November 14, 2018

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

> Re: **In Re: Resolution Regarding Proposed Rulemaking to Establish Integrated Resource Planning Components and Reporting Requirements for Entergy New Orleans, Inc. (Docket No. UD-08-02 and UD-17-03)**

Dear Ms. Johnson:

Entergy New Orleans, LLC ("ENO") hereby submits for your further handling and filing an original and three copies of the Application of Entergy New Orleans, LLC for Approval of the Revised Supplemental and Amended Implementation Plan for Program Year 9 of the Energy Smart Plan, along with the Exhibits attached thereto. Please file an original and two copies in the record in the above-referenced matter, and return a date-stamped copy to our courier.

Should you have any questions regarding the above matter, please don't hesitate to contact me at 504-576-2984. Thank you for your assistance with this matter.

Sincerely,

Harry M. Barton

HMB/bkd
Enclosures

cc: Official Service List (_via email_)

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IN RE: RESOLUTION REGARDING)	
PROPOSED RULEMAKING TO)	
ESTABLISH INTEGRATED)	
RESOURCE PLANNING)	**DOCKET NOS. UD-08-02 and UD-**
COMPONENTS AND REPORTING)	**17-03**
REQUIREMENTS FOR)	
ENTERGY NEW ORLEANS, LLC)	

APPLICATION OF ENTERGY NEW ORLEANS, LLC FOR APPROVAL
OF THE REVISED SUPPLEMENTAL AND AMENDED IMPLEMENTATION PLAN
<u>**FOR PROGRAM YEAR 9 OF THE ENERGY SMART PLAN**</u>

Entergy New Orleans, LLC ("ENO") respectfully submits to the Council for the City of New Orleans (the "Council") this Application for Approval of the Revised Supplemental and Amended Implementation Plan for Program Year 9 of the Energy Smart Plan (the "Revised Application"), and in support of this Revised Application, ENO respectfully states as follows:

I.

On February 13, 2017, in accordance with Resolution No. R-17-31, dated January 26, 2017, ENO filed its Application for Approval of the Implementation and Cost Recovery Plan for Energy Smart Program Years 7-9 (the "Application"). Resolution R-17-31 also approved ENO's selection of CB&I Environmental and Infrastructure, Inc. (subsequently renamed "APTIM")[1] as the Third Party Administrator, Accelerated Innovations, LLC ("AI") as the Behavioral Program Implementer, and ADM Associates ("ADM") as the Third Party Evaluator for Energy Smart.

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[1] On July 7, 2017, CB&I Environmental & Infrastructure, Inc. received approval from the Louisiana Secretary of State for an Amendment to its Articles of Incorporation to change its name to APTIM Environmental and Infrastructure, Inc. ENO notified the Council's Advisors and the Council's Utility Regulatory Office of this name change on July 11, 2017. The Third Party Administrator is referred to as APTIM throughout this filing, but documents attached hereto issued prior to July 7, 2017 still refer to the entity as CB&I.

II.

In the Application, APTIM and ENO presented three potential funding scenarios for Program Years 7-9. The first funding scenario maintained the same level of funding as Program Year 6 throughout Program Years 7-9. The second scenario used funding levels that would be required to attempt to increase savings by 0.2% annually and to put the programs on a track to achieve kWh savings that amount to 2% of total annual sales. The third scenario used the funding levels in the Final 2015 IRP. Council Resolution R-17-176 (the "Resolution") resolved that "Scenario 2 presented in the Application is consistent with the annual kWh savings goal of 0.2% per year described in Council Resolution R-15-599."

III.

In the Resolution, the Council approved the individual programs described in the Application, but not the program budget levels and utility incentive level. The Resolution further required ENO to host at least three technical conferences to address certain concerns related to the Application including, but not limited to, the following: "(1) resolve the inconsistencies in DSM measure level costs and savings of the proposed program structure when compared to the DSM Portfolio of the 2015 Final IRP; (2) resolve inconsistencies in the Scenario budget analysis and supporting models of the Application; (3) assess whether the Residential Direct Load Control Pilot, Behavioral Pilot and Algiers Smart Thermostat Pilot implemented in 2016 should be fully implemented with the programs proposed in the Application; (4) evaluate stakeholders proposed changes to the programs listed in the Application including, but not limited to, a residential HVAC replacement program, and combining the home performance with Energy Star program budget with the low income program budget; (5) determine the impact of all program design changes on the proposed budget framework; (6) ensure that the estimated kWh savings derived from the evaluation of the pilot programs and any Energy Smart Program design changes

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meet the kWh savings goal approved by the Council in [resolution R-17-176]; (7) assess the status, adequacy and specific use of the New Orleans Technical Resource Manual as a critical resource in supporting the design and performance evaluation of the measures and programs proposed for Energy Smart; (8) evaluate the feasibility of an additional program year related goal related to peak kW reduction; and (9) determine the appropriate individual program redesign to adjust the Program Year 7 budget and savings to a nine-month basis."

IV.

In compliance with the Council's directives, ENO held five technical conferences on the following dates to address the above issues and other issues raised by stakeholders:

- April 19, 2017 – Technical Conference 1A
- April 27, 2017 – Technical Conference 1B
- May 12, 2017 – Technical Conference 2
- July 6, 2017 – Technical Conference 3
- August 31, 2017 – Technical Conference 4

V.

The Resolution also directed ENO to file a "Supplemental and Amended Implementation Plan for Program Years 8 and 9" no later than October 1, 2017. In compliance with this directive, ENO filed its Supplemental and Amended Implementation Plan ("Supplemental Plan") on September 29, 2017. The Supplemental Plan was designed to maximize the likelihood that ENO could meet the Scenario 2 savings targets, though it did not guarantee that ENO can achieve these aggressive energy savings targets. Council Resolution No. R-17-673 approved the Supplemental Plan and allowed ENO to propose any necessary changes after complete and final evaluation of the pilot programs. ENO submits the Revised Implementation Plan ("Revised Plan," attached hereto as Exhibit A) in compliance with R-17-673 and to seek Council approval for changes to the Implementation Plan for Program Year 9 that will be necessary to achieve the savings targets approved by the Council for that Program Year. As discussed briefly below, and

more fully in the Revised Plan, the need for the proposed changes became evident upon ENO's review of the final results for one pilot.

VI.

As detailed in ENO's filing of March 22, 2018, an initial evaluation of the Behavioral Scorecard Offering Pilot yielded "negative" savings showing that the participants actually increased their usage during the pilot period. The evaluators, ADM Associates ("ADM") suggested that the negative results were likely due to the approximately 1,400 participants that had opted into the offering being highly energy efficient prior to participation. As a result, the Behavioral offering was not as beneficial as it would have been to people who were not as energy efficient prior to participation. In an effort to boost participation, ENO requested and received approval, via Council Resolution No. R-18-136, to transition the Behavioral offering from Opt-in to Opt-out enrollment. After approval, ENO added participants in two groups of 25,000 customers. In hopes of gaining a better understanding of the potential kWh savings that can result from a Behavioral offering in New Orleans, ADM recommended conducting a mid-year evaluation of the Opt-out version of the program. A copy of the mid-year evaluation is included with this filing, attached hereto as Exhibit B.

VII.

ADM's analysis in the mid-year evaluation concluded that the Opt-out Behavioral program, based upon a shortened treatment period, would save participants approximately 0.07% in annual usage. ADM further concluded that the kWh savings percentage would likely be larger if the test period was 12 months instead of 3 months because "[B]ehavioral programs usually take a few months to affect change in user behavior and usage reductions in early months tend to be much lower than subsequent treatment months." Despite this recognized trend, ENO feels that it is necessary at this time to adjust the Supplemental Plan to reduce its reliance on the

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Behavioral offering in attaining the PY9 kWh goals. ENO estimates that the Behavioral offering will be able to save approximately 2,000,000 kWh in PY9. As such, the PY9 boost strategy, detailed in the Revised Plan, will replace approximately 6,000,000 kWh.

VIII.

The table below shows the projected savings and program costs associated with the Supplemental Plan, which are consistent with the Council's annual incremental kWh savings goal of 0.2% per year, described in Council Resolution R-15-599.

ENERGY SMART PROJECTED SAVINGS				
	kWh		$	$
	Legacy	Algiers	Legacy	Algiers
Program Year 9 Total	50,266,105	3,628,289	$ 13,340,182	$ 1,073,538
PY9 Behavioral Only	6,844,121	1,155,879	$285,497	$41,250

IX.

The attached Revised Plan discusses ENO's plan to implement new tactics to achieve the level of kWh savings needed to remain consistent with the goals previously approved by the Council. The Behavioral offering shortfall will be addressed in the following ways:

- Mailing Lighting and Weatherization Kits;

- Expanding the Retail Lighting and Appliance Program; and

- Conducting Lighting Giveaways.

Though ENO plans to achieve its kWh target through the use of the above-mentioned strategies, which leverage the most cost-effective measures from Energy Smart, ENO still plans to continue the Behavioral offering in PY9. However, as deployment of Advanced Metering Infrastructure ("AMI") is undertaken and completed, the Behavioral offering will be replaced with an AMI-enabled offering (the Customer Engagement Portal) that serves a similar purpose. The Revised Plan details the anticipated changes to the Behavioral offering in PY9.

X.

In recognition of the continually increasing difficulty to attain kWh savings in Algiers, the Revised Plan also discusses shifting projected a portion of the PY9 kWh Commercial savings goal from ENO-Algiers to ENO-Legacy. The table below illustrates the challenges the Energy Smart has encountered in reaching the kWh savings goal in Algiers.

Energy Smart Algiers kWh Savings Percentage Attained	
	%
Program Year 3	103.0
Program Year 4	97.6
Program Year 5	105.9
Program Year 6	86
Program Year 7	65.5

Algiers is a section of New Orleans that has a limited number of commercial entities and therefore limited opportunity to garner commercial energy efficiency projects. Further reducing the potential to achieve kWh savings is the fact that many of these properties have participated in the Energy Smart Program in previous years and therefore do not have the need or desire for additional for projects. The cumulative effect is that it is becoming increasingly more challenging to garner commercial kWh-saving projects in Algiers. In recognition of this trend, the Revised Plan proposes to shift projected PY9 kWh savings to ENO-Legacy in order to better allow ENO to remain consistent with the Council's annual incremental kWh savings goal of 0.2% per year for the entire ENO service area. The tables in the Revised Plan illustrate the proposed kWh savings and budget shift.

XI.

Given the relatively small amount of dollars required to run the Behavioral offering, it is anticipated that there will be additional costs in replacing the approximately 6,000,000 of kWh savings by using other measures. For PY9, an estimated increase in budget of $984,187 for

Energy Smart Legacy and $173,683 for Energy Smart Algiers will be required to effectuate the revisions detailed in the Revised Plan.

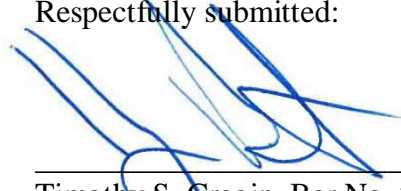|	Legacy		Algiers	
	Estimated Spend	**Projected MWh Savings**	**Estimated Spend**	**Projected MWh Savings**
Energy Savings Kits	$633,919	2,331	$111,868	411
LED Lighting Giveaway	$80,107	465	$14,137	82
Residential Lighting & Appliances	$270,171	2,304	$47,678	407
Total	$984,197	5,100	$173,683	900

However, ENO anticipates that the increase in budget will not require ENO to seek incremental funding from customers prior to the time that rates are adjusted through the 2018 ENO Combined Base Rate Case and a dedicated source of funding for Energy Smart is established, assuming Council action permits new rates to take effect by or prior to August, 2019.

WHEREFORE, ENO respectfully requests that this Council issue a Resolution:

1. Approving ENO's proposed implementation of the Revised Plan.

2. Granting ENO the opportunity to revise elements of the Revised Plan should material changes to circumstances and expectations arise; and

3. Granting all other general and equitable relief that the law and the nature of this proceeding may permit or require.

Respectfully submitted:

BY: _____

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**ATTORNEYS FOR ENTERGY
NEW ORLEANS, INC.**

I hereby certify that I have served the required number of copies of the foregoing report upon all other known parties of this proceeding, by the following: electronic mail, facsimile, overnight mail, hand delivery, and/or United States Postal Service, postage prepaid.

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New Orleans, Louisiana, this 14th day of November, 2018.

_____

Harry M. Barton

Energy Smart Demand Side Management Plan

Revised Program Year 9 Plan

11/14/2018

Prepared By

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Aptim Environmental & Infrastructure, Inc.

631216186

Contents

Aptim Environmental & Infrastructure, Inc.

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Summary

After performing a mid-year evaluation on the Energy Smart Behavioral Scorecard offering, it was determined that there would likely be a shortfall in reaching the New Orleans City Council's ("Council") kWh savings goals for Program Year 9 ("PY9"). In addition, during PY9, it is anticipated that Entergy New Orleans, LLC ("ENO") customers will begin receiving Advanced Metering Infrastructure meters. Along with these meters, customers will be provided access to their own Customer Engagement Portal ("CEP"). One feature of the portal will be a Home Energy Report that is very similar to the Behavioral Scorecard. As such, ENO and Accelerated Innovations, the third party Behavioral Offering Implementer, plans to transition customers from the current Behavioral Scorecard to the CEP as they are granted access. Accordingly, ENO estimates that the Behavioral offering will attain approximately 2,000,000 kWh as opposed to the approximately 8,000,000 kWh listed in the Supplemental and Amended Implementation Plan ("Supplemental Plan"), filed on September 29, 2017 and approved by the Council on December 14, 2017. In an effort to boost savings and reach the kWh goals, ENO requested that Aptim Environmental and Infrastructure, Inc., the third party administrator ("TPA"), identify strategies for achieving a portion of the savings through other offerings.

The following revised supplemental plan ("Revised Plan") includes changes to the Supplemental Plan. This Revised Plan proposes an expansion of tactics to deliver additional approved measures and expand program delivery mechanisms for PY9. In designing the program offerings, energy efficiency measures and delivery tactics were selected that provide the greatest amount of savings as cost-effectively as possible. The plan provides detail on amendments to the program designs, savings targets, and budgets for the Energy Smart program. These new tactics aim to increase participation, drive energy savings within programs that bring quick returns, enhance the overall offerings, improve customer experience, and achieve the Council's kWh savings goals for PY9.

Tactics

In an effort to boost savings and reach the kWh savings goals in PY9, Entergy New Orleans has requested program design changes that will produce quick, cost-effective energy savings. The Program identified several tactics that will shift savings into offerings that ensure the greatest success.

Energy Savings Kits

This solution increases customer awareness of energy saving opportunities and provides energy-saving materials for customers to self-install in their home. Customers can request a kit via mail-in and online options to be delivered to their residence, at no-cost. The kit includes measures such as LED lightbulbs and water saving devices and includes installation instructions and educational literature. This solution will be available to all residential customers with a specific emphasis on economically disadvantaged communities. This new tactic will also be used to cross-promote other opportunities for savings from the Energy Smart Program and provide leads for additional program participation.

LED Lighting Giveaway

The objective of the LED Lighting Giveaway tactic is to rapidly deploy energy savings, in the form of LED lighting measures, with an emphasis on serving income-qualified and disadvantaged communities. The initiative is to increase ability of residential customers to reduce their lighting consumption. This tactic will provide LED lightbulbs to non-profit organizations, social service providers, and faith-based organizations

to give way to those served through their existing programming. With the full cost of the LED bulb covered by the Program, this tactic will completely remove any out of pocket expense to households in the greatest need. The offering can also be delivered through Customer Care Centers, with staff available to provide LEDs to the centers upon request.

Residential Lighting & Appliances

The objective of the expansion of the Residential Lighting and Appliance offering is to increase awareness and sales of efficient lighting and appliances to residential customers. This tactic will expland the offering by increasing the number, and availability, of eligible products through both physical stores as well as a new Online Marketplace. The offering will increase the product schedules and incentive budgets with participating retailer/manufacturer partners for discounted products that are at a minimum, ENERGY STAR qualified.

Demand Side Management Portfolio

Portfolio Budgets and Savings

The APTIM team developed the following budgets and savings estimates detailed in this implementation plan utilizing available historical results and through incorporating best practices of energy efficiency programs to provide aggressive, yet achievable program savings targets that provide significant benefits to ENO's customers.

The following tables detail the incentive and non-incentive budgets for the PY9 boost.

Energy Smart Total	2019
Administration, Marketing & Delivery	$263,792
Incentives	
Energy Saving Kits	$472,500
Lighting Giveaway	$73,677
Residential Lighting and Appliances	$277,243
Total	$1,087,212

Energy Smart New Orleans - Legacy	2019
Administration, Marketing & Delivery	$219,018
Incentives	
Energy Saving Kits	$401,625
Lighting Giveaway	$62,625
Residential Lighting and Appliances	$235,656
Total	$918,925

Aptim Environmental & Infrastructure, Inc.

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Energy Smart New Orleans - Algiers	2019
Administration, Marketing & Delivery	$44,774
Incentives	
Energy Saving Kits	$70,875
Lighting Giveaway	$11,052
Residential Lighting and Appliances	$41,586
Total	$168,287

2019 - Scenario B								
	Energy Saving Kits			Lighting Giveaway			Residential Lighting & Appliance		
	Total	Algiers	New Orleans	Total	Algiers	New Orleans	Total	Algiers	New Orleans
Admin	$27,808	$4,171	$23,637	$3,624	$544	$3,081	$1,516	$227	$1,288
Delivery	$107,464	$16,120	$91,345	$11,192	$1,679	$9,513	$19,691	$2,954	$16,737
Marketing	$92,498	$13,875	$78,623	$0	$0	$0	$0	$0	$0
EM&V	$45,518	$6,828	$38,690	$5,752	$863	$4,889	$19,399	$2,910	$16,489
Incentives	$472,500	$70,875	$401,625	$73,677	$11,052	$62,625	$277,243	$41,586	$235,657
Total	$745,788	$111,868	$633,919	$94,245	$14,137	$80,108	$317,849	$47,677	$270,171
Total Non-Incentive	$273,288	$40,993	$232,294	$20,568	$3,085	$17,483	$40,606	$6,091	$34,515
Total Incentives	$472,500	$70,875	$401,625	$73,677	$11,052	$62,625	$277,243	$41,586	$235,657

i. Energy Smart New Orleans – PY9

ENERGY SMART NEW ORLEANS LEGACY	
DSM PORTFOLIO BUDGETS	Year 9
Residential Total	$6,455,346
Implementation	$3,005,889
Original	$2,815,735
Adjustment	$190,154
Incentives	$3,053,391
Original	$2,353,484
Adjustment	$699,907
EM&V	$396,067
C&I Total	$8,798,944
Implementation	$3,142,049
Incentives	$5,125,781
Original	$5,028,914

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Adjustment	$96,867
EM&V	$531,114
Energy Smart Total	$15,254,291
Implementation	$6,147,938
Original	$5,957,784
Adjustment	$190,154
Incentives	$8,179,172
Original	$7,382,398
Adjustment	$796,773
EM&V	$927,181

ENERGY SMART NEW ORLEANS LEGACY	
DSM PORTFOLIO SAVINGS	Year 9
Residential Total	
Participation	308,611
Gross Energy Savings (MWh)	17,340
Gross Demand Savings (MW)	5.74
C&I Total	
Participation	486
Gross Energy Savings (MWh)	33,469
Gross Demand Savings (MW)	5.5
Energy Smart Total	
Participation	309,097
Gross Energy Savings (MWh)	50,809
Gross Demand Savings (MW)	11.2

Aptim Environmental & Infrastructure, Inc.

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ii. Energy Smart Algiers – PY9

ENERGY SMART ALGIERS	
DSM PORTFOLIO BUDGETS	Year 9
Residential Total	$710,121
Implementation	$348,697
Original	$313,853
Adjustment	$34,844
Incentives	$317,794
Original	$194,280
Adjustment	$123,513
EM&V	$43,630
C&I Total	$505,288
Implementation	$307,956
Incentives	$160,581
Original	$257,449
Adjustment	-$96,868
EM&V	$36,751
Energy Smart Total	$1,215,409
Implementation	$656,653
Original	$621,809
Adjustment	$34,844
Incentives	$478,375
Original	$451,729
Adjustment	$26,646
EM&V	$80,381

ENERGY SMART ALGIERS	
DSM PORTFOLIO SAVINGS	Year 9
Residential Total	
Participation	41,632
Gross Energy Savings (MWh)	2,078
Gross Demand Savings (MW)	0.7

C&I Total	
Participation	21
Gross Energy Savings (MWh)	1,009
Gross Demand Savings (MW)	0.2
Energy Smart Total	
Participation	41,653
Gross Energy Savings (MWh)	3,087
Gross Demand Savings (MW)	0.9

Measure Planning and Savings Estimates

The following tables detail the proposed tactics in terms of estimated number of participants, kWh savings, and incentives.

Measure Tactics – PY9

Energy Savings Kits	2019 Participants	2019 kWh Savings	2019 kW Reduction	2019 Incentives
LED General Service (<1050 Lumen)	56,700	913,635	189.4	$226,800
LED General Service (>=1050 Lumen)	18,900	510,565	105.9	$75,600
Kitchen Aerators (1.5 gpm)	18,900	117,833	12.4	$37,800
Bathroom Aerators (1.0 gpm)	18,900	196,403	20.4	$18,900
Low-Flow Showerheads (1.5 gpm)	18,900	1,003,779	104.4	$113,400
TOTAL	18,900	2,742,215	432.6	$472,500

Lighting Giveaway	2019 Participants	2019 kWh Savings	2019 kW Reduction	2019 Incentives
LED General Service (<1050 Lumen)	24,000	386,724	80.2	$59,040
LED General Service (>=1050 Lumen)	5,950	160,733	33.3	$14,637
TOTAL	29,950	547,457	113.5	$73,677

Residential Lighting & Appliance	2019 Participants	2019 kWh Savings	2019 kW Reduction	2019 Incentives
Big Box Stores (CostCo/Sams)				
LED General Service (<1050 Lumen)	40,600	654,208	135.6	$50,750
LED General Service (>=1050 Lumen)	8,000	216,112	44.8	$10,000
LED Specialty/Directional/Kit (<1050 Lumen)	8,000	128,908	26.7	$16,000
LED Specialty/Directional/Kit (>=1050 Lumen)	8,000	216,112	44.8	$20,000
Retail Stores (Home Depot, Lowe's, etc)	-	-	0.0	$0
LED General Service (<1050 Lumen)	32,000	555,296	115.1	$56,000
LED General Service (>=1050 Lumen)	6,050	176,007	36.5	$10,588
LED Specialty/Directional/Kit(<1050 Lumen)	6,050	104,986	21.8	$18,150
LED Specialty/Directional/Kit(>=1050 Lumen)	6,050	176,007	36.5	$18,150
Online MarketPlace	-	-	0.0	$0
LED General Service (<1050 Lumen)	5,280	104,713	21.7	$9,240
LED General Service (>=1050 Lumen)	660	21,944	4.6	$1,155
LED Specialty/Directional/Kit(<1050 Lumen)	660	13,089	2.7	$1,980
LED Specialty/Directional/Kit(>=1050 Lumen)	660	21,944	4.6	$1,980
Smart Thermostat	500	257,396	0.0	$50,000
Programmable Thermostat	50	16,553	0.0	$1,250
Advanced Power Strip (Tier 1)	400	26,400	2.6	$8,000
Advanced Power Strip (Tier 2)	50	8,168	0.8	$2,500
Pipe Insulation (3ft piece)	50	595	0.1	$200
Kitchen Aerators (1.5 gpm)	50		0.1	$250

		623		
Bathroom Aerators (1.0 gpm)	50	1,039	0.1	$150
Low-Flow Showerheads (1.5 gpm)	50	5,311	0.6	$500
Handheld LF Showerheads (1.5 gpm)	50	5,311	0.6	$400
TOTAL	123,260	2,710,720	500.1	$277,243

Funding

Program Year 9

In addition to the proposed changes within the Residential offerings, the Program is proposing to reallocate a portion of savings from the Algiers to New Orleans territory. The Revised Plan proposes the shift in order to provide more achievable savings targets based on past experience and near-term projections. Energy Smart will continue to actively promote participation in Algiers in order to achieve more and deeper energy savings.

ENERGY SMART - PY9 Original Numbers						
Program	Incentives - Legacy	Savings - Legacy (MWh)	Demand Savings (MW)	Incentives - Algiers	Savings - Algiers (MWh)	Demand Savings (MW)
Small Commercial	$ 1,136,305	5,760	1.10	$ 105,675	536	0.11
Large C&I	$ 3,445,727	24,206	3.90	$ 113,462	797	0.12
Publicly Funded	$ 446,882	2,928	0.40	$ 38,312	251	0.04
Total	$ 5,028,914	32,894	5.40	$ 257,449	1,584	0.27

ENERGY SMART - PY9 Proposed Shift Numbers						
Program	Incentives - Legacy	Savings - Legacy (MWh)	Demand Savings (MW)	Incentives - Algiers	Savings - Algiers (MWh)	Demand Savings (MW)
Small Commercial	$ 1,185,624	6,010	1.11	$ 56,357	286	0.10
Large C&I	$ 3,474,198	24,406	3.91	$ 84,991	597	0.11
Publicly Funded	$ 465,960	3,053	0.41	$ 19,233	126	0.03
Total	$ 5,125,781	33,469	5.43	$ 160,581	1,009	0.24

ENERGY SMART - PY9 Shift Variances						
Program	Incentives - Legacy	Savings - Legacy (MWh)	Demand Savings (MW)	Incentives - Algiers	Savings - Algiers (MWh)	Demand Savings (MW)
Small Commercial	$ 49,319	250	0.01	$ (49,318)	(250)	(0.01)
Large C&I	$ 28,471	200	0.01	$ (28,471)	(200)	(0.01)
Publicly Funded	$ 19,078	125	0.01	$ (19,079)	(125)	(0.01)
Total	$ 96,867	575	0.03	$ (96,868)	(575)	(0.03)

DSM Net Benefits and Cost Effectiveness Analysis

The program design was screened for cost-effectiveness using an industry accepted, best practice energy efficiency cost efficiency modeling tool. The modeling tool takes into consideration savings and costs over the lifetime of each measure, the costs associated with delivering the programs, as well as economic factors, and avoided costs of energy and demand. The table below summarizes the cost effectiveness results for both the Total Resource Cost test (TRC) and the Utility Cost test (UCT), sometimes referred to as the Program Administrator Cost test (PACT). The screening tool relies on the most recent avoided costs determined through calculations that are consistent with the methodology that was implemented in the Entergy New Orleans IRP and utilizes ENO's WACC as the discount rate. The programs that fail to pass are Low Income Audit & Wx, School Kits & Education, and Direct Load Control.

DSM PORTFOLIO COST EFFECTIVENESS ANALYSIS	TRC BENEFITS ($)	TRC RATIO	UCT RATIO
Small C&I	$6,609,625	1.3	1.43
Large C&I	$26,601,884	1.38	2.15
Publicly Funded Institutions	$3,101,491	1.3	1.5
Home Performance with ENERGY STAR	$3,979,278	1.22	1.43
Residential Lighting & Appliances	$4,494,924	2.97	2.65
Green Light New Orleans	$65,152	1.06	0.93
Energy Smart for Multi-Family	$968,862	1.24	1.5
Low Income Audit & Wx	$2,690,164	0.88	0.9
School Kits & Education	$505,704	0.37	0.35
High Efficiency Tune Up	$2,832,091	1.33	1.92
Behavioral	$1,159,892	1.3	1.3
Direct Load Control	$1,935,806	0.96	0.9
Total	$54,944,874	1.31	1.65

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Program Portfolio

Portfolio Budgets and Savings

The following tables represent the budget and savings totals by offering after the boost.

Energy Smart New Orleans Legacy - PY9

2019 - ENERGY SMART NEW ORLEANS DSM PORTFOLIO BUDGET AND SAVINGS						
Program	Incentives	Non-Incentive	Total	Participation	Gross Energy Savings (MWh)	Gross Demand Savings (MW)
Small C&I	$1,185,624	$706,024	$1,891,648	331	6,010	1.11
Original	$1,136,305	$706,024	$1,842,329	317	5,760	1.10
Adjustment	$49,319	$0	$49,319	14	250	0.01
Large C&I	$3,474,198	$1,973,579	$5,447,777	109	24,406	3.91
Original	$3,445,727	$1,973,579	$5,419,306	107	24,206	3.90
Adjustment	$28,471	$0	$28,471	2	200	0.01
Publicly Funded Institutions	$465,960	$462,446	$928,406	46	3,053	0.41
Original	$446,882	$462,446	$909,328	44	2,928	0.40
Adjustment	$19,078	$0	$19,078	2	125	0.01
Home Performance with ENERGY STAR	$754,811	$416,647	$1,171,458	1,220	2,864	0.60
Residential Lighting & Appliances	$366,435	$211,862	$578,297	120,664	3,357	0.70
Energy Smart for Multi-Family	$197,737	$76,634	$274,371	773	718	0.10
Low Income Audit & Wx	$452,430	$586,864	$1,039,294	480	1,316	0.30
NOLA Wise School Kits & Education	$95,200	$334,852	$430,052	2,800	547	0.10
High Efficiency Tune Up	$326,911	$190,459	$517,370	950	1,727	0.50
Behavioral	$0	$211,207	$211,207	34,221	1,711	1.45
Original	$0	$305,344	$305,344	34,221	6,844	5.80
Adjustment		-$94,137	-$94,137		(5,133)	(4.35)
Direct Load Control	$159,960	$693,073	$853,033	1,209	-	1.10

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Boost Savings	$699,906	$284,291	$984,197	146,294	5,100	0.89
Energy Savings Kits	$401,625	$232,294	$633,919	16,065	2,331	0.37
LED Lighting Giveaway	$62,625	$17,482	$80,107	25,458	465	0.10
Residential Lighting & Appliances	$235,656	$34,515	$270,171	104,771	2,304	0.43
TOTAL	$8,179,171	$6,147,938	$14,327,110	309,097	50,809	11.17
Original	$7,382,398	$5,957,784	$13,340,182	162,785	50,267	14.60
Adjustment	$796,773	$190,154	$986,928	146,312	542	(3.43)

Energy Smart Algiers – PY9

2019 - ENERGY SMART ALGIERS DSM PORTFOLIO BUDGET AND SAVINGS						
Program	Incentives	Non-Incentive	Total	Participation	Gross Energy Savings (MWh)	Gross Demand Savings (MW)
Small C&I	$56,357	$83,806	$140,163	16	286	0.10
Original	$105,675	$83,806	$189,481	30	536	0.11
Adjustment	-$49,318		-$49,318	(14)	(250)	(0.01)
Large C&I	$84,991	$178,935	$263,926	3	597	0.11
Original	$113,462	$178,935	$292,397	4	797	0.12
Adjustment	-$28,471		-$28,471	(1)	(200)	(0.01)
Publicly Funded Institutions	$19,233	$45,215	$64,448	2	126	0.03
Original	$38,312	$45,215	$83,527	4	251	0.04
Adjustment	-$19,079		-$19,079	(2)	(125)	(0.01)
Home Performance with ENERGY STAR	$56,489	$35,555	$92,044	91	215	0.04
Residential Lighting & Appliances	$27,596	$17,822	$45,418	8,981	251	0.05
Energy Smart for Multi-Family	$15,664	$7,931	$23,595	63	54	0.01
Low Income Audit & Wx	$33,794	$50,379	$84,173	36	98	0.02
NOLA Wise School Kits & Education	$23,800	$83,712	$107,512	700	137	0.02

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High Efficiency Tune Up	$24,897	$21,269	$46,166	74	134	0.04
Behavioral	$0	$28,793	$28,793	5,779	289	0.25
Original	$0	$44,118	$44,118	5,779	1,156	0.98
Adjustment		-$15,325	-$15,325		(867)	(0.74)
Direct Load Control	$12,040	$53,067	$65,107	91	-	0.08
Boost Savings	$123,514	$50,169	$173,683	25,817	900	0.16
Energy Savings Kits	$70,875	$40,993	$111,868	2,835	411	0.06
LED Lighting Giveaway	$11,052	$3,085	$14,137	4,493	82	0.02
Residential Lighting & Appliances	$41,587	$6,091	$47,678	18,489	407	0.08
TOTAL	$478,375	$656,653	$1,135,028	41,653	3,087	0.90
Original	$451,729	$621,809	$1,073,538	15,853	3,629	1.51
Adjustment	$26,646	$34,844	$61,490	25,800	(542)	(0.61)

Mid-Year Results of 2018
Scorecard Behavioral Offering

Submitted to:

Entergy New Orleans

September 2018

Draft

ADM Associates, Inc.

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1. Executive Summary

This measurement and verification ("M&V") report provides the impact of the Entergy New Orleans (ENO) Energy Smart Scorecard Offering ("Scorecard" or "Offering"). The Offering is intended to use social norming to leverage energy savings; this is a long-known behavioral science tenet that individuals desire to be at a similar or better level than their peers, and thus, the report drives high users to reduce their energy consumption.[1] 48,198 unique dwellings were used in the final analysis. Their savings, 13 kWh per household per year, were extrapolated to the participant population. The treatment group was supplemented by a control group consisting of 19,987 households. The process ensured no double counting of savings resulting from separate energy savings offerings.

1.1 Offering Description

The Offering provides tailored reports to residential customers. These reports include:

- Comparisons of customers' current energy use to their past use;

- Comparison of energy use to similar homes in the area; and

- Tips on how customers can reduce their energy use as well as information on ENO energy efficiency offerings

The offering uses a randomized control trial (RCT) experimental design. At the outset of program design, pre-selected customers are randomly assigned to a treatment group or a control group. The RCT is of type 'opt-out' and treatment customers can discontinue, 'opt-out' of, receiving home energy reports. The control group serves as the basis for comparison to the treatment group in measuring the effects of the home energy reports.

Initially, the offering was launched with 25,000 treatment households and 10,000 control households, beginning in May 2018 (initial group). However, ENO decided to add a supplemental group of 25,000 treatment households and 10,000 control households (supplemental group) which began receiving Scorecards in July 2018. This aggregates to a total of 50,000 treatment customers and 20,000 control customers (aggregate group).

An RCT and a post-only regression (PO) panel data model was used to estimate energy savings. The PO model was supplemented by a difference in difference regression (DID) and a post-program regression (PPR).

The typical treatment period of a behavior-based offering is at minimum twelve months. However, the data used in this analysis contains one to three months of

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

post-period data (three months of post-period data for the initial group and one month of post-period data for the supplemental group) and is designed to perform a mid-year check of performance. Behavioral offerings typically need a few months for the effect in user behavior to change. Results from such a short treatment period are not fully indicative of 12-month savings realizations.

1.2 Evaluation Objectives

The objectives of this evaluation is to measure early kWh savings impacts of the first part of the 2018 offering year.

1.3 Verified Energy Savings

Below, Table 1 summarizes the total numbers of customers who participated in the full offering without opting out. Table 2 summarizes the verified energy savings across all three waves. These summaries represent the aggregate group savings.

Table 1: Overall Savings Summary

Variable	2018
Number of Treatment Customers	48,661
Number of Control Customers	19,987
Verified Gross Savings per Month (MWh)	52

Table 2: Savings by Wave

Variable	Value 2018
Number of Treatment Customers	48,661
Number of Control Customers	19,987
Percent Realized Savings	0.07%
Average Daily Savings per Customer	0.035
Verified Net Savings Before Double Counting Adjustment (MWh)	52
Savings Counted in Other Energy Efficiency Offerings (MWh)[2]	-5.25
Final Verified Net Savings per Month (MWh)	47

The analysis resulted in 0.07% kWh savings of pre-period treatment group usage.

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[2] These amounts are used to adjust the realized savings to account for energy savings measure implemented through other residential energy efficiency programs. A negative value indicates less of an effect (decreased consumption) from these programs as compared to the control group and thus their savings is subtracted to account for the difference. A positive value means the opposite.

1.4 Key Findings

1.4.1 Impact Evaluation Findings

- **The post-only regression (PO) model provides the verified savings for the 2018 mid-year evaluation.** It was chosen as the best-fit model due to the data restraints and model results. The savings coefficient lacks statistical significance, along with all other models tested.

- **None of the models tested displayed statistically significant results.** Because of the lack of post-period data, we were unable to find statistically significant savings in any of the models reported and also in additional models not reported.

- **Mid-year evaluated kWh savings are 0.07% of household energy use.** The low savings value is also most likely due to the very short treatment period. Behavioral offerings usually take a few months to affect change in user behavior and usage reductions in early months tend to be much lower than subsequent treatment months.

1.5 Recommendations

- **Consider starting the offering period earlier in the year to allow the behavioral changes to start during the summer or winter.** Because the first group of customers started receiving scorecards in May 2018 and the second group in July 2018, it is unlikely that behavioral changes in the treatment group will start before the higher energy-use months (mid-to late summer).

2. Offering Background

The Energy Smart Scorecard offering administered to ENO customers by Accelerated Innovations, is designed to generate quantifiable behavioral savings that cannot be feasibly attained through standard energy efficiency efforts. The offering differs from standard energy conservation marketing efforts in that it provides customized reports to customers, comparing their billed energy use to homes in their area with similar energy consumption. The comparison is intended to leverage social norming effects; this is a long-known behavioral science tenet that individuals desire to be at a similar or better level than their peers, and thus, the report drives high users to reduce their energy consumption.[3]

The offering is a randomized control trial (RCT). In this experimental design, a group of eligible customers are randomly assigned to treatment or control groups. Treatment households receive mailed or emailed home energy reports, which show the comparison of their use to their neighbors. The offering is an opt-out implementation model; treatment customers who wish to not participate but may contact ENO and request to be removed from the offering at any time.

The offering targets the highest users in ENO service area. Households used an average of 50 kWh per day during the baseline year (i.e. 12-month pre-period before a wave begins). The initial group of customers used an average of 62 kWh per day during the baseline year and the supplemental group used an average of 29 kWh per day during the baseline year.

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

3. EM&V Methodology

The impact evaluation approach for this offering is as follows:

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

2) Energy savings are estimated via regression modeling; and

3) Excess savings from other-offering-participation by the treatment group are accounted for and netted out of the offering savings from the home energy Reports offering.

3.1 Control Group Validity Testing

Control group validity testing entails testing for statistically significant differences in usage between the treatment and control groups for each baseline month. Before launch, the Evaluators were given billing records of all customers to created two matched (i.e. validated) groups: a treatment group and a control group. The Evaluators conducted a two-tailed T-test based on kWh used per day (which normalize for differences in billing period length). The control groups were validated in prior evaluations of this program, however it is important to reassess this in the current evaluation because as the treatment and control groups decay, there is a possibility of the groups ceasing to be a statistical match. Below, Table 3, Table 4, and Table 5 detail any differences and statistical significance between the aggregated group, the initial group, and the supplemental group. The initial group's intervention date was in May 2018, while the supplemental group's intervention date was in July 2018. Therefore, the baseline months listed in each table differ between the three groups.

Table 3: 2018 Aggregated Group Monthly Average Baseline Usage by Treatment Status

Month-Year	Control Mean	Treatment Mean	Difference	PR > T	Reject Null Hypothesis
May 2017	61.73	61.09	0.64	0.14	-
Jun 2017	72.17	72.36	-0.19	0.61	-
Jul 2017	80.30	80.69	-0.39	0.33	-
Aug 2017	60.12	60.33	-0.21	0.47	-
Sep 2017	52.59	52.72	-0.13	0.62	-
Oct 2017	43.28	43.24	0.03	0.88	-
Nov 2017	33.16	33.02	0.14	0.47	-
Dec 2017	46.79	46.43	0.37	0.23	-
Jan 2018	55.10	54.83	0.27	0.47	-
Feb 2018	34.82	34.83	-0.01	0.94	-
Mar 2018	30.73	30.79	-0.06	0.73	-
Apr 2018	31.57	31.57	0.00	1.00	-
May 2018	51.37	51.60	-0.23	0.38	-
Jun 2018	60.01	60.66	-0.65	0.03	*

Month-Year					
Jul 2018	63.67	64.04	-0.37	0.25	-
*statistically significant if p<0.05					

Table 4: 2018 Initial Group Monthly Average Baseline Usage by Treatment Status

Month-Year	Control Mean	Treatment Mean	Difference	PR > T	Reject Null Hypothesis
May 2017	61.73	61.09	0.64	0.14	-
Jun 2017	72.17	72.36	-0.19	0.61	-
Jul 2017	80.30	80.91	-0.61	0.13	-
Aug 2017	80.74	81.22	-0.47	0.25	-
Sep 2017	70.94	71.34	-0.40	0.28	-
Oct 2017	58.94	58.93	0.00	0.99	-
Nov 2017	45.36	45.28	0.08	0.78	-
Dec 2017	64.18	63.93	0.25	0.59	-
Jan 2018	74.47	74.30	0.17	0.77	-
Feb 2018	47.27	47.36	-0.09	0.78	-
Mar 2018	42.21	42.24	-0.03	0.90	-
Apr 2018	43.40	43.26	0.13	0.63	-
*statistically significant if p<0.05					

Table 5: 2018 Supplemental Group Monthly Average Baseline Usage by Treatment Status

Month-Year	Control Mean	Treatment Mean	Difference	PR > T	Reject Null Hypothesis
Aug 2017	39.46	39.54	-0.07	0.75	-
Sep 2017	34.25	34.22	0.03	0.88	-
Oct 2017	27.60	27.61	-0.01	0.96	-
Nov 2017	20.80	20.61	0.19	0.17	-
Dec 2017	29.34	28.97	0.37	0.14	-
Jan 2018	35.56	35.32	0.25	0.45	-
Feb 2018	22.02	22.01	0.01	0.96	-
Mar 2018	19.40	19.40	0.00	0.97	-
Apr 2018	20.03	19.93	0.10	0.46	-
May 2018	34.24	34.24	-0.01	0.98	-
Jun 2018	40.47	40.95	-0.48	0.05	*
Jul 2018	43.38	43.46	-0.08	0.75	-
*statistically significant if p<0.05					

The RCT for the all three groups remained balanced at the 95% confidence level in the entire pre-period, except June 2018 for the aggregate and supplemental group. This indicates the groups' usage was balanced at the onset of the RCT however, if baseline usage were to be re-calculated with the remaining treatment and control customers[4] the baseline month of June 2018 would reveal statistically significant differences.

[4] Those customers who have not opted out or moved.

3.1 Decay

The tracking of treatment and control households can be affected by either move-outs or opt-outs (known collectively as 'decay').

3.1.1 Move-Outs

When an inhabitant moves, that households cannot be retained as the inhabitant/address link has been broken. The evaluation timespan for that household ends on the move out date. If a household's final bill was before August 2018[5], it was considered a move out household. Figure 1 displays the cumulative level of both treatment and control move outs over the program life by month, wave and treatment/control status. The offering targeted higher use households, which are historically correlated with owner-occupied single-family homes.

Figure 1: Move Outs by Treatment/Control and Wave
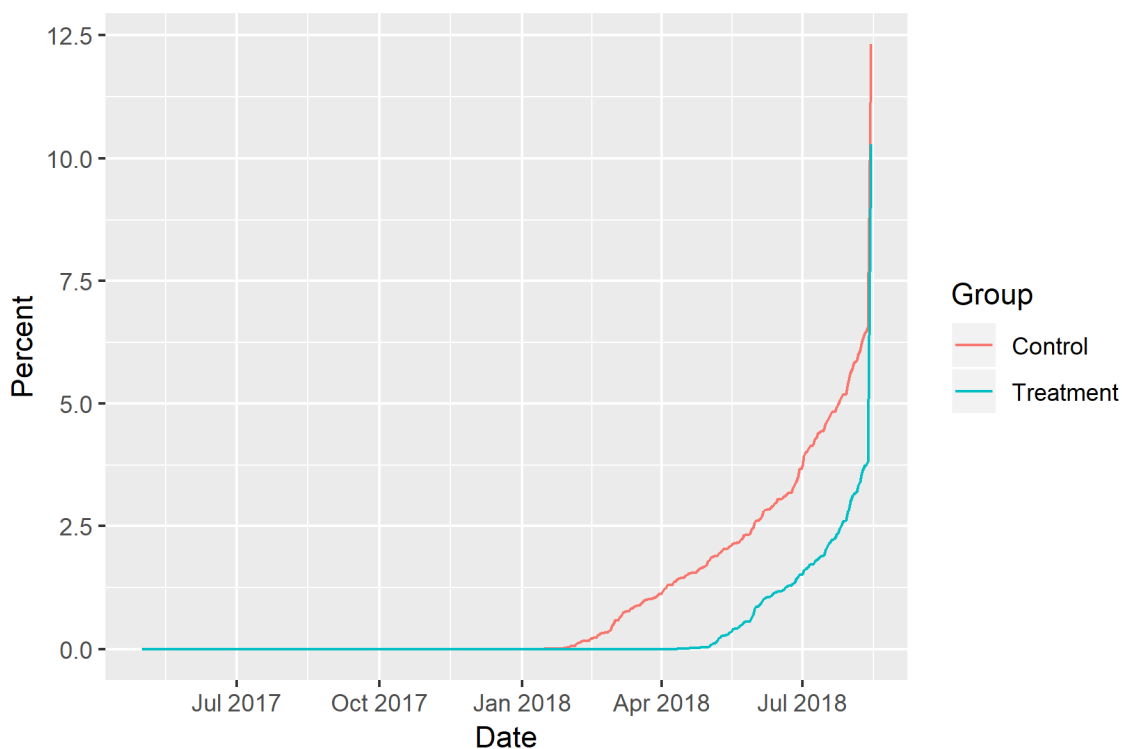
From each wave's onset until August 2018, the Offering experienced a 10.28% move out rate for treatment and 12.32% for the control group.

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[5] Few homes had data from January and February 2018. For most homes, billing data ends in December. This precludes move-out determinations from being made without examining subsequent months.

3.1.1 Opt-Outs

Households which receive energy reports (treatment group) can opt-out and no longer receive the mailings at any time. It is not possible to determine who in the control group would have opted out of receiving reports had they been in the treatment group, and thus no equivalent modification can be made. The Evaluators were also unable to compute the opt-out rate of the treatment households, as this data was not maintained by the implementors. However, a total of 1,314 of the RCT treatment customers billing data were not delivered, meaning that these 1,314 customers opted out at some point in the offering. This amounts to 2.6% of the total treatment group (by count).

3.2 Savings Calculation Methodologies

For the impact evaluation, multiple analyses were run to determine group-specific savings, including the post-only regression (PO), post-program regression (PPR) and difference in difference regression (DID) models. Each of these models were run for the aggregate of both groups, the initial group, and the supplemental group separately.

The primary savings calculation method used is a post-only regression model. This model demonstrated the highest adjusted r-squared value along and reasonable savings estimates. This model, along with all others tested, did not display statistically significant savings. It is important to note that this is an interim analysis and the data provided lacks the minimum requirements for a proper evaluation. For this reason, the savings are not a reliable estimate.

ADM compared the results of the three models: While the PO model with pre-usage controls yielded a slightly higher R-square than the PPR model, results are also presented using the PPR and the DID specifications to facilitate better comparability to prior evaluations.

3.2.1 Post-Only Specification

The post-only regression model uses post-program data from the control and treatment group to estimate the change in treatment group usage, netting out the effects of any change observed in the control group. This model incorporates controls for month, pre-offering usage, and season-specific dummy variables.

The model specification is as follows:

$$Usage_{it} = \alpha_0 + \beta * treatment_i$$

$$+\alpha_1 * PreUsage_i$$

$$+\alpha_2 * PreSummer_i$$

$$+\alpha_3 * PreWinter_i$$

$$+\gamma * mm_t$$

$$+\delta_1 * mm_t * PreUsage_i$$

$$+\delta_2 * mm_t * PreSummer_i$$

$$+\delta_3 * mm_t * PreWinter_i$$

$$+\varepsilon_{it}$$

Where:

- i denotes the ith customer
- t denotes the first, second, third, etc. month of the post-treatment period
- $Usage_{it}$ is the average daily use for read t for household i during the post-treatment period
- $PreUsage_i$ is the average daily usage across households i's available pre-treatment billing reads.
- $PreWinter_i$ is the average daily usage over the months of December January, February, and March over household i's available pre-treatment meter reads.
- $PreSummer_i$ is the average daily usage over the months of June, July, August, and September over household i's available pre-treatment meter reads.
- mm_t is a vector of month-year dummies

And parameter definitions are:

- α_0 is an intercept term
- $\alpha_1, \alpha_2, \alpha_3$ are effects of control variables $PreUsage_i, PreWinter_i, PreSummer_i$ on $Usage_{it}$ in the reference month.
- $\delta_1, \delta_2, \delta_3$ are the effect of the control variables in each month-year (mm_t) of the post period.
- ε_{it} is an error term

3.2.2 Post-Program Regression Specification

The post-program regression (PPR) model combines both cross-sectional and time series data in a panel dataset. This model uses only the post-program data, with lagged energy use for the same calendar month of the pre-program period acting as a control for any small systematic differences between the participant and control customers. In particular, energy use in calendar month t of the post-program period is framed as a function of both the participant variable and energy use in the same calendar month of the pre-program period. The underlying logic is that systematic differences between participants and controls will be reflected in differences in their past energy use, which is highly correlated with their current energy use. The version we estimate includes monthly fixed effects and interacts these monthly fixed effects with the pre-program energy use variable. These interaction terms allow pre-program usage to have a different effect on post-program usage in each calendar month.

Formally, the model is:

$$ADC_{kt} = \sum_{J} \beta_{1j} Month_{jt} + \sum_{J} \beta_{2j} Month_{jt} \cdot ADClag_{kt} + \beta_3 Participant_k + \varepsilon_{kt} \;,$$

Where,

ADC_{kt} = The average daily consumption in kWh for customer k during billing cycle t. This is the dependent variable in the model;

$Month_{jt}$ = A binary variable taking a value of 1 when j=t and 0 otherwise;[6]

$ADClag_{kt}$ = Customer k's energy use in the same calendar month of the pre-program year as the calendar month of month t;

$Participant_k$ = A binary variable indicating whether customer k is in the participant group (taking a value of 1) or in the control group (taking a value of 0);

ε_{kt} = The cluster-robust error term for customer k during billing cycle t. Cluster- robust errors account for heteroscedasticity and autocorrelation at the customer level.[7]

In this model, β_3 is the estimate of average daily energy savings due to the offering. Offering savings are the product of the average daily savings estimate and the total number of participant-days in the analysis.

3.2.3 Difference in Difference Regression Model

The difference in difference (DID) regression model uses pre- and post-program data from the control and treatment group to estimate the change in treatment group usage, netting out the effects of any change observed in the control group. This model incorporates controls for month, pre-post program usage, and season-specific dummy variables. The model specification is as follows:

$$Usage_{it} = \alpha_0 + \gamma * mm_t + \alpha_{1,}* Post_{it} + \delta_1 * Treatment_i + \delta_2 * Treatment_i * Post_{it} + \varepsilon_{it}$$

Where

- i denotes the ith customer
- t denotes the first, second, third, etc. month of the post-treatment period
- $Usage_{it}$ is the average daily use for read t for household i during the post-treatment period

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[6] If there are T post-program months, there are T monthly dummy variables in the model, with the dummy variable $Month_{tt}$ the only one to take a value of 1 at time t. These are, in other words, monthly fixed effects.

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

- mm_t is a vector of month-year dummies
- $Treatment_i$ is the status of the ith customer treatment dummy
- $Post_{it}$ is the status of the ith customer treatment dummy during month t

And parameter definitions are:

- α_0 is an intercept term
- α_1 is effects of control variables $Post$ in the reference month.
- δ_1, δ_2 are the effect of the control variables in each month-year (mm_t) of the post-period.
- ε_{it} is an error term

3.3 Double Counting Analysis

Measurement of savings from behavioral offerings needs to account for other offering savings to ensure that the ENO residential portfolio is not double counting any savings.

The first step in this process is to cross-reference the account IDs for each treatment and control group customer with all other offering participation in the study period. Aptim and Franklin Energy, then residential offering implementors, provided ADM with all other program tracking data, and the datasets were cross-referenced by account number. This resulted in a total "other offering kWh" per group.

It is important in this analysis to normalize the effects to the number of households in the group. The treatment and control groups are not precisely matched in customer count (the treatment group is 2.5 times larger than the control group). As such, if one were to directly compare the other-offering-kWh of the treatment and control group, it would overestimate the double counting (a treatment group of 50,000 customers is most assuredly going to show higher savings than a matched control group of 20,000 customers). By comparing this on a per-household basis, we normalize to the reality of mismatched treatment and control group population sizes.

The final double counting of savings adjustment (calculated separately for each unique wave in each program year) is as follows:

$$Uplift = \left(\frac{OP\ kWh}{Hosehold_{Treatment}} - \frac{OP\ kWh}{Hosehold_{Control}} \right) \times \#\ Accounts_{Treatment}$$

Where,

$$\frac{OP\ kWh}{Hosehold_{Treatment}} = Other\ program\ kWh\ per\ household\ in\ the\ treatment\ group$$

$$\frac{OP\ kWh}{Hosehold_{Control}} = Other\ program\ kWh\ per\ household\ in\ the\ control\ group$$

$$\#\ Accounts_{Treatment} = Total\ accounts\ in\ the\ treatment\ group$$

Further discussion of the double counting analysis as well detailed results can be found in Appendix A: Double Counting Analysis.

3.4   Summary of Data Used

The data used in this study was comprised of billing data supplied by Accelerated Innovations. Before the offering launch, the Evaluators used this data to created matched treatment and control groups for the RCT design.

As mentioned above, it is important to note that this is an interim analysis and the data provided lacks the recommended minimum requirements of 12 months pre- and post-treatment data for a proper evaluation. The data provided contains 12 months of pre-period data, but only one to three months of post-treatment data.

As part of the data cleaning, the following observations were removed to create the sample used in the regression analyses:

- Observations with fewer than 10 days or more than 90 days in the billing cycle; these observations were removed because long and short bills can be an indication of an issue in the recording of energy use. In past evaluations, the inclusion range was 20-40 days. ADM broadened this range as abnormal billing reads may not be randomly distributed; long billing cycles are more common among rural populations.

- Observations outside of the evaluation period: the 12-month pre-program period.

- Outliers, which are defined as observations with average daily usage at least 10 times larger; these observations were removed because very high observations of energy use can have an outsize impact on the regression results biasing the estimate of savings.

4. Impact Evaluation Results

Table 6 summarizes the verified energy savings. Overall verified net savings were 52 MWh per month. The post-only (PO) regression model is used for reporting savings. Table 7 summarizes the final verified net savings accounting for double counting of savings.

Table 6: Overall Savings Summary

Variable	2018
Number of Treatment Customers	48,661
Number of Control Customers	19,987
Savings as a Percent of Annual Use	0.07%
Verified Gross Savings per Month (MWh)	52

Table 7: Savings by Group: PO Model

Variable	Aggregate	Initial Group	Supplemental Group
Number of Treatment Customers	48,661	24,192	24,469
Number of Control Customers	19,987	9,994	9,993
Percent Savings	0.07%	0.09%	0.03%
90% Confidence Interval	[-0.37%, 0.52%]	[-0.33%, 0.52%]	[-0.79%, 0.85%]
Average Daily Savings per Customer (kWh)	0.03537	0.05658	0.008602
Standard Error	0.108	0.13427	0.127378
90% Confidence Interval	[-0.176, 0.247]	[-0.207, 0.320]	[-0.241, 0.258]
Verified Net Savings Before Double Counting Adjustment (MWh)	52	42	6.4
90% Confidence Interval	[-92, 129]	[-142, 220]	[-81, 87]
Savings Double Counting in Other Energy Efficiency Offerings (MWh) [8]	-5.25	-6.7	1.75
Final Verified Net Savings (MWh)	45	35	8

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[8] These amounts are used to adjust the realized savings to account for energy savings measure implemented through other residential energy efficiency programs. A negative value indicates less of an effect (decreased consumption) from these programs as compared to the control group and thus their savings is subtracted to account for the difference. A positive value means the opposite.

4.1 Model Output

Of the three regression models used, none of the model outputs displayed a statistically significant estimate of savings for the treatment group. However, the post-only regression model displayed the highest adjusted R-squared value and the most reasonable savings results of the models tested. The savings estimate for this model is not statistically significant, and therefore we cannot confidently estimate savings for this report. The p-value for this model is greater than 0.05, which means we cannot reject the null hypothesis of zero savings.

Of the three models, the post-only model is also the most reliable choice because it subsets the data to only the post-period months available. Because the data supplied only has a few months of post-period data (June, July, August), including the pre-period months as controls is unnecessary and may even have biased the results. Therefore, using the little amount of post-period available, and comparing to the same months in the pre-period displays the most reasonable savings estimates for this analysis.

In the Evaluator's experiences with home energy report-type offerings, the average estimated savings is about 2% of annual household energy use. However, it was expected that the savings for this interim analysis would be much smaller than the usual home energy report estimated savings of 2% due to the limited program time period.

The post-program and difference in difference models were used as a supplement to account for the variable results of this interim analysis. Both of the supplemental models also did not display statistically significant results, with negative savings estimates. This means these models predicted the treatment group used, on average, more energy than the control group after receiving scorecards. Because this result is unlikely, we cannot confidently estimate the savings for the analysis.

Table 8, Table 9, and Table 10 summarize the model output coefficients and adjusted r-squared values for each of the models.

Table 8: PO Parameter Estimates

Variable	Aggregate		Initial Group		Supplemental Group	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
(Intercept)	3.390	6.448	3.405	5.900	-0.595	-0.665
trmt	-0.035	-0.328	-0.0566	-0.421	-0.009	-0.068
avgPre.kWh	1.372	31.236	1.3725	28.546	0.597	5.237
avgPreSummer.kWh	0.143	5.93	0.1434	5.418	0.764	14.307
avgPreWinter.kWh	-0.405	-25.04	-0.4053	-22.883	-0.166	-3.748
month6	1.161	1.941	1.1613	1.774	-	-
month7	1.816	3.085	2.3720	3.636	-	-
month8	-0.965	-1.768	0.4771	0.723	1.781	1.971
month9	9.518	2.534	7.9842	0.801	9.898	2.313
avgPre.kWh*month6	-0.316	-6.369	-0.3161	-5.821	-	-
avgPre.kWh*month7	-0.549	-11.117	-0.5425	-10.024	-	-
avgPre.kWh*month8	-0.457	-9.519	-0.2378	-4.34	-0.049	-0.426

Variable	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
avgPre.kWh*month9	-1.342	-2.825	-1.3498	-2.082	-0.549	-1.127
avgPreSummer.kWh*month6	0.235	8.647	0.2354	7.903	-	-
avgPreSummer.kWh*month7	0.416	15.374	0.4086	13.764	-	-
avgPreSummer.kWh*month8	0.327	12.444	0.1898	6.322	-0.074	-1.358
avgPreSummer.kWh*month9	0.367	1.506	0.3847	1.109	-0.220	-0.949
avgPreWinter.kWh*month6	0.086	4.665	0.0859	4.264	-	-
avgPreWinter.kWh*month7	0.159	8.667	0.1544	7.695	-	-
avgPreWinter.kWh*month8	0.126	7.022	0.0567	2.79	-0.008	-0.176
avgPreWinter.kWh*month9	0.377	2.112	0.3784	1.57	0.220	1.078
Adjusted R-Squared	0.7734		0.7128		0.7416	

Table 9: PPR Parameter Estimates

Variable	Aggregate		Initial Group		Supplemental Group	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
(Intercept)	6.414	11.182	6.420	10.409	2.482	2.051
trmt	0.146	1.222	0.138	0.946	0.139	0.79
month6	0.482	0.739	0.482	0.69	-	-
month7	0.172	0.269	0.686	0.987	-	-
month8	-1.557	-2.626	0.725	1.031	2.338	1.911
month9	-0.100	-0.024	6.045	0.574	5.981	1.016
avgPre.kWh	1.154	135.636	1.154	126.544	1.234	28.066
avgPre.kWh*month6	0.033	3.406	0.033	3.178	-	-
avgPre.kWh*month7	0.039	4.076	0.033	3.13	-	-
avgPre.kWh*month8	0.061	6.671	0.033	3.116	-0.036	-0.804
avgPre.kWh*month9	-0.173	-1.987	-0.255	-1.537	-0.360	-1.807
Adjusted R-Squared	0.6984		0.6228		0.5075	

Table 10: DID Parameter Estimates

Variable	Aggregate		Initial Group		Supplemental Group	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
trmt*post	0.220	1.726	0.223	1.268	0.080	0.478
post1	3.758	32.935	4.595	29.025	0.485	3.11
month2	-20.392	-192.858	-27.188	-154.381	-13.492	-134.371
month3	-24.078	-230.85	-32.190	-184.48	-15.982	-162.076
month4	-23.253	-211.947	-33.498	-170.469	-15.423	-156.403
month5	-4.457	-40.914	-7.825	-40.368	-1.131	-11.469
month6	2.872	29.056	-0.491	-3.088	5.392	53.628
month7	9.755	87.885	6.175	38.882	1.989	4.905
month8	3.228	33.339	3.538	22.223	4.151	42.14
month9	-2.220	-21.223	-3.212	-18.36	-1.184	-11.976
month10	-11.634	-111.566	-15.472	-88.747	-7.779	-78.849
month11	-21.986	-209.061	-29.040	-165.522	-14.854	-148.98
month12	-8.316	-79	-10.301	-58.544	-6.307	-63.309
Adjusted R-Squared	0.6968		0.6097		0.5476	

The most important factor in the lack of significance in the model output is that the lack of post-treatment period. The initial group only had three months of post-period data, and the additional group only had one month of post-period data. For robust results, home energy report analyses typically require 12 months of pre-period data and several months of post-treatment data.

In addition, the customers receiving home energy reports usually do not display any behavioral changes for a few months. This lag time between treatment initiation and behavioral change has a large impact on an analysis that only has the first few months of post-period data. We predict that as the treatment continues throughout the rest of the program year, the savings in the treatment group will accumulate, especially in the winter months with high energy use for heating.

The output from the post-only regression model was used to report savings estimates for the offering, shown below in Table 11.

Table 11: Post Program Regression Results

Variable	Aggregate	Initial Group	Supplemental Group
Number of Treatment Customers	48,661	24,192	24,469
Number of Control Customers	19,987	9,994	9,993
Percent Savings	0.07%	0.09%	0.03%
Average Daily Savings per Customer (kWh)	0.03537	0.05658	0.0086
Verified Net Savings Before Double Counting Adjustment (MWh)	52	42	6.4

The initial group has slightly differing savings rates as a percent of annual use. There are multiple factors which contribute to this:

- **Length of time in treatment group.** The initial group has received reports for two months longer than the additional group. Historically, there has been a documented effect in behavioral offerings of longer treatment resulting increased savings as a percent of billed use.

- **Difference in pre-treatment energy use.** With each successive group, the available savings potential declines as the offering first targeted high-use customers. Higher users have historically demonstrated a high percentage of savings. This is due to there being more usage that could be considered discretionary, and as a result, high-use customers have the greater potential for savings both in absolute and relative terms.

The initial group showed a higher savings rate than the additional group. This is most likely due to the initial group having higher energy-using customers. As

mentioned before, the average pre-period daily kWh usage from the initial group was 62 while the additional group was 29. The initial group has higher pre-period usage, meaning that they have more opportunity to save energy. Also, because the initial group's intervention date was two months earlier than the additional group, any behavioral changes from the treatment group have more time to manifest.

4.2 Double Counting Findings

Savings estimates for Scorecard must also consider savings resulting from other offerings. ADM examined tracking data from Entergy New Orleans' AC Tune-up Offering (AC Tune-up), Energy Smart Home Performance with Energy Star (HPwES), Low-Income Qualified Weatherization (LIW), Energy Smart Multifamily (MF), and Energy Smart Residential Lighting and Appliances offerings (L&A). Savings claimed by these offerings were netted out of Scorecard savings estimates to avoid double-counting of the same savings.

4.2.1 Double Counting from Down Stream Measures

The double-counting analysis is for the downstream measures, such as duct sealing, air sealing, attic insulation and major appliances. These offerings track participation by customer and thus savings can be directly tied to a treatment or control group accounts. Table 12 summarizes the double counting analysis for each group.

Table 12: Double counting Results

Group	Treatment Participants	Control Participants	Other-Offering kWh per-Account		Double-Count (kWh)[9]
			Treatment	Control	
Aggregate	48,661	19,987	30.41	31.71	62,865
Initial Group	24,192	9,994	40.88	44.18	79,919
Additional Group	24,469	9,993	20.07	19.23	20,540

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[9] The sign on this value indicated whether the kWh value is added or subtracted from program savings.

5. Key Findings and Recommendations

5.1 Key Findings

5.1.1 Impact Evaluation Findings

- **The post-only regression (PO) model provides the verified savings for the 2018 evaluation.** It was chosen as the best-fit model due to the data restraints and model results. The savings coefficient lacks statistical significance, along with all other models tested.

- **None of the models tested displayed statistically significant results.** Because of the lack of post-period data, we were unable to find statistically significant savings in any of the models reported, and additional models not reported.

- **Mid-year offering savings is 0.07% of household energy use.** This is also most likely due to the lack of post-period data, along with the scorecards being sent out later in the year (resulting in lower savings).

Typical savings for behavioral offerings of this design is about 2% of household pre-energy use. The results of this analysis are considerably lower and 0.07%. However, these results are premised on a very short post-treatment period (ranging from one to three months). Unlike equipment rebates, savings resulting from these offerings is not immediate and is very likely to increase as time progresses and people adjust their behaviors as well as upgrade appliances in response to the offering. This effect can already be seen in the two groups (see Table 7Table 11).

5.2 Recommendations

- **Consider starting the offering period earlier in the year to allow the behavioral changes to start during the summer or winter.** Because the first group of customers started receiving scorecards in May 2018 and the second group in July 2018, it is unlikely that behavioral changes in the treatment group will start before the higher energy-use months (mid-to late summer).

6. Appendix A: Double Counting Analysis

To avoid double-counting of savings, offering savings from other energy efficiency offerings due to Scorecard participation must be counted toward either the Scorecard offering or the other energy efficiency offerings but not both. The double-counted savings, positive or negative, are subtracted from the net savings estimates from the regression analysis to get total verified savings.

Customer ID and address fields were used to identify Scorecard treatment and control participants who had also enrolled in the Home Performance with ENERGY STAR (HPwES) and Low-Income Qualified Weatherization (LIW), Energy Smart AC Tune-up (Tune-up), Energy Smart Multifamily (MF) and Energy Smart Residential Lighting and Appliances (L&A)[10] offerings. These savings were categorized as: Appliances, Building Shell, Direct Install, HVAC, Lighting, and Water Heating.

Table 13: Other Offering Savings (kWh) by Group and Treatment Statusdetails the 2018 other offering savings. In 2018, HVAC aggregated savings were the highest of all measure types.

Table 13: Other Offering Savings (kWh) by Group and Treatment Status

Measurement Type	Aggregate		Initial Group		Supplemental Group	
	Control	Treatment	Control	Treatment	Control	Treatment
Appliances	445	4,388	111	2,250	334	2,138
Building Shell	130,582	275,838	88,838	153,398	41,743	122,440
Direct Install	12,640	28,243	10,254	20,056	2,386	8,187
HVAC	433,752	1,029,414	308,023	721,283	125,728	308,131
Lighting	56,294	140,624	34,327	91,840	21,967	48,784
Water Heating	-	1,485	-	101	-	1,384
Total	633,713	1,475,604	441,554	986,679	192,159	488,925

By participation, HVAC had the highest number of treatment and control customers across all waves as detailed in Table 14.

Table 14: Other Offering Participants by Wave and Treatment Status

Measurement Type	Aggregate		Initial Group		Supplemental Group	
	Control	Treatment	Control	Treatment	Control	Treatment
Appliances	8	14	2	8	6	6
Building Shell	49	89	33	54	16	35
Direct Install	37	89	29	63	8	26
HVAC	137	343	94	225	43	118

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[10] This analysis includes appliances rebated in this program but does not include lighting from upstream rebates.

Lighting	93	224	56	141	37	83
Water Heating	-	2	-	1	-	1
Total	324	747	214	484	110	263

Table 15 details the double counting calculations.

Table 15: Double Counting Calculation

Group		Total Double counting	# Accounts	Avg. Double Counting (kWh per treatment customer)	MWh
Aggregate	Control	633,713	19,987	31.71	
	Treatment	1,475,604	48,661	30.41	-62.87
Initial Group	Control	441,554	9,994	44.18	
	Treatment	986,679	24,192	40.88	-79.92
Additional Group	Control	192,159	9,993	19.23	
	Treatment	488,925	24,469	20.07	20.54