE	APTIM/Energy Wise Alliance
Appliance Recycling & Replacement	AR&R	Res	EE	APTIM/Legacy Professional Services
Behavioral	Behavioral	Res	Behavioral	APTIM/Franklin
Rewards	Rewards	Res	Behavioral	APTIM/Franklin
EasyCool Bring Your Own Thermostat	EasyCool BYOT	Res	DR	APTIM/Energyhub
Small C&I Solutions	Small C&I	C&I	EE	APTIM
Large C&I Solutions	Large C&I	C&I	EE	APTIM
Publicly Funded Institutions	PFI	C&I	EE	APTIM
C&I Construction Solutions	C&I NC	C&I	EE	APTIM
Large C&I Demand Response	Large C&I DR	C&I	DR	Honeywell
EasyCool for Business	EasyCool for Business	C&I	DR	APTIM/Energyhub

TABLE 1-1 PY12 ENERGY SMART PORTFOLIO OF PROGRAMS

In PY12, ENO offered a portfolio of 16 programs; two behavioral, three demand response ("DR"), and eleven energy efficiency ("EE") programs which provided a comprehensive range of customer options focused on energy efficiency, demand reduction, and educational options. This report includes the DR programs; a previous PY12 EM&V Report included the Behavioral and EE programs.

ENO designed its DR programs to achieve the following objectives:

- PY12 portfolio of program's ex post gross energy savings (kWh) goal of 96,773,677 kWh and a demand reduction (kW) target of 22,351 kW;¹
- Significant energy and demand savings opportunities for all customers and market segments; and
- Broad ratepayer benefits.

Those DR programs are described below.²

EasyCool Bring Your Own Thermostat ("BYOT") The program tapped into the existing installed base of connected thermostats in the ENO territory. Through technical integrations with the leading thermostat manufacturers in the industry, ENO will have the ability to enroll, monitor, and control connected thermostats and leverage the enrolled aggregation as a capacity resource for peak demand reduction.

¹ These goals represent first-year energy and demand savings at the meter.

² The program descriptions below align with the ENO Application for Approval of the Implementation Plan for PY10 through PY12 of the Energy Smart Program. Filed December 09, 2019, in Docket UD-17-03.

When a DR event is dispatched, targeted devices will experience a temperature adjustment (an "offset" or "setback") that will in turn curtail HVAC usage during the peak period. Customers participating in the program will receive an incentive upon enrollment, as well as an ongoing annual incentive for continued participation in the program.

- Large C&I Demand Response The program was implemented by Honeywell Smart Energy ("HSE"). The objective of the program is to secure curtailable capacity from large commercial and industrial facilities. HSE, in coordination with ENO, will recruit, enroll, conduct DR Surveys, and install control equipment at customer sites to provide a turn-key solution for commercial customers. Specific load control shed measures are tailored to the individual customer facility and their operations. HSE will be deploying an advanced software platform for dispatch, control, and optimization of all DR resources enrolled in the offering. This software platform, Concerto, will be provided by Honeywell's partner, Enbala Power Networks.
- EasyCool for Business This program provided the opportunity for small business customers to assist with broader load curtailment strategy. Under a BYOT framework, small businesses will be able to participate by installing a qualifying connected thermostat (or enlisting a trade ally for professional installation), and then enrolling in the program through the web-based Mercury DERMS platform. Peak demand events will take place on days when heating or cooling needs may strain generating and transmission capacity. Through Mercury, peak events will trigger minor thermostat set-back adjustments among the population of enrolled small businesses.

Through its portfolio, ENO also seeks to provide customers with easy program entry points, flexible options for saving demand and ongoing support for those who want to pursue deeper demand reductions (kW). The table below shows a list of the DR programs with their PY12 ex post gross goal or target.

TABLE 1-2 ENERGY SAVINGS (KWH) GOALS AND DEMAND REDUCTION (KW) TARGETS BY DR PROGRAM

PY12 Programs	Ex Post Gross Energy Savings (kWh)	Ex Post Gross Energy Savings (kWh) Goal	% to kWh Goal	Ex Post Gross Demand Reductions (kW)	Ex Post Gross Savings (kW) Target	% to kW Target
EasyCool BYOT	0	NA	NA	3,076.84	4,032.00	76%
Large C&I DR	16,989	NA	NA	1,225.81	3,731.00	33%
EasyCool for Business	0	NA	NA	64.96	911	7%
DR Total	16,989	NA	NA	4,367.6	8,674.0	50%

Sums may differ due to rounding.

2 EVALUATION FINDINGS

The following subsections provide a summary of the portfolio-level findings and any cross-cutting evaluation activities that occurred over the course of the PY12 EM&V effort. Specifically, this includes:

- A summary of EM&V activities and expenditures;
- A summary of program and portfolio performance; and
- High-level findings that cut across programs.

2.1 Summary of Evaluation Effort

The table below summarizes the total EM&V expenditures and total program expenditures.

TABLE 2-1 PORTFOLIO EM&V EXPENDITURES

Total PY12 EM&V Expenditures	Total PY12 Program Expenditures	EM&V as % of Expenditures
\$846,000	\$18,200,210	4.6%

Sums may differ due to rounding.

To facilitate a thorough evaluation, the Evaluators conducted several primary research and data collection activities, including site visits, interviews with program and implementer staff, customer surveys, and market actor interviews. The Evaluators conducted participant surveys for programs using the collected self-reported data to inform net impacts for those programs. The results of these analyses informed our calculation of NTG values.

The Evaluators followed the NO TRM V5.0 in designing both the focus and level of effort for each process evaluation. For all programs, the Evaluators performed telephone discussions with the primary program staff and the primary implementation staff for most programs.

2.1.1 SUMMARY OF DATA COLLECTION

The Evaluators completed surveys with customers and active trade allies as part of the PY12 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 2-2 SUMMARY OF PROCESS PRIMARY DATA COLLECTION

Survey Group	Mode	Survey Time Frame	Number of Contacts*	Number of Completions
EasyCool BYOT	NA	NA	NA	NA
Large C&I DR	Telephone/Online	10/10 - 1/31/23	10	1
EasyCool for Business	NA	NA	NA	NA

The third-party Evaluator (TPE) performed staff interviews. Staff interviews with program staff provided insight into program management and operations. Interviews were performed with eight third-party administrator (TPA) and third-party implementation (TPI) team members.

Site visits were not performed for demand response programs in PY12. To supplement the findings from site visits, the Evaluators will also conduct participant surveys. These activities collect process, net, and gross impact information.

The table below shows the number of surveys, interviews, site visits and desk reviews performed.

TABLE 2-3 SUMMARY OF IMPACT PRIMARY DATA COLLECTION

PY12 Programs	Project Desk Reviews	Site Visits	# Participant Surveys	# Staff Interviews	# Property Manager Interviews	# Trade Ally Interviews
EasyCool BYOT	Census	NA	NA	NA	NA	NA
Large C&I DR	Census	NA	1	4	0	0
EasyCool for Business	Census	NA	NA	6	0	0

The table below outlines the scale of staff interviews in PY12.

TABLE 2-4 SUMMARY OF STAFF INTERVIEWS

Programs	Organization	Interviewed Staff Roles	# Staff Interviewed
Large C&I DR	ENO & Honeywell	Honeywell Program Manager, Honeywell Energy Products Manager, ENO EE Project Manager, and ENO DSM Manager	4
EasyCool for Business / EasyCool BYOT	EnergyHub, APTIM & ENO	APTIM Program Director, EnergyHub Director of Client Success, EnergyHub Associate Director, EnergyHub Client Success Manager, ENO EE Project Manager, and ENO DSM Manager	6

2.1.1.1 Response Rates

The table below outlines survey timing and results. Additionally, information on incentives was provided to survey participants. Effective contact information was limited in many cases.

TABLE 2-5 SURVEY RESPONSE INFORMATION

Program	Mode	Time Frame	Unique Contacts	# Contacted by Email	# Contacted by Phone	# Complete	Incentive Paid (\$)
Large C&I DR	Telephone/ Online	10/10 – 1/31/23	10	10	8	1	\$25

2.1.2 IMPACT EVALUATION FINDINGS

The Energy Smart programs achieved 79.7% of planned *ex post* gross energy (kWh) savings and 92.3% of planned *ex post* gross demand reduction (kW). In addition to verifying the savings reported by ENO, the Evaluators calculated lifetime impacts. As part of this process, in the body of the report we refer to the impacts (energy savings (kWh) or peak demand reduction (kW)) accrued during the program year being evaluated (PY12) as "first year" impacts.

The figure below summarizes demand reductions (kW) in each phase of the evaluation, for each program in the portfolio.



FIGURE 2-1 DEMAND REDUCTIONS (KW) SUMMARY BY DR PROGRAM

TABLE 2-6 PORTFOLIO ENERGY SAVINGS (KWH) RESULTS BY DR PROGRAM

PY12 DR Programs	<i>Ex Post</i> Gross Energy Savings (kWh) Goal	<i>Ex Ante</i> Gross Energy Savings (kWh)	<i>Ex Post</i> Gross Energy Savings (kWh)	<i>Ex Post</i> Net Energy Savings (kWh)	Realization Rate	NTG	% to Goal
EasyCool BYOT	0	0	0	0	NA	NA	NA
Large C&I DR	0	21,412	16,989	16,989	79%	100%	NA
EasyCool for Business	0	0	0	0	NA	NA	NA
DR Total	0	21,412	16,989	16,989	79%	100%	NA

Sums may differ due to rounding.

PY12 DR Programs	<i>Ex Post</i> Gross Demand Reductions (kW) Target	<i>Ex Ante</i> Gross Demand Reductions (kW)	<i>Ex Post</i> Gross Demand Reductions (kW)	<i>Ex Post</i> Net Demand Reductions (kW)	Realization Rate	NTG	% to Target
EasyCool BYOT	4,032.00	0.00	3,076.84	3,076.84	NA	100%	76%
Large C&I DR	3,731.00	1,651.00	1,225.81	1,225.81	74%	100%	33%
EasyCool for Business	911.00	64.96	64.96	64.96	100%	100%	7%
DR Total	8,674.00	1,715.96	4,367.61	4,367.61	255%	100%	50%

TABLE 2-7 PORTFOLIO DEMAND REDUCTIONS (KW) RESULTS BY DR PROGRAM

Sums may differ due to rounding.

A summary of participation and gross incentive spent by program can be found in the table below.

TABLE 2-8 PARTICIPATION AND INCENTIVE SPEND BY PROGRAM

PY12 DR Programs	Ex Ante Gross Incentives	Count of Measures
EasyCool BYOT	\$260,679	4,660
Large C&I DR	\$95,876	11
EasyCool for Business	\$6,735	134
DR Total	\$363,290	4,805

Sums may differ due to rounding.

Budgets and expenditures are summarized in the table below.

TABLE 2-9 BUDGETS AND ACTUAL SPEND SUMMARY

PY12 DR Programs	Budgeted Expenditures	Actual Expenditures	Spending (% of Budget)	Energy Savings (% of Goal)	Levelized (\$ per kWh)
EasyCool BYOT	\$634,808	\$513,981	81%	NA	\$0.00
Large C&I DR	\$1,085,398	\$619,508	57%	NA	\$2.11
EasyCool for Business	\$1,071,112	\$564,806	53%	NA	\$0.00
DR Total	\$2,791,318	\$1,698,295	61%	NA	\$0.70

Sums may differ due to rounding.

2.1.3 PROCESS EVALUATION FINDINGS

There were comprehensive process evaluation activities for the residential, commercial, and industrial energy efficiency programs, which included staff interviews, site visits, participant surveys, trade ally interviews, property manager interviews and the review of program documentation and forward-facing materials.

2.1.3.1 EasyCool BYOT

2.1.3.1.1 *Findings and Conclusions*

The following summarizes the key findings and conclusions from the PY12 evaluation.

• The program hit 73% of its *ex post* demand reduction (kW) target.

- The program added 2,983 participants in PY12. This increased program participation by 583%.
- Demand Response event opt-out rates ranged from 22% to 29%, which falls to a similar range seen in prior program years.
- The Evaluators found that roughly 83% of participants had AMI data during the evaluation period. The remaining were missing from the project data provided to the Evaluators.

2.1.3.1.2 Recommendations

There were no recommendations after completing the PY12 evaluation.

2.1.3.2 EasyCool For Business

2.1.3.2.1 Findings and Conclusions

The following summarizes the key findings and conclusions from the PY12 evaluation.

- **The program did not meet their enrollment goals for this program year.** The number of participants nearly doubled in PY12, but the program fell short of its kW target (7.1%).
- Pre-cooling occurs prior to an event to manage customer comfort. In addition, events last no more than four hours and are limited to 15 events per year.
- New additions for the program are planned for PY13. Program staffing are planning to integrate a new API for nest data to help with real-time data collection for nest thermostats. In addition, staff are in the process of adding amazon smart thermostats as a program offering.

2.1.3.2.2 Recommendations

There were no recommendations after completing the PY12 evaluation.

2.1.3.3 Large C&I DR

2.1.3.3.1 Findings and Conclusions

The following summarizes the key findings and conclusions from the PY12 evaluation.

- **AMI data was used for all sites in PY12.** In PY11, two sites had incomplete AMI data, however, this issue was resolved in PY12.
- Honeywell did not meet enrollment goals for this program for the past two years. The program hit 32% of its kW target in PY12 and 11% in PY11. The increase in kW savings stemmed from the addition of three new sites in PY12.
- Participants are given ample warning ahead of an event. Participants are a warned of an upcoming event about 24 hours in advance via a notification. Typically, events last about 2-3 hours and occur in the middle of heat waves or other predictable events.
- In response to concerns about comfort during events, staff recommend participants "pre-cool".
 Program staff encourage customers to plan ahead for events and practice pre-cooling prior to an event.
 Staff underscored that this program is not an energy saving kWh savings program but rather a load shifting, kW savings program.
- Educating customers about demand response is a challenge. Staff noted that the biggest challenges the
 program face are educating customers about the program and getting them to enroll. Educating
 decision-makers on what demand response is and what it entails can be difficult, as well as relationshipbuilding with new customers or potential new customers.

2.1.3.3.2 Recommendations

The following summarizes key recommendations after completing the PY12 evaluation.

- Continue to build relationships with other C&I programs. The program should continue to build off of
 its partnership with other C&I programs as a means of recruiting interested customers in the demand
 response program. Staff noted that buildings with more updated equipment perform better in this
 program and thus participants who recently received updated equipment through the C&I program are
 prime candidates.
- Consider providing an educational demand response workshop for potential and current customers. Customers often have difficulty understanding incentive payments for demand response programs therefore we believe an educational workshop is necessary. Customers need education on how baselines are measured, and the overall EM&V process, to estimate their potential benefit. This education will often assist with customer retention, especially for key accounts that drive a substantial portion of kW reductions.
- Cross promote Large C&I Demand Response with relevant Large C&I Solutions projects. Large C&I Solutions has numerous customer engagements related to building commissioning or the installation and use of building automation systems (BAS). The customer engagement with their BAS as part of a retrofit rebate project presents an opportunity to make the business case for registering systems covered by their BAS for rebates associated with demand response load shedding.

2.1.4 COST-EFFECTIVENESS EVALUATION FINDINGS

See Appendix B: Cost-Effectiveness Analysis of this report for additional information on the approach. The results of the cost effectiveness analysis are in the table below. There are \$6,703,535 in TRC net benefits.

Program	TRC	UCT	RIM	РСТ	SCT
HPwES	1.10	1.03	0.36	4.40	1.47
RLA	3.64	3.13	0.41	9.06	4.50
MF Solutions	1.61	1.52	0.40	5.10	2.13
IQW	1.29	1.31	0.55	2.85	1.83
A/C Solutions	1.40	1.49	0.45	4.54	1.86
SK&E	0.47	0.41	0.21	5.23	0.56
AR&R	0.14	0.15	0.11	1.47	0.20
Behavioral	0.47	0.47	0.19	8.74	0.47
Rewards	0.00	0.00	0.00	1.00	0.00
EasyCool BYOT	0.01	0.01	0.01	1.00	0.01
C&I NC	0.62	0.71	0.32	3.72	0.82
Small C&I Solutions	1.00	1.50	0.40	2.70	1.31
Large C&I Solutions	1.28	1.99	0.38	3.69	1.65
PFI	1.36	1.51	0.32	6.20	1.78
Large C&I DR	0.00	0.00	0.00	1.02	0.00
EasyCool for Business	0.00	0.00	0.00	1.00	0.00
Total	1.29	1.55	0.38	4.10	1.67

TABLE 2-10 COST TEST RESULTS BY PROGRAM

2.1.4.1 Avoided Replacement Costs

The Evaluators included an adjustment to incremental costs accounting for ARC associated with LED lamps.

Table 2-11 Avoided Replacement Cost Summary by Program

Program	<i>Ex Post</i> Gross ARC (\$)	<i>Ex Post</i> Net ARC (\$)
HPwES	\$60,430	\$31,623
RLA	\$1,585,379	\$969,274
Multifamily Solutions	\$39,803	\$39,803
IQW	\$44,714	\$44,714
A/C Solutions	\$0	\$0
SK&E	\$32,538	\$32,538
AR&R	\$0	\$0
Behavioral	\$0	\$0
Small C&I Solutions	\$3,521	\$3,345
Large C&I Solutions	\$180,771	\$171,873
PFI	\$496,098	\$486,782
C&I NC	\$37,527	\$35,859
Total	\$2,480,781	\$1,815,812

Sums may differ due to rounding.

The method used in the evaluation is described in Section 3.4.1.3.

3 EVALUATION METHODOLOGY

3.1.1 GROSS IMPACT CALCULATIONS

The general approach for calculation of verified energy savings (kWh) and demand reductions (kW) was to use the NO TRM V5.0. Further detail can be found in each program chapter for relevant measures.

The gross impact evaluation effort included the following:

- Desk Reviews: The Evaluators utilized the NO TRM V5.0 values in assessing *ex post* gross energy savings (kWh) and demand reductions (kW). In addition to the TRM, the Evaluators also examined Excel workbooks and supplemental documentation used by implementation staff to assess savings by measure. The workbook utilizes TRM savings algorithms with trade ally inputs to calculate savings based on the measure and input parameters. The Evaluators verified the factor tables for each measure to ensure the values were appropriate.
- Data Tracking Review: Project data from the implementers was reviewed to ensure that tracking systems followed the TRM.
- Site Visits: Site visits were conducted on an as needed basis, where sites with higher uncertainties in project documentation were selected for on-site verification.
- Survey Analysis: Where applicable, results from participant survey results were utilized to determine inservice-rates and verification of savings parameters.

3.2 Introduction

This section details general evaluation methodologies by program-type as well as data collection methods applied to this evaluation and methods and activities used in the PY12 evaluation. This section will present full descriptions of gross savings estimation; net savings estimation; sampling methodologies; process evaluation methodologies; and data collection procedures.

3.3 Glossary of Terminology

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

- Baseline: Conditions, including energy consumption, which would have occurred without implementation of the subject energy efficiency activity. Baseline conditions are sometimes referred to as "business-as-usual" conditions.
- Deemed Savings: An estimate of an energy savings or demand savings outcome (gross savings) for a single unit of an installed energy efficiency measure. This estimate (a) has been developed from data sources and analytical methods that are widely accepted for the measure and purpose and (b) is applicable to the situation being evaluated (e.g., assuming 284 kWh savings for a low flow showerhead)
- Effective useful life (EUL): Sometimes referred to as measure life and often used to describe persistence. EUL is an estimate of the duration of savings from a measure.

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

- **Rigor:** The level of expected confidence and precision. The higher the level of rigor, the more confident one is that the results of the evaluation are both accurate and precise, i.e., reliable.
- Technical Reference Manual: A prepared resource document that contains (ex-ante) savings estimates, assumptions, sources for those assumptions, guidelines, and relevant supporting documentation for the prescriptive energy efficiency measures which is populated and vetted by the Administrators, Implementers, Evaluators and other relevant stakeholders.
- Uncertainty: The range or interval of doubt surrounding a measured or calculated value within which the true value is expected to fall within some degree of confidence.
- Verification: An assessment that the program or project has been implemented per the program design. An assessment that the program or project has been implemented per the program design. For example, the objectives of measure installation verification are to confirm (a) the installation rate, (b) that the installation meets reasonable quality standards, and (c) that the measures are operating correctly and have the potential to generate the predicted savings.

3.4 Overview of Methodology

3.4.1 SAMPLING

Programs are evaluated on one of three bases:

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

3.4.1.1 Census

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

3.4.1.2 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

3.4.1.3 Stratified Sampling

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

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

TABLE 3-1 STRATIFIED SAMPLING SUMMARY

Program	Strata	Sites Sampled
Small C&I Solutions	4	25
Large C&I Solutions	4, plus 1 certainty	48
C&I NC	1	1
PFI	4	10

3.4.2 NET IMPACT CALCULATIONS

Table 3-2 summarizes the net savings approach used for each program.
Program	Self-Report Surveys	Literature Review	Billing Analysis/ Price Response Modeling	Deemed Value
HPwES	\checkmark			
HPwES (Kits)	\checkmark			
IQW				\checkmark
Multifamily Solutions	\checkmark			\checkmark
RLA			\checkmark	\checkmark
A/C Solutions				\checkmark
School Kits and Education				\checkmark
Behavioral			\checkmark	
DLC and DR Programs			\checkmark	
Small C&I Solutions	\checkmark			
Large C&I Solutions	\checkmark			
PFI	\checkmark			

TABLE 3-2 SUMMARY OF NET SAVINGS APPROACHES

3.5 Impact Evaluation

3.5.1 GROSS IMPACT

The Evaluators approach to savings analysis depends largely on the types of measures installed.

In the following subsections gross savings calculation methodologies are detailed by measure category, as is appropriate.

3.5.1.1 New Orleans TRM V5.0

Whenever possible, deemed savings values and algorithms from the New Orleans Technical Reference Manual version 5.0³ (herein referred to as the "New Orleans TRM" or simply, "NO TRM V5.0") were used to determine verified *Ex Post* gross energy (kWh) and demand (kW) impacts. Care was taken to ensure any assumptions were reasonable and current, and that there were no errors in the algorithms. For each measure in the program, total *ex post* gross energy (kWh) and demand (kW) savings were determined as a product of the number of measures verified as qualifying for an incentive and the deemed savings per measure.

3.5.1.2 Energy Savings (kWh) Calculations

For the PY12 evaluation, the Evaluators utilized the NO TRM V5.0 for deemed projects. The varied approaches are as follows below.

 Deemed Savings: The deemed savings approach includes any analysis based upon the TRM or current ENO work papers. This approach involves using stipulated savings for measures for which average savings values are well known and documented. When applying deemed values, our verification efforts include verifying installations through on-site inspection or telephone surveys.

³ The New Orleans TRM can be found here: https://www.entergy-neworleans.com/energy_efficiency/energy_smart_filings/

The effort may involve using one savings value for all installations of a particular measure (for example, a residential refrigerator) or a site-specific analysis that uses partially deemed unit energy savings algorithms (such as assessing the savings from deemed commercial lighting retrofits). In the latter case, some inputs into the savings calculation are site specific (for example, lighting hours of use).

- Billing Data Analysis: Billing data analysis may be applied where there is a large, relatively homogenous pool of participant customers implementing similar energy efficiency measures. Billing analysis may be particularly effective when a program installs a number of measures in individual homes, which affect similar end uses and therefore have interactive effects. Such analysis typically involves regression modeling of participants and a non-participant control group. Examining bills of these two groups before and after participation has occurred. Analysis based on comparison of energy use in a participant and non-participant control group is applicable for the Behavioral Program and could possibly be expanded to weatherization programs.
- Site-Specific Custom: This refers to any program where savings must be calculated on a per-site basis using primary data collected on-site or facility bills for a unique, premise-level analysis (as opposed to the large-scale, whole-program analysis detailed under the "Billing Data Analysis" bullet). This includes the C&I programs in the portfolio for which custom protocols would need to be applied (e.g., IPMVP).

The table below summarizes the approaches that were applied.

Sector	Program	Approach to Savings Estimation	
	HPwES	Deemed Savings	
	IQW	Deemed Savings	
	MF Solutions	Deemed Savings	
	A/C Solutions	Deemed Savings	
	RLA	Deemed Savings	
Residential	SK&E	Deemed Savings	
	EasyCool BYOT	Whole Program Billing Analysis	
	EasyCool DLC	Whole Program Billing Analysis	
	Behavioral	Whole Program Billing Analysis	
	AR&R	Deemed Savings	
	Small C&I Solutions	Deemed Savings	
	Large C&I Solutions	Deemed Savings/Site-Specific Custom	
CQ I	PFI	Deemed Savings/Site-Specific Custom	
Cal	C&I NC	Site-Specific Custom/Site-Specific Custom	
	Large C&I DR	Deemed 50% of nomination due to missing data	
	EasyCool for Business	Whole Program Billing Analysis	

TABLE 3-3 SAVINGS ESTIMATION APPROACHES FOR ENERGY SMART PROGRAMS

3.5.1.3 Avoided Replacement Costs

Avoided replacement costs associated with energy efficiency measures were derived from the AR TRM Version 9.1: Protocol L3: Non-Energy Benefits of Avoided and Deferred Equipment Replacement Costs.

The Evaluator utilizes the following two Protocols to calculate avoided replacement costs for Replacement on Burnout (ROB) measures:

- ROB 1 baseline and efficient measures that have different useful lifetimes under static baselines over the lifetime of the measures; and
- ROB 2 baseline and efficient measures that have different useful lifetimes under changing baselines over the lifetime of the measures.

The avoided replacement costs are summarized mathematically as:

Avoided Replacement Cost = NPV(RDR, ML, RLCC_t)
NPV = Net Present Value function =
$$\sum_{t=1}^{ML} \frac{RLCC_t}{(1 + RDR)^t}$$

Where:

RDR = Real Discount Rate

ML = Program Measure Life (EUL)

RLCC_t = Real Levelized Carrying Charge in year t (annualized baseline installed cost at RDR)

The following equation defines the ARCs for ROB 1, under the assumption of different EULs for baseline and efficient measures and static baselines:

Avoided Replacement Cost =
$$-PV(RDR, ML - EUL_B, RLCC_B)/(1 + RDR)^{EUL_B}$$

Where:

RDR = Real Discount Rate ML = Program Measure Life (EUL) $EUL_B = Baseline Equipment Life$ $RLCC_B = -PMT (RDR, EUL_B, Baseline Installed Cost)$

The following equations define the ARC for ROB 2, under the assumption of different EULs for baseline and efficient measures and changing baselines:

Avoided Replacement Cost = ARC (Tier 1) + ARC (Tier 2)
ARC (Tier 1) =
$$-PV(RDR, NY - EUL_{T1}, RLCC_{T1})/(1 + RDR)^{EUL_{T1}}$$

ARC (Tier 2) = $-PV(RDR, ML - NY, RLCC_{T2})/(1 + RDR)^{NY}$

Where:

RDR = Real Discount Rate

ML = Program Measure Life (EUL) EUL_{T1} = Baseline Equipment Life (Tier 1) RLCC_{T1} = -PMT (RDR, EUL_{T1}, Baseline Installed Cost (Tier 1)) EUL_{T2} = Baseline Equipment Life (Tier 2) RLCC_{T2} = -PMT (RDR, EUL_{T2}, Baseline Installed Cost (Tier 2)) NY = Number of years of Tier 1 installation

ARC estimates are found in each of the program chapters within this report.

3.5.1.4 Deviations from the New Orleans TRM

There were no diversions from the NO TRM.

3.5.1.5 Tracking System Review

The impact evaluation began with a review of program tracking data. The tracking data included a separate row for each measure installed. Every premise in the program had a unique incentive identifier, so each premise had multiple rows to reflect the different measures completed.

3.5.1.6 Site Visits

Site visits resumed in PY12. Site visits summaries can be found within each chapter.

3.5.2 NET IMPACT

This section discusses the approaches used to estimate net savings.

The table below summarizes the net savings approach used for each program.

TABLE 3-4 SUMMARY OF NET SAVINGS APPROACHES

Program	Self-Report Surveys	Literature Review/ NO TRM	Billing Analysis	Deemed Value
HPwES	\checkmark	\checkmark		\checkmark
HPwES Kit	\checkmark			\checkmark
IQW				\checkmark
MF Solutions	\checkmark	\checkmark		\checkmark
RLA	\checkmark	\checkmark		
A/C Solutions	\checkmark	\checkmark		
SK&E				\checkmark
AR&R	\checkmark			\checkmark
Small C&I Solutions	\checkmark			
C&I NC Solutions	\checkmark			
Large C&I Solutions	\checkmark			
PFI	\checkmark			
Behavioral			\checkmark	
Demand Response			\checkmark	

3.5.2.1 Literature Review

The Evaluators applied literature review values for specific measures in some programs for which survey responses were not obtained. Table 3-5 summarizes the measures for which literature review-based values were applied to estimate net savings. Table 3-6 through Table 3-12 summarize the literature review findings.

TABLE 3-5 SUMMARY OF LITERATURE REVIEW-BASED NET-TO-GROSS VALUES

Program	Measure	NTG
Small C&I Solutions	OLM Advanced Power Strips	72%
A/C Solutions	AC Replacement	72%
	Showerhead	86%
HPWES	LED Lighting (Upstream)	61%
	OLM LED Lamp	74%
	Upstream LED Lamp	61%
	OLM Advanced Power Strip (Tier 1)	72%
	OLM Aerator (1.0 GPM)	92%
	OLM Aerator (1.5 GPM)	92%
RLA	OLM Pipe Insulation	88%
	OLM Showerhead	94%
	ENERGY STAR Heat Pump	74%
	ENERGY STAR Water Cooler	53%
	LED Lighting (Upstream)	61%

TABLE 3-6 UPSTREAM LIGHTING NTG LITERATURE REVIEW SUMMARY

Reference Number	NTG	РҮ	State
1	59%	2020	IL
2	64%	2019	MO
Average 61%		%	

1. https://www.ilsag.info/wp-content/uploads/ComEd_NTG_History_and_CY2020_Recs_2019-10-01.pdf

2. https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936298055

TABLE 3-7 MARKETPLACE LED NTG LITERATURE REVIEW SUMMARY

Reference Number	NTG	РҮ	State
1	83%	2021	WI
2	69%	PY8	IL
3	69%	2019	NY
Average		74	!%
1. Focus on Energy Colondar Voor 2021 Evaluation Report Volume II Program Evaluations			

1. Focus on Energy Calendar Year 2021 Evaluation Report. Volume II Program Evaluations.

2. <u>https://www.ilsag.info/wp-content/uploads/AIC-2023-NTGR-Recommendations-for-SAG-FINAL-2022-09-</u>28.xlsx

3. Process Evaluation of Online Marketplace, Appliance Recycling, Residential Rebates, and ESRPP Programs

TABLE 3-8 Advanced Power Strips NTG Literature Review Summary

Reference Number	NTG	РҮ	State	
1	100%	2019	MA	
2	96%	2021	IN	
3	20%	2021	WI	
Average 72%				
1. https://ma-eeac.org/wp-content/uploads/MA20X04-E-PRODNTG Res-Products-NTG-				
Report_FINAL_2021.06.08.	<u>pdf</u>			
2. https://www.indianamic	higanpower.com/lib/docs/c	ommunity/projects/demand	<u>-side-</u>	
management/ExhibitB-2021IMIndianaResidentialPortfolioEMVReportVolumeI-04-22-2022.pdf				
3. Focus on Energy Calendar Year 2021 Evaluation Report. Volume II Program Evaluations.				

TABLE 3-9 FAUCET AERATOR NTG LITERATURE REVIEW SUMMARY

Reference Number	NTG	РҮ	State	
1	100%	2021	IN	
2	84%	2021	WI	
Average		92%		
1. <u>https://www.indianamichiganpower.com/lib/docs/community/projects/demand-side-</u> management/ExhibitB-2021IMIndianaResidentialPortfolioEMVReportVolumeI-04-22-2022.pdf				
2 Focus on Energy Calendar Vear 2021 Evaluation Report Volume II Program Evaluations				

2. Focus on Energy Calendar Year 2021 Evaluation Report. Volume II Program Evaluations.

TABLE 3-10 SHOWERHEAD NTG LITERATURE REVIEW SUMMARY

Reference Number	NTG	РҮ	State		
1	100%	2019	MA		
2	100%	2021	IN		
3	82%	2021	WI		
Average 94%					
1. https://ma-eeac.org/wp-	-content/uploads/MA20X04	-E-PRODNTG_Res-Products-I	NTG-		
<u>Report_FINAL_2021.06.08.</u>	Report FINAL 2021.06.08.pdf				
2. https://www.indianamic	higanpower.com/lib/docs/c	ommunity/projects/demand	<u>-side-</u>		
management/ExhibitB-2021IMIndianaResidentialPortfolioEMVReportVolumeI-04-22-2022.pdf					
3. Focus on Energy Calendar Year 2021 Evaluation Report. Volume II Program Evaluations.					

TABLE 3-11 WATER COOLER NTG LITERATURE REVIEW SUMMARY

Reference Number	NTG	РҮ	State	
1	58%	2019	ОК	
2	48%	2021	ОК	
Average 53%				
1. PSO 2019 Evaluation:				
https://oklahoma.gov/cont	<u>tent/dam/ok/en/occ/docum</u>	ents/pu/energyefficiency/de	<u>emand-program-annual-</u>	
reports/pso-2019-demand-report.pdf				
2. https://oklahoma.gov/content/dam/ok/en/occ/documents/pu/energyefficiency/demand-program-annual-				
reports/2021-pso-demand-report.pdf				

TABLE 3-12 PIPE INSULATION NTG LITERATURE REVIEW SUMMARY

Reference Number	NTG	РҮ	State
1	88%	2021	WI
Average		88	3%

1. Focus on Energy Calendar Year 2021 Evaluation Report. Volume II Program Evaluations.

3.5.2.2 Demand Response Programs

Assigned a NTG of 1.0 for demand response programs because the timing of the peak events that produce the demand reductions is at the discretion of the utility. The impact approach for each is as follows: Large C&I DR: Assigned 50% of the nomination when sites had missing meter data; and EasyCool for Business: Deemed per-ton kW from metering.

3.5.2.3 Deemed Values for Low Income Programs

Assigned a NTG of 1.0 for the IQW program, and applicable IQ refrigerator replacement participants in the AR&R.

3.5.2.4 Self-Report Methodology for Non-Low Income Residential Energy Efficiency Programs

This section discusses self-report methodologies used to estimate the net savings of the residential programs.

3.5.2.4.1 Major Measure Free Ridership

The major measure free ridership approach was applied to measures rebated through the HPwES, RLA, and AC Solutions. 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.

3.5.2.4.1.1 Prior Plans

Respondents who indicated that they did not have plans to install the efficient measure or the financial ability to do so were determined to not be free riders. Free ridership scores were developed for the remaining respondents using survey response data on likelihood of completing the efficiency project or installing the efficient equipment and the program's impact on when that would have occurred.

3.5.2.4.1.2 Likelihood of Project Completion Score

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

- Prior to learning about the program, did you have plans to have an energy assessment of your home performed?
- How likely is it that you would have installed the same measure that you completed through the if the rebate was not available?
- How likely is it that you would install the same measure 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 nor 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 multiplication of the following two scores:

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

3.5.2.4.1.3 Timing Score

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

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

3.5.2.4.1.4 Final Free Ridership Score

The procedures used to estimate free ridership are summarized below in Figure 3-1.



FIGURE 3-1 MAJOR MEASURE FREE RIDERSHIP SCORING

3.5.2.4.2 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 installation 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 project's timing. Third, for LED lamps, 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, the 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 3-2. 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 3-2 HPWES DIRECT INSTALL FREE RIDERSHIP SCORING METHODOLOGY

3.5.2.4.3 Multifamily Direct Install Free Ridership Assessment

The multifamily direct install free ridership assessment approach was similar to the approach used for HPwES but differed because it included an assessment of financial ability. The assessment of financial ability because the cost of the direct installation measures can be higher when installed in multiple residences. Figure 3-3 summarizes the free ridership scoring approach.



FIGURE 3-3 MULTIFAMILY DIRECT INSTALL FREE RIDERSHIP ASSESSMENT

3.5.2.4.4 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 of 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 nor unlikely: .5
- Somewhat unlikely: .25
- Very unlikely: 0

3.5.2.4.5 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.

3.5.2.5 Appliance Recycling

The NTG approach was consistent with the Uniform Methods Protocol (UMP) chapter seven refrigerator recycling protocol. This approach utilizes customer self—report data to estimate what participating customers would have done with the unit in the absence of the program and what would have happened with discarded units (free ridership). The approach also incorporates the secondary market impacts that arise when a would-be

buyer of a recycled unit would do given that it was not available. The counterfactual for this approach is not what units would not have been recycled, but instead what units would remain on the grid.

3.5.2.5.1 Free Ridership

Free ridership occurs when an appliance recycled through the program would have been taken off the grid even in the absence of the program. The first step of the free ridership analysis was to ask participants if they had considered discarding the program appliance before learning about the program. If the participant indicated no previous consideration of unit disposal, they are categorized as non-free riders and removed from the subsequent free ridership analysis.

Next, the remaining participants (i.e., those who had previously considered discarding the program appliance) were asked a series of questions to determine the distribution of program appliances that would have been kept within participant households versus those that would have been discarded. If one considers the counterfactual scenario where there is no program intervention, there are essentially three outcomes for participating appliances:

- The appliance would have been kept in use by the participant household.
- The appliance would have been discarded in such a way that it was transferred to another customer for continued use.
- The appliance would have been discarded in such a way that it would be taken out of service.

Of the three outcomes, participants who respond that their appliance would have been discarded and taken out of service is indicative of free ridership. This is because the recycled units would have been removed from the grid even without program intervention.

3.5.2.5.2 Secondary Market Impacts

Secondary market impacts refer to the effect the program has on would-be acquirers of program participating units. In the event that a program unit would have been transferred to another customer (sold, gifted, donated), the question then becomes what other appliance acquisition decisions are made by the would-be acquirer of the program unit now that it is decommissioned and unavailable. The would-be acquirer could:

- Not purchase/acquire another unit.
- Purchase/acquire a different non-program appliance.
- Purchase a new appliance instead.

Ultimately, the true market level outcome in the absence of the program is difficult to assess. As a result, this evaluation took a midpoint approach, as recommended by the UMP protocol. That is, 50% of would-be acquirers of program avoided transfers are assumed to find an alternate unit. The next question of interest is whether the alternative units acquired would be used (similar to those recycled by the program) or new. Again, this market distribution is difficult to estimate with any certainty. This evaluation took the UMP recommendation and assumed that 50% of the alternative units would be used and 50% would be new, standard efficiency units.

Figure 3-4 summarizes the complete net-to-gross calculation that will be used in the evaluation of the program. Note that this diagram depicts net savings as calculated under the UMP gross savings definition.



FIGURE 3-4 UMP NET-TO-GROSS CALCULATION METHODOLOGY

3.5.2.5.3 Appliance Recycling Spillover

In accordance with the UMP guidance, the Evaluators did not assess spillover for appliance recycling.

3.5.2.6 Self-Report Methodology for C&I Energy Efficiency Programs

Participant survey responses were used to estimate the net energy impacts for the Small C&I, Large C&I, PFI, NC offerings. The methodology used is described in detail below.

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 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 3-8 shows these values.

Indicator Variables				
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?	Free ridership Score
Y	N/A	Y	Y	100%
Y	N/A	Ν	Ν	100%
Y	N/A	Ν	Y	67%
Y	N/A	Y	Ν	67%
Ν	Y	Ν	Y	67%
Ν	N	Ν	Y	33%
Ν	Y	Ν	Ν	33%
Ν	Y	Y	Ν	0%
Ν	Ν	Ν	Ν	0%
Ν	Ν	Y	Ν	0%
Ν	Ν	Y	Y	0%

TABLE 3-13 FREE RIDERSHIP SCORES FOR COMBINATIONS OF INDICATOR VARIABLE RESPONSES

3.5.2.6.1 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.

3.5.2.7 Self-Report Methodology for Small Business Online Marketplace

Information collected through a survey of a sample of program participants was used for the net-to-gross analysis for the online marketplace measures. The approach taken for each of the measure types is presented below.

3.5.2.7.1 Smart Thermostats

The criteria indicating customer had plans and intentions that likely signify free ridership are as follows:

- FR1: "Did you plan to purchase smart thermostats before learning you could get a [free/discounted] smart thermostat from the Energy Smart Business Store?"
- FR2: [IF YES] "Just to be clear, did you have plans to purchase a smart thermostat as opposed to a
 programmable or non-programmable thermostat?"

If respondent answered "no" to FR1 or "yes" to FR1 and then "yes" to FR2, they were not considered to have plans or intentions.

Participants were asked about the direct influence of the program on their decision to purchase the measures. Specifically, participants were asked:

• FR3: "How likely is that you would have purchased the same smart thermostat(s) in the next 12 months if you had not received a [free/discounted] thermostat from the Energy Smart Business Store?"

A program influence score was developed based on this response in the following manner:

Program Influence = FR3 / 10

Respondents who were found to not have plans or the financial ability to purchase the measures were deemed not free riders. If respondent had plans, their free ridership score equals their program influence score.

3.5.2.7.2 LED Light Bulbs

The criteria indicating customer had plans and intentions that likely signify free ridership are as follows:

- FR1: Did you have any LED light bulbs installed at your organization before learning about the discount from the Energy Smart Small Business Store?
- FR2: Prior to receiving LED light bulb(s) from the Energy Smart Business Store, had your organization purchased any LED bulbs within the last three years?
- FR3: Before learning about the Energy Smart Business Store discounts, did you have plans to purchase LED light bulb(s) for your organization?

If respondent answered "no" to FR1, "no" to FR2 or "no" to FR3, they were not considered to have plans or intentions.

Participants were asked about the direct influence of the program on their decision to purchase the measures. Specifically, participants were asked:

- FR4: If you had not received the discount through the Energy Smart Small Business Store, how many LED light bulb(s)would you have purchased within the next 12 months?
- FR5: How likely would you have been to purchase [Field-LED_Quant] LED light bulb(s) within the next 12 months, if you did not receive the discounted bulbs?

A program influence score was developed based on this response in the following manner: Program Influence = FR5 / 10

Respondents who were found to not have plans to purchase the measures were deemed to not be free riders. If respondent had plans, their free ridership score equals their program influence score.

3.5.2.7.3 LED Exit Sign Retrofit Kits

The criteria indicating customer had plans and intentions that likely signify free ridership are as follows:

- FRI: Did you have any LED exit sign(s) installed at your organization before learning about the discount from the Energy Smart Small Business Store?
- FR2: Did you plan to purchase LED exit sign(s) before learning about the discount from the Energy Smart Small Business Store?

If respondent answered "no" to FR1 or "no" to FR2, they were not considered to have plans or intentions.

Participants were asked about the direct influence of the program on their decision to purchase the measures. Specifically, participants were asked:

• FR3: How likely would you have been to purchase [Field-Exit_Quant] LED exit sign(s) within the next 12 months, if you did not receive the discount from the Energy Smart Small Business Store?

A program influence score was developed based on this response in the following manner:

Program Influence = FR3 / 10

Respondents who were found to not have plans to purchase the measures were deemed to not be free riders. If respondent had plans, their free ridership score equals their program influence score.

3.5.2.7.4 Low Flow Showerheads

The criteria indicating customer had plans and intentions that likely signify free ridership are as follows:

- FR1: Did you have any low flow showerheads installed at your organization before learning about the discount from the Energy Smart Small Business Store?
- FR2: Had you heard of low flow showerhead before you purchased from the Energy Smart Small Business Store
- FR3: Did you plan to purchase low flow showerheads before learning about the discount from the Energy Smart Small Business Store?

If respondent answered "no" to FR1, "no" to FR2 or "no" to FR3, they were not considered to have plans or intentions.

Participants were asked about the direct influence of the program on their decision to purchase the measures. Specifically, participants were asked:

- FR4: "How many low flow showerheads do you think you would have purchased in the next 12 months if you had not received a discount through the Energy Smart business store?"
- FR5: "How likely would you have been to purchase [Field-Shower Quant] low flow showerheads within the next 12 months, if you did not receive the discount from the Energy Smart Small Business Store?

A program influence score was developed based on this response in the following manner:

Program Influence = FR5 / 10

Respondents who were found to not have plans to purchase the measures were deemed to not be free riders. If respondent had plans, their free ridership score equals their program influence score.

3.5.2.7.5 High Efficiency Aerators

The criteria indicating customer had plans and intentions that likely signify free ridership are as follows:

- FR1: Did you have any low flow sink aerators installed at your organization before learning about the discount from the Energy Smart Small Business Store?
- FR2: Had you heard of low flow sink aerators before you purchased from the Energy Smart Small Business Store
- FR3: Did you plan to purchase low flow aerators before learning about the discount from the Energy Smart Small Business Store?

If respondent answered "no" to FR1, "no" to FR2 or "no" to FR3, they were not considered to have plans or intentions.

Participants were asked about the direct influence of the program on their decision to purchase the measures. Specifically, participants were asked:

- FR4: "How many low flow aerators do you think you would have purchased in the next 12 months if you had not received a discount through the Energy Smart business store?"
- FR5: "How likely would you have been to purchase [Field-Shower Quant] low flow aerators within the next 12 months, if you did not receive the discount from the Energy Smart Small Business Store?

A program influence score was developed based on this response in the following manner:

Program Influence = FR5 / 10

Respondents who were found to not have plans to purchase the measures were deemed to not be free riders. If respondent had plans, their free ridership score equals their program influence score.

3.5.2.7.6 Advanced Power Strips

The criteria indicating customer had plans and intentions that likely signify free ridership are as follows:

- FR1: Were you using any Tier 1 Advanced Power Strips at your organization before you received one from ENO?
- FR2: Had you heard of Tier 1 Advanced Power Strips before learning about the discount from the Energy Smart Small Business Store?
- FR3: Did you have plans to purchase Tier 1 Advanced Power Strips before you learned about the discount from the Energy Smart Small Business Store?
- FR4: Just to be clear, did you have plans to purchase a Tier 1 Advanced Power Strips that manages energy use instead of a standard power strip that does not manage energy use?

If respondent answered "no" to FR1, "no" to FR2 or "no" to FR3, they were not considered to have plans or intentions. If respondent answered "yes to FR3 and then "no" to FR4, they were not considered to have plans or intentions.

Participants were asked about the direct influence of the program on their decision to purchase the measures. Specifically, participants were asked:

 FR5: How likely is that you would have purchased [Field-APS Quant] Tier 1 Advanced Power Strip(s) in the next 12 months if you had not received a discount from the Energy Smart Business Store?

A program influence score was developed based on this response in the following manner:

Program Influence = FR5 / 10

Respondents who were found to not have plans to purchase the measures were deemed to not be free riders. If respondent had plans, their free ridership score equals their program influence score.

3.6 Process Evaluation

3.6.1 APPROACH

The Evaluator's general approach to process evaluation begins with a review of the tests for timing and appropriateness of process evaluation. In this review, the Evaluators determined what aspects of the program warrant a process evaluation.

In general, process evaluations assess organizational and procedural aspects of programs to provide feedback on features of programs that are functioning well and contribute recommendations when areas of improvement are identified. These evaluations are based on criteria that justify conducting a process evaluation. Table 3-14 provides details on those criteria that should be met prior to proceeding with a process evaluation.

TABLE 3-14 GENERAL OVERVIEW OF PROCESS EVALUATION GUIDANCE

Process Evaluation Guidance

Process evaluation required if:

- Program is new.
- No process evaluation has been undertaken during current funding cycle.

Process evaluation potentially needed if:

- Program impacts are lower than expected.
- Goals (both informational and educational) are not being achieved.
- Rates of participation are lower/slower than expected.
- Program operational system is slow to get up and running.
- Cost-effectiveness of the program is less than expected.
- Participants (both customers and market actors) report problems/low rates of satisfaction with program.

A process evaluation is a culmination of information from a variety of sources, including program staff, trade allies, and program participants (collectively referred to as market actors). To increase the validity of the findings, the Evaluators gathered data from multiple sources and then "triangulated" the data to compare it across multiple groups. This methodology increases the overall validity of the findings.

It should also address a variety of issues, including:

- Help program designers and managers structure programs to achieve cost-effective savings while maintaining high levels of customer satisfaction;
- Determine program awareness levels to refine marketing strategies and reduce barriers to program participation;
- Provide recommendations for changing the program's structure, management, administration, design, delivery, operations, or target;
- Test for use of best practices and determine what best practices should be incorporated; and
- Gather data from a variety of sources to minimize bias in the findings.

TABLE 3-15 KEY PROCESS EVALUATION ACTIVITIES

Process Evaluation Activity						
Key Researchable Issues	Materials Review	Database Review	Staff Interview	Market Actor Interview	Part. Trade Ally Survey	Part. Customer Survey
Program Effectiveness	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark
Tracking Systems		\checkmark	\checkmark	\checkmark		
Rebate Application Processing		\checkmark	\checkmark	\checkmark		
Trade ally Reporting/ Tracking		\checkmark	\checkmark	\checkmark	\checkmark	
Overall Program Satisfaction					\checkmark	\checkmark
Satisfaction with Trade allies			\checkmark	\checkmark		\checkmark
Satisfaction with Utility					\checkmark	\checkmark
Satisfaction with Implementer			\checkmark		\checkmark	
Market Effects	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark
Changes in Stocking Practices			\checkmark	\checkmark	\checkmark	
Barriers to Participation			\checkmark	\checkmark	\checkmark	\checkmark
Awareness Levels					\checkmark	\checkmark
Reasons for Participation					\checkmark	\checkmark
Reasons for Non-Participation					\checkmark	

The process evaluation for PY12 consists of a multiple step process that is outlined in the following section.

3.6.2 REVIEW OF PROGRAM MATERIALS

The Evaluators reviewed reports and supporting materials for clarity and consistency with program objectives. As an initial step in the PY12 process evaluation, the Evaluators reviewed available program documents such as delivery schedules, sample reports and samples of any additional engagement materials. The purpose of reviewing these materials is to understand what information is communicated to participants, how it is communicated, and to identify any gaps or opportunities for improvement.

3.6.3 PROGRAM STAFF AND MARKET ACTOR IMPLEMENTER INTERVIEWS

The program staff in-depth interviews were conducted via telephone and addressed the key process evaluation objectives discussed previously. The initial evaluation interviews focus on the program history, design, and identifying areas for improvement, while the subsequent process evaluation interviews focused on "lessons learned" and the overall effectiveness of the program. These interviews are open-ended, in that there is a discussion guide, but responses will not be limited to a specific set of choices. Moreover, all respondents are promised confidentiality throughout the interview process to assure that these findings truly reflect program operations and activities. The results of these interviews were summarized for each program. Overall themes from these interviews are summarized for the entire portfolio.

The third-party implementer interviews were conducted by telephone. Particular attention was paid to the program implementers' perceptions of how the programs operate, what program data are tracked and captured, how that data are managed and maintained, and how the programs are promoted to motivate trade allies and customers.

3.6.4 TRADE ALLY SURVEYS AND INTERVIEWS

The Evaluators conducted trade ally surveys or in-depth interviews with participating trade allies. The specifics of these trade ally activities are described more fully in each Energy Smart Program chapter. These interviews focused on identifying areas of program effectiveness, overall satisfaction, and identifying barriers to program participation. The results from these interviews are summarized at the program and portfolio level.

3.6.5 REVIEW OF PROGRAM MATERIALS

The Evaluators reviewed reports and supporting materials for clarity and consistency with program objectives. As an initial step in the PY12 process evaluation, the Evaluators reviewed available program documents such as the program website and engagement materials. The purpose of reviewing these materials is to understand what information is communicated to participants, how it is communicated, and to identify any gaps or opportunities for improvement.

3.6.6 PARTICIPANT SURVEYS

The Evaluators conducted surveys across the residential and commercial energy efficiency programs. These surveys focused on program awareness, participants' decision-making process, program operations, customer satisfaction with eligible measures, and satisfaction with the program. These surveys also included questions to verify measure installations and collected other data necessary to support the impact evaluation. Survey summaries can be found in each program chapter.

3.7 Cost-Effectiveness Evaluation

See Appendix B: Cost-Effectiveness Analysis for additional details on this approach. The results by each program and the portfolio for cost test is shown in the table below.

The portfolio and most programs pass the TRC and the UCT, with the exception of Behavioral/Rewards, EasyCool for Business, Large C&I DR, Small C&I, C&I NC, SK&E and AR&R. The portfolio has \$6,703,535 in TRC net benefits and is cost-effective.

The details of each program evaluation are found in the sections below.

4 EASYCOOL BRING YOUR OWN THERMOSTAT

4.1 Summary

The tables below report *ex ante* gross, *ex post* gross, *ex post* net energy savings (kWh) (both annual and lifetime), demand reductions (kW), participation, incentive spend, and *ex post* net NEBs, by measure, where applicable.

TABLE 4-1 PY12 EASYCOOL BYOT ENERGY SAVINGS (KWH)

Measure	<i>Ex ante</i> Gross Savings (kWh)	Realization Rate (kWh)	<i>Ex post</i> Gross Savings (kWh)	NTG	<i>Ex post</i> Net Savings (kWh)
DR Participation	0	N/A	0	N/A	0
Total	0	N/A	0	N/A	0

Sums may differ due to rounding.

TABLE 4-2 PY12 EASYCOOL BYOT DEMAND REDUCTIONS (KW)

Measure	<i>Ex ante</i> Gross Demand (kW)	Realization Rate (kW)	<i>Ex post</i> Gross Demand (kW)	NTG	<i>Ex post</i> Net Demand Reductions (kW)
DR Participation	0.00	N/A	3,076.85	100%	3,076.85
Total	0.00	N/A	3.076.85	100%	3.076.85

Sums may differ due to rounding.

TABLE 4-3 PY12 EASYCOOL BYOT LIFETIME SAVINGS SUMMARY

Measure	EUL	<i>Ex post</i> Gross Lifetime Energy Savings (kWh)	<i>Ex post</i> Net Lifetime Energy Savings (kWh)
DR Participation	1	0	0
Total	1	0	0

Sums may differ due to rounding.

TABLE 4-4 PY12 EASYCOOL BYOT PARTICIPATION AND INCENTIVE SUMMARY

Measure	Participation (Count of Measures)	Incentive Spend (\$)
DR Participation	3,600	\$260,679
Total	3,600	\$260,679

Sums may differ due to rounding.

TABLE 4-5 PY12 EASYCOOL BYOT NEB SUMMARY

Measure	<i>Ex post</i> Net ARCs (\$)	<i>Ex post</i> Net Water Savings (gallons)	<i>Ex post</i> Net Avoided Arrearages
DR Participation	\$0	0	\$0
Total	\$0	0	\$0

Sums may differ due to rounding.

4.2 Program Description

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

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

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

The program was first introduced in PY10.

4.2.1 PROGRAM CHANGES

There were no reported changes to this program in PY12.

4.2.2 TIMING OF PROJECTS

All projects occurred from May to September.

4.2.3 TRADE ALLIES

There were no reported trade allies in this program.

4.2.4 GOAL ACHIEVEMENT

The table below summarizes the programs' performance against goal.

<i>Ex post</i> Gross Energy Savings (kWh) Goal	% to kWh Goal	<i>Ex post</i> Gross Energy Savings (kWh)	<i>Ex post</i> Gross Savings (kW) Target	% to kW Target	<i>Ex post</i> Gross Savings (kW)
0	N/A	0	4,032.00	76%	3,076.85

TABLE 4-6 EASYCOOL BYOT PERFORMANCE TOWARDS GOAL

4.3 EM&V Methodology

The Evaluators employed the following approach to complete impact evaluation activities for the program. The Evaluator followed the Calculated Baseline approach outlined in the Midcontinent Independent System Operator, Inc. (MISO) Business Practices Manual (BPM)⁴. The following impact evaluation steps were taken to determine the suitability of the MISO Calculated Baseline approach:

- Developed an Unadjusted Consumption (UC) Baseline, a Symmetric Multiplicative Adjustment (SMA)
 Baseline, and a Weather Sensitive Adjustment (WSA) Baseline for each program participant. Loads were calculated utilizing 1-hour AMI data.
- Determined days that will serve as proxy days for testing the suitability of the baseline approach. Proxy
 days represent days like demand response event days in terms of load shape and temperature profiles.
- Estimated bias (uncertainty) and error on proxy days for each model to assess baseline performance.
 Bias is assessed by examining the average percent error of the baseline predictions relative to the actual usage on proxy days. In a similar manner, error is assessed through various metrics such as Root Mean Squared Error (RRMSE) using baseline predictions and actual usage on proxy days.
- Selected the baseline model with the lowest absolute bias.

4.3.1 GROSS IMPACT METHODOLOGIES

In the evaluation of demand response programs, energy savings are estimated by comparing a participant's load shape during a demand response event with a baseline load shape. This baseline load is assumed to be a good estimate of the counterfactual load—that is, the load that would have manifested had there not been an event called that day.

4.3.1.1 Data Sources

Data used for this evaluation include program tracking data that identifies which customers participated in the program and contains data fields such as hourly usage, hourly interval meter data (AMI) for each customer participating in the program, and a full schedule of DR program events, including the time of the event.

4.3.1.2 MISO Calculated Baseline Approach (Customer Baselines)

The following details the general requirements for the MISO Calculated Baseline Approach. The Evaluators developed Customer Baselines (CBLs) in accordance with this approach. For a demand resource, the Consumption Baseline is a profile of hourly demand based on an averaged sample of historical data which may be adjusted for factors that reflect specific, on-the-day conditions, such as temperature.

⁴ Ibid.

The default consumption baseline is designed as follows:

- Separate hourly demand profiles for non-holiday weekdays and for weekends/holidays
- The "weekday" hourly profile is based on the average of the ten (10), but not less than five (5), most recent weekdays that are not holidays or other non-standard "event" days
- The "weekend/holiday" hourly profile is based on the average of the four (4), but not less than two (2), most recent weekend days or holidays that are not "event" days
- An "event" day is one during which there was, for the resource in question, a real- time energy or ancillary services dispatch, or a scheduled outage
- The maximum look-back window is limited to 45 days
- If the 45-day window contains insufficient days to meet the minimum number of days described above, the profiles are constructed based on the available days within the 45-day window that qualify, supplemented by the largest (MW) matching "event" day(s) values for that resource within that same window as necessary to obtain the minimum number of values.

Adjustment mechanisms to the default Consumption Baseline include:

- Symmetric Multiplicative Adjustment (SMA)
 - \circ Adjusts each baseline hourly value (MW) during the event up or down by the ratio of
 - (a) the sum of hourly demands for the three hours beginning four hours prior to the event and
 (b) the sum of those same three hourly baseline demands
 - The adjustment is limited to a change in any individual baseline hour of plus or minus 20 percent.
 - If multiple events occur during the same day, the SMA is calculated only for the first event, but applied to all events that day.
- Weather Sensitive Adjustment (WSA)
 - Adjusts each baseline hourly value (MW) up or down by a Weather Adjustment Factor
 - The Weather Adjustment Factor is determined by a mathematical relationship derived through a regression analysis that considers the DRR load and historical hourly temperature data.

4.3.1.3 Evaluators MISO Models

The following CBL models were developed for each customer in accordance with MISO protocols.

For a 5-of-10 (or 5-of-5) unadjusted baseline, the Evaluators examine the load data from the most recent ten (or five) non-event, non-holiday weekdays relative to the event day and calculate the mean demand usage values of the five highest load days. This baseline is then adjusted for the SMA and WSA models utilizing the method described in *Section 5.3.1.2 Customer Baselines*.

Model Type	Baseline Days	SMA	WSA
Unadjusted	5-of-10	No	No
SMA-Adjusted	5-of-10	Yes	No
WSA-Adjusted	5-of-10	No	Yes
Unadjusted	5-of-5	No	No
SMA-Adjusted	5-of-5	Yes	No
WSA-Adjusted	5-of-5	No	Yes

TABLE 4-7 EVALUATORS' MISO CBL MODELS

4.3.1.4 Baseline and Proxy Day Development

The Evaluators defined proxy days as the top eight non-event, non-holiday, non-weekend days with the highest loads across all summer months. In addition, proxy days must display a maximum temperature of greater than or equal to the minimum temperature observed during normal curtailment hours during the events. The Evaluators used these defined proxy days to determine the ability of CBL models to predict actual usage for each customer.

4.3.2 NET IMPACT METHODOLOGIES

In demand response programs, it is typically assumed that there are neither spillover nor free-ridership effects (customers are not expected to curtail without participating). Although customers can find workarounds to make up for lost productivity due to demand response events, they are compensated only if they reduce their load during the peak demand window, the primary program goal. As such, the net-to-gross ratio for this program is assumed to be 100%.

4.4 Evaluation Findings

TABLE 4-8 EVENT DATES AND TIMES

Event Dates	Event Times (CDT)
6/9/2022	1500-1800
6/17/2022	1500-1800
6/23/2022	1400-1800
6/24/2022	1500-1700
8/15/2022	1600-1900
9/1/2022	1500-1830
9/22/2021	1500-1900

4.4.1 LOAD SHAPES AND MODEL PERFORMANCE

The figures below are average load shapes for each program on proxy and event days and depict actual kW and baseline kW for the selected baseline model. The figures show that baseline kW is a good match for actual kW during the hours of curtailment on the majority of proxy days.



FIGURE 4-1 EASYCOOL BYOT PROXY DAY LOAD SHAPES



FIGURE 4-2 EASYCOOL BYOT EVENT DAY LOAD SHAPES

The Evaluators estimated bias and error for the Evaluators MISO models across all sites and when applied on a site-specific basis and selected for the model with the lowest bias. As shown in the table below, the MISO SMA Adjusted CBL 5-of-10 model performed the best and had the lowest bias and error for the Residential BYOT program.

TABLE 4-9 MODEL FIT AND BIAS

Model	Follow MISO Protocols	RRMSE	RMSE	Bias	Selected Model
MISO_SMA_Adjusted_CBL.5.of.10	Х	0.014	0.051	0.44%	Х
MISO_Unadjusted_CBL.5.of.10	Х	0.018	0.066	-1.13%	
MISO_WSA_Adjusted_CBL.5.of.5	Х	0.042	0.155	-3.75%	
MISO_WSA_Adjusted_CBL.5.of.10	Х	0.082	0.304	7.92%	
MISO_SMA_Adjusted_CBL.5.of.5	Х	0.109	0.405	-10.79%	
MISO_Unadjusted_CBL.5.of.5	Х	0.184	0.683	-18.29%	

4.4.2 GROSS IMPACT FINDINGS

Using results from the CBLs, the Evaluators calculated the PY12 kW reduction. Results are shown below in the table below.

TABLE 4-10 TOTAL GROSS EASYCOOL BYOT DEMAND REDUCTIONS

Average Savings per Event per Unit (kW)	Average Savings per Event per Participant (kW)	Number of Units	Number of Participants	Total Program kW Reduction
0.660269	0.854682	4,660	3,600	3,076.84

The overall verified kW reduction is 3,076.84 kW.

4.4.3 NET IMPACT FINDINGS

For demand response programs, net savings equals gross savings.

TABLE 4-11 TOTAL EASYCOOL BYOT NET DEMAND REDUCTION RESULTS

Gross kW Reduction	Net-to-Gross Ratio	Net Demand Reduction
3,076.84	100%	3,076.84

Program results can be found in tables in Section 4.1 Summary.

4.4.4 NON ENERGY BENEFITS FINDINGS

There were no NEBs identified in this program.

4.4.5 PROCESS FINDINGS

There were no process evaluation activities or findings in PY12.

4.5 Data Tracking Review

The Evaluators were able to perform the analysis as planned once advanced metering infrastructure (AMI) data was provided. The Evaluators found that roughly 83% of participants had AMI data during the evaluation period.

4.6 Key Findings and Conclusions

The following summarizes the key findings and conclusions from the PY12 evaluation.

- The program hit 73% of its *ex post* demand reduction (kW) target.
- The program added 2,983 participants in PY12. This increased program participation by 583%.
- Demand Response event opt-out rates ranged from 22% to 29%, which falls to a similar range seen in prior program years.
- The Evaluators found that roughly 83% of participants had AMI data during the evaluation period. The remaining were missing from the project data provided to the Evaluators.

4.7 Recommendations

There were no recommendations after completing the PY12 evaluation.

5 EASYCOOL FOR BUSINESS

5.1 Summary

The tables below report *ex ante* gross, *ex post* gross, *ex post* net energy savings (kWh) (both annual and lifetime), demand reductions (kW), participation, and incentive spend.

TABLE 5-1 PY12 EASYCOOL FOR BUSINESS ENERGY SAVINGS (KWH)

Measure	<i>Ex Ante</i> Gross Savings (kWh)	Realization Rate (kWh)	<i>Ex Post</i> Gross Savings (kWh)	NTG	<i>Ex Post</i> Net Savings (kWh)
DR Participation	0	N/A	0	N/A	0
Total	0	N/A	0	N/A	0

Sums may differ due to rounding.

TABLE 5-2 PY12 EASYCOOL FOR BUSINESS DEMAND REDUCTIONS (KW)

Measure	<i>Ex Ante</i> Gross Demand (kW)	Realization Rate (kW)	<i>Ex Post</i> Gross Demand (kW)	NTG	<i>Ex Post</i> Net Demand (kW)
DR Participation	64.96	100%	64.96	100%	64.96
Total	64.96	100%	64.96	100%	64.96

Sums may differ due to rounding.

TABLE 5-3 PY12 EASYCOOL FOR BUSINESS LIFETIME SAVINGS SUMMARY

Measure	EUL	<i>Ex Post</i> Gross Lifetime Energy Savings (kWh)	<i>Ex Post</i> Net Lifetime Energy Savings (kWh)
DR Participation	1	0	0
Total	1	0	0

Sums may differ due to rounding.

TABLE 5-4 PY12 EASYCOOL FOR BUSINESS PARTICIPATION AND INCENTIVE SUMMARY

Measure	Participation (Count of Measures)	Incentive Spend (\$)
DR Participation	134	\$6,735
Total	134	\$6,735

Sums may differ due to rounding.

5.2 Program Description

The EasyCool for Business offering is a Bring Your Own Thermostat (BYOT) demand response (DR) offering that leverages the built-in capabilities of many connected thermostats to slightly adjust the HVAC temperature setbacks of enrolled customers' thermostats. In response to a peak load event called in advance by ENO, participants' thermostats will be adjusted during the peak event, and in the aggregate will shave load peaks during periods where generation and transmission capacity is stressed. Small businesses participating in the

offering will receive an incentive upon enrollment, as well as an additional annual incentive upon confirmation of ongoing involvement.

5.2.1 PROGRAM CHANGES

There were no reported changes to this program in PY12.

5.2.2 TIMING OF PROJECTS

All projects occurred from May to September.

5.2.3 TRADE ALLIES

There were no reported trade allies in this program.

5.2.4 GOAL ACHIEVEMENT

The table below summarizes the programs' performance against goal.

TABLE 5-5 EASYCOOL FOR BUSINESS PERFORMANCE TOWARDS GOAL

<i>Ex Post</i> Gross Energy Savings (kWh) Goal	% to kWh Goal	<i>Ex Post</i> Gross Energy Savings (kWh)	<i>Ex Post</i> Gross Savings (kW) Target	% to kW Target	<i>Ex Post</i> Gross Savings (kW)
0	N/A	0	911.00	7.1%	64.96

5.3 EM&V Methodology

For PY12, the Evaluators utilized the per participant kW savings estimated in PY11 to calculate program savings. The savings methodology from PY11 is provided below for reference. In PY11, the Evaluators employed the following approach to complete impact evaluation activities for the program. The Evaluator followed the Calculated Baseline approach outlined in the Midcontinent Independent System Operator, Inc. (MISO) Business Practices Manual (BPM)⁵. The following impact evaluation steps were taken to determine the suitability of the MISO Calculated Baseline approach:

- Developed an Unadjusted Consumption (UC) Baseline, a Symmetric Multiplicative Adjustment (SMA)
 Baseline, and a Weather Sensitive Adjustment (WSA) Baseline for each program participant. Loads were calculated utilizing 1-hour AMI data.
- Determined days that will serve as proxy days for testing the suitability of the baseline approach. Proxy
 days represent days like demand response event days in terms of load shape and temperature profiles.
- Estimated bias (uncertainty) and error on proxy days for each model to assess baseline performance.
 Bias is assessed by examining the average percent error of the baseline predictions relative to the actual usage on proxy days. In a similar manner, error is assessed through various metrics such as Root Mean Squared Error (RRMSE) using baseline predictions and actual usage on proxy days.
- Selected the baseline model with the lowest absolute bias.

⁵ Ibid.

5.3.1 GROSS IMPACT

In the evaluation of demand response programs, energy savings are estimated by comparing a participant's load shape during a demand response event with a baseline load shape. This baseline load is assumed to be a good estimate of the counterfactual load—that is, the load that would have manifested had there not been an event called that day.

5.3.1.1 Data Sources

Data used for this evaluation include program tracking data that identifies which customers participated in the program and contains data fields such as hourly usage, hourly interval meter data (AMI) for each customer participating in the program, and a full schedule of DR program events, including the time of the event.

5.3.1.2 MISO Calculated Baseline Approach (Customer Baselines)

The following details the general requirements for the MISO Calculated Baseline Approach. The Evaluators developed Customer Baselines (CBLs) in accordance with this approach. For a demand resource, the Consumption Baseline is a profile of hourly demand based on an averaged sample of historical data which may be adjusted for factors that reflect specific, on-the-day conditions, such as temperature.

The default consumption baseline is designed as follows:

- Separate hourly demand profiles for non-holiday weekdays and for weekends/holidays
- The "weekday" hourly profile is based on the average of the ten (10), but not less than five (5), most recent weekdays that are not holidays or other non-standard "event" days
- The "weekend/holiday" hourly profile is based on the average of the four (4), but not less than two (2), most recent weekend days or holidays that are not "event" days
- An "event" day is one during which there was, for the resource in question, a real- time energy or ancillary services dispatch, or a scheduled outage
- The maximum look-back window is limited to 45 days
- If the 45-day window contains insufficient days to meet the minimum number of days described above, the profiles are constructed based on the available days within the 45-day window that qualify, supplemented by the largest (MW) matching "event" day(s) values for that resource within that same window as necessary to obtain the minimum number of values.

Adjustment mechanisms to the default Consumption Baseline include:

- Symmetric Multiplicative Adjustment (SMA)
 - Adjusts each baseline hourly value (MW) during the event up or down by the ratio of
 - (a) the sum of hourly demands for the three hours beginning four hours prior to the event and
 (b) the sum of those same three hourly baseline demands
 - The adjustment is limited to a change in any individual baseline hour of plus or minus 20 percent.
 - If multiple events occur during the same day, the SMA is calculated only for the first event, but applied to all events that day.

- Weather Sensitive Adjustment (WSA)
 - Adjusts each baseline hourly value (MW) up or down by a Weather Adjustment Factor
 - The Weather Adjustment Factor is determined by a mathematical relationship derived through a regression analysis that considers the DRR load and historical hourly temperature data.

5.3.1.3 Evaluators MISO Models

The following CBL models were developed for each customer in accordance with MISO protocols.

For a 5-of-10 (or 5-of-5) unadjusted baseline, the Evaluators examine the load data from the most recent ten (or five) non-event, non-holiday weekdays relative to the event day and calculate the mean demand usage values of the five highest load days. This baseline is then adjusted for the SMA and WSA models utilizing the method described within.

Model Type	Baseline Days	SMA	WSA
Unadjusted	5-of-10	No	No
SMA-Adjusted	5-of-10	Yes	No
WSA-Adjusted	5-of-10	No	Yes
Unadjusted	5-of-5	No	No
SMA-Adjusted	5-of-5	Yes	No
WSA-Adjusted	5-of-5	No	Yes

TABLE 5-6 EVALUATORS' MISO CBL MODELS

5.3.1.4 Baseline and Proxy Day Development

The Evaluators defined proxy days as the top eight non-event, non-holiday, non-weekend days with the highest loads across all summer months. In addition, proxy days must display a maximum temperature of greater than or equal to the minimum temperature observed during normal curtailment hours during the events. The Evaluators used these defined proxy days to determine the ability of CBL models to predict actual usage for each customer.

5.3.2 NET IMPACT

In demand response programs, it is typically assumed that there are neither spillover nor free-ridership effects (customers are not expected to curtail without participating). Although customers can find workarounds to make up for lost productivity due to demand response events, they are compensated only if they reduce their load during the peak demand window, the primary program goal. As such, the net-to-gross ratio for this program is assumed to be 100%.

5.4 Evaluation Findings

Evaluation findings are found in the table below.

TABLE 5-7 EVENT DATES AND TIMES

Event Dates	Event Times (CDT)
6/9/2022	1500-1800
6/17/2022	1500-1800
6/23/2022	1400-1800
6/24/2022	1500-1700
8/15/2022	1600-1900
9/1/2022	1500-1830
9/22/2022	1500-1900

5.4.1 GROSS IMPACT FINDINGS

Using per participant demand reductions (kW) from PY11, the Evaluators calculated the PY12 kW reduction. Results are shown below in the table below.

TABLE 5-8 TOTAL EASYCOOL FOR BUSINESS DEMAND REDUCTIONS

Average Savings per Event per Unit (kW)	Average Savings per Event per Participant (kW)	Total Participating Systems	Number of Participants	Total Program kW Reduction
0.484759	0.484759	134	134	64.96

The overall verified kW reduction is 64.96 kW.

5.4.2 NET IMPACT FINDINGS

For demand response programs, net savings equals gross savings.

Program results can be found in tables in Section 5.4.1.

5.4.3 PROCESS FINDINGS

In PY12, the Evaluator conducted limited process evaluation activities.

5.4.3.1 Staff Interviews

The following section summarizes the key findings from in-depth interviews with APTIM/Energy Hub staff. These in-depth interviews aimed to learn more about program design and operations, and the successes and challenges experienced during 2022 (PY12). Interviews lasted approximately 60 minutes and were conducted using the Microsoft Teams platform. The evaluators recorded all interviews with participant permission.

5.4.3.1.1 Program Description

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

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

PY12 marked the second year of the Easy Cool BYOT program. In PY12, APTIM noted the program had several thousand participants enroll, with most being residential customers, and 50 small commercial customers, and summed up the program year as a *"smooth dispatch season"*. Emails from the utility versus other marketing channels, are the most effective way to getting customers to enroll and participate in the program, as well as notifications from their thermostat brands – something the customer already trusts.

5.4.3.1.2 Program Changes

This year, ENO discontinued the switches and instead encouraged customers to purchase smart thermostats in order to enroll in the BYOT program. Additionally, program staff are planning to integrate a new API for nest data to help collect more real-time data from the nest thermostats. They are also in the process of adding the amazon smart thermostat as an offering.

5.4.3.1.3 Program Challenges

The program did not meet their enrollment goals for this program year. This year, customers in ENO territory experienced an extreme heat wave in June, resulting in four events.

5.5 Data Tracking Review

The Evaluators reviewed the tracking data and found no issues. Advanced metering infrastructure (AMI) data was not provided which led the Evaluators to utilize kW reductions values from PY11.

5.6 Key Findings and Conclusions

The following summarizes the key findings and conclusions for the PY12 evaluation.

- **The program did not meet their enrollment goals for this program year.** The number of participants nearly doubled in PY12, but the program fell short of its kW target (7.1%).
- Pre-cooling occurs prior to an event to manage customer comfort. In addition, events last no more than four hours and are limited to 15 events per year.
- New additions for the program are planned for PY13. Program staffing are planning to integrate a new API for nest data to help with real-time data collection for nest thermostats. In addition, staff are in the process of adding amazon smart thermostats as a program offering.

5.7 Recommendations

There are no recommendations from the PY12 evaluation.
6 LARGE C&I DEMAND RESPONSE

6.1 Summary

The tables below report *ex ante* gross, *ex post* gross, *ex post* net energy savings (kWh) (both annual and lifetime), demand reductions (kW), participation, and incentive spend.

TABLE 6-1 PY12 LARGE C&I DR ENERGY SAVINGS (KWH)

Measure	<i>Ex Ante</i> Gross Savings (kWh)	Realization Rate (kWh)	<i>Ex Post</i> Gross Savings (kWh)	NTG	<i>Ex Post</i> Net Savings (kWh)
DR Participation	21,412	79%	16,989	100%	16,989
Total	21,412	79%	16,989	100%	16,989

Sums may differ due to rounding.

TABLE 6-2 PY12 LARGE C&I DR DEMAND REDUCTIONS (KW)

Measure	<i>Ex Ante</i> Gross Demand (kW)	Realization Rate (kW)	<i>Ex Post</i> Gross Demand (kW)	NTG	<i>Ex Post</i> Net Demand (kW)
DR Participation	1,651.00	74%	1,225.81	100%	1,225.81
Total	1,651.00	74%	1,225.81	100%	1,225.81

Sums may differ due to rounding.

TABLE 6-3 PY11 LARGE C&I DR LIFETIME SAVINGS SUMMARY

Measure	EUL	<i>Ex Post</i> Gross Lifetime Energy Savings (kWh)	<i>Ex Post</i> Net Lifetime Energy Savings (kWh)
DR Participation	1	16,989	16,989
Total	1	16,989	16,989

Sums may differ due to rounding.

TABLE 6-4 PY12 LARGE C&I DR PARTICIPATION AND INCENTIVE SUMMARY

Measure	Participation	Incentive Spend (\$)	
DR Participation	11	\$95,876	
Total	11	\$95,876	

6.2 Program Description

The Large C&I Demand Response (Large C&I DR) program is designed to help reduce the strain on the electric grid during periods of peak demand. The automated program is free, flexible, and easy to use. The program provides scaled incentives based on the load provided (with seasonal payments in summer and winter). Customers nominate the load they will provide in collaboration with Honeywell (the program implementer) and may provide the curtailment with automated controls or via manual curtailment of the proposed systems. Curtailed systems may include HVAC, lighting, industrial processes, or any other applicable end-use.

6.2.1 PROGRAM DELIVERY CHANNELS AND EXPECTED SAVINGS

Incentives are based on twice-yearly payments based on average demand reduction across all events during a performance period (\$50/kW for summer, \$10/kW for non-summer).

Motivation to participate varies from customer-to-customer, and program staff noted that they will tailor their sales pitch to meet this variety. Some customers are driven by the financial incentive, while others look at participation purely from a sustainability standpoint. However, program staff emphasized that lowering energy costs are not a main selling point, as it could just be one outcome of the program, not a main driver. Being able to return to in-person engagement has really helped the program this year and seen as an overall success. Additionally, being able to present to larger hospitals in the area, paving the way for enrollment for new program year, has also been a huge success.

The program did not hit the demand reduction target of 3,731.00.

6.2.2 TIMING OF PROJECTS

All projects occurred from May to September.

6.2.3 TRADE ALLIES

There were no reported trade allies in this program.

6.2.4 GOAL ACHIEVEMENT

The table below summarizes the programs' performance against goal.

TABLE 6-5 LARGE C&I DR PERFORMANCE TOWARDS GOAL

<i>Ex Post</i> Gross Energy Savings (kWh) Goal	% to kWh Goal	<i>Ex Post</i> Gross Energy Savings (kWh)	<i>Ex Post</i> Gross Savings (kW) Target	% to kW Target	<i>Ex Post</i> Gross Savings (kW)
0	NA	16,989	3,731.00	32.9%	1,225.81

6.3 EM&V Methodology

The Evaluators employed the following approach to complete impact evaluation activities for the program. The Evaluator followed the Calculated Baseline approach outlined in the Midcontinent Independent System Operator, Inc. (MISO) Business Practices Manual (BPM)⁶. The following impact evaluation steps were taken to determine the suitability of the MISO Calculated Baseline approach:

- Developed an Unadjusted Consumption (UC) Baseline, a Symmetric Multiplicative Adjustment (SMA)
 Baseline, and a Weather Sensitive Adjustment (WSA) Baseline for each program participant. Loads were calculated utilizing 15-minute AMI data.
- Determined days that will serve as proxy days for testing the suitability of the baseline approach. Proxy
 days represent days like demand response event days in terms of load shape and temperature profiles.
- Estimated bias (uncertainty) and error on proxy days for each model to assess baseline performance.
 Bias is assessed by examining the average percent error of the baseline predictions relative to the actual usage on proxy days. In a similar manner, error is assessed through various metrics such as Root Mean Squared Error (RRMSE) using baseline predictions and actual usage on proxy days.
- Assigned the model/baseline with the lowest bias to each customer.
- Assessed bias and error for the entire program population and customers with the largest nominated loads, with the goal of minimizing bias and error for the program overall.

6.3.1 GROSS IMPACT

In the evaluation of demand response programs, energy savings are estimated by comparing a participant's load shape during a demand response event with a baseline load shape. This baseline load is assumed to be a good estimate of the counterfactual load—that is, the load that would have manifested had there not been an event called that day.

6.3.1.1 Data Sources

Data used for this evaluation include program tracking data that identifies which customers participated in the program and contains data fields such as contract curtailment amount, hourly usage, hourly baseline estimates, 15-minute interval meter data (AMI) for each customer participating in the program, and a full schedule of DR program events, including the time of the event.

6.3.1.2 MISO Calculated Baseline Approach (Customer Baselines)

The following details the general requirements for the MISO Calculated Baseline Approach. The Evaluators developed Customer Baselines (CBLs) in accordance with this approach. For a demand resource, the Consumption Baseline is a profile of hourly demand based on an averaged sample of historical data which may be adjusted for factors that reflect specific, on-the-day conditions, such as temperature.

⁶ Ibid.

The default consumption baseline is designed as follows:

- Separate hourly demand profiles for non-holiday weekdays and for weekends/holidays
- The "weekday" hourly profile is based on the average of the ten (10), but not less than five (5), most recent weekdays that are not holidays or other non-standard "event" days
- The "weekend/holiday" hourly profile is based on the average of the four (4), but not less than two (2), most recent weekend days or holidays that are not "event" days
- An "event" day is one during which there was, for the resource in question, a real- time energy or ancillary services dispatch, or a scheduled outage
- The maximum look-back window is limited to 45 days
- If the 45-day window contains insufficient days to meet the minimum number of days described above, the profiles are constructed based on the available days within the 45-day window that qualify, supplemented by the largest (MW) matching "event" day(s) values for that resource within that same window as necessary to obtain the minimum number of values.

Adjustment mechanisms to the default Consumption Baseline include:

- Symmetric Multiplicative Adjustment (SMA)
 - \circ Adjusts each baseline hourly value (MW) during the event up or down by the ratio of
 - (a) the sum of hourly demands for the three hours beginning four hours prior to the event and
 (b) the sum of those same three hourly baseline demands
 - The adjustment is limited to a change in any individual baseline hour of plus or minus 20 percent.
 - If multiple events occur during the same day, the SMA is calculated only for the first event, but applied to all events that day.
- Weather Sensitive Adjustment (WSA)
 - Adjusts each baseline hourly value (MW) up or down by a Weather Adjustment Factor
 - The Weather Adjustment Factor is determined by a mathematical relationship derived through a regression analysis that considers the DRR load and historical hourly temperature data.

6.3.1.3 Evaluators MISO Models

The following CBL models were developed for each customer in accordance with MISO protocols.

For a 10-of-10 (or 5-of-5) unadjusted baseline, the Evaluators examine the load data from the most recent ten (or five) non-event, non-holiday weekdays relative to the event day and calculate the mean demand usage values of the ten (or five) highest load days. This baseline is then adjusted for the SMA and WSA models utilizing the method described in Section 6.3.1.2.

Model Type	Baseline Days	SMA	WSA
Unadjusted	10-of-10	No	No
SMA-Adjusted	sted 10-of-10 Yes		No
WSA-Adjusted	10-of-10	No	Yes
Unadjusted	5-of-5	No	No
SMA-Adjusted	5-of-5	Yes	No
WSA-Adjusted	5-of-5	No	Yes

TABLE 6-6 EVALUATORS' MISO CBL MODELS

6.3.1.4 Baseline and Proxy Day Development

The Evaluators defined proxy days as the top four non-event, non-holiday, non-weekend days with the highest loads across all summer months. In addition, proxy days must display a maximum temperature of greater than or equal to the minimum temperature observed during normal curtailment hours during the events. The Evaluators used these defined proxy days to determine the ability of CBL models to predict actual usage for each customer.

6.3.2 NET IMPACT

In demand response programs, it is typically assumed that there are neither spillover nor free-ridership effects (customers are not expected to curtail without participating). Although customers can find workarounds to make up for lost productivity due to demand response events, they are compensated only if they reduce their load during the peak demand window, the primary program goal. As such, the net-to-gross ratio for this program is assumed to be 100%.

6.4 Evaluation Findings

6.4.1 GROSS IMPACT

Seven events were called during the summer of 2022 between the hours of 1500 and 1830 CDT, as shown in the table below.

TABLE 6-7 EVENT DATES AND TIMES

Event Dates	Event Times (CDT)
5/18/2022	16:00-18:00
6/9/2022	15:00-17:00
6/17/2022	16:00-18:00
6/23/2022	16:00-18:00
6/24/2022	16:00-18:00
9/1/2022	16:00-18:00
9/22/2022	16:30-18:30

6.4.1.1 Performance Versus Nomination Comparison

The Evaluator compared realized kW for each site with their nominated kW to summarize the extent to which participants have met their nominated load curtailments. The names of sites have been anonymized to protect customer confidentiality.

The verified kW curtailment as a percent of nominated load is 72%. This represents an improvement from PY11 with the program hitting 41% of nominated load.

Site	Nominated kW	Verified kW	% of Nominated Load
Site 1	103.00	79.94	78%
Site 2	42.00	2.04	5%
Site 3	88.00	14.62	17%
Site 4	ite 4 700.00		119%
Site 5	Site 5 73.00		12%
Site 6	96.00	66.09	69%
Site 7	56.00	13.55	24%
Site 8	260.00	96.26	37%
Site 9	181.00	67.61	37%
Site 10	89.00	44.46	50%
Site 11	10.00	0.91	9%
Total	1,698.00	1,225.81	72%

TABLE 6-8 SITE LEVEL RESULTS

6.4.1.2 Load Shapes and Model Performance

The figures below are average load shapes for all sites on proxy and event days and depict actual kW and baseline kW. While the figures show that baseline kW is not an exact match for actual kW during the hours of curtailment, the differences are expected to average out, with some days over-estimating the baseline and other days under-estimating the baseline. In addition, the Evaluators determined that the site with the largest usage has erratic loads that are not easily predicted using the agreed-upon MISO models, which depend on either weather or prior usage patterns.



FIGURE 6-1 PROXY DAY LOAD SHAPES



FIGURE 6-2 EVENT DAY LOAD SHAPES

The Evaluator estimated bias and error for the Evaluators' MISO models across all sites and when applied on a site-specific basis and selecting for the model with the lowest bias (shown as the "Unadjusted CBL 5-of-5"). In addition, the Evaluator estimated and verified Honeywell's *Ex Ante* model for all sites. As shown in the table below, the Evaluator's Unadjusted CBL 5-of-5 performed the best by having the lowest absolute bias. The Evaluator determined that the method of additive adjustment for Honeywell's CBL model does not match the approved adjustment factors in the MISO protocols which only allow for multiplicative or weather-sensitive adjustments⁷.

⁷ Per MISO, the offset factor must also begin three hours prior to the event start time, whereas Honeywell's utilizes a one hour offset factor beginning two hours prior to the event start time.

TABLE 6-9 MODEL FIT

Model	Follow MISO Protocols	RRMSE	RMSE	Bias	Best Fit Model (Lowest Absolute Bias)
Unadjusted CBL 10-of-10	X	0.720	207.244	-0.02	
Unadjusted CBL 5-of-5	X	0.716	206.206	0.00	X
WSA Adjusted CBL 10-of-10	X	0.713	205.203	0.01	
WSA Adjusted CBL 5-of-5	X	0.708	203.866	0.02	
Mixed Model CBL (site-specific)	X	0.711	204.588	0.03	
SMA Adjusted CBL 5-of-5	X	0.705	203.012	0.10	
SMA Adjusted CBL 10-of-10	Х	0.705	202.962	0.10	
Honeywell CBL 10-of-10 Additive Adjustment (2-Hour Offset)		1.011	291.075	1.53	

The table below shows the expected savings, verified savings and realization rate for the program. The realization rate of kWh is 79% because the *ex ante* Honeywell baselines had large positive bias on proxy days and the Honeywell baselines were higher than any of the *ex post* MISO models.

TABLE 6-10 VERIFIED GROSS IMPACTS

Utility	Expected kWh	Expected kW	Verified Gross kWh	Verified Gross kW	Realization Rate kWh	kW Realization Rate
DR Events	21,412	1,651.00	16,989	1225.81	79%	74%

6.4.2 NET IMPACT

The NTG is assumed to be 100% for demand response programs.

Program results can be found in tables in Section 6.4.1.

6.4.3 PROCESS FINDINGS

The following section summarizes the key findings from in-depth interviews with program staff. These in-depth interviews with ENO and the TPI, Honeywell, aimed to learn more about program design and operations, and the successes and challenges experienced during 2022 (PY12). Interviews lasted approximately 60 minutes and were conducted using the Microsoft Teams platform. The evaluators recorded all interviews with participant permission.

6.4.3.1 Program Management and Delivery

The Evaluators interviewed the Honeywell team in charge of implementing the program. Interviewees included a program manager from Honeywell's Smart Energy group, as well as an energy products manager; interviewees indicated the program employs one other full time staff member, as well as contracts with local trade allies to conduct the installs.

6.4.3.2 Program Background

The program kicked off in early 2020 right before the start of the COVID-19 pandemic. This unfortunate launch timing resulted in delays and setbacks for the program, as the pandemic hindered staff's ability to meet with customers in person. Staff explained that although the approach to every project is the same, the projects themselves vary as equipment size and usage patterns are very customer dependent. They noted that is easy to create demand curves and usage forecasts for office-building focused projects as these buildings have standard usage pattern, others building types like manufactures can be more complicated.

When beginning a new project, program staff conduct a demand response survey to understand the customers' operational restrictions and typical utility usage. From there, they can make calculations to predict how much energy the customers can reduce during peak events. Customers then sign up for specific kilowatt reduction goals that they can meet over the course of the peak demand events. The program is completely voluntary; customers can opt out of events at any time.

Typically, customers are a warned of an upcoming event about 24 hours in advance via a notification. The program is automated, so unless the customer opts out of the event their usage will automatically be reduced once the event begins. Typically, events last about 2-3 hours and occur in the middle of heat waves or other predictable events; 2021 experienced four events, all of which occurred in the summer. Customers are told to expect anywhere from 4-8 events when they enroll. When enrolling in the program customers often express concern regarding comfort during events, however staff note that the set points are so low that comfort is rarely impacted, and customers often do not even realize the event is happening.

Program staff encourage customers to plan for events and practice pre-cooling prior to an event. Staff underscored that this program is not an energy saving savings program but rather a load shifting, demand reduction program.

6.4.3.3 Program Challenges

Staff noted that the biggest challenge the program faces is educating customers enough to get them to enroll, along with low incentive levels.

6.4.3.4 Program Goals

The overall goal for the program is 3.7 megawatts. Thus far, the team has enrolled customers that cover 1.6 megawatts.

6.4.3.5 Marketing

Program marketing consists of handouts, information on the website, lunch-n-learns, and industry presentations. Staff note that word of mouth accounts for about half of their recruitment. Honeywell manages all program marketing, communicating for account managers to help with scheduling and logistics.

6.4.3.6 Communication and Data

Honeywell and ENO meet every other week to go over program updates; they also communicate as needed outside of meetings. Staff receive event data, in 15-minute interval, the day after an event. Before enrolling a customer in the program staff conduct a dry run in the building and verify the facility can perform during an event. Typically, local trade allies conduct the installations and verifications.

6.4.3.7 Successes

When asked what the biggest success of the program in 2021 staff talked about their success building relationships and conducting outreach. As a new program, the program is still getting its feet off the ground and enrolling participants. Staff often work with ENO's other C&I programs to enroll new customers once they have received upgraded equipment through the various other programs.

6.5 Data Tracking Review

The Evaluators reviewed the tracking data and found no issues. AMI data was provided and was complete for all sites which allowed the Evaluators to estimate program impacts.

6.6 Key Findings and Conclusions

The following summarizes the key findings and conclusions from the PY12 evaluation.

- **AMI data was used for all sites in PY12.** In PY11, two sites had incomplete AMI data, however, this issue was resolved in PY12.
- Honeywell did not meet enrollment goals for this program for the past two years. The program hit 32% of its kW target in PY12 and 11% in PY11. The increase in kW savings stemmed from the addition of three new sites in PY12.
- Participants are given ample warning ahead of an event. Participants are a warned of an upcoming event about 24 hours in advance via a notification. Typically, events last about 2-3 hours and occur in the middle of heat waves or other predictable events.
- In response to concerns about comfort during events, staff recommend participants "pre-cool".
 Program staff encourage customers to plan ahead for events and practice pre-cooling prior to an event.
 Staff underscored that this program is not an energy saving kWh savings program but rather a load shifting, kW savings program.
- Educating customers about demand response is a challenge. Staff noted that the biggest challenges the
 program face are educating customers about the program and getting them to enroll. Educating
 decision-makers on what demand response is and what it entails can be difficult, as well as relationshipbuilding with new customers or potential new customers.

6.7 Recommendations

The following summarizes key recommendations after completing the PY12 evaluation.

- Continue to build relationships with other C&I programs. The program should continue to build off of
 its partnership with other C&I programs as a means of recruiting interested customers in the demand
 response program. Staff noted that buildings with more updated equipment perform better in this
 program and thus participants who recently received updated equipment through the C&I program are
 prime candidates.
- Consider providing an educational demand response workshop for potential and current customers. Customers often have difficulty understanding incentive payments for demand response programs therefore we believe an educational workshop is necessary. Customers need education on how baselines are measured, and the overall EM&V process, to estimate their potential benefit. This

education will often assist with customer retention, especially for key accounts that drive a substantial portion of kW reductions.

 Cross promote Large C&I Demand Response with relevant Large C&I Solutions projects. Large C&I Solutions has numerous customer engagements related to building commissioning or the installation and use of building automation systems (BAS). The customer engagement with their BAS as part of a retrofit rebate project presents an opportunity to make the business case for registering systems covered by their BAS for rebates associated with demand response load shedding.

7 APPENDIX A: COST-EFFECTIVNESS

7.1 Summary

The Evaluators estimated the cost-effectiveness for the overall energy efficiency and demand response portfolio of programs, based on PY12 costs and savings estimates provided by ENO and their third-party implementers. This appendix provides the cost-effective results, as well as a brief overview of the approach taken by the Evaluators. The portfolio and energy efficiency programs pass all the cost-effectiveness tests except the RIM test. The table below presents the cost-effectiveness results for the PY12 portfolio.

Program	TRC	UCT	RIM	РСТ	SCT
HPwES	1.10	1.03	0.36	4.40	1.47
RLA	3.64	3.13	0.41	9.06	4.50
MF Solutions	1.61	1.52	0.40	5.10	2.13
IQW	1.29	1.31	0.55	2.85	1.83
A/C Solutions	1.40	1.49	0.45	4.54	1.86
SK&E	0.47	0.41	0.21	5.23	0.56
AR&R	0.14	0.15	0.11	1.47	0.20
Behavioral	0.47	0.47	0.19	8.74	0.47
Rewards	0.00	0.00	0.00	1.00	0.00
EasyCool BYOT	0.01	0.01	0.01	1.00	0.01
C&I NC	0.62	0.71	0.32	3.72	0.82
Small C&I Solutions	1.00	1.50	0.40	2.70	1.31
Large C&I Solutions	1.28	1.99	0.38	3.69	1.65
PFI	1.36	1.51	0.32	6.20	1.78
Large C&I DR	0.00	0.00	0.00	1.02	0.00
EasyCool for Business	0.00	0.00	0.00	1.00	0.00
Total	1.29	1.55	0.38	4.10	1.67

TABLE 7-1 PY12 COST-EFFECTIVENESS RESULTS

Sums may differ due to rounding.

7.2 Methods

The California Standard Practice Model was used as a guideline for the calculations, along with guidance from the ENO TRM V5.0, the IL TRM V9.0, and the AR TRM v9.1. The cost-effectiveness analysis methods that were used in this analysis are among the set of standard methods used in this industry and include the Utility Cost Test (UCT)⁸, Total Resource Cost Test (TRC), Ratepayer Impact Measure Test (RIM), and Participant Cost Test (PCT). All tests weigh monetized benefits against costs. These monetized amounts are presented as Net Present

⁸ The UCT is also referred to as the Program Administrator Cost Test (PACT).

Value (NPV) evaluated over the lifespan of the measure. The benefits and costs differ for each test based on the perspective of the test. The definitions below are taken from the California Standard Practice Manual.

The TRC measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.

The UCT measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits. Costs are defined more narrowly.

The PCT is the measure of the quantifiable benefits and costs to the customer due to participation in a program. Since many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.

The RIM test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs. Conversely, rates or bills would go up if revenues collected after program implementation is less than the total costs incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.

A common misperception is that there is a single best perspective for evaluation of cost-effectiveness. Each test is useful and accurate, but the results of each test are intended to answer a different set of questions. The questions to be addressed by each cost test are shown in the table below.⁹

TABLE 7-2 QUESTIONS ADDRESSED	BY THE VARIOUS COST TESTS
-------------------------------	---------------------------

Cost Test	Questions Addressed				
Participant Cost Test (PCT)	Is it worth it to the customer to install energy efficiency?				
	Is it likely that the customer wants to participate in a utility program that promotes energy efficiency?				
	What is the impact of the energy efficiency project on the utility's operating				
Ratepayer Impact	margin?				
Measure (RIM)	Would the project require an increase in rates to reach the same operating				
	margin?				
Utility Cost Test	Do total utility costs increase or decrease?				
(UCT)	What is the change in total customer bills required to keep the utility whole?				
	What is the regional benefit of the energy efficiency project (including the net				
Total Resource Cost Test (TRC)	costs and benefits to the utility and its customers)?				
	Are all of the benefits greater than all of the costs (regardless of who pays the				
	costs and who receives the benefits)?				
	Is more or less money required by the region to pay for energy needs?				

⁹ https://www.epa.gov/energy/understanding-cost-effectiveness-energy-efficiency-programs

Overall, the results of all four cost-effectiveness tests provide a more comprehensive picture than the use of any one test alone. The TRC cost test addresses whether energy efficiency is cost-effective overall. The PCT, UCT, and RIM address whether the selection of measures and design of the program are balanced from the perspective of the participants, utilities, and non-participants. The scope of the benefit and cost components included in each test are summarized in the table below.¹⁰

Test	Benefits	Costs	
PCT (Benefits and costs from	 Incentive payments 	Incremental equipment costs	
the perspective of the	 Bill Savings 	Incremental installation costs	
customer installing the measure)	 Applicable tax credits or incentives 		
UCT (Perspective of utility,	 Energy-related costs avoided by the utility 	Program overhead costs	
party implementing the program	 Capacity-related costs avoided by the utility, including generation, transmission, and distribution 	 Utility/program administrator incentive costs 	
	 Energy-related costs avoided by the utility 	Program overhead costs	
TRC (Benefits and costs from the perspective of all utility customers in the utility	 Capacity-related costs avoided by the utility, including generation, transmission, and distribution 	Program installation costs	
service territory)	 Additional resource savings 	Incremental measure costs	
	 Monetized non-energy benefits as outlined by the TRM. 		
RIM (Impact of efficiency	 Energy-related costs avoided by the utility 	Program overhead costs	
measure on non- participating ratepayers	 Capacity-related costs avoided by the utility, including generation, 	 Lost revenue due to reduced energy bills 	
overall)	transmission, and distribution	 Utility/program administrator installation costs 	

TABLE 7-3 BENEFITS AND	COSTS INCLUDED IN	EACH COST-EFFECTIVEN	ESS TEST
	COSID INCLODED IN		.55 1 251

7.2.1 LINE LOSSES

The Evaluators used the line losses provided by ENO for the PY12 evaluation.

7.2.2 ECONOMIC INPUTS

The Evaluators used the economic inputs provided by ENO for the cost benefit analysis, this included avoided costs that were estimated using the Real Economic Carrying Charge (RECC) approach. The rates utilized for avoided water from Protocol L in the AR TRM V8.2.

The Evaluators used the discount rates provided by ENO to perform the cost benefit analysis, and these values align with the rates used in the PY11 to PY12 Plan. The evaluated net energy savings (kWh) and demand

¹⁰ Ibid.

reductions (kW) values utilized in the cost benefit analysis include a line loss factor, those values are in the table below. Additionally, the table below outlines the discount rates, escalation rate and avoided costs used in the PY12 cost-effectiveness analysis.

TABLE 7-4 ECONOMIC INPUTS FOR COST EFFECTIVENESS ANALYSIS

Discount Rates	
Utility (TRC)	7.09%
Utility (UCT)	7.09%
Utility (RIM)	7.09%
Societal (SCT)	3.00%
Participant (PCT)	10.00%
Line Losses	
Line Losses (demand)	7.29%
Line Losses (energy)	7.29%
Escalation rate	1.90%
Avoided Costs	
Avoided Energy (\$/kWh)	\$0.027
Avoided Demand (\$/kW)	\$1.456

7.3 Findings

The tables below outline the results for each test, for both the programs and the portfolio as a whole.

TABLE 7-5 PY12 COST-EFFECTIVENESS RESUL	TS BY PROGRAM
---	---------------

Program	TRC	UCT	RIM	РСТ	SCT
HPwES	1.10	1.03	0.36	4.40	1.47
RLA	3.64	3.13	0.41	9.06	4.50
MF Solutions	1.61	1.52	0.40	5.10	2.13
IQW	1.29	1.31	0.55	2.85	1.83
A/C Solutions	1.40	1.49	0.45	4.54	1.86
SK&E	0.47	0.41	0.21	5.23	0.56
AR&R	0.14	0.15	0.11	1.47	0.20
Behavioral	0.47	0.47	0.19	8.74	0.47
Rewards	0.00	0.00	0.00	1.00	0.00
EasyCool BYOT	0.01	0.01	0.01	1.00	0.01
C&I NC	0.62	0.71	0.32	3.72	0.82
Small C&I Solutions	1.00	1.50	0.40	2.70	1.31
Large C&I Solutions	1.28	1.99	0.38	3.69	1.65
PFI	1.36	1.51	0.32	6.20	1.78
Large C&I DR	0.00	0.00	0.00	1.02	0.00
EasyCool for Business	0.00	0.00	0.00	1.00	0.00
TRM Development	0.00	0.00	0.00	0.00	0.00
Total	1.29	1.55	0.38	4.10	1.67

Program	TRC Benefits	UCT Benefits	RIM Benefits	PCT Benefits	SCT Benefits
HPwES	\$882,188	\$850,565	\$850,565	\$1,772,506	\$1,177,222
RLA	\$6,404,739	\$5,435,465	\$5,435,465	\$12,106,107	\$7,918,851
MF Solutions	\$1,256,746	\$1,216,943	\$1,216,943	\$2,507,633	\$1,659,174
IQW	\$2,923,809	\$2,879,095	\$2,879,095	\$3,967,653	\$4,148,013
A/C Solutions	\$742,422	\$742,422	\$742,422	\$1,235,208	\$987,187
SK&E	\$248,934	\$216,395	\$216,395	\$567,029	\$298,969
AR&R	\$53,746	\$53,746	\$53,746	\$242,328	\$73,870
Behavioral	\$150,897	\$150,897	\$150,897	\$528,777	\$150,897
Rewards	\$0	\$0	\$0	\$5,240	\$0
EasyCool BYOT	\$4,833	\$4,833	\$4,833	\$260,679	\$4,833
C&I NC	\$75,950	\$72,605	\$72,605	\$128,051	\$99 <i>,</i> 930
Small C&I Solutions	\$2,851,806	\$2,679,933	\$2,679,933	\$5,345,163	\$3,729,159
Large C&I Solutions	\$12,867,413	\$12,380,632	\$12,380,632	\$26,342,318	\$16,662,003
PFI	\$1,618,261	\$1,582,402	\$1,582,402	\$3,867,099	\$2,119,223
Large C&I DR	\$2,428	\$2,428	\$2,428	\$97,448	\$2,428
EasyCool for Business	\$102	\$102	\$102	\$6,735	\$102
TRM Development	\$0	\$0	\$0	\$0	\$0
Total	\$30,084,275	\$28,268,462	\$28,268,462	\$58,979,976	\$39,031,862

TABLE 7-6 PY12 COST-EFFECTIVENESS BENEFITS BY PROGRAM

Program	TRC Costs	UCT Costs	RIM Costs	PCT Costs	SCT Costs
HPwES	\$801,087	\$829,459	\$2,366,276	\$402,497	\$801,087
RLA	\$1,758,603	\$1,737,152	\$13,254,175	\$1,336,826	\$1,758,603
MF Solutions	\$778,531	\$798,460	\$3,074,422	\$491,282	\$778,531
IQW	\$2,262,370	\$2,201,042	\$5,259,323	\$1,392,245	\$2,262,370
A/C Solutions	\$529,721	\$499,582	\$1,648,068	\$272,025	\$529,721
SK&E	\$533,426	\$533,426	\$1,025,774	\$108,325	\$533,426
AR&R	\$373,523	\$358,181	\$469,151	\$164,292	\$373,523
Behavioral	\$320,035	\$320,035	\$788,296	\$60,515	\$320,035
Rewards	\$5,240	\$5,240	\$5,240	\$5,240	\$5,240
EasyCool BYOT	\$513,981	\$513,981	\$513,981	\$260,679	\$513,981
C&I NC	\$121,639	\$102,454	\$229,958	\$34,446	\$121,639
Small C&I Solutions	\$2,854,315	\$1,784,511	\$6,758,138	\$1,978,875	\$2,854,315
Large C&I Solutions	\$10,084,389	\$6,219,369	\$32,274,938	\$7,138,643	\$10,084,389
PFI	\$1,191,956	\$1,045,395	\$4,967,799	\$623,924	\$1,191,956
Large C&I DR	\$619,508	\$619,508	\$621,080	\$95,876	\$619,508
EasyCool for Business	\$564,806	\$564,806	\$564 <i>,</i> 806	\$6,735	\$564,806
TRM Development	\$67,608	\$67,608	\$67,608	\$0	\$67,608
Total	\$23,380,739	\$18,200,210	\$73,889,033	\$14,372,426	\$23,380,739

TABLE 7-7 PY12 COST-EFFECTIVENESS COSTS BY PROGRAM

TABLE 7-8 PY12 COST-EFFECTIVENESS NET BENEFITS BY PROGRAM

Program	TRC Net Benefits	UCT Net Benefits	RIM Net Benefits	PCT Net Benefits	PCT Net Benefits
HPwES	\$81,101	\$21,105	-\$1,515,711	\$1,370,009	\$774,724
RLA	\$4,646,136	\$3,698,313	-\$7,818,710	\$10,769,281	\$6,582,025
MF Solutions	\$478,215	\$418,483	-\$1,857,479	\$2,016,351	\$1,167,893
IQW	\$661,439	\$678,053	-\$2,380,228	\$2,575,408	\$2,755,768
A/C Solutions	\$212,701	\$242,840	-\$905,646	\$963,183	\$715,162
SK&E	-\$284,492	-\$317,030	-\$809,378	\$458,704	\$190,644
AR&R	-\$319,777	-\$304,435	-\$415,405	\$78,036	-\$90,422
Behavioral	-\$169,137	-\$169,137	-\$637,399	\$468,262	\$90,382
Rewards	-\$5,240	-\$5,240	-\$5,240	\$0	-\$5,240
EasyCool BYOT	-\$509,148	-\$509,148	-\$509,148	\$0	-\$255,846
C&I NC	-\$45,689	-\$29,850	-\$157,353	\$93,605	\$65,484
Small C&I Solutions	-\$2,509	\$895,421	-\$4,078,205	\$3,366,288	\$1,750,283
Large C&I Solutions	\$2,783,024	\$6,161,262	-\$19,894,306	\$19,203,675	\$9,523,360
PFI	\$426,304	\$537,007	-\$3,385,397	\$3,243,175	\$1,495,299
Large C&I DR	-\$617,081	-\$617,081	-\$618,652	\$1,572	-\$93,448
EasyCool for Business	-\$564,704	-\$564,704	-\$564,704	\$0	-\$6,633
TRM Development	-\$67,608	-\$67,608	-\$67,608	\$0	\$0
Total	\$6,703,535	\$10,068,253	-\$45,620,571	\$44,607,550	\$24,659,436