

Evans Exhibit 15

	2020 Projection per Rider 11 System Energy Reduction (kWh)	2020 Actuals System Energy Reduction (kWh)	2020 Actuals Total Cost	2021 Projection per Rider 12 System Energy Reduction (kWh)	2021 Actuals System Energy Reduction (kWh)	2021 Actuals Total Cost
<b>Residential Programs</b>						
<b>EE Programs</b>						
1 Energy Efficiency Education	7,034,771	4,746,423	\$ 1,113,485	7,951,567	7,013,162	\$ 1,147,501
2 Energy Efficient Appliances and Devices	47,578,710	110,986,906	\$ 22,124,101	56,621,851	51,700,635	\$ 10,824,171
3 HVAC Energy Efficiency	10,603,088	7,689,428	\$ 7,538,303	5,570,374	9,425,675	\$ 8,156,036
4 Low Income Energy Efficiency and Weatherization Assistance	4,245,993	2,039,928	\$ 2,787,490	9,167,483	2,545,882	\$ 4,634,161
5 Multi-Family Energy Efficiency	20,196,677	4,042,084	\$ 1,613,839	28,264,645	2,019,667	\$ 517,454
6 Residential Energy Assessments	6,119,618	7,891,628	\$ 3,358,880	14,921,390	6,590,951	\$ 3,326,179
7 Total for Residential Conservation Programs	95,778,857	137,396,395	38,536,099	122,497,311	79,295,972	28,605,502
8 My Home Energy Report	306,337,865	332,105,411	\$ 12,749,651	342,160,803	336,292,411	\$ 7,072,233
9 Total Residential Conservation and Behavioral Programs	402,116,722	469,501,806	51,285,750	464,658,114	415,588,383	35,677,734
10 Power Manager®	-	-	\$ 14,303,277	-	-	\$ 16,829,058
11 Total Residential	402,116,722	469,501,806	65,589,027	464,658,114	415,588,383	\$ 52,506,792
	System Energy Reduction (kWh)	System Energy Reduction (kWh)	Total Cost	System Energy Reduction (kWh)	System Energy Reduction (kWh)	Total Cost
<b>Non-Residential Programs</b>						
<b>EE Programs</b>						
12 Non Residential Energy Efficient ITEE	323,520	9,917	\$ 15,179	272,355	2,353	\$ 74,699
13 Non Residential Smart Saver Custom	67,082,262	21,156,703	\$ 5,771,790	53,115,768	30,798,533	\$ 7,505,201
14 Non Residential Smart Saver Custom Technical Assessments	7,950,216	1,413,836	\$ 330,629	5,482,371	921,248	\$ 293,539
15 Non Residential Smart Saver Energy Efficient Food Service Products	4,363,034	502,870	\$ 533,411	4,280,461	1,201,408	\$ 203,130
16 Non Residential Smart Saver Energy Efficient HVAC Products	2,546,698	9,270,812	\$ 2,450,713	3,698,306	21,054,972	\$ 4,899,800
17 Non Residential Smart Saver Energy Efficient Lighting Products	131,137,431	109,556,031	\$ 13,098,851	156,866,525	116,783,529	\$ 17,924,291
18 Non Residential Smart Saver Energy Efficient Process Equipment Products	547,055	567,122	\$ 29,681	877,998	824,803	\$ 87,540
19 Non Residential Smart Saver Energy Efficient Pumps and Drives Products	4,603,201	1,402,429	\$ 167,464	2,717,418	1,521,286	\$ 202,615
20 Smart Saver(R) Non Residential Performance Incentive Program	22,097,800	5,961,326	\$ 751,724	14,901,572	8,247,437	\$ 342,826
21 Small Business Energy Saver	50,048,128	32,007,385	\$ 6,933,130	50,790,447	38,560,812	\$ 8,935,952
22 Smart Energy in Offices	-	-	\$ -	-	-	\$ -
23 Total for Non-Residential Conservation Programs	290,699,344	181,848,432	30,082,573	293,003,221	219,916,383	\$ 40,469,592
24 EnergyWise for Business	2,557,590	2,604,631	\$ 2,941,282	2,557,568	1,436,361	\$ 2,463,194
25 PowerShare®	-	-	\$ 12,082,697	-	-	\$ 13,583,912
26 Total for Non-Residential DSM Programs	2,557,590	2,604,631	15,023,979	2,557,568	1,436,361	\$ 16,047,106
27 Total Non Residential	293,256,933	184,453,063	45,106,551	295,560,789	221,352,744	\$ 56,516,699
28 Total All Programs	695,373,655	653,954,870	110,695,578	760,218,903	636,941,127	\$ 109,023,491





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# My Home Energy Report Program Evaluation

Submitted to Duke Energy

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# 1 Executive Summary

## 1.1 Program Summary

This report describes process and impact findings for the Duke Energy Carolinas and Duke Energy Progress My Home Energy Report (MyHER) offered to residential customers who live in single-metered, single family homes with thirteen months of usage history. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to that of a peer group of similar homes.<sup>1</sup> MyHER motivates customers to reduce their energy consumption by:

- Showing customers a comparison of their household electricity consumption to that of similar homes;
- Presenting a month-ahead forecast of electricity consumption disaggregated by end-use category;
- Suggesting tips for reducing energy use by changing customers' behavior or installing energy efficient equipment;
- Educating them about the energy savings benefits of Duke Energy's demand side management (DSM) programs; and
- Encouraging active management of their home's energy consumption.

## 1.2 Evaluation Objectives and High Level Findings

Nexant estimated the energy impacts associated with MyHER delivery for the period June 2017 to May 2018. This report also presents measurements of customer satisfaction and engagement for MyHER participants. The MyHER program is implemented as a randomized controlled trial (RCT). Customers are randomly assigned to either "treatment" or "control" groups for the purpose of measuring energy savings. Treatment customers are MyHER recipients (participants). The control group is a set of customers from whom the MyHER is intentionally withheld. The control group serves as the baseline against which MyHER impacts are measured. As Duke Energy customers become eligible for the MyHER program, Duke Energy randomly assigns them to one of these two groups.

The energy savings generated by the DEC MyHER program are presented in Table 1-1, showing that the evaluated impacts of the program are 248 kWh per household. The energy savings generated by the DEP MyHER program are presented in Table 1-2, showing that the evaluated impacts of the program are 201 kWh per household. These evaluated energy savings for the MyHER program are net of additional energy savings achieved through increased

<sup>1</sup> Homes are grouped by characteristics such as location, size, vintage, and heating fuel. Energy use is compared on groups of similar homes.



participation by the MyHER treatment group in other Duke Energy programs. Additional information concerning the evaluation period is shown in Table 1-3.

**Table 1-1: DEC Deemed and Evaluated Energy Impacts per Participating Household**

	Energy (kWh)	Confidence/Precision
Evaluated Impacts	248	90/6
Deemed Impacts	230	N/A

\*MyHER is an opt-out program. As such, all impacts are considered net impacts; Nexant also calculated the impacts of the MyHER program by removing savings achieved by MyHER participants via other Duke Energy Programs.

**Table 1-2: DEP Deemed and Evaluated Energy Impacts per Participating Household**

	Energy (kWh)	Confidence/Precision
Evaluated Impacts	201	90/9
Deemed Impacts	148	N/A

\*MyHER is an opt-out program. As such, all impacts are considered net impacts; Nexant also calculated the impacts of the MyHER program by removing savings achieved by MyHER participants via other Duke Energy Programs.

**Table 1-3: Sample Period Start and End Dates**

Evaluation Component	Start	End
Impact Evaluation Period	June 2017	May 2018
Customer Survey Period	January 2019	March 2019

## 1.3 Evaluation Recommendations

This evaluation finds the DEC MyHER program realized 137% of its claimed impacts and the DEP MyHER program realized 108% of its claimed impacts. The MyHER program remains fully deployed at these two Duke Energy jurisdictions, due to semiannual introductions of newly eligible customers to the treatment and control program populations. The continual addition of new customers to the program means that there will always be a mix of participants with respect to the duration of the customers' exposure to the treatment. Impacts delivered by behavioral programs such as MyHER have been shown in many evaluations of behavioral programs to vary depending on the length of that exposure, reaching maturity after 1-2 years of exposure to the program. As such, Duke Energy should generally expect that the newest cohorts of MyHER treatment customers will deliver lower energy savings than the established cohorts. In the case of DEC, some cohorts are attaining an age of 8 years.

Duke Energy undertakes substantial work in partnership with their implementation contractor, Tendril, Inc., in planning and coordinating the delivery of MyHER reports to more than 1.1 million customers in the Carolinas and more than 680,000 customers at Duke Energy Progress. Duke Energy has developed a production process that allows for the customization of MyHER messages, tips, and promotions on the basis of customer information and exposure to Duke Energy's demand-side management programs. Since the prior MyHER evaluation<sup>2</sup>, Tendril has implemented a number of improvements that have resulted in increased product quality, as evidenced by improved performance in Duke Energy's quality checks that take place before each batch of reports is sent to participants. The process evaluation finds that MyHER is successful in achieving its goal of enhancing customer motivation, awareness, and attention to saving energy in most areas probed by customer surveys.

Nexant has the following specific recommendations for enhancing Duke Energy's MyHER program:

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective status in a single billing month, to the extent that is technically feasible.
- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.
- **Increase MyHER participant awareness of Interactive.** The process evaluation finds that current awareness of Interactive among DEP and DEC MyHER participants is very low; another program objective above increasing aware customers' engagement with Interactive is to more effectively get the word out about its existence and increase the number of aware customers.
- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.
- **Continue to operate MyHER with an eye towards change management.** MyHER's implementer Tendril has made great strides in improving quality control performance since the prior DEC and DEP evaluations in the automation of quality control processes. Effective change management and stable staffing have been notable contributors to these improvements and they should continue to be emphasized in MyHER program

<sup>2</sup> DEC was previously evaluated in February 2016. DEP was previously evaluated in July 2017.

operations, especially as Tendril's new HER production platform, HOMERS (the Home Energy Reporting Service), is rolled out and its implementation is optimized.

- **Continue to prioritize the structuring of the processes and schedules for program elements.** Improved organization of tasks for elements such as the FFT report module has been a significant success in the operations of the MyHER program and has made reactive responses to impending deadlines and emergent challenges that characterized these operations in the past much less common. Program staff should seek out additional opportunities for the optimization of program schedules, tasks, and long term goals in this manner.



## 2 Introduction and Program Description

This section presents a brief description of the My Home Energy Report (MyHER) program as it is operated in the DEC and DEP service territories during the evaluation timeframe. This description is informed by document review, in-depth interviews with staff, and Nexant's understanding of program nuance developed through regular communication during the evaluation process.

### 2.1 Program Description

The MyHER program is a Duke Energy Carolinas and Duke Energy Progress behavioral product for demand-side management (DSM) of energy consumption and generation capacity requirements. The MyHER presents a comparison of participants' energy use to a peer group of similar homes. It is sent by direct mail eight times a year, and 12 times a year by email to customers that have provided Duke Energy with their email address.<sup>3</sup> The MyHER provides customer-specific information that allows customers to compare their energy use for the month and over the past year to the consumption of similar homes as well as homes considered to be energy-efficient. Reports include seasonal and household-appropriate energy savings tips and information on energy efficiency programs offered by Duke Energy. Many tips include low cost suggestions such as behavioral changes. An additional feature presents a month-ahead forecast of energy usage disaggregated by end-use type. Duke Energy contracts with Tendril Inc. for the management and delivery of its MyHER product.

Duke Energy also launched the MyHER Interactive Portal<sup>4</sup> in March 2015. MyHER Interactive seeks to engage customers in a responsive energy information and education dialogue. When customers enroll in the online portal they are given the opportunity to update and expand on information known to Duke Energy about their home and electricity consumption. Customers who have registered to use MyHER Interactive are also sent weekly energy management tips and conservation challenges via email. The general strategy of MyHER Interactive is to open communications between customers and the utility, as well as to explore new ways of engaging households in electricity consumption management.

Customers occupying single-family homes with an individual electric meter and at least thirteen months of electricity consumption history are eligible for MyHER in Duke Energy Carolinas and Duke Energy Progress territories in North Carolina and South Carolina. The program is an opt-out program: customers can notify Duke Energy if they no longer wish to receive a MyHER and will be subsequently removed from the program. Customers who receive both paper and email

<sup>3</sup> For clarity: MyHERs are only sent to customers randomly assigned to the treatment group. All of the customers in the treatment group receive paper MyHERs 8 times a year. Duke Energy has email contact information for some of the treatment customers – those email customers also receive email MyHERs 12 times a year. Therefore, the email customers receive both an email and paper MyHER 8 months of the year and only an email report 4 months of the year.

<sup>4</sup> We refer to the MyHER Interactive Portal simply as "Interactive" in the remainder of this report.

MyHERs may also opt out of the report format of their choice (i.e., elect to only receive MyHERs by email, or only receive them by U.S. Mail).

Duke Energy placed a portion of eligible customers into a control group to satisfy evaluation, measurement, and verification (EM&V) requirements. These control group customers are not eligible to participate in the MyHER program.

Duke Energy has several objectives for the MyHER program, including:

1. Generating cost effective energy savings;
2. Increasing customer awareness of household energy use, engagement with Duke Energy, and overall customer satisfaction with services provided by Duke Energy; and
3. Promoting other energy efficiency and demand response program options to residential customers.

## 2.2 Implementation

MyHER is implemented by Tendril Inc., a behavioral science and analytics contractor that prepares and distributes the MyHER reports according to a pre-determined annual calendar. Tendril also generates and disseminates the MyHER Interactive Portal content and email reports, energy savings tips, and energy savings challenges. Tendril and Duke Energy coordinate closely on the data transfer and preparation required to successfully manage the MyHER program, and they make adjustments as needed to provide custom tips and messages expected to reflect the characteristics of specific homes. A more detailed discussion of the roles and responsibilities of both organizations is provided in [Section 4](#).

### ***Eligibility***

The single-family MyHER program targets residential customers living in single-family, single meter, non-commercial homes with at least thirteen months of electricity consumption history. Approximately 1,174,000 DEC and 695,000 DEP residential customers met those requirements as of May 2018 and are assigned to the MyHER treatment groups. Accounts could still be excluded from the program for reasons such as the following: different mailing and service addresses and enrollment in payment plans based on income (although Equal Payment Plan customers are eligible). Eligibility criteria for the MyHER program have changed over time, and in some cases, customers were assigned to either treatment or control but later determined to be ineligible for the program. Nexant estimates that approximately 2% of assigned DEC customers and 1% of assigned DEP customers have been deemed ineligible for the program after having been assigned. Nexant addresses this topic by applying an intention-to-treat analysis (ITT); refer to [Section 3.1.2](#).

## 2.3 Key Research Objectives

The section describes our key research objectives and associated evaluation activities.

### 2.3.1 Impact Evaluation Objectives

The primary objective of the impact evaluation is to describe the impact of the program on energy consumption (kWh). Savings attributable to the program are measured across an average annual and monthly time period. The following research questions guided impact evaluation activities:

1. Is the process used to select customers into treatment and control groups unbiased?
2. What is the impact of MyHER on the uptake of other Duke Energy programs (downstream and upstream) in the market?
3. What net energy savings are attributable solely to MyHER reports after removing savings already claimed by Duke Energy's other energy efficiency programs?
4. What incremental savings are achieved by customers participating in the MyHER Interactive portal?

### 2.3.2 Process Evaluation Objectives

The program evaluation also seeks to identify improvements to the business processes of program delivery. Process evaluation activities focused on how the program is working and opportunities to make MyHER more effective. The following questions guided process data collection and evaluation activities:

1. Are there opportunities to make the program more efficient, more effective, or to increase participant engagement?
2. What components of the program are most effective and should be replicated or expanded?
3. What additional information, services, tips or other capabilities should MyHER consider?
4. Does MyHER participation increase customer awareness of their energy use and interest in saving energy?
5. What elements of the reports are useful to recipients?
6. How satisfied are recipients with MyHER reports?
7. To what extent does receiving MyHER increase customer engagement in energy saving behaviors and upgrades?
8. Do participants hold more favorable opinions of Duke Energy as a result of receiving the reports?
9. What encourages or prevents households from acting upon information or tips provided by MyHER?
10. To what degree are recipients aware of, and making use of, MyHER Interactive?
11. How can the program encourage additional action?



## 2.4 Organization of This Report

The remainder of this report contains the results of the impact analysis ([Section 3](#)); the results of the process evaluation activities, including the customer surveys ([Section 4](#)); and Nexant's conclusions and recommendations ([Section 5](#)).

## 3 Impact Evaluation

### 3.1 Methods

A key objective of the MyHER impact evaluation is to measure the change in electricity consumption (kWh) resulting from exposure to the normative comparisons and conservation messages presented in Duke Energy's My Home Energy Reports. The approach for estimating MyHER impacts is built into the program delivery strategy. Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.

The impact estimate is based on monthly billing data and program participation data provided by Duke Energy. The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program. After estimating the total change in energy consumption in treatment group homes, Nexant performed an "overlap analysis", which quantifies the savings associated with increased participation by treatment homes in other DEC or DEP energy efficiency offerings. These savings were claimed by other programs; therefore, they are subtracted from the MyHER impact estimates to eliminate double-counting.

#### 3.1.1 Data Sources and Management

The MyHER impact evaluation relied on a large volume of participation and billing data from Duke Energy's data warehouse. Nexant provided a data request for the necessary information in July 2018. Key data elements include the following:

- **Participant List** – a table listing each of the homes assigned to the MyHER program since its 2010 inception in DEC and its 2014 inception in DEP. This table also indicated whether the account was in the treatment or control group and the date the home was assigned to either group. Duke Energy also provided a supplemental table of Acxiom demographic data for program participants.
- **Billing History** – a monthly consumption (kWh) history for each account in the treatment and control group. Records included all months since assignment as well as the pre-assignment usage history required for eligibility. This file also included the meter read date and the number of days in each billing cycle.
- **MyHER Report History** – a record of the approximate 'drop date' of each MyHER report sent to the treatment group accounts, the messaging included, and the recommended actions. This dataset also contained a supplemental table of treatment group accounts omitted from each MyHER mailing during the evaluation period, and the associated reason for omission.

- **Participation Tracking Data for Other Energy Efficiency Programs offered by Duke Energy** – a table of the Duke DSM program participation of MyHER control and treatment group accounts. Key fields for analysis include the measure name, quantity, participation date, and net annual kWh and peak demand impacts per unit for each MyHER recipient and control group account participating in other DSM programs offered by Duke Energy.

In preparation for the impact analysis, Nexant combined and cleaned the participation and billing data provided by the MyHER program staff and then combined with the cleaned dataset from Nexant's prior MyHER impact evaluation for that jurisdiction.<sup>5</sup> The combined billing dataset includes 1,652,515 distinct DEC accounts and 1,011,440 distinct DEP accounts (the actual number varies by month). A number of treatment and control accounts in this dataset have closed prior to the start of this evaluation period (May 2016) and they have been dropped from the analysis dataset. For DEC, there were 306,131 such treatment customers and 126,142 such control customers. For DEP, there were 86,346 such treatment customers and 12,722 such control customers.

Nexant also removed the following accounts or data points from the analysis (total for DEC and DEP):

- 7,459 accounts that had a negative value for billed kWh;
- 710 records with unrealistically high usage: any month with greater than six times the 99<sup>th</sup> percentile value for daily kWh usage, or approximately 900 kWh per day.

Like most electric utilities, Duke Energy does not bill its customers for usage within a standard calendar month interval. Instead, billing cycles are a function of meter read dates that vary across accounts. Since the interval between meter reads vary by customer and by month, the evaluation team "calendarized" the usage data to reflect each calendar month, so that all accounts represent usage on a uniform basis. The calendarization process includes expanding usage data to daily usage, splitting the billing month's usage uniformly among the days between reads. The average daily usage for each calendar month is then calculated by taking the average of daily usage within the calendar month.

### 3.1.2 Intention to Treat

Duke Energy maintains a number of eligibility requirements for continued receipt of MyHER. Not all accounts assigned to treatment remained eligible and received MyHER over the study horizon. Several programmatic considerations can prevent a treatment group home from receiving MyHER in a given month. Common reasons for an account not being mailed include the following:

<sup>5</sup> Rather than re-requesting all of the data necessary for this evaluation (pre-treatment and posttreatment usage data for all treatment and control customers), Nexant omitted any data that we already had from the first evaluation – the pre-treatment data for cohorts included in our prior evaluation is still necessary for this current evaluation.

- **Mailing Address Issues** – mailing addresses are subjected to deliverability verification by the printer. If an account fails this check due to an invalid street name or PO Box or has another issue, the home will not receive the MyHER.
- **Implausible Bill** – if a home's billed usage for the previous month is less than 150 kWh or greater than 10,000 kWh, Tendril does not mail the MyHER.
- **Insufficient Matching Households** – this filter is referred to as “Small Neighborhood” by Tendril and is a function of the clustering algorithm Tendril uses to produce the usage comparison. If a home can't be clustered with a sufficient number of other homes, it will not receive the MyHER.
- **No Bill Received** – if Tendril does not receive usage data for an account from Duke within the necessary time frame to print and mail, the home will not receive MyHER for the month.

The Nexant data cleaning steps listed in [Section 3.1.1](#) do not impose these filters on the impact evaluation analysis dataset. This is necessary to preserve the RCT design because eligibility filters are not applied to the control group in the same manner as the treatment group. Instead, Nexant employed an “intention-to-treat” (ITT) analysis. In the ITT framework, the average energy savings per home *assigned* to the treatment is calculated via billing analysis. This impact estimate is then divided by the proportion of the treatment group homes analyzed that were active MyHER participants. The underlying assumption of this approach is all of the observed energy savings are being generated by the participating accounts.

Nexant relied on Duke Energy's monthly participation counts for the numerator of the proportion treated calculation. MyHER program staff calculates participation monthly according to the business rules and eligibility criteria in place at the time. The denominator of the proportion treated is the number of treatment group homes with billed kWh usage for the bill month. This calculation is presented by month in Table 3-1 and Table 3-2 for the study period. The average proportion of assigned accounts that were treated during the period of June 2017 to May 2018 was 98% for both DEC and DEP.

**Table 3-1: DEC Calculation of Treatment Percentage by Bill Month**

Month	Treatment Homes Analyzed	DEC Participant Count	% Treated
06/2017	1,231,705	1,197,462	97%
07/2017	1,218,640	1,198,133	98%
08/2017	1,207,107	1,171,813	97%
09/2017	1,195,242	1,172,053	98%
10/2017	1,185,902	1,172,053	99%
11/2017	1,225,916	1,195,285	98%
12/2017	1,216,916	1,191,881	98%
01/2018	1,208,915	1,193,353	99%
02/2018	1,200,827	1,178,403	98%
03/2018	1,192,681	1,177,960	99%
04/2018	1,183,803	1,157,514	98%
05/2018	1,173,821	1,151,896	98%
<b>12-month Average Proportion</b>			<b>98%</b>

**Table 3-2: DEP Calculation of Treatment Percentage by Bill Month**

Month	Treatment Homes Analyzed	DEP Participant Count	% Treated
06/2017	727,455	682,040	94%
07/2017	719,693	713,994	99%
08/2017	712,653	701,172	98%
09/2017	705,487	700,125	99%
10/2017	699,920	700,125	100%
11/2017	726,344	710,313	98%
12/2017	720,920	707,899	98%
01/2018	715,954	708,355	99%
02/2018	711,221	697,726	98%
03/2018	706,614	698,443	99%
04/2018	701,195	693,815	99%
05/2018	695,352	689,886	99%
<b>12-month Average Proportion</b>			<b>98%</b>



The monthly participation counts shown in Table 3-1 and Table 3-2 were also used by Nexant to estimate the aggregate impacts of the MyHER. Per-home kWh savings estimates for each bill month are multiplied by the number of participating homes to arrive at the aggregate MWh impact achieved by the program.

### 3.1.3 Sampling Plan and Precision of Findings

The MyHER program was implemented as an RCT in which individuals were randomly assigned to a treatment (participant) group or a control group for the purpose of estimating changes in energy use because of the program. Nexant's analysis methodology relies on a census analysis of the homes in both groups so the resulting impact estimates are free of sampling error. However, there is inherent uncertainty associated with the impact estimates because random assignment produces a statistical chance that the control group consumption would not vary in perfect harmony with the treatment group, even in the absence of MyHER exposure. The uncertainty associated with random assignment is a function of the size of the treatment and control groups. As group size increases, the uncertainty introduced by randomization decreases, and the precision of the estimates improves.

Nexant's MyHER impact estimates are presented with both an absolute precision and relative precision. Absolute precision estimates are expressed in units of annual energy consumption (kWh) or as a percentage of annual consumption.

The two following statements about the MyHER impact analysis reflect absolute precision:

- DEC MyHER saved an average of 247.7 kWh per home during the 12-month period June 2017 to May 2018,  $\pm 16.0$  kWh. Homes in the treatment group reduced electric consumption by an average of 1.69%,  $\pm 0.11\%$ .
- DEP MyHER saved an average of 201.2 kWh per home during the 12-month period June 2017 to May 2018,  $\pm 18.9$  kWh. Homes in the treatment group reduced electric consumption by an average of 1.25%,  $\pm 0.12\%$ .

In these examples, the uncertainty of the estimate, or margin of error (denoted by " $\pm$ "), is presented in the same absolute terms as the impact estimate—that is, in terms of annual electricity consumption. Nexant also includes the relative precision of the findings. Relative precision expresses the margin of error as a percentage of the impact estimate itself. Consider the following examples:

- The average treatment effect of DEC MyHER during the 12-month period June 2017 to May 2018 is 247.7 kWh with a relative precision of  $\pm 6.4\%$ . In this case,  $\pm 6.4\%$  is determined by dividing the absolute margin of error by the impact estimate:  $16.0 \div 247.7 = 0.064 = 6.4\%$ .
- The average treatment effect of DEP MyHER during the 12-month period June 2017 to May 2018 is 201.2 kWh with a relative precision of  $\pm 9.4\%$ . In this case,  $\pm 9.4\%$  is determined by dividing the absolute margin of error by the impact estimate:  $18.9 \div 201.2 = 0.094 = 9.4\%$ .

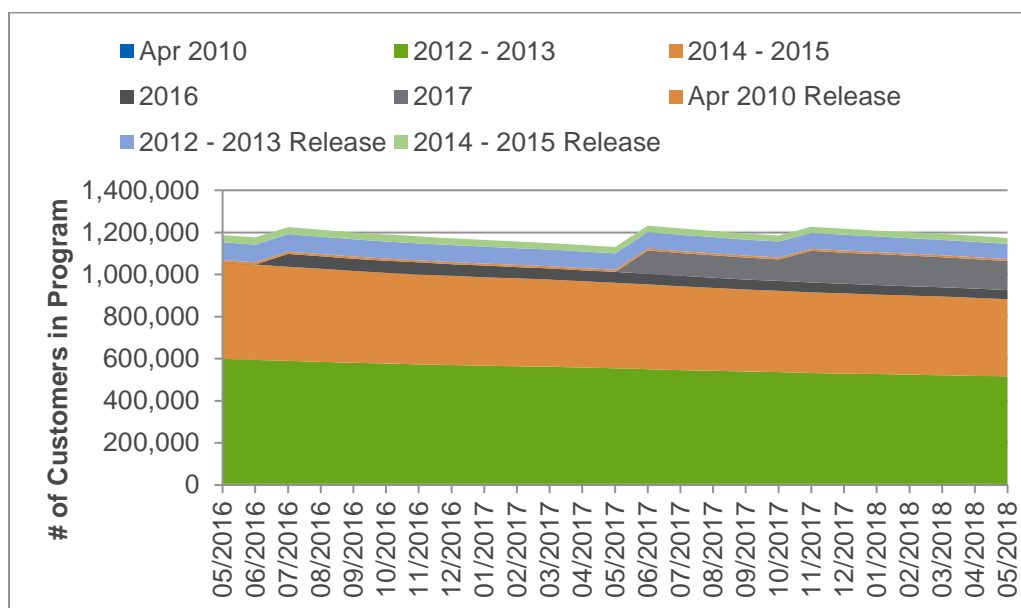
All of the precision estimates in this report are presented at the 90% confidence level and assume a two-tailed distribution.

### 3.1.4 Assignment Cohorts and Equivalence Testing

The DEC and DEP MyHER program has been growing over time since its DEC launch in 2010 and DEP launch in 2014. Nexant mapped the DEC MyHER population into eight cohorts and DEP MyHER population into six cohorts. The cohort groupings are defined on a temporal basis, generally following the major periods when customers were assigned to treatment and control groups. Cohorts that had been defined in prior evaluations of the DEC and DEP programs were maintained for consistency.

Figure 3-1 shows the timeline of DEC program expansion by cohort since May 2016. The original pilot cohort started the program in April 2010 which was followed by a large expansion of customers who were added in 2012 and 2013, mainly in September 2012. A second large cohort was added in 2014 and 2015, mainly in December 2014. The program has continued to expand since 2015, in more modest increments relative to the 2012 - 2013 and 2014 - 2015 expansions, as newer customers met the program's eligibility criteria. In October 2015, Duke Energy also released a small number of DEC customers originally assigned to the control group into treatment from the April 2010, 2012 - 2013, and 2014 - 2015 cohorts. These cohorts are denoted with "Release" in Figure 3-1.<sup>6</sup> These customers were released into treatment starting in October 2015, and began producing impacts in November 2015.

**Figure 3-1: History of Cohort Assignments for DEC MyHER Program**

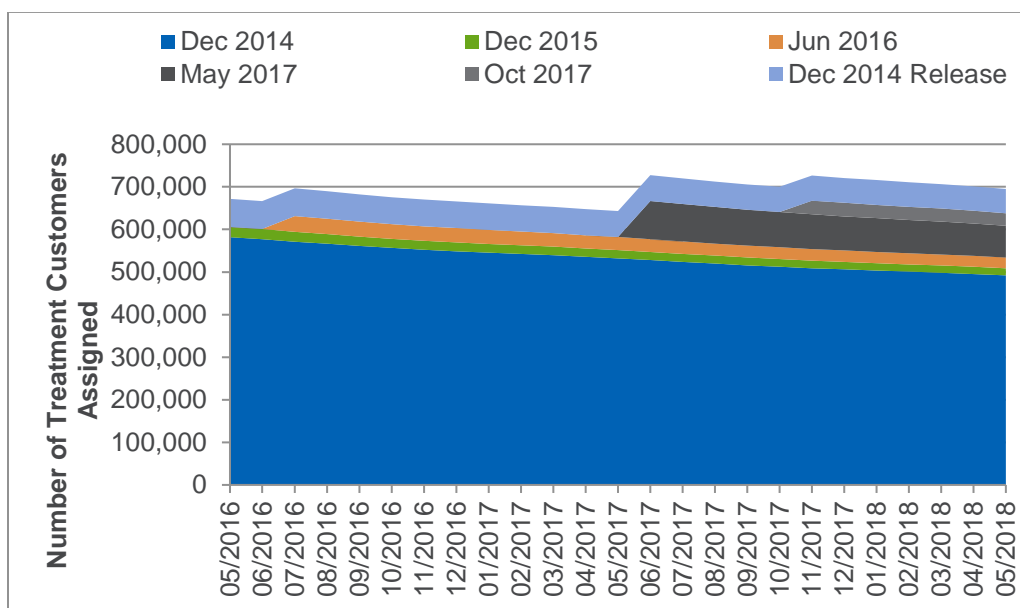


<sup>6</sup> Duke Energy commissioned a review of the MyHER control groups in 2015 to assess whether or not there were any control groups that were larger than necessary for the purpose of EM&V. Four relatively small releases (approximately 110,000 customers total) from the DEC jurisdiction was recommended by that review. Consequently, about 110,000 control group customers from the April 2010, September 2012, December 2014, and January 2015 cohorts were randomly selected for release into treatment.

Approximately 26% of DEC MyHER treatment customers were not assigned to the program simultaneously with a control group, and were bundled into cohorts with treatment customers assigned around the same time, consistent with the prior DEC evaluations. Nexant has advised Duke Energy to continue a simultaneous assignment protocol and to make assignments on an annual or biennial basis. Doing so will minimize any potential sources of bias that could occur due to a lack of simultaneous assignment to treatment and control.

Figure 3-2 shows the timeline of DEP program expansion by cohort since May 2016. A large original cohort started the program in December 2014. The program has continued to expand since 2014, in more modest increments relative to the original cohort, as newer customers met the program's eligibility criteria. In October 2015, Duke Energy also released a small number of DEP customers originally assigned to the control group into treatment from the December 2014 cohort. This cohort is denoted with "Release" in Figure 3-2.<sup>7</sup> These customers were released into treatment starting in October 2015, and began producing impacts in November 2015.

**Figure 3-2: History of Cohort Assignments for DEP MyHER Program**



Approximately 8% of DEP MyHER treatment customers were not assigned to the program simultaneously with a control group, and were bundled into cohorts with treatment customers assigned around the same time. These cohort definitions are consistent with those used in the previous evaluation. Simultaneous assignment will minimize any potential sources of bias that could occur due to a lack of simultaneous assignment to treatment and control.

Straightforward impact estimates are a fundamental property of the RCT design. Random assignment to treatment and control produces a situation in which the treatment and control

<sup>7</sup> Duke Energy commissioned a review of the MyHER control groups in 2015 to assess whether or not there were any control groups that were larger than necessary for the purpose of EM&V. A release of 60,000 customers from the DEP jurisdiction was recommended by that review. Consequently, about 60,000 control group customers from the December 2014 cohort were randomly selected for release into treatment.

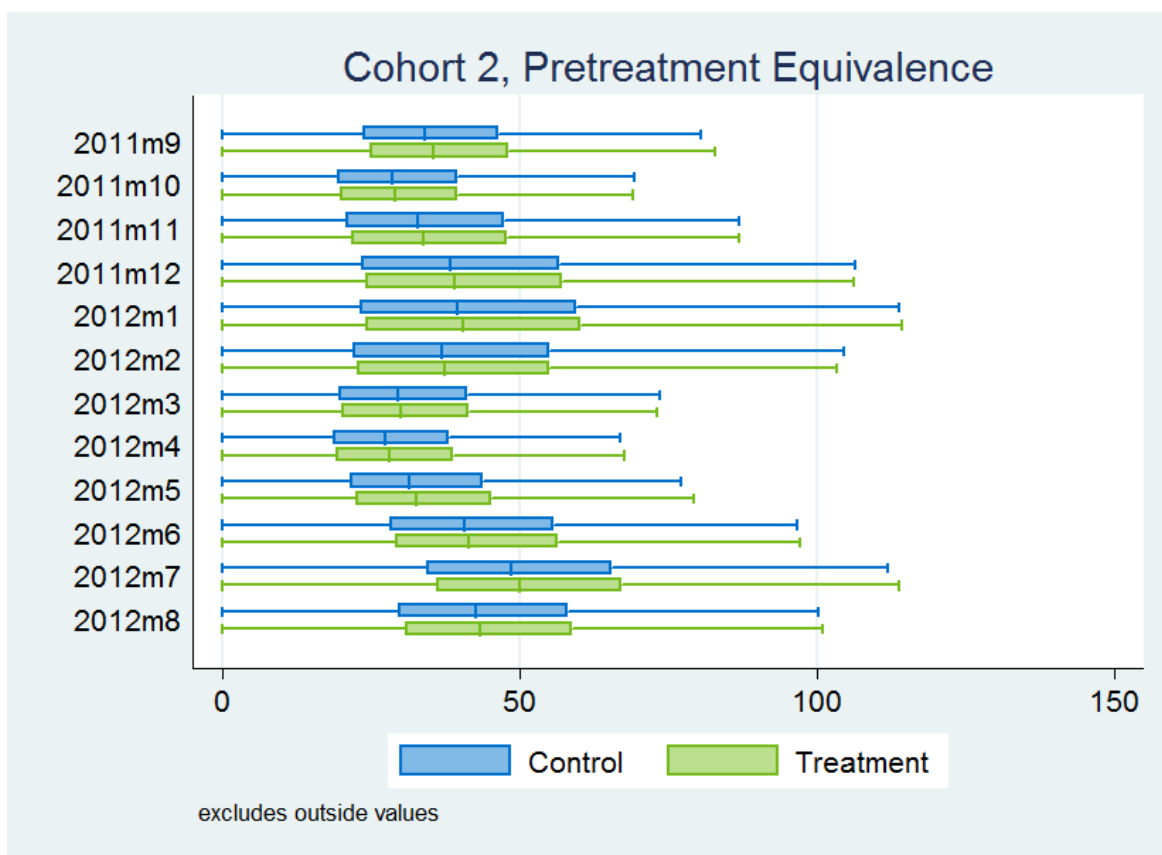
groups are statistically identical on all dimensions prior to the onset of treatment; the only difference between the treatment and control groups is exposure to MyHER. The impact is therefore simply the difference in average electricity consumption between the two groups. The first step to assessing the impact of an experiment involving a RCT is to determine whether or not the randomization worked as planned.

Table 3-3 presents summary information for each of the eight cohorts included in Nexant's DEC analysis, comparing the average annual kWh usage of each cohort's treatment and control group for the 12 months prior to the beginning of assignment. On an annual basis, the pre-assignment usage is relatively balanced between groups for each of these cohorts, where the largest difference occurs in Cohort 5 ("2017").

**Table 3-3: DEC MyHER Cohort Summary Statistics**

Cohort		Pretreatment Period		# Homes		Annual kWh in Pretreatment Period	
		Start	End	Control	Treatment	Control	Treatment
1	Apr 2010	04/2009	03/2010	9,535	6,173	17,871	17,893
2	2012 - 2013	09/2011	08/2012	30,566	527,684	14,392	14,528
3	2014 - 2015	12/2013	11/2014	26,376	383,024	14,782	14,684
4	2016	06/2015	05/2016	19,848	61,332	13,324	13,402
5	2017	05/2016	04/2017	27,388	161,317	13,204	13,554
6	Apr 2010 Release	04/2009	03/2010	9,535	10,689	17,871	17,732
7	2012 - 2013 Release	09/2011	08/2012	30,566	85,505	14,392	14,486
8	2014 - 2015 Release	12/2013	11/2014	26,376	35,809	14,782	14,660

Since MyHER is evaluated on a month basis, the more important equivalency check is on month-to-month comparability between treatment and control groups. Figure 3-3 is a box-and-whisker plot of the average pre-treatment consumption for the treatment and control groups of DEC Cohort 2 ("2012 - 2013"), the largest treatment cohort of the DEC MyHER program. The figure depicts the distribution of monthly average consumption from September 2011 to August 2012, the time period prior to the launch of the cohort. This figure represents usage of all accounts assigned to treatment and control in this cohort. The plot illustrates that usage patterns of the treatment and control customers are grossly similar, however t-tests on the mean consumption for treatment and control groups reveals statistically significant differences between treatment and control customers during much of the pretreatment period. For example, the cohort shown in Figure 3-3 has statistically significant differences between treatment and control groups in 11 of 12 months in the year immediately prior to the onset of treatment. Across all eight DEC cohorts, the number of pretreatment months that show statistically different differences between treatment and control customers ranges from 0 to 12. These differences will need to be addressed by the estimation procedure, as we describe later in this section.

**Figure 3-3: DEC Difference in Average Pre-treatment Billed Consumption (kWh)**

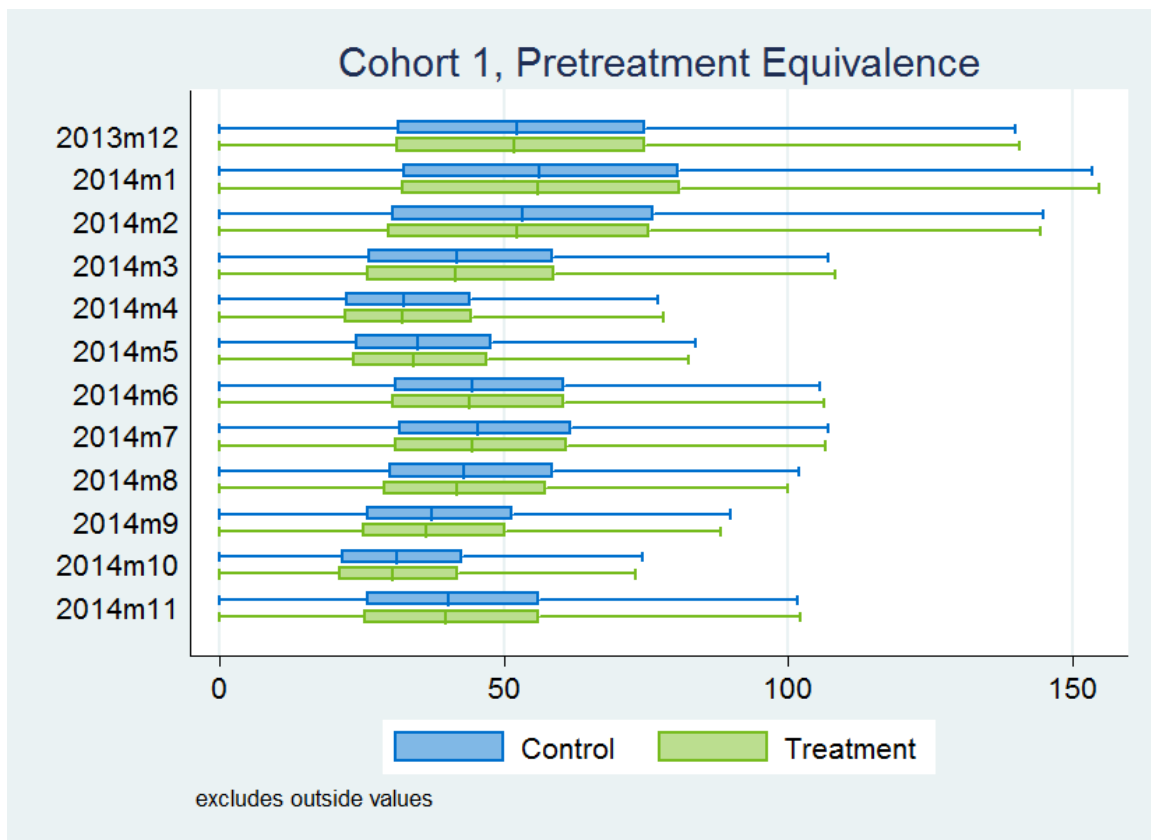
Considering the DEP program, Table 3-4 presents summary information for each of the six cohorts included in Nexant's analysis, comparing the average annual kWh usage of each cohort's treatment and control group for the 12 months prior to the beginning of assignment. Here as in DEC, on an annual basis, the pre-assignment usage is relatively balanced between groups for each of these cohorts, where the largest difference occurs in Cohort 5 ("October 2017") which is the smallest cohort in terms of the number of both treatment and control customers.

**Table 3-4: DEP MyHER Cohort Summary Statistics**

Cohort		Pre-Period		# Homes		Annual kWh in Pre-Period	
		Start	End	Control	Treatment	Control	Treatment
1	Dec 2014	12/2013	11/2014	72,590	565,291	16,852	16,773
2	Dec 2015	12/2014	11/2015	8,086	24,482	14,826	14,628
3	Jun 2016	06/2015	05/2016	16,579	37,011	13,765	13,860
4	May 2017	05/2016	04/2017	7,102	94,947	15,121	15,060
5	Oct 2017	10/2016	09/2017	12,401	33,879	13,636	13,838
6	Dec 2014 Release	12/2013	11/2014	72,590	65,869	16,852	16,847

On a month-to-month basis, DEP's cohorts perform similarly to DEC's cohorts in terms of equivalence in treatment and control group usage. Figure 3-4 is a box-and-whisker plot of the average pre-treatment consumption for the treatment and control groups of DEP Cohort 1 ("December 2014"), the largest treatment cohort of the DEP MyHER program. The figure depicts the distribution of monthly average consumption from December 2013 to November 2014, the time period prior to the launch of the cohort. This figure represents usage of all accounts assigned to treatment and control in this cohort. As was the case for DEC, this largest of DEP cohorts grossly demonstrates monthly equivalence of treatment and control group usage, but the differences in mean monthly consumption are actually statistically significant for all 12 months of the year immediately preceding the onset of treatment. Across the six DEP cohorts, the number of months of the year immediately prior to the onset of treatment that treatment and control group usage is statistically different ranges from 0 to 12. These differences will need to be taken into account during estimation.

**Figure 3-4: DEP Difference in Average Pre-treatment Billed Consumption (kWh)**





### 3.1.5 Regression Analysis

Separating the MyHER population into cohorts accounts for cohort maturation effects and improves statistical precision relative to differences among the cohorts. Nevertheless, as discussed above, there are still small, but significant, underlying differences between the cohort treatment and control groups that need to be netted out via a difference-in-differences approach. Nexant applied a linear fixed effects regression (LFER) model to account for the month-to-month differences in electricity usage observed in the pre-treatment period between the treatment and control groups. The basic form of the LFER model is shown in [Equation 3-1](#). Average daily electricity consumption for treatment and control group customers is modeled using an indicator variable for the billing period of the study, a treatment indicator variable, and a customer-specific intercept term:

#### Equation 3-1: Fixed Effects Model Specification

$$\text{kWh}_{ity} = \text{customer}_i * \beta_i + \sum_{t=1}^{12} \sum_{y=2009}^{2018} I_{ty} * \beta_{ty} + \sum_{t=1}^{12} \sum_{y=2009}^{2018} I_{ty} * \tau_{ty} * \text{treatment}_{ity} + \varepsilon_{ity}$$

Table 3-5 provides additional information about the terms and coefficients in [Equation 3-1](#).

**Table 3-5: Fixed Effects Regression Model Definition of Terms**

Variable	Definition
$\text{kWh}_{ity}$	Customer i's average daily energy usage in billing month t of year y
$\text{customer}_i$	An indicator variable that equals one for customer i and zero otherwise. This variable models each customer's average energy use separately.
$\beta_i$	The coefficient on the customer indicator variable. Equal to the mean daily energy use for each customer.
$I_{ty}$	An indicator variable equal to one for each monthly billing period t, year y and zero otherwise. This variable captures the effect of each billing period's deviation from the customers' average energy use over the entire time series under investigation.
$\beta_{ty}$	The coefficient on the billing period t, year y indicator variable.
$\text{treatment}_{ity}$	The treatment variable. Equal to one when the treatment is in effect for the treatment group. Zero otherwise. Always zero for the control group.
$\tau_{ty}$	The estimated treatment effect in kWh per day per customer in billing month t of year y; the main parameter of interest.
$\varepsilon_{ity}$	The error term.

Nexant estimated the LFER model separately for each of the randomized cohorts included in the analysis for each jurisdiction. Detailed regression outputs can be found in [Appendix A](#). The model specification includes an interaction term between the treatment indicator variable and the indicator variable for the bill month term. This specification generates a separate estimate of the MyHER daily impact for each month.

Table 3-6 illustrates the calculation of monthly impact estimates from the regression model coefficients for homes in the DEC 2012 - 2013 cohort (DEC Cohort 2). The monthly savings shown in Table 3-6 are the unweighted point estimates for that cohort. Each month's average

treatment effect is multiplied by an assumed number of days in the month equal to  $365.25/12 = 30.4375$ .

**Table 3-6: Impact Calculation Example – DEC Cohort 2**

Month	Daily Treatment Coefficient ( $\tau$ )	Monthly Impact (kWh)
06/2017	-0.2310	-7.0
07/2017	0.1645	5.0
08/2017	0.1487	4.5
09/2017	-0.5932	-18.1
10/2017	-0.4416	-13.4
11/2017	-1.1360	-34.6
12/2017	-1.9676	-59.9
01/2018	-1.0220	-31.1
02/2018	-1.2419	-37.8
03/2018	-1.2941	-39.4
04/2018	-1.0254	-31.2
05/2018	-0.6825	-20.8
<b>12-month Total</b>		<b>-283.7</b>

Impact estimates by cohort were combined for each month using a weighted average where the weighting factor is the number of homes with billing data that had been assigned to the treatment group during a prior month (e.g., were in the post-treatment period). These estimates of the average MyHER impact per assigned home were then divided by the proportion of customers treated, as shown in Table 3-1 and Table 3-2, to estimate the average treatment effect per participating home.

### 3.1.6 Dual Participation Analysis

The regression model outputs and subsequent intention-to-treat adjustments discussed in [Section 3.1.5](#) produce estimates of the total change in electricity consumption in homes exposed to MyHER. Some portion of the savings estimated by the regression is attributable to the propensity of MyHER treatment group homes to participate in other energy efficiency offerings at Duke Energy at a greater rate than control group homes. The primary purpose of the dual participation analysis is to quantify annual electricity savings attributable to this incremental DSM participation and subtract it from the MyHER impact estimates. This downward adjustment prevents savings from being double-counted by both the MyHER program and the program where savings were originally claimed.

A secondary objective of the dual participation analysis is to better understand the increased DSM participation, or “uplift” triggered by inclusion of marketing messages within MyHER. The ability to serve as a marketing tool for other DSM initiatives is an important part of what makes MyHER attractive as Duke Energy assumes the role of a trusted energy advisor with its customer base.

Duke Energy EM&V staff provided Nexant with a dataset of non-MyHER program participation records for the MyHER treatment and control group homes dating back to January 2015. This dataset included nearly 439,000 records of efficient measure installations by the MyHER treatment and control group and formed the basis of Nexant’s dual participation analysis.

Table 3-7 and Table 3-8 shows the distribution of participation and savings during the 12-month period June 2017 to May 2018 across DEC and DEP’s residential portfolio, respectively.

**Table 3-7: DEC Total EE Program Participation among MyHER Customers**

Program Name	Number of Records	Net MWh/year	Net kW/year
DE Residential EE Products & Services	181,353	36,612	12,092
DE Smart Saver Residential	243,630	152,553	31,754
Residential Energy Assessments	13,584	15,457	2,530
<b>Total</b>	<b>438,567</b>	<b>204,622</b>	<b>46,376</b>

**Table 3-8: DEP Total EE Program Participation among MyHER Customers**

Program Name	Number of Records	Net MWh/year	Net kW/year
DEP Home Energy Improvement	17,585	5,435	1,429
DEP Neighborhood Energy Saver	2,534	1,144	174
DEP New Construction Program	30	1	1
DEP ResEE Multi-Family	4,739	1,172	118
DEP Residential Energy Assessment	10,494	11,758	1,955
DEP Single Family Water Measures	115,504	30,605	10,199
DEP Smart Saver Residential	8,672	11,021	4,297
<b>Total</b>	<b>159,558</b>	<b>61,137</b>	<b>18,173</b>

The MyHER dual participation analysis included the following steps:

- Match the data to the treatment and control homes by Account ID
- Assign each transaction to a bill month based on the participation date field in the tracking data
- Exclude any installations that occurred prior to the home being assigned to the treatment or control group

- Calculate the daily net energy savings for each efficiency measure
- Sum the daily net energy impact by Account ID for measures installed prior to each bill month
- Calculate the average savings per day for the treatment and control groups by bill month. This calculation is performed separately for each cohort
- Calculate the incremental daily energy saved from energy efficiency (treatment – control) and multiply by the average number of days per bill month (30.4375)
- Take a weighted average across cohorts of the incremental energy savings observed in the treatment group
- Subtract this value from the LFER estimates of treatment effect for each bill month

Table 3-9 shows the dual participation calculations, by bill month, for homes in the DEC 2012 – 2013 Cohort (DEC Cohort 2). Savings from energy efficiency measures climb steadily over time in both groups as additional efficient technologies are installed through Duke Energy's residential energy efficiency portfolio. The treatment group's impacts increase at a slightly greater rate, so the incremental energy savings subtracted from the MyHER treatment effect generally grows as a cohort's duration of exposure lengthens.

**Table 3-9: Incremental Energy Efficiency Savings Calculation Example – DEC Cohort 2**

Month	Mean Daily EE kWh Impact (Control)	Mean Daily EE kWh Impact (Treatment)	Incremental Daily kWh from EE (Treatment – Control)	Uplift %	Incremental kWh Savings
06/2017	0.354	0.381	0.027	7.6%	0.82
07/2017	0.369	0.395	0.026	7.2%	0.80
08/2017	0.384	0.412	0.028	7.3%	0.85
09/2017	0.406	0.435	0.029	7.1%	0.88
10/2017	0.428	0.459	0.031	7.2%	0.94
11/2017	0.445	0.476	0.031	7.0%	0.95
12/2017	0.459	0.492	0.033	7.2%	1.01
01/2018	0.477	0.511	0.034	7.2%	1.04
02/2018	0.488	0.523	0.035	7.1%	1.06
03/2018	0.506	0.540	0.034	6.7%	1.04
04/2018	0.527	0.561	0.034	6.5%	1.05
05/2018	0.541	0.576	0.035	6.5%	1.06
<b>12-month Total</b>					<b>11.51</b>

While the incremental participation rate of the treatment group in other EE programs is modest when considered in total, increased uptake of measures immediately following promotional messaging within MyHER mailers could be much more dramatic. Each MyHER issued has space for one product promotion message that is used to market other Duke Energy programs

or initiatives. Duke Energy provided Nexant with records of the exact messages received by each home. Table 3-10 and Table 3-11 show the number of homes that received each combination of messages for the DEC and DEP MyHER cycles from this evaluation period.

**Table 3-10: DEC MyHER Promotional Messaging by Month**

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
06/2017	Fire Up The Grill	Think Thermostat	207,609
06/2017	HEHC	Think Thermostat	291,650
06/2017	NC Greenpower	Think Thermostat	674,093
07/2017	Discover Ways To Save	Full Not Too Full	87
07/2017	Duke Energy Delivers	Full Not Too Full	1,153,123
07/2017	Safety First	Full Not Too Full	6,172
08/2017	Laundry Savings	Automate Energy Use	1,148,835
10/2017	Share The Warmth	To Preheat Or Not	1,171,806
11/2017	Great Escape	Unblock The Heat	96,953
11/2017	Weatherstrip	Unblock The Heat	447,864
12/2017	Share The Warmth	Think At The Sink	1,116,808
01/2018	Great Escape	Safety And Savings	273,800
01/2018	Let The Sun Shine	Safety And Savings	856,846
02/2018	Insulate And Seal	Caulk	428,407
02/2018	Johns Manville Ad (Intelligent)	None	44,173
02/2018	Johns Manville Ad (Traditional)	None	38,854
02/2018	Johns Manville eHER only Ad (Intelligent)	None	20,459
02/2018	Johns Manville eHER only Ad (Traditional)	None	20,267
03/2018	Equal Payment Plan	Interactive	446,161
03/2018	Power Manager 32	Interactive	443,381
03/2018	Ecobee Ad (Intelligent)	None	87,843
03/2018	Ecobee Ad (Traditional)	None	78,410
03/2018	Ecobee eHER only Ad (Intelligent)	None	20,442
03/2018	Ecobee eHER only Ad (Traditional)	None	20,329
04/2018	Find It Duke	Cool Off On Counter	425,744
04/2018	Lighting DEC Ad (Intelligent)	None	60,356
04/2018	Lighting DEC Ad (Traditional)	None	60,395
05/2018	Find It Duke	Let LEDs Lower Bills	952,111
05/2018	Online Store - May Lighting Ad A	None	99,426
05/2018	Online Store - May Lighting Ad B	None	99,070

**Table 3-11: DEP MyHER Promotional Messaging by Month**

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
06/2017	Fire Up The Grill	Think Thermostat	16,901
06/2017	HEHC	Think Thermostat	527,037
06/2017	NC Greenpower	Think Thermostat	145,351
07/2017	Discover Ways To Save	Full Not Too Full	38
07/2017	Don't Forget The Bulbs	Full Not Too Full	678,448
07/2017	Safety First	Full Not Too Full	15
08/2017	Laundry Savings	Automate Energy Use	680,829
10/2017	It Takes More DEP	To Preheat Or Not	691,761
11/2017	Great Escape	Unblock The Heat	233,084
11/2017	Weatherstrip	Unblock The Heat	72,702
11/2017	Weatherstrip MF	Unblock The Heat MF	1,559
12/2017	It Takes More DEP	Think At The Sink	626,155
01/2018	Great Escape	Safety And Savings	494,476
01/2018	Let The Sun Shine	Safety And Savings	171,651
02/2018	Insulate And Seal	Caulk	196,546
02/2018	Johns Manville Ad (Intelligent)	None	23,627
02/2018	Johns Manville Ad (Traditional)	None	20,684
02/2018	Johns Manville eHER only Ad (Intelligent)	None	39,638
02/2018	Johns Manville eHER only Ad (Traditional)	None	39,871
03/2018	Energy Wise DEP	Interactive	269,480
03/2018	Equal Payment Plan	Interactive	2,417
03/2018	Equal Payment Plan DEP	Interactive	220,991
03/2018	Ecobee Ad (Intelligent)	None	39,307
03/2018	Ecobee Ad (Traditional)	None	35,126
03/2018	Ecobee eHER only Ad (Intelligent)	None	40,113
03/2018	Ecobee eHER only Ad (Traditional)	None	40,239
04/2018	Find It Duke	Cool Off On Counter	184,896
04/2018	Lighting DEP Ad (Intelligent)	None	62,604
04/2018	Lighting DEP Ad (Traditional)	None	54,374
05/2018	Find It Duke	Let LEDs Lower Bills	532,453
05/2018	Retail Lighting - May Lighting DEP Ad A	None	70,712
05/2018	Retail Lighting - May Lighting DEP Ad B	None	79,863



## 3.2 Impact Findings

### 3.2.1 Per-home kWh and Percent Impacts

Nexant estimates the average participating DEC MyHER home saved 247.7 kWh of electricity from June 2017 to May 2018. This represents a 1.69% reduction in total electricity consumption compared to the control group over the same period. The average DEP MyHER home saved 201.2 kWh of electricity from June 2017 to May 2018, which represents a 1.25% reduction in electricity consumption. These estimates reflect an upward adjustment to account for the intention-to-treat methodology and a downward adjustment to prevent double-counting of savings attributable to incremental participation of treatment groups in Duke Energy's energy efficiency programs.

Table 3-12 and Table 3-13 show the impact estimates in each bill month for the average home assigned to treatment in DEC and DEP, respectively. The table also shows the subsequent adjustment to account for the fact that only a subset of homes assigned to treatment was actively participating in MyHER during the study period.

**Table 3-12: DEC MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment**

Month	Treatment Homes Analyzed	DEC Participant Count	kWh impact in Assigned Homes	% Treated	kWh Impact in Treated Homes
06/2017	1,231,705	1,197,462	8.7	97%	9.0
07/2017	1,218,640	1,198,133	3.6	98%	3.7
08/2017	1,207,107	1,171,813	4.0	97%	4.1
09/2017	1,195,242	1,172,053	14.5	98%	14.7
10/2017	1,185,902	1,172,053	15.3	99%	15.5
11/2017	1,225,916	1,195,285	27.0	98%	27.6
12/2017	1,216,916	1,191,881	36.8	98%	37.6
01/2018	1,208,915	1,193,353	30.4	99%	30.7
02/2018	1,200,827	1,178,403	30.1	98%	30.7
03/2018	1,192,681	1,177,960	31.9	99%	32.3
04/2018	1,183,803	1,157,514	26.1	98%	26.7
05/2018	1,173,821	1,151,896	20.5	98%	20.9
<b>12-month Total</b>			<b>248.9</b>	<b>98%</b>	<b>253.6</b>

**Table 3-13: DEP MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment**

Month	Treatment Homes Analyzed	DEP Participant Count	kWh impact in Assigned Homes	% Treated	kWh Impact in Treated Homes
06/2017	727,455	682,040	18.3	94%	19.5
07/2017	719,693	713,994	17.2	99%	17.4
08/2017	712,653	701,172	19.5	98%	19.8
09/2017	705,487	700,125	4.1	99%	4.1
10/2017	699,920	700,125	-6.1	100%	-6.1
11/2017	726,344	710,313	19.3	98%	19.7
12/2017	720,920	707,899	31.2	98%	31.8
01/2018	715,954	708,355	29.2	99%	29.5
02/2018	711,221	697,726	21.4	98%	21.8
03/2018	706,614	698,443	15.5	99%	15.6
04/2018	701,195	693,815	16.3	99%	16.5
05/2018	695,352	689,886	17.4	99%	17.6
<b>12-month Total</b>			<b>203.3</b>	<b>98%</b>	<b>207.2</b>

An adjustment factor of 5.95 kWh per home for DEC and 6.02 kWh per home for DEP is applied to MyHER impact estimates in Table 3-14 to arrive at the final net verified program impact per home. [Section 3.2.6](#) provides additional detail on the calculation of the adjustment for overlapping participation in other Duke EE programs.

**Table 3-14: MyHER Impact Estimates Net of EE Overlap**

Jurisdiction	Time Period	kWh Savings in Treated Homes	Incremental kWh from EE Programs	Net MyHER Impact Estimate	Control Group Usage (kWh)	Percent Reduction
DEC	June 2017 - May 2018	253.6	5.95	247.7	14,658	1.69%
DEP	June 2017 - May 2018	207.2	6.02	201.2	16,137	1.25%

### 3.2.2 Aggregate Impacts

The total impact of the MyHER program in each service territory is calculated by multiplying the per-home impacts (adjusted for ITT and incremental EE participation) for each bill month by the number of participating homes. Over the 12-month period June 2017 to May 2018, DEC MyHER participants conserved 292.2 GWh of electricity, while DEP MyHER participants conserved 141.1 GWh. The aggregate impacts presented in Table 3-15 and Table 3-16 are at the meter

level so they do not reflect line losses which occur during transmission and distribution between the generator and end-use customer.

**Table 3-15: DEC MyHER Aggregate Impacts**

Month	DEC Participant Count	kWh Net Impact	GWh Net Impact
06/2017	1,197,462	8.5	10.2
07/2017	1,198,133	3.2	3.8
08/2017	1,171,813	3.6	4.2
09/2017	1,172,053	14.1	16.6
10/2017	1,172,053	14.8	17.4
11/2017	1,195,285	27.3	32.6
12/2017	1,191,881	37.2	44.3
01/2018	1,193,353	30.3	36.2
02/2018	1,178,403	30.2	35.6
03/2018	1,177,960	31.9	37.6
04/2018	1,157,514	26.2	30.3
05/2018	1,151,896	20.4	23.5
<b>12-month Total</b>		<b>247.7</b>	<b>292.2</b>

**Table 3-16: DEP MyHER Aggregate Impacts**

Month	DEP Participant Count	kWh Net Impact	GWh Net Impact
06/2017	682,040	19.1	13.0
07/2017	713,994	16.9	12.1
08/2017	701,172	19.3	13.6
09/2017	700,125	3.6	2.5
10/2017	700,125	-6.6	-4.6
11/2017	710,313	19.2	13.6
12/2017	707,899	31.3	22.1
01/2018	708,355	29.0	20.5
02/2018	697,726	21.3	14.9
03/2018	698,443	15.1	10.6
04/2018	693,815	16.0	11.1
05/2018	689,886	17.1	11.8
<b>12-month Total</b>		<b>201.2</b>	<b>141.1</b>

### 3.2.3 Precision of Findings

The margin of error of the per-home impact estimate is  $\pm 16.0$  kWh for DEC and  $\pm 18.9$  kWh for DEP at the 90% confidence interval. Nexant clustered the variation of the LFER model by

Account ID to produce a robust estimate of the standard error associated with treatment coefficients. The standard normal z-statistic for the 90% confidence level of 1.645 was then used to estimate the uncertainty associated with each cohort estimate. This uncertainty was then aggregated across cohorts to quantify the precision of the program-level impacts estimates (Table 3-17 and Table 3-18).

**Table 3-17: 90% Confidence Intervals Associated with DEC MyHER Impact Estimates**

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	231.7	247.7	263.6
Percent Reduction	1.58%	1.69%	1.80%
Aggregate Impact (GWh)	273.4	292.2	311.0

**Table 3-18: 90% Confidence Intervals Associated with DEP MyHER Impact Estimates**

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	182.3	201.2	220.1
Percent Reduction	1.13%	1.25%	1.36%
Aggregate Impact (GWh)	127.9	141.1	154.3

For DEC, the absolute precision of the result is  $\pm 0.11\%$  and the relative precision of  $\pm 6.4\%$  at the 90% confidence level. For DEP, the absolute precision of the result is  $\pm 0.12\%$  and the relative precision of  $\pm 9.4\%$  at the 90% confidence level.

### 3.2.4 Impact Estimates by Cohort

The per-home impact estimates shown in Table 3-15 and Table 3-16 reflect a weighted average impact across the eight cohorts of DEC MyHER customers analyzed and the six cohorts of DEP MyHER customers analyzed. The impact estimates for the individual cohorts varied across the study period. Table 3-19 and Table 3-20 show point estimates for each cohort during the period June 2017 to May 2018 for DEC and DEP, respectively. Three released cohorts for DEC and one release cohort for DEP were added to treatment in October 2015 and began producing impacts in November 2015.

**Table 3-19: DEC Annual kWh Impact Estimates by Cohort**

Month	Monthly Average Impact							
	Apr 2010	2012 - 2013	2014 - 2015	2016	2017	Apr 2010 Release	2012 - 2013 Release	2014 - 2015 Release
06/2017	-22.6	-7.0	-8.7	-7.0	-15.7	-6.4	-11.1	-10.1
07/2017	-22.0	5.0	-7.4	-5.0	-21.3	-9.6	-15.3	-8.8
08/2017	-23.5	4.5	-9.8	-3.9	-15.4	-12.6	-12.4	-13.8
09/2017	-29.4	-18.1	-11.4	-3.7	-14.6	-12.4	-10.1	-15.5
10/2017	-22.1	-13.4	-22.1	-8.5	-8.6	-10.7	-6.9	-15.6
11/2017	-19.8	-34.6	-28.3	-18.2	-12.2	-17.0	-8.4	-13.7
12/2017	-19.6	-59.9	-27.4	-23.9	-1.2	-19.0	-12.3	-18.3
01/2018	-24.9	-31.1	-45.7	-21.2	0.0	-26.9	-15.8	-23.4
02/2018	-23.5	-37.8	-33.5	-19.8	-10.3	-15.9	-11.5	-17.6
03/2018	-24.1	-39.4	-36.7	-19.5	-12.1	-20.9	-9.5	-16.4
04/2018	-20.2	-31.2	-26.7	-14.6	-21.7	-13.5	-8.3	-15.0
05/2018	-23.1	-20.8	-17.4	-11.9	-36.9	-15.2	-8.8	-19.0
<b>12 Month Total</b>	<b>-274.8</b>	<b>-283.7</b>	<b>-275.0</b>	<b>-157.1</b>	<b>-169.9</b>	<b>-180.1</b>	<b>-130.3</b>	<b>-187.2</b>

**Table 3-20: DEP Annual kWh Impact Estimates by Cohort**

Month	Monthly Average Impact					
	Dec 2014	Dec 2015	Jun 2016	May 2017	Oct 2017	Dec 2014 Release
06/2017	-22.3	-5.7	-15.3	-8.6	0.0	-3.0
07/2017	-21.0	-10.5	-19.2	-5.5	0.0	-2.6
08/2017	-24.3	-11.0	-16.2	-4.0	0.0	-4.0
09/2017	-2.8	-10.9	-16.8	-5.1	0.0	-5.8
10/2017	10.6	-5.8	-17.4	-2.7	0.0	-6.6
11/2017	-24.4	-9.1	-10.8	-8.6	10.0	-12.6
12/2017	-40.8	-18.9	-2.0	-14.8	30.2	-21.3
01/2018	-38.1	-24.4	-2.2	-13.4	32.6	-19.8
02/2018	-26.6	-8.4	-15.3	-13.0	14.9	-13.2
03/2018	-18.7	-5.4	-14.5	-9.0	11.1	-14.0
04/2018	-19.2	-1.1	-20.0	-6.4	-5.9	-12.2
05/2018	-21.1	-6.8	-22.1	-0.9	-17.9	-8.3
<b>12 Month Total</b>	<b>-248.8</b>	<b>-118.1</b>	<b>-171.8</b>	<b>-92.1</b>	<b>74.9</b>	<b>-123.4</b>

For DEC, cohorts 1, 2, and 3 (April 2010, 2012 - 2013, and 2014 - 2015) show the greatest impacts and are also the oldest cohorts. Cohort 2 is the largest cohort and contains roughly 44% of analyzed treatment customers. For DEP, cohorts 1 and 3 (December 2014 and June 2016) show the greatest impacts. Cohort 1 is the largest cohort in DEP and contains about 71% of analyzed treatment customers.

Table 3-21 and Table 3-22 show the margin of error at the 90% confidence level for each cohort's annual impact estimate for DEC and DEP, respectively. The combined margin of error for the entire program is lower than the error for any single cohort because the combined program impact estimate is based on a larger pool of customers. Individual cohort margins of error are high for the small cohorts due to the sizes of these groups relative to the underlying variation in consumption among the treatment and control groups constituting each cohort.

**Table 3-21: DEC 90% Confidence Intervals Associated with Cohort Savings Estimates**

Cohort	Margin of Error in kWh at 90% Confidence Level	Lower Bound (kWh)	Point Estimate (kWh)	Upper Bound (kWh)
Apr 2010	± 194	-468	-275	-81
2012 - 2013	± 72	-356	-284	-212
2014 - 2015	± 65	-340	-275	-210
2016	± 86	-243	-157	-71
2017	± 67	-237	-170	-102
Apr 2010 Release	± 166	-346	-180	-15
2012 - 2013 Release	± 83	-213	-130	-48
2014 - 2015 Release	± 94	-281	-187	-93

**Table 3-22: DEP 90% Confidence Intervals Associated with Cohort Savings Estimates**

Cohort	Margin of Error in kWh at 90% Confidence Level	Lower Bound (kWh)	Point Estimate (kWh)	Upper Bound (kWh)
Dec 2014	± 49	-298	-249	-199
Dec 2015	± 148	-266	-118	30
Jun 2016	± 105	-277	-172	-67
May 2017	± 144	-236	-92	52
Oct 2017	± 70	5	75	145
Dec 2014 Release	± 67	-191	-123	-56

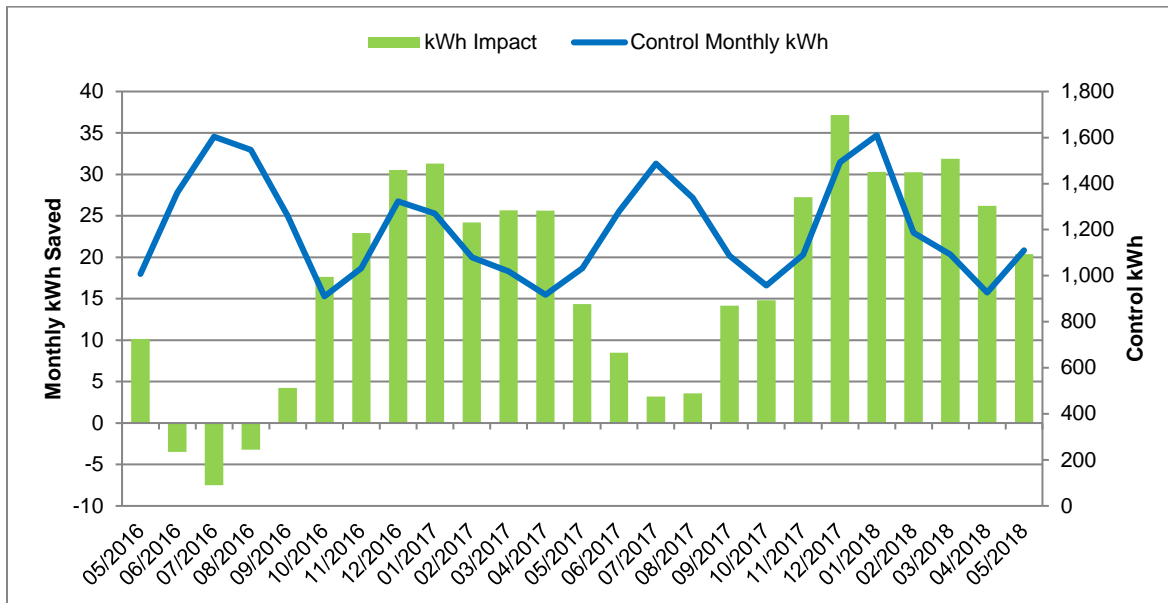
### 3.2.5 Seasonal Trends

There is a clear seasonal pattern to the DEC and DEP MyHER savings profiles. DEC and DEP customers both consistently experience the greatest reductions in winter and the smallest,

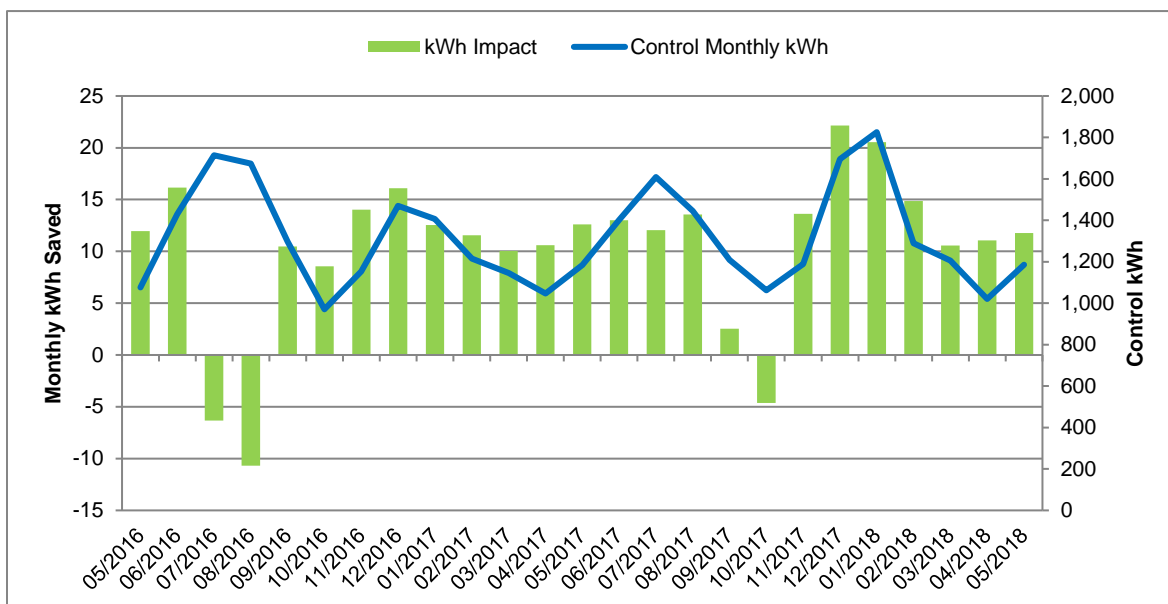


sometimes negative, reductions in summer. The green series in Figure 3-5 and Figure 3-6 show the average estimated monthly treatment effect for the program in each bill month from May 2016 to May 2018. The blue series in Figure 3-5 and Figure 3-6 show the average control customer's load during the same period of time. Even though annual electricity consumption for customers in both service territories is clearly bimodal (with peaks in both the summer and winter), MyHER impacts are not.

**Figure 3-5: DEC Average kWh Savings by Month**



**Figure 3-6: DEP Average kWh Savings by Month**



Based on the observed savings trends, MyHER is realizing the greatest impacts in the winter and shoulder months, with the lowest impacts in the summer months. Seasonal trends in

MyHER average treatment effects likely reflect customers' differing abilities to respond by season. For example, winter heating demand can be mitigated by dressing more warmly, using more blankets in the home, or shutting off lights more often (there are fewer hours of daylight in the winter than the summer). The summer impacts still occur but the conservation options, and potentially willingness to conserve on cooling, options available to customers are fewer.

### 3.2.6 Uplift in Other Duke Energy Programs

Section 3.1.6 outlined the methodology Nexant used to calculate the annual kWh savings attributable to increased participation in other Duke Energy programs. Table 3-23 presents the downward adjustment per home that was applied to impacts in order to avoid double-counting savings from June 2017 to May 2018. For DEC, the uplift was determined to be 5.95 kWh per home, or 7.0 GWh in aggregate. For DEP, the uplift was determined to be 6.02 kWh per home, or 4.2 GWh in aggregate.

**Table 3-23: Monthly Adjustment for Overlapping Participation in Other EE Programs**

Month	DEC Incremental kWh from Other EE Programs	DEP Incremental kWh from Other EE Programs
06/2017	0.52	0.46
07/2017	0.52	0.48
08/2017	0.56	0.49
09/2017	0.60	0.53
10/2017	0.64	0.56
11/2017	0.40	0.52
12/2017	0.43	0.49
01/2018	0.45	0.49
02/2018	0.45	0.50
03/2018	0.45	0.50
04/2018	0.46	0.50
05/2018	0.46	0.50
<b>12 Month Total</b>	<b>5.95</b>	<b>6.02</b>

Although these additional savings must be subtracted from the MyHER effect to prevent double-counting, the MyHERs clearly played an important role in harvesting these savings.

Table 3-24 and Table 3-25 show the average daily energy savings attributable to tracked energy efficiency measures as of May 2018 by cohort and calculates an uplift percentage. In nearly every case the treatment group showed a higher propensity to adopt measures through Duke Energy programs than the control group.

**Table 3-24: DEC Uplift Percentage by Cohort**

	Cohort	Monthly Net kWh Savings from EE (Treatment Group)	Monthly Net kWh Savings from EE (Control Group)	Uplift Percentage
1	Apr 2010	18.7	17.7	6.2%
2	2012 - 2013	14.6	13.7	7.0%
3	2014 - 2015	15.2	14.6	3.9%
4	2016	28.1	27.3	2.9%
5	2017	18.1	19.4	-6.4%
6	Apr 2010 Release	17.9	17.7	1.6%
7	2012 - 2013 Release	14.0	13.7	2.3%
8	2014 - 2015 Release	13.8	14.6	-5.3%

**Table 3-25: DEP Uplift Percentage by Cohort**

	Cohort	Monthly Net kWh Savings from EE (Treatment Group)	Monthly Net kWh Savings from EE (Control Group)	Uplift Percentage
1	Dec 2014	9.3	8.7	6.76%
2	Dec 2015	9.2	8.0	13.98%
3	Jun 2016	9.8	9.1	7.64%
4	May 2017	7.8	7.8	0.14%
5	Oct 2017	6.9	7.2	-4.90%
6	Dec 2014 Release	9.1	8.7	4.93%

### 3.2.7 Duration of Exposure

Home energy report evaluations in North America consistently find a trend of increasing savings with length of treatment. Since the prior evaluation, Nexant has estimated impacts for three new cohorts in both service territories. The bulk of the cohorts were added to the DEC and DEP programs in June 2016, May 2017, and October 2017. In DEC, the newest cohorts (Cohorts 4 and 5) make up 15% of the treatment population by May 2018. In DEP, the newest cohorts (3, 4, and 5) make up 19% of the treatment population by May 2018. Figure 3-7 and Figure 3-8 compare the overall results with the results of the average customer who is not in one of the three newest cohorts for DEC and DEP, respectively. The older cohorts consistently realize higher impacts than their newer counterparts.

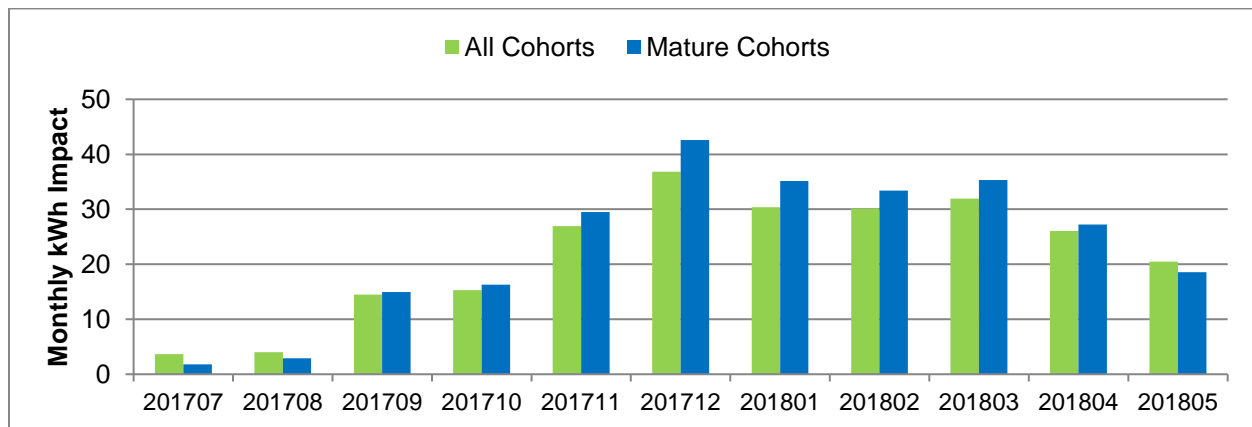
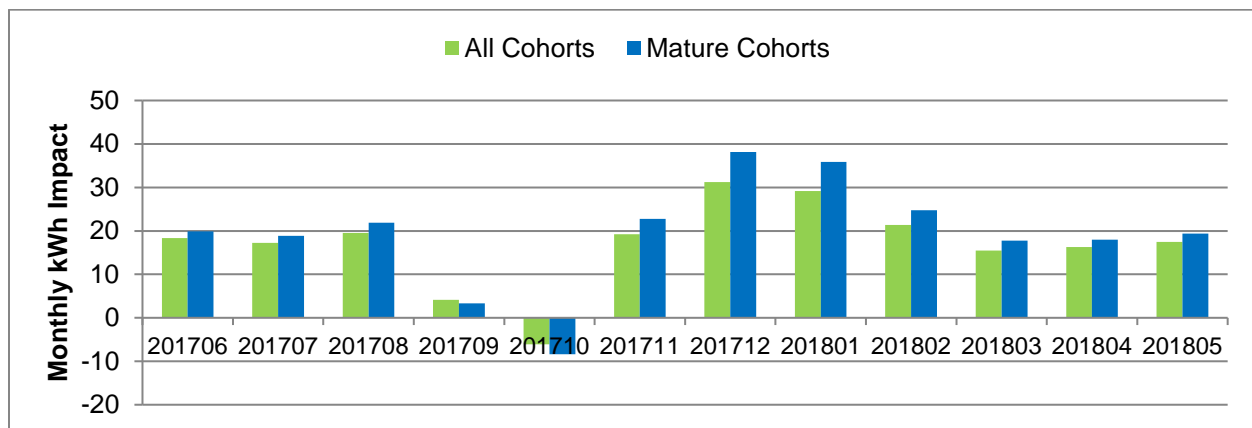
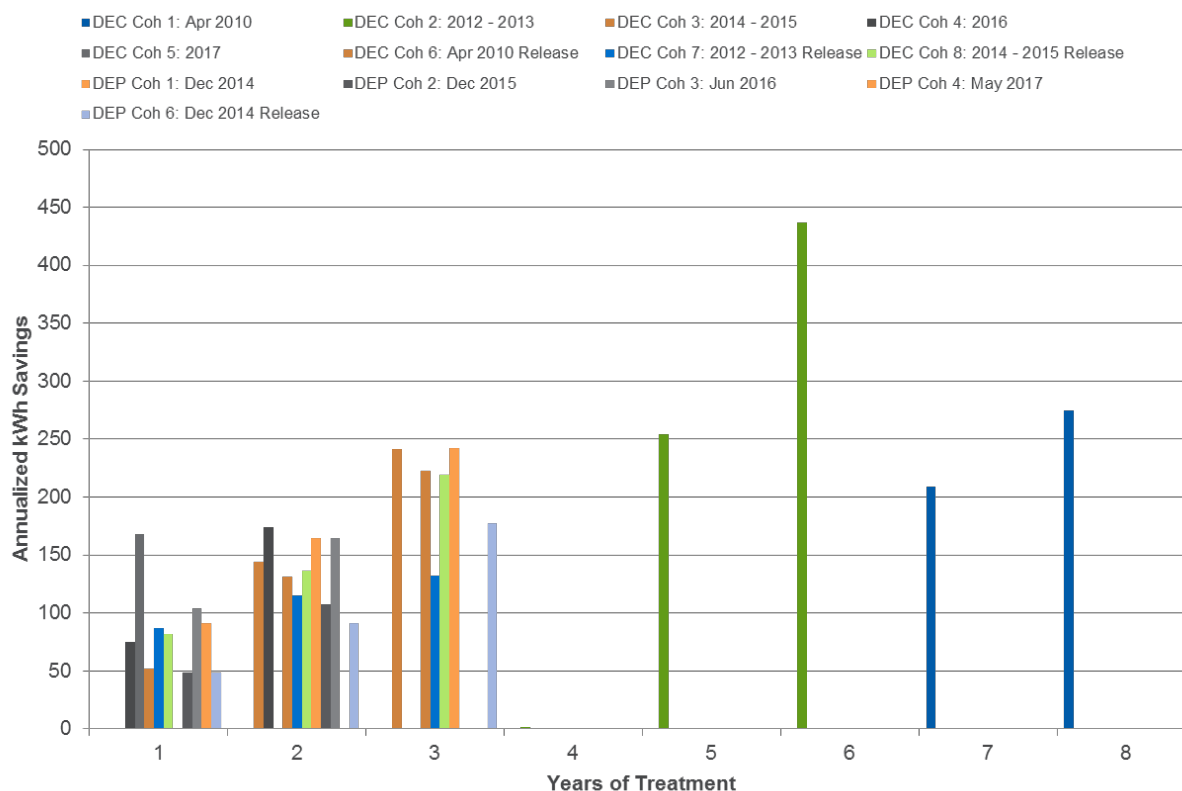
**Figure 3-7: DEC Comparison of Average Customer Savings to the Savings of the Older Program Participants****Figure 3-8: DEP Comparison of Average Customer Savings to the Savings of the Older Program Participants**

Figure 3-9 displays the annual savings by the number of years a cohort has been in the program. A general upward trend of savings occurs with longer exposure to treatment, however some exceptions are visible. The oldest cohort, which has been in treatment since 2010, shows lower impacts than those in earlier years of treatment. It should be noted that there are few program implementations of home energy report programs with durations in excess of five years and there is less information about what should be expected from implementations of that vintage. Additionally, with less than 6,000 treatment customers in this cohort, it is now one of the smallest cohorts in DEC. It is reasonable to expect the newer cohorts' impacts to increase with maturation of the cohorts, however the 2010 cohort's performance may be indicative of the existence of a point peak maturation after which mature impacts cannot be sustained. A literature review of home energy report programs in North America with participants exposed to treatment for eight years or more would be valuable to benchmark the performance of Duke Energy's oldest MyHER cohorts.

**Figure 3-9: Annual Savings by Duration of Exposure**

### 3.3 MyHER Interactive Portal

Nexant also evaluated the incremental energy savings generated by Duke Energy's enhancement to the standard MyHER report. Duke Energy launched the MyHER Interactive Portal in March 2015. The portal offers additional means for customers to customize or update Duke Energy's data on their premises, demographics, and other characteristics that affect consumption and MyHER's classification of each customer.

The portal provides additional custom tips based on updated data provided by the customer. MyHER Interactive also sends weekly email challenges that seek to engage customers in active energy management, additional efficiency upgrades, and conservation behaviors. Nexant evaluated the impacts of the MyHER Interactive Portal using a matched comparison group because MyHER Interactive is not deployed as a randomized controlled trial (RCT).

#### 3.3.1 Estimation Procedures for MyHER Interactive

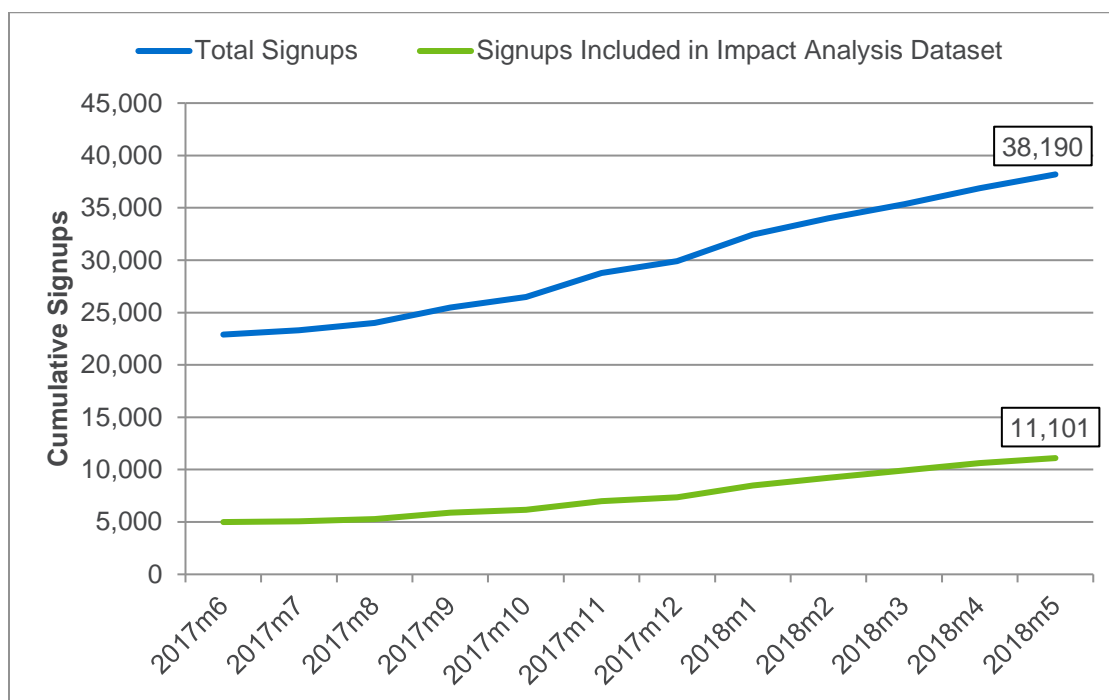
A matched comparison group is a standard approach for establishing a counterfactual baseline when there is no random assignment to treatment and control. The goal of matching estimators is to estimate impacts by matching treatment customers to similar customers that did not participate in the program. The key assumption to matched comparison approaches is that MyHER Interactive participants closely resemble non-participants, except for the fact that one of these two groups participated in the program while the other did not. When a strong comparison

group is established, evaluators can reliably conclude that any differences observed after enrollment are due to program's stimulus. In using a matched comparison group to estimate energy savings due to exposure to MyHER Interactive, the same statistical modeling approach is used to estimate energy savings impacts as was used for estimating energy savings for the program overall (i.e., with linear fixed effects regression (LFER) estimation).

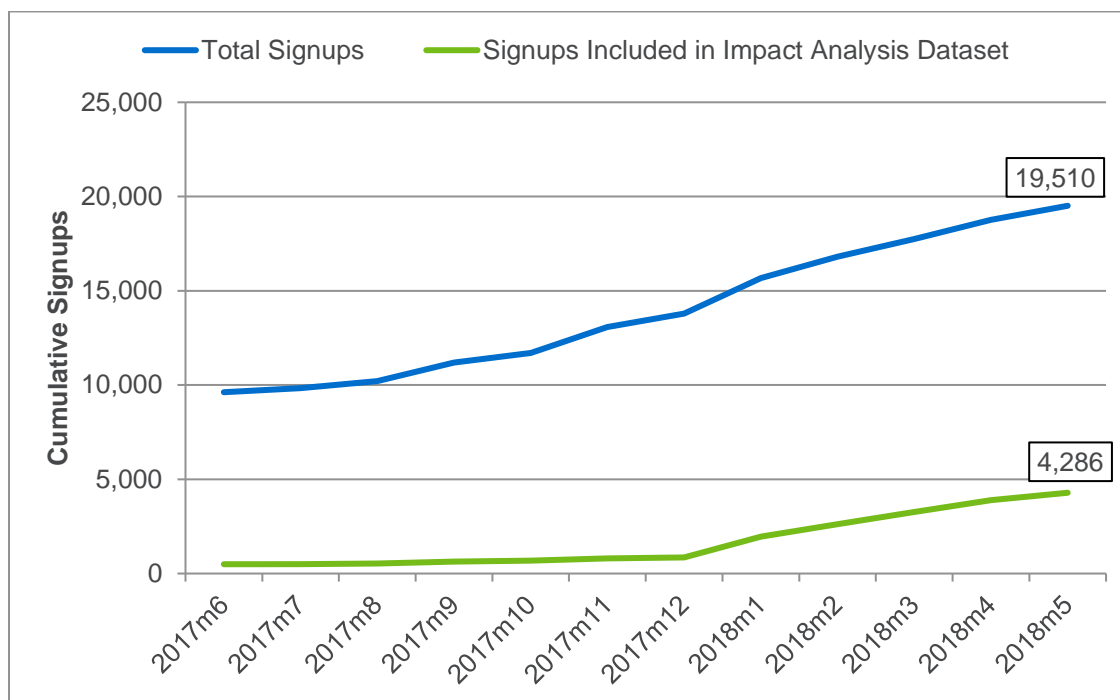
Duke Energy provided Nexant with MyHER participant enrollment information for the Interactive portal. A total of 38,190 DEC and 19,510 DEP MyHER treatment customers signed up to use the portal. For DEC, 13,523 of the 38,190 Interactive users signed into the portal more than once, and 6,880 signed in more than twice between December 2014 and May 2018. For DEP, 6,983 of the 19,510 Interactive users signed into the portal more than once, and 3,575 signed in more than twice between March 2015 and May 2018. The average DEC and DEP MyHER Interactive user has logged in to Interactive 2.6 times.

In order for the LFER regression model to generate monthly energy savings attributable to Interactive, the customer data that the regression model uses to make the estimates must use a year of exposure to MyHER reports prior to enrolling in Interactive. For DEC, 11,101 of the Interactive users (29%) had sufficient data available for the LFER analysis before their Interactive enrollment. 4,286 Interactive users (22%) in DEP had sufficient data to be included in the LFER analysis. Figure 3-10 and Figure 3-11 plot the total number of customers enrolled in MyHER Interactive as well as the subset in the analysis for each month of the 12-month period June 2017 to May 2018 for DEC and DEP, respectively.

**Figure 3-10: DEC MyHER Interactive Portal Enrollment**

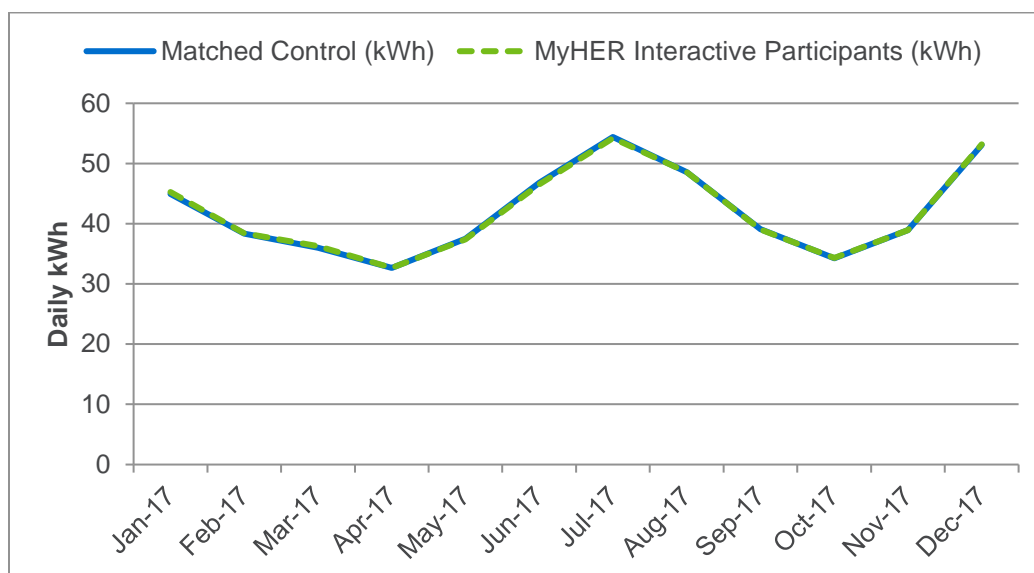




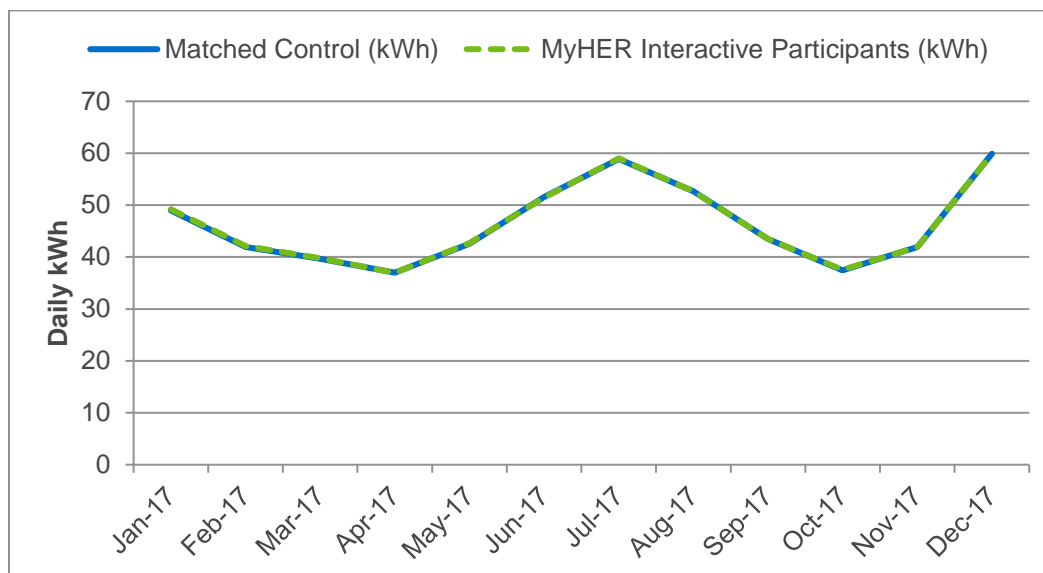
**Figure 3-11: DEP MyHER Interactive Portal Enrollment**

For DEC, many of the Interactive customers used in the estimation analysis were matched on their 2017 billing usage, but some customers who enrolled in Interactive at earlier points in time were matched on their 2014, 2015, or 2016 usage. Figure 3-12 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER customers that have not enrolled in Interactive for the DEC customers matched on 2017 usage. The matching approach generates two groups with nearly identical consumption patterns over the time period prior to customers' enrollment in MyHER Interactive. On average, the difference in monthly usage between the matched control group and the DEC Interactive treatment group is -0.6% for the 2014 match, 0.4% for the 2015 match, 0.1% for the 2016 match, and 0.0% for the 2017 match. The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in [Section 3.1.5](#).

**Figure 3-12: DEC MyHER Interactive Portal Customers and Matched Comparison Group – 2017 Pre-Interactive Enrollment Periods**



For DEP, most of the Interactive customers used in the estimation analysis were matched on their 2017 billing usage, but some customers who enrolled in Interactive earlier were matched on their 2015 or 2016 usage. Figure 3-13 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER customers that have not enrolled in Interactive for the DEP customers matched on 2017 usage. The matching approach generates two groups with nearly identical consumption patterns over the time period prior to customers' enrollment in MyHER Interactive. On average, the difference in monthly usage between the matched control group and the DEP Interactive treatment group is 0.3% for the 2015 match, -0.2% for the 2016 match, and 0.1% for the 2017 match. The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in [Section 3.1.5](#).

**Figure 3-13: DEP MyHER Interactive Portal Customers and Matched Comparison Group – 2017 Pre-Interactive Enrollment Periods**

### 3.3.2 Results and Precision

For DEC, the average monthly impact across the 12-month period June 2017 to May 2018 was 21.3 kWh or 255.1 kWh annually per customer, representing the uplift in savings that MyHER Interactive produces over and above the savings produced by the paper MyHER, and this impact is significant at the 90% level of confidence. In aggregate, the DEC MyHER Interactive Portal resulted in 7.38 GWh of annual savings, incremental to the MyHER reports. These high-level findings are summarized in Table 3-26.

**Table 3-26: 90% Confidence Intervals Associated with DEC MyHER Interactive Impact Estimates**

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	41.4	255.1	468.8
Percent Reduction	0.27%	1.65%	3.02%
Aggregate Impact (GWh)	0.99	7.38	13.77

On a month-to-month basis, energy impacts were statistically significant during the months of April, May, June, August, September, October, November, and December and range from 0.6% to 2.6%, or from 9 to 36 kWh on an absolute basis.

Figure 3-14 illustrates average monthly energy usage for the DEC MyHER Interactive users (the blue line) and the same for the matched control group (the green line), along with the estimated impact and 90% confidence band (the orange lines and orange dashed lines) by month. Also shown as blue bars are counts of Interactive sign-ups.

**Figure 3-14: DEC MyHER Interactive Portal Energy Impacts**

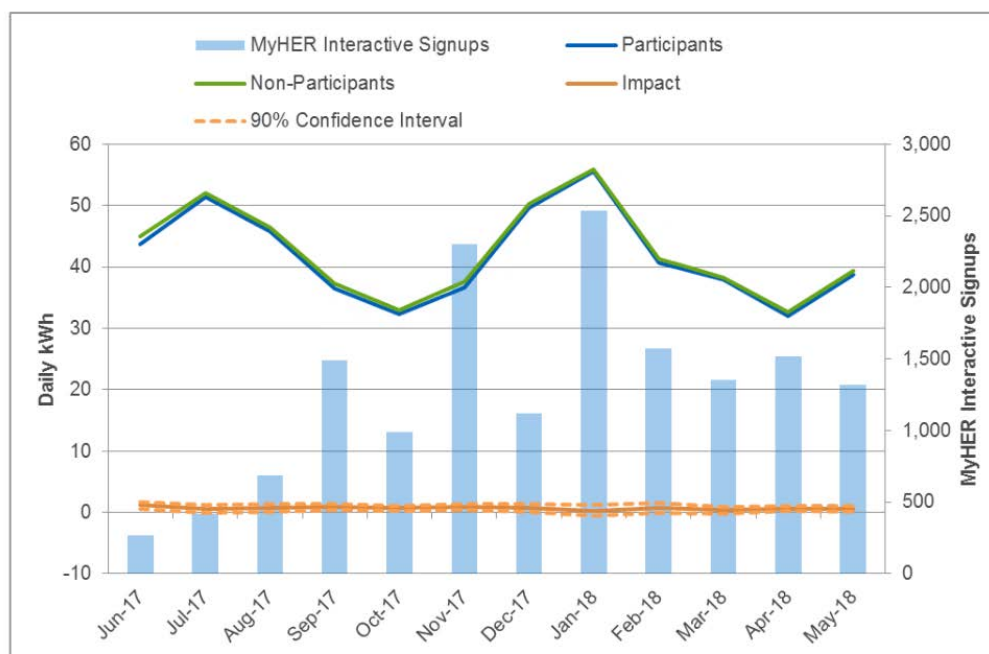


Table 3-27 provides impact model results for DEC, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence.

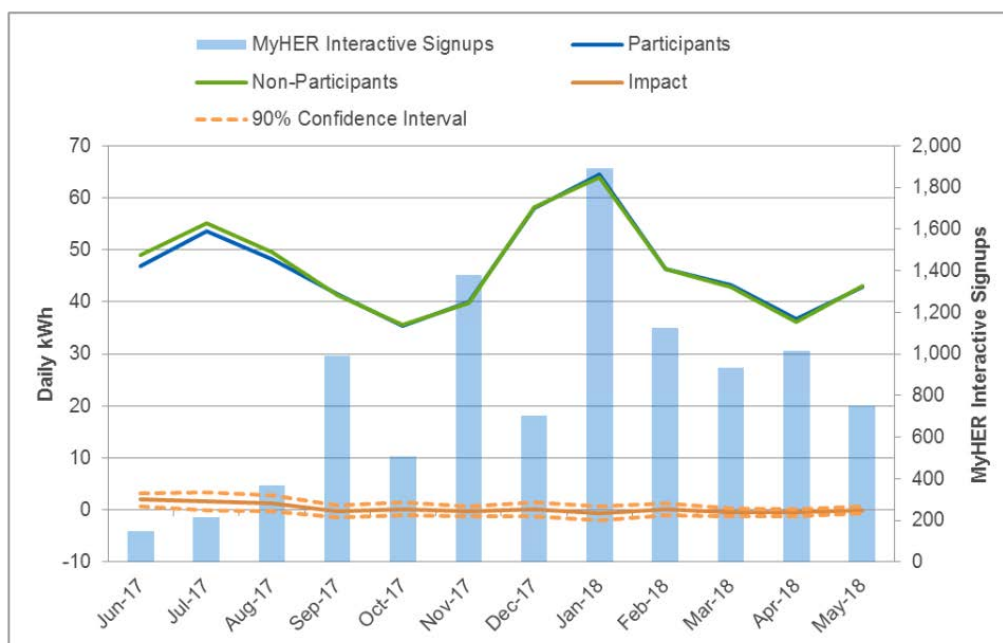
**Table 3-27: DEC MyHER Interactive Monthly Energy Savings**

Month	Number of Participants Analyzed	MyHER Interactive Signups	Daily kWh			90% Conf. Interval		% Impact	
			Non-Participants	Participants	Impact				
Jun-17	4,993	270	44.9	43.8	1.2	0.6	1.8	2.6%	*
Jul-17	5,075	420	52.1	51.5	0.6	0.0	1.3	1.2%	
Aug-17	5,288	684	46.5	45.7	0.7	0.1	1.3	1.6%	*
Sep-17	5,880	1,490	37.3	36.5	0.9	0.4	1.3	2.3%	*
Oct-17	6,157	990	33.0	32.4	0.7	0.3	1.1	2.0%	*
Nov-17	6,976	2,301	37.6	36.7	0.9	0.5	1.4	2.5%	*
Dec-17	7,356	1,119	50.3	49.6	0.7	0.1	1.4	1.5%	*
Jan-18	8,491	2,537	56.0	55.6	0.3	-0.6	1.2	0.6%	
Feb-18	9,219	1,571	41.3	40.7	0.7	-0.1	1.5	1.6%	
Mar-18	9,910	1,351	38.3	37.9	0.4	-0.2	1.0	1.0%	
Apr-18	10,628	1,515	32.7	32.1	0.6	0.2	1.1	2.0%	*
May-18	11,101	1,316	39.4	38.8	0.6	0.1	1.1	1.6%	*
<b>Average</b>	<b>7,590</b>	<b>1,297</b>	<b>42.5</b>	<b>41.8</b>	<b>0.7</b>	<b>0.5</b>	<b>0.9</b>	<b>1.6%</b>	*

For DEP, the average monthly impact across the 12-month period June 2017 to May 2018 was 8.7 kWh, representing the uplift in savings that MyHER Interactive produces over and above the savings produced by the paper MyHER, but this estimate is not statistically significant at the 90% level of confidence. On a month-to-month basis, energy impacts were statistically significant only during June, which represented an impact of 4.2%, or 60 kWh on an absolute basis.

Figure 3-15 illustrates average monthly energy usage for the DEP MyHER Interactive users (the blue line) and the same for the matched control group (the green line), along with the estimated impact and 90% confidence band (the orange lines and orange dashed lines) by month. Also shown as blue bars are counts of Interactive sign-ups.

Table 3-28 provides impact model results for DEP, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence. Impacts for DEP were only significant for June 2016, but not for the remaining months or for the year June 2017 through May 2018 overall.

**Figure 3-15: DEP MyHER Interactive Portal Energy Impacts****Table 3-28: DEP MyHER Interactive Monthly Energy Savings**

Month	Number of Participants Analyzed	MyHER Interactive Signups	Daily kWh			90% Conf. Interval		% Impact
			Non-Participants	Participants	Impact			
Jun-17	494	150	48.9	46.9	2.0	0.8	3.3	4.2%
Jul-17	505	213	55.2	53.5	1.6	-0.1	3.4	3.0%
Aug-17	535	369	49.6	48.3	1.3	-0.2	2.8	2.6%
Sep-17	631	992	41.3	41.5	-0.2	-1.3	0.9	-0.5%
Oct-17	677	508	35.6	35.5	0.2	-1.1	1.4	0.5%
Nov-17	800	1,381	39.8	40.0	-0.2	-1.2	0.8	-0.5%
Dec-17	853	703	58.2	58.1	0.2	-1.2	1.5	0.3%
Jan-18	1,960	1,894	63.9	64.5	-0.6	-2.0	0.7	-1.0%
Feb-18	2,625	1,127	46.3	46.2	0.1	-1.1	1.2	0.2%
Mar-18	3,262	934	42.8	43.3	-0.4	-1.2	0.3	-1.0%
Apr-18	3,900	1,015	36.3	36.8	-0.5	-1.1	0.1	-1.4%
May-18	4,286	754	43.0	43.0	0.0	-0.6	0.7	0.0%
<b>Average</b>	<b>1,711</b>	<b>837</b>	<b>46.7</b>	<b>46.5</b>	<b>0.3</b>	<b>-0.6</b>	<b>1.1</b>	<b>0.6%</b>

Nexant concludes that the DEC MyHER Interactive portal succeeded in generating additional statistically significant savings during much of the evaluation period from June 2017 to May

2018. The DEP MyHER Interactive portal only achieved additional statistically significant savings in the evaluation period during June 2017.

### 3.4 Impact Conclusions and Recommendations

Nexant's impact evaluation shows that Duke Energy's MyHER program continues to trigger a reduction in electric consumption among homes exposed to the program messaging.

MyHER programs also demonstrate an apparent maturation effect, typically on the order of 1-2 years. If Duke Energy continues to consistently introduce new cohorts to the program, program management should generally expect the newest cohorts to underperform relative to the established cohorts. Currently, 15% of DEC and 19% of DEP program participants should be considered as not fully mature.

Additionally, the findings from this evaluation suggest that savings of fully mature cohorts may eventually plateau or degrade over time – the oldest DEC cohort is in its 8<sup>th</sup> year on the program and displays impacts comparable to other cohorts that are in their second or third year on the program.

We find that MyHER also causes an uplift in participation in other energy efficiency programs. We have deducted the energy savings associated with that uplift so that Duke Energy does not claim the delivery of energy reductions associated with that uplift twice – those energy savings have already been claimed by those energy efficiency programs. This uplift in energy efficiency program participation means that MyHER is delivering on its secondary goal to encourage participation in other programs. We also find that the Interactive web portal has begun to show statistically significant energy savings in DEC, but not yet in DEP.

Nexant provides the following recommendations for Duke Energy's consideration:

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective statuses in a single billing month, to the extent that is technically feasible.
- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.
- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.



## 4 Process Evaluation

This section presents the results of process evaluation activities including in-depth interviews with Duke Energy and implementation staff and surveys of control and treatment households.

### 4.1 Methods

Process evaluations support continuous program improvement by identifying opportunities to improve the effectiveness and efficiency of program operations and services. Process evaluations also identify successful program components that should be enhanced or replicated. Process evaluation activities for MyHER sought to document program operational processes and to understand the experience of those receiving MyHER mailings. The customer survey given to MyHER recipients focused on investigating the recall and influence of MyHER messages among recipients, the extent to which MyHER affects customer engagement and satisfaction with Duke Energy, their use of MyHER Interactive, and subsequent actions taken by participants to reduce household energy consumption. A survey of control group households provided a point of comparison for estimating the effect of MyHER on behavior and attitudes of treatment households.

#### 4.1.1 Data Collection and Sampling Plan

The process evaluation included two primary data collection activities: in-depth interviews with program management and implementation staff, and surveys of a random sample of households selected to receive MyHER reports as well as surveys of a random sample of control group households.

Nexant deployed the household surveys using a mixed-mode survey measurement protocol, the activities associated with which are summarized in Table 4-1 and Table 4-2. In this protocol, customers were contacted by letter on Duke Energy stationery (to assure recipients of the legitimacy of the survey) asking them to go online and complete the survey. The letter contained a two-dollar bill as a cost-effective measure to maximize the survey completion rates. The letter also included a personalized URL for the online survey that points the recipient to a unique location on the internet at which they were able to complete the survey. Customers for whom email addresses were available also received an email inviting them to take the survey online, which also included the same personalized URL that appeared in the letter leading to the survey website at the location where they could complete it. After two weeks, customers who did not respond to the web survey received another letter, this time containing a paper copy of the survey and a return postage-paid envelope asking them to complete the survey by mail. Survey recipients also had the option of calling a toll-free telephone number to complete the survey by telephone. Table 4-1 shows that 337<sup>8</sup> DEC treatment customers and 211 DEC control customers completed the survey, totaling 548 responses from DEC recipients. Two samples of

<sup>8</sup> 337 total DEC treatment respondents is the sum of 153 and 184 DEC completes by treatment sample.

treatment customers were used to accommodate an expanded set of questions used for comparison with control customers. A treatment-only survey was sent to a second sample of treatment customers that only contained questions specific to the MyHER experience. This approach to using a second treatment-only instrument was taken to prevent the treatment version of the survey from becoming too long. Among the 337 DEC treatment customers that completed the survey, 153 were in the sample that received the treatment-only survey and 184 were in the sample that received the primary instrument designed to compare the responses of treatment and control customers. A total of 211 DEC control customers completed the survey. By state, 420 DEC respondents are located in North Carolina and 128 DEC respondents are located in South Carolina.

**Table 4-1: Summary of Process Evaluation Activities - DEC**

Population	Approach	Population	Sample		Confidence/Precision	
			Expected	Actual	Expected	Actual
Program management and implementation	In-depth interviews	~10	2-5	4	Not Applicable	Not Applicable
Treatment group households; Treatment only instrument	Mixed-mode; mail, web, and phone	~1.4 M	188	153	90/6	90/6.7
Treatment group households; Primary instrument	Mixed-mode; mail, web, and phone	~1.4 M	188	184	90/6	90/6.0
Control group households; Primary instrument	Mixed-mode; mail, web, and phone	~133,000	188	211	90/6	90/5.7
<b>Total Responses</b>			<b>564</b>	<b>548</b>		

Table 4-2 shows that a total of 539 DEP customers responded to the survey. The DEP survey design was identical to that of DEC, with two treatment samples receiving surveys; one sample received surveys with only treatment-related questions, and the other sample of treatment customers received another survey with questions designed to compare the responses of treatment and control customers. A total of 192 DEP control customers completed the survey, while 171 DEP treatment customers completed the treatment-only survey, and 176 DEP treatment customers completed the primary comparison survey. By state, 473 DEP respondents reside in North Carolina and 29 DEP respondents reside in South Carolina.

**Table 4-2: Summary of Process Evaluation Activities - DEP**

Population	Approach	Population	Sample		Confidence/Precision	
			Expected	Actual	Expected	Actual
Program management and implementation	In-depth interviews	~10	2-5	4	Not Applicable	Not Applicable
Treatment group households; Treatment only instrument	Mixed-mode; mail, web, and phone	~842,000	186	171	90/06	90/6.3
Treatment group households; Primary instrument	Mixed-mode; mail, web, and phone	~842,000	186	176	90/06	90/6.2
Control group households; Primary instrument	Mixed-mode; mail, web, and phone	~117,000	186	192	90/06	90/5.9
<b>Total Responses</b>			<b>558</b>	<b>539</b>		

Nexant's survey instruments included demographic questions to support comparisons of the treatment and control respondents as well as to support overall comparisons to the jurisdiction's territory. We present summaries of the responses to the demographic questions in [Section 4.2](#), after the summaries of the responses to the survey questions on customer attitudes, energy usage behaviors, energy-savings actions and purchases/investments, and experience with the MyHER program.

#### **4.1.1.1 Interviews**

Nexant conducted interviews with key contacts at Duke Energy and Tendril. The interviews built upon information obtained during previous evaluations of the Duke Energy MyHER program in multiple jurisdictions. The central objectives of the interviews were to understand program operations and the main activities required to develop and distribute the MyHER reports to DEP and DEC customers, as well as to understand any developments or enhancements in program delivery.

#### **4.1.1.2 Household Surveys**

Both treatment and control groups were surveyed. Treatment households were surveyed as two groups that received different surveys: The first group's survey included questions about the respondents' experience of the reports themselves as well as questions to assess engagement and understanding of household energy use, awareness of Duke Energy efficiency program offers, and satisfaction with the services Duke Energy provides to help households manage

their energy use. The second treatment group and control group surveys were identical, and excluded questions about the information and utility of the MyHER reports, but included identical questions on the other aspects to facilitate comparison with each other, as well as to the first treatment group.

Nexant analyzed the survey results to identify differences between treatment and control group households on the following:

- Reported levels of stated intention for future action;
- Levels of awareness of and interest in household energy use;
- The level of behavioral action or equipment-based upgrades;
- Satisfaction with Duke Energy communications, service, and efficiency options;
- Barriers to energy saving behaviors and purchases; and
- Inclination to seek information on managing household energy use from Duke Energy.

This survey approach is consistent with the RCT design of the program and supports both the impact and process evaluation activities by providing additional insight into potential program effects.

### ***Survey Disposition - DEC***

We mailed 553 letters to randomly selected residential customers in the treatment group and 553 letters to the randomly selected residential customers in the control group for the primary survey. We also mailed 553 letters to the treatment customers for the treatment-only survey. The surveys were completed by a total of 337 treatment households (across both surveys) and 211 control households, representing a an overall treatment group response rate of 30% for DEC and a control group response rate of 38%. More than half (69% of the treatment group and 66% of the control group) of the surveys were completed online. Table 4-3 summarizes the treatment and control group survey dispositions in DEC.

**Table 4-3: Survey Disposition - DEC**

Mode	Treatment		Control	
	Count	Percent	Count	Percent
<b>Completes by Mode</b>				
Web-based Survey	232	69%	140	66%
Mail/Paper Survey	88	26%	58	27%
Inbound Phone Survey	17	5%	13	6%
<b>Total Completes</b>	<b>337</b>	<b>100%</b>	<b>211</b>	<b>100%</b>

Table 4-4 presents DEC response rates by state. Higher response rates are observed in both North and South Carolina for control customers relative to treatment customers. In North Carolina, 30% of treatment customers invited to take the survey completed it, as compared to a

36% response rate for control customers in North Carolina. South Carolina response rates were a bit higher: 31% of treatment customers in South Carolina and 45% of control customers in South Carolina completed the survey.

**Table 4-4: Response Rates by State and Treatment Condition - DEC**

State	Treatment			Control		
	Sampled	Completed	Response Rate	Sampled	Completed	Response Rate
North Carolina	866	262	30%	435	158	36%
South Carolina	240	75	31%	118	53	45%
<b>Total</b>	<b>1,106</b>	<b>337</b>	<b>30%</b>	<b>553</b>	<b>211</b>	<b>38%</b>

#### **Survey Disposition - DEP**

We mailed 552 letters to randomly selected residential customers in the treatment group and 552 letters to the randomly selected residential customers in the control group for the primary survey. We also mailed 552 letters to the treatment customers for the treatment-only survey. The surveys were completed by 347 treatment households (across both surveys) and 192 control households, representing a treatment group response rate of 31% and a control group response rate of 35%. More than half (63% of the treatment group and 61% of the control group) of the DEP surveys were completed online. Table 4-5 outlines the treatment and control group survey dispositions in DEP.

**Table 4-5: Survey Disposition - DEP**

Mode	Treatment		Control	
	Count	Percent	Count	Percent
<b>Completes by Mode</b>				
Web-based Survey	220	63%	117	61%
Mail/Paper Survey	104	30%	67	35%
Inbound Phone Survey	23	7%	8	4%
<b>Total Completes</b>	<b>347</b>	<b>100%</b>	<b>192</b>	<b>100%</b>

Table 4-6 summarizes DEP response rates by state and treatment condition. In North Carolina, 32% of treatment customers invited to take the survey completed it, as compared to a 35% response rate for control customers in North Carolina. South Carolina DEP response rates were on the whole a bit lower: 29% of treatment customers in South Carolina and 32% of control customers in South Carolina completed the survey.

**Table 4-6: Response Rates by State and Treatment Condition - DEP**

State	Treatment			Control		
	Sampled	Completed	Response Rate	Sampled	Completed	Response Rate
North Carolina	976	310	32%	462	163	35%
South Carolina	128	37	29%	90	29	32%
<b>Total</b>	<b>1,104</b>	<b>347</b>	<b>31%</b>	<b>552</b>	<b>192</b>	<b>35%</b>

## 4.2 Findings

This section presents the findings from in-depth interviews with staff and implementation contractors and the results of the customer surveys.

### 4.2.1 Program Processes and Operations

As in other Duke Energy jurisdictions, MyHER at DEP and DEC is managed primarily through a core team of three Duke Energy staff members: a Manager of Behavioral Programs with oversight of residential behavioral programs, a Program Manager in charge of the day-to-day operations of the MyHER program, and a Data Analyst that is responsible for the substantial data tracking and cleaning tasks required to support the contracted implementation team, as well as internal program reporting to Duke Energy management.

At Tendril, Duke Energy's contracted program implementer, MyHER is supported by a team of people including an Operations Manager, a Home Energy Report Product Manager, an Engineering Manager, a dedicated Operations Engineer, a Quality Control Engineer, an "Ask-the-Expert" technical writer, and an Account Manager responsible for ensuring that the Duke Energy MyHER products meet expectations for quality, timing, and customer satisfaction. Tendril staff track the number of reports sent, the quality of the reports, and the timing of when reports are mailed. Tendril's key performance indicators (KPIs) include in-home dates for each batch as well as the percentage of treatment customers actually treated.

MyHER is Duke Energy's flagship behavioral energy efficiency program. Its primary goals are to achieve energy savings, increase customer satisfaction, and cross-promote enrollment into Duke Energy's demand response and energy efficiency programs. Staff at both organizations described continuous, close coordination to ensure that the data behind the MyHER comparisons are accurate, the tips provided to specific households are appropriate, and that MyHERs are delivered as soon as possible after billing data is received, within the relatively short timeframe between bills.

Program operations are conducted with a customer-focused orientation where the commitment to producing a high-quality product is a demanding process that must be executed consistently each month of the year.

#### 4.2.1.1 MyHER Production

During the period of time under study by this evaluation, MyHERs were mailed out to DEP and DEC customers on paper through the U.S. Mail service about eight times a year, where the mailing gaps generally occurred in January, April, September, and December. During the eight U.S. Mail treatment months, the reports are generated twice per week, a cadence that is designed to facilitate meeting one of Tendril's key performance indicators: that MyHERs arrive at the customers' homes at the cycle's mid-point (though, ideally, as soon as possible after the bill), so as to make the information presentment as useful and timely as possible. Additionally, any customer that has provided Duke Energy with their email address also receives their report by email, and in fact, MyHER reports are generated and emailed to those customers monthly, 12 times a year, while they continue to receive paper reports 8 times a year.<sup>9</sup>

The production process for any given treatment month begins as soon as meter reads for the first billing cycle are processed by Duke Energy's meter data management system. After processing, billing data is uploaded each afternoon, five times a week, to Tendril. Once the data has been received, production proceeds according to the following process, twice a week<sup>10</sup>: Tendril runs report production and conducts quality control checks. Then a flat file containing all the data from the reports in addition to drafts of every report (in PDF format) are sent to Duke Energy for an independent quality control check. Upon approval, Tendril then sends the PDFs to the printhouse, and the printhouse generates a final proof for Duke Energy approval. Finally, after the proof is approved, the printhouse prints and mails all the reports, Tendril emails eHERs on the specified day, and then commences the process of reporting the printing, mailing, and emailing to Duke Energy. There have been issues, however, in the iterative process of reconciling customer email addresses between Duke Energy and Tendril that has resulted in the loss of updated customer emails. There is interest in automating the email update process, but in the meantime in order to avoid further problems, Duke Energy is simply sending Tendril updates quarterly.

This production chain moves quickly: once Tendril generates a batch of reports, the time elapsed until transfer to the printhouse is generally 3-4 hours when all processes are completed according to plan. This timeframe has become the norm, but when quality control problems emerge, that elapsed time can increase significantly. Considering that the printhouse has one week to complete the mailing, and Standard Rate postage can take another week to deliver, making the mid-cycle in-home delivery goal something that takes dedicated effort to achieve.

Prior MyHER process evaluations in other Duke Energy jurisdictions where MyHER is also implemented found that this fast-moving process has seen improvements over time through the adoption of various changes: recently, these have been best characterized by an increased attention to developing procedures and schedules for a number of elements of the MyHER production process. These elements include the Duke Energy product request list, new quality

<sup>9</sup> Duke Energy will cease delivery of paper MyHER reports, and only send email reports, if the customer requests them to do so.

<sup>10</sup> During the months where only eHERs are produced, reports are generated in one batch per week, rather than two.



control processes at Tendril, and free form text (FFT) content development, as examples. These changes continue to deliver improvements in the number of problems found during report batch quality control checks, though Tendril continues to have some difficulty dealing with last minute requests from Duke Energy. Additionally, Tendril has implemented a number of back office process enhancements in the past year, such as migrating their computational platform to Amazon Web Services (AWS), providing a pre-promotion (i.e., draft) platform to enable Duke Energy staff to review draft PDF reports prior to promoting or finalizing them, and converting their email HER reports to Hypertext Markup Language (HTML) format which provides greater responsiveness and flexibility to Tendril operational staff.

#### **4.2.1.2 Quality Control**

Embedded in the early days of this production cycle is a quality control process that is undertaken to ensure that the reports contain accurate information and are of high quality. Duke Energy analyzes a dataset containing all of the information presented in the reports for each production cycle. This data is checked for essentially anything that could be erroneous, ranging from verifying that all the customers receiving reports are eligible to receive them, that no control customers are getting reports, that the reported electricity usage is correct, that no customers who have opted-out are getting reports, and that no one has gotten more than one report a month. Duke Energy also checks for unexpected cluster assignment changes, presentment of messaging and tips and overall print quality.

In the past, these checks have proven to be crucial as they occasionally revealed significant production problems, which were subsequently reviewed in Tendril's governance sessions with Duke Energy. This visibility has typically resulted in issue resolution on a going-forward basis.

Both Duke Energy and Tendril staff report that the incidence of significant production problems has also been dramatically reduced since Tendril implemented quality control automation. Issues that surfaced during this evaluation period were small in scope, and infrequent. In 6 months, roughly 20 incidents were identified by Duke Energy that required Tendril to remove errors it had missed in their initial round of quality control. Tendril's automated quality control process is described as follows, recalling that customer data is transferred to Tendril daily:

- Tendril pulls the Duke Energy billing data into a database (Amazon Redshift; part of the AWS suite) and organizes it in a way that allows it to be fed into the HERs. The HERs are then generated and rendered;
- The QC protocol, which is a set of SQL queries against the data, then runs. This process produces output (presented in Amazon S3; another part of the AWS suite) that reports the results of the checks, indicating the reports that were incorrectly created. Postfiltering is then done for the incorrect reports;
- Tendril staff execute visual checks to be sure nothing noticeable or significant has slipped through to final report presentment; and
- An approved file is then sent to Duke Energy, along with about 100 samples of both paper and electronic HERs.

This automated process has the added benefit of being able to be managed by one person, which has significantly reduced the problems that the “all hands on deck” approach to executing report production and quality control presented in the past.

Prior evaluations of MyHER revealed that some program processes could benefit from improved quality control performance. Improved quality control in these areas can reduce the risk associated with running a program with processes that too often fail quality control checks. Such issues present timing risks (reports may not be sent out on time), customer service risk (reports may be sent out with problems if problems someday are missed), and risk to the overall success of the program (if the QC process is overburdened with detecting too many problems, it can become an overly-leveraged component of program operations). Interviews for this evaluation revealed continued improvement since the prior DEC and DEP evaluations in terms of frequency and significance of issues detected by Duke Energy’s quality control processes.

Tendril is currently implementing a new production platform, the Home Energy Reporting Service (HOMERS), that will allow for the production of reports for multiple billing cycles at once, which will dramatically improve the production process by, notably, eliminating what are referred to as “Batch 1” problems, which are related to the relatively large number of reports produced for the first cycle of the month. Data transfers to Duke will contain much smaller and consistent batch sizes. Additionally, this new platform allows for the continuous importation of customer usage data and production of reports. This will make preventing problems easier because it allows the QC software to be programmed in a way that can verify the proper execution of customer segmentation protocols, as well as larger scale descriptive analyses at a frequency chosen by Tendril, as opposed to having to wait for the entire batch run, as is the case with the legacy system. The development of this new platform is currently near completion at Tendril, and is expected to not only detect emergent problems, but also help prevent detected errors from recurring.

The improvements described above are likely a function of the continuation of Duke Energy and Tendril’s collaborative activities for program success. Duke Energy and Tendril staff join for weekly status meetings, monthly operations meetings, and quarterly governance meetings. These meetings provide a venue for shared brainstorming and roadmapping activities and the ongoing maintenance of a product request list for Tendril. Tendril has additionally commissioned an internal HER Improvement Team with the mandate to make consistent progress on the product request list. This team meets quarterly to reassess the feasibility of each of the list’s items (currently numbering about 25) and reprioritize these items, as needed, based on the priorities Duke Energy has expressed in collaborative meetings. Making progress on this list, for which Tendril produces quarterly reports, has been made a priority by Duke Energy and has resulted in the above described attention in meetings. In general, this prioritization has resulted in 3 items on this list being accomplished in the last quarter.

Duke Energy and Tendril staff have recognized in prior evaluations of Duke Energy’s MyHER program in other jurisdictions, as well as this one, that production problems, when they occur, usually occur following changes to the report or report cycle process. However, our interviewees

also recognized that a strength of Tendril lies in their willingness to dive deep into details and processes to solve problems that may only affect a relatively few number of customers, and to go the extra mile to help address problems that in fact may have originated on the Duke Energy side. Interviews for this evaluation additionally reveal that the Tendril operations team has stabilized in terms of staffing, and that Tendril has added a quality control engineer to program staff. Tendril has also implemented a “Batch 0” strategy where the first batch of reports following any changes to the report is produced not for distribution, but only for quality control purposes, which is reviewed prior to the production of any live batches of reports. This procedural innovation allows Tendril to support Duke Energy’s interest in fine-tuning any new features or changes to reports and to facilitate early detection of unexpected problems. Generally, both Duke Energy and Tendril staff continue to speak highly of the collaborative partnership shared by Duke Energy and Tendril in running the MyHER program and of the open lines of communication that exist and function very well at all levels of program and corporate management.

#### **4.2.1.3 MyHER Components**

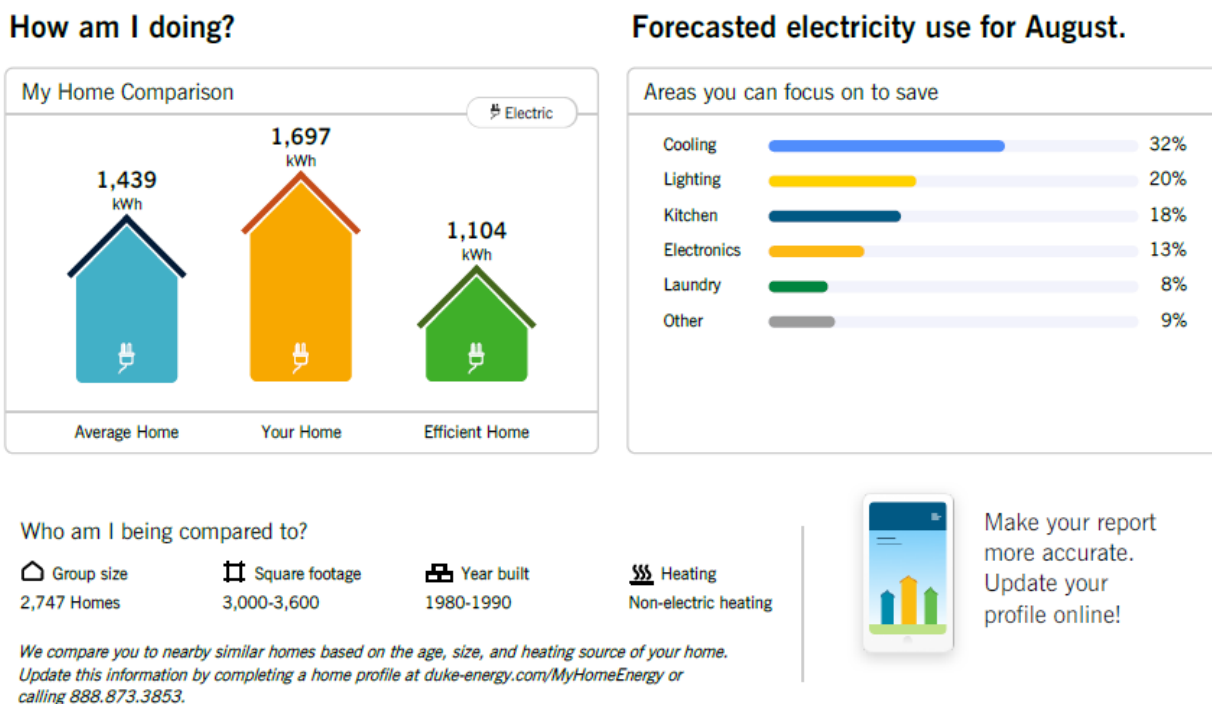
MyHER reports include several key elements that are customized each month: bar charts, tips, a trend chart, and messages. Duke Energy and Tendril implemented a general refresh of the MyHER report template in 2017, designed to improve readability and to keep the presentation fresh in the eyes of recipients. Graphics were updated and images were added to some modules (described below) that were previously text-only. A new module (also described below) was added that presents usage disaggregated by end use type. Overall, recipient response to this redesign was positive, though program staff did note some difficulty recipients had with interpreting the disaggregated end use presentation.

The front page includes two bar chart graphics. The first chart is a vertical bar chart (stylized in the shape of homes) comparing the subject home to the average and most efficient homes for an assigned cluster or “neighborhood” of similar homes. Previously, in Duke Energy jurisdictions with the earliest MyHER program implementations, these graphs were labeled with dollars, but this occasionally caused confusion among recipients if the dollar amount didn’t exactly match their recall of a recent bill. In March 2013, Duke Energy shifted to using kWh as the unit of measurement for the bar charts; Duke Energy conducted customer focus groups in an effort to understand the level of confusion this shift might cause and found that customers reported not paying attention to unit of measurement: they were simply absorbing the shape and directionality of the bar charts (Figure 4-1).

An infographic beneath the bar charts provides the size of the group of comparison homes, the assumed heating type, the approximate square footage, and the approximate age of the similar homes to which the customer’s home is being compared. According to MyHER staff, a common reason for customer phone calls relating to MyHERs is simply the customer’s desire to correct assumed information about a given home. For example, the MyHER could indicate that Duke Energy assumes a home has electric heat when it does not, or has assigned a home to the wrong size category. Any corrections provided in this manner are considered highly reliable and are not changed based on subsequent uploads of third party data.

To the right of the vertical bar chart is a horizontal bar chart that illustrates Tendril's forecast for subject home's electricity usage in the next month, disaggregated by end use type. This chart is intended to provide actionable insights to each customer as to where they might direct their energy savings efforts to make the greatest impact in their energy usage in the month ahead. Tendril staff continues to fine-tune the disaggregation in these forecasts, as a response to customer concerns about the accuracy of this component of the report. To help improve their accuracy, Duke Energy and Tendril continue to push customers to the Interactive portal where they are able to further customize or correct information about their homes that may impact the accuracy of the disaggregated usage forecasts.

**Figure 4-1: MyHER Electricity Usage Comparison and Forecasted Energy Use Bar Charts**






In addition to the comparison graph, each MyHER includes a set of customized action tips under the heading “How can I save more?” (Figure 4-2). These tips are designed to provide information relevant to homes with similar characteristics, as presented in the box accompanying the comparison graph. These tips often are presented with monetary values (appropriately scaled to each customer receiving the tip) that estimate the bill savings that the customer might expect to realize by implementing the action tip.

The Duke Energy MyHER program has a large library of action tips, numbering between 80 and 90. Half of them were initially developed internally at Duke Energy, and Tendril’s “Ask the Expert” technical writer has continued to add to them over time. The large library has enabled the program to avoid any repeats to customers over lengthy periods of time (up to three years). Tip freshness is also managed with display rules that ensure that a diversity of tip types (both in the value of the tip and the area of the household they apply to) is shown, and this management sometimes results in the removal of tips that staff no longer deem relevant. Duke Energy

validates the monetary values estimated by Tendril for each tip action for reasonableness. Duke Energy and Tendril have identified an opportunity for improvement with action tips in developing additional targeting algorithms for tip display. For example, more sophisticated targeting could be developed that cross-references age of home with relevancy for certain actions (e.g., only display a tip to install new windows to customers with older homes). This targeting of tips in this section are developing into “smart actions”, and have been established as a priority at both Duke Energy and Tendril. Tendril has made progress on, converting about 20% of all action tips to smart actions—that is, they are targeted to the appropriate audience. However, not all of the actions and tips in this section are amenable to being used in this fashion, as there is significant variability in their applicability: some tips are only applicable to a few segments, while others have broader customer applicability and have lower capacity to be used as a “targeted” action.

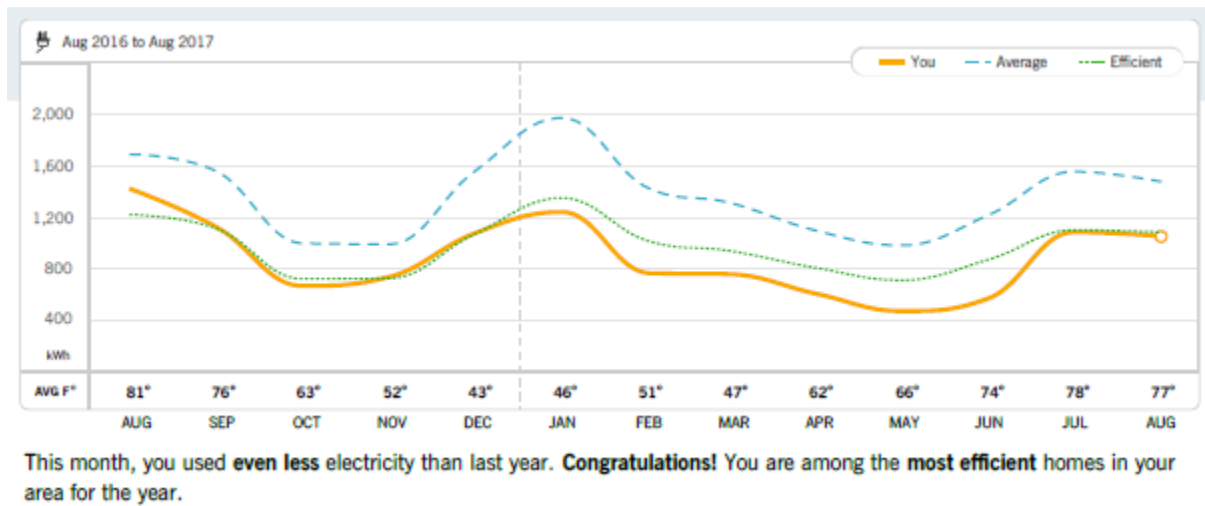
**Figure 4-2: MyHER Tips on Saving Money and Energy**

### How can I save more?

 <p><b>Every little bit helps!</b></p> <p><b>Dry your dishes, and save</b></p> <p>Is your dishwasher letting off steam at your expense? Most dishwashers use up to 15% of their energy for DRYING your dishes. Why pay for that? Instead of using the heated drying cycle, choose "energy saver" or "economy" mode. The hot water will evaporate quickly... and save you money in the process.</p>	 <p><b>Save up to \$56 per year.</b></p> <p><b>Unplug your second refrigerator or freezer</b></p> <p>Most backup refrigerators are at least 10 years old and use a LOT of energy. Many just hold extra drinks or get used during parties. Sound familiar? Consider only plugging yours in when you really need it. You'll be surprised at how much energy you can save. Better yet, why not retire that second fridge altogether?</p> <p> More Savings Tips at <a href="http://duke-energy.com/homereport">duke-energy.com/homereport</a></p>
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The back page of the MyHER reports includes a trend chart that displays how the recipient's home compares to the average and efficient home in energy usage over a year (Figure 4-3). This trend chart can help customers identify certain months where their usage increased relative to the efficient or average home—helping them focus on the equipment and activities most likely to affect their usage. For example, if a home tracks the average home until mid-winter and then spikes well above, that could indicate the heating equipment should be checked.

Figure 4-3: MyHER 13-month Trend Chart



The back page of the MyHER report also reserves space for Duke Energy to include seasonal and programmatic messaging, referred to by program staff as free form text (FFT), that reflects Duke Energy-specific communication objectives. Ensuring that FFT messages are relevant and do not conflict with the actions or tips provided on the front page requires ongoing coordination and monitoring. Broad targeting efforts taking advantage of seasonal relevance, program eligibility, and the presence of end uses such as pools, are used to cross-promote Duke Energy programs. Customer participation databases are cross checked each month to ensure that customers only receive information about programs they have not already participated in; if a customer is found to have participated in the program being promoted in a given month, that customer will receive an alternate, typically more generic, message. Occasionally the action text on the front page will be disabled to accommodate FFT messaging.

FFT messages are developed by the MyHER team in cooperation with Duke Energy's marketing and communications group. Duke Energy staff strive to develop messages that are clever, relevant, and upbeat—some recognize events on the calendar (such as Earth Day) while others provide specific program promotional information or promote general home upgrades (even for measures outside of current programs).

Establishing an FFT calendar early in each year and attempting to avoid last-minute changes to the messages each month has been challenging to implement. Last minute changes have been common due to changes during the course of the year to Duke Energy program promotions and incentive levels. In addition to developing the messages included in each MyHER, the program team must also ensure that the messages conform to expectations established to protect the customer experience. This feature of MyHER is relatively resource-intensive with a lengthy revision-review-approval process with numerous stakeholders accompanying most changes to FFT messages.

To help prevent last minute changes that characterized FFT production in the past, there was renewed focus and energy on prioritizing it as much as possible in 2018 at both Tendril and



Duke Energy. A product of this renewed energy is an FFT tool under development at Tendril. It will allow for faster and more accurate rendering of FFT messaging, as well as the ability for Duke Energy stakeholders to participate directly in the FFT creation and review process; it is being built as a “self-serve” tool. The implementation of such a tool, due for launch in early 2019, is expected to streamline the FFT process significantly.

Finally, the back page of the reports also provides contact information for the MyHER program at Duke Energy. Customers occasionally contact Duke Energy with questions or concerns about MyHERs and, rarely, to opt-out. Duke Energy’s efforts to maintain a high-quality MyHER customer experience is reflected by the high value that is placed on program participant satisfaction and as such, it is closely monitored. Only 1% of MyHER customers contact Duke Energy annually and less than 0.5% of MyHER treatment customers contact Duke Energy to opt-out. The rigorous quality control efforts described earlier have kept quality-related issues from ever reaching customers.

#### **4.2.1.4 MyHER Interactive**

Enrollment in MyHER Interactive is still relatively low. The most reliably successful enrollment generators are email campaigns, sweepstakes, and cross-promotion with the High Bill Alerts program. Envelope messaging has also been used, but is less successful. Email campaigns are a very successful enrollment generator because they can use personalized uniform resource locator PURLs (to enable clicking through to the Interactive screen where the customers’ account number is auto-populated in the registration process). Program staff revamped the content and graphics of the email campaign in 2018.

Duke Energy continues to prioritize enrollment in Interactive. However, enrollment in MyHER Interactive was not as strong as was hoped, so Tendril is developing a marketing plan to increase enrollments in 2019.

Additionally, Duke Energy has 6 product requests in with Tendril for the “User Profile” section of MyHER Interactive, so as to improve the quality of customer-provided data and in turn, improve clustering models, load disaggregation, the applicability of targeted tips, and other applications that use the data. Duke Energy also continues to roll out AMI meters to customers in the DEC and DEP service territories. With the completion of the AMI deployment, the granularity of customer data will increase, which will directly benefit those who enroll in MyHER Interactive. Currently, about 57% of Interactive customers have AMI meters. For these customers, their usage data is available on MyHER Interactive. However, there have been problems with the transfer of this data to Tendril, which has caused some customer data displays to be erroneous. To remedy this, Tendril is in the process of upgrading their data ingester<sup>11</sup>. Duke Energy and Tendril are considering ways to effectively utilize and meaningfully leverage AMI data.

<sup>11</sup> Data ingestion refers to the process of importing, cleaning, and organizing large or complex sets of data for storage and/or analysis. Tendril’s upgraded data ingester will process AMI data from Duke Energy in a faster, more effective manner.



Few quality control or process issues pertaining to Interactive were reported in our interviews. However, it should be noted that there is currently no mechanism by which Duke Energy can use or check the quality of data presented on Interactive in a systematic or bulk fashion. All checks are made on an individual customer basis. The bulk of quality control for Interactive is carried out by Tendril.

One opportunity for improvement exists in MyHER Interactive's limitation such that a Duke Energy account can only be associated with one email, and only one email may be associated with any account. Currently, Tendril is evaluating the feasibility of a number of solutions to this problem, which has caused issues for customers attempting to enroll. First, they are attempting to shorten the time it takes to archive emails of customers who leave the program (to disassociate the email from the account). Secondly, they are exploring the possibility of allowing more than one email to be associated with an account. Lastly, they may disable the requirement that login ID's be email addresses. These solutions should open up eligibility to accounts associated with homes in ownership transition, rental transition, and will allow those who own more than one home to have all of their homes associated with their Interactive account.

#### **4.2.1.5 Other MyHER Plans to Further Improve Program Operations**

Looking forward, Duke Energy and Tendril are also contemplating other program enhancements that are anticipated to further improve program performance and the customer experience with the program:

- Developing new content specific to shoulder month email MyHERs;
- The full HOMERS rollout;
- Revised service-level agreements (SLAs);
- Duke Energy app; and
- Self-comparisons of energy usage (as opposed to "neighborhood" comparisons).

#### **4.2.2 Customer Surveys - DEC**

The customer surveys included questions focused specifically on the experience of and satisfaction with the information provided in MyHERs and awareness of MyHER Interactive—these questions were asked only of households in the treatment group.

Both treatment and control households answered the remaining questions, which focused on assessing:

- Awareness of Duke Energy efficiency program offers;
- Satisfaction with the Duke Energy, and services Duke Energy provides to help households manage their energy use;
- Levels of awareness of and interest in household energy use; motivations and perceived importance;
- Reported behavioral or equipment-based upgrades; and

- Barriers that prevent customers from undertaking energy savings actions.

#### 4.2.2.1 Comparing Treatment and Control Responses - DEC

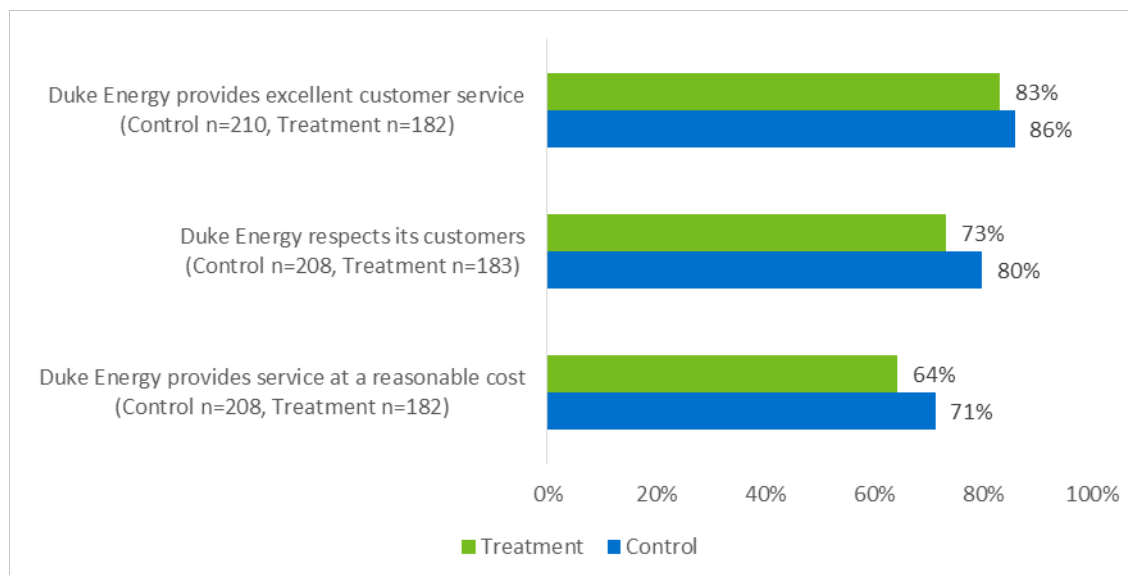
This section presents the results of survey questions asked of both treatment and control households in DEC and compares the response patterns. Statistically significant differences between treatment and control households are noted.

#### Duke Energy Customer Satisfaction

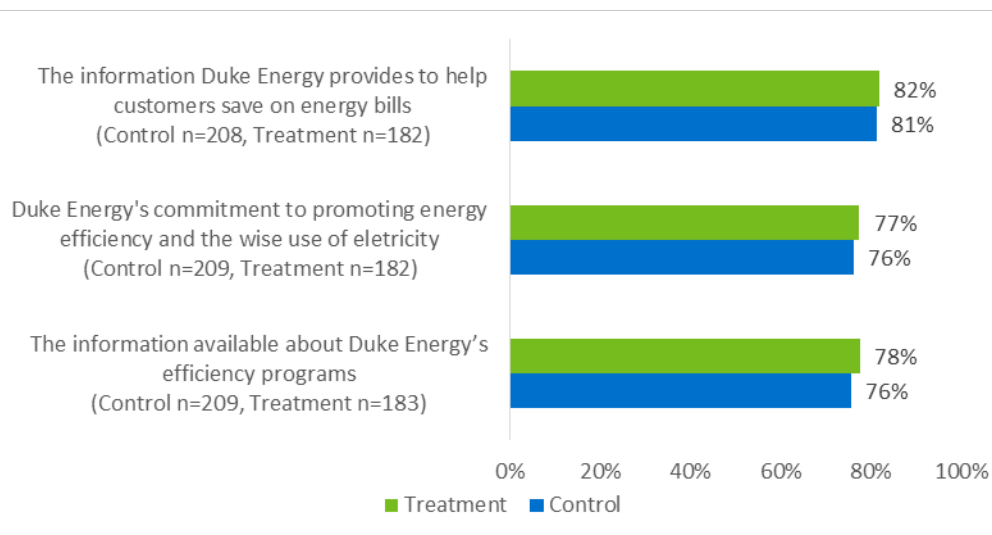
Both treatment and control groups' overall satisfaction with Duke Energy are high. Seventy-three percent of treatment customers and 78% of control customers are satisfied or very satisfied with Duke Energy as their electric supplier (rated 8 or higher on a 0-10 point scale); the difference is not statistically significant at the 90% level of confidence.

Control households rated Duke Energy higher on providing excellent customer service, respecting its customers, and providing service at a reasonable cost than treatment households. The differences between the control and treatment group are not statistically significant (Figure 4-4). MyHER does not result in a measurable change in stated customer satisfaction with Duke Energy in DEC.

**Figure 4-4: Satisfaction with Various Aspects of Customer Service - DEC**



Additionally, the differences between treatment and control customers with respect to satisfaction with the information available about Duke Energy's efficiency programs, the information Duke Energy provides to help customers save on energy bills, and Duke Energy's commitment to promoting energy efficiency and the wise use of electricity are not statistically significant (Figure 4-5), thus MyHER has not measurably changed customers' satisfaction with Duke Energy's promotion of energy efficiency at DEC.

**Figure 4-5: Satisfaction with Energy Efficiency Offerings and Information - DEC**

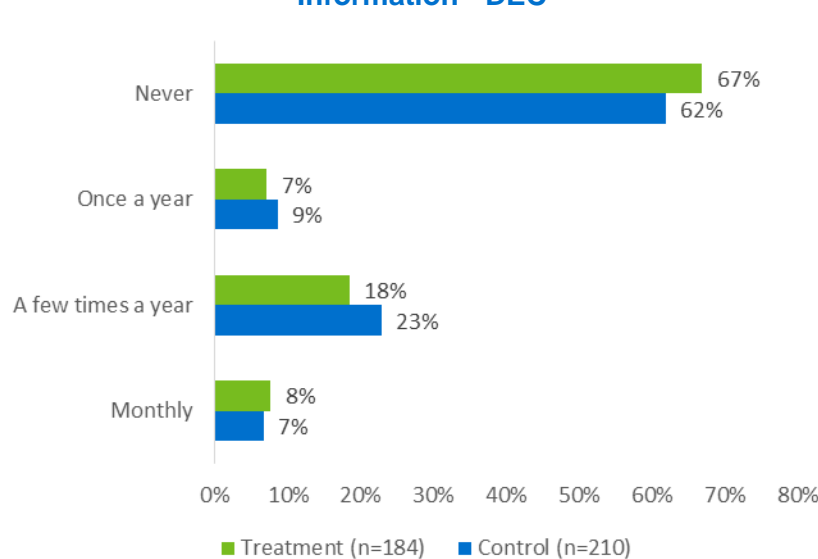
### Engagement with Duke Energy's Website

Both groups answered several questions about their use of the Duke Energy website, a proxy for overall engagement with information provided by the utility on energy efficiency and household energy use, and the results showed no significant differences. Table 4-5 shows that 36% of the treatment group and 37% of the control group reported they had never logged in to their Duke Energy accounts. Among those that had logged in, the most commonly reported purpose was to pay their bill.

**Table 4-7: Use of Duke Energy Online Account - DEC**

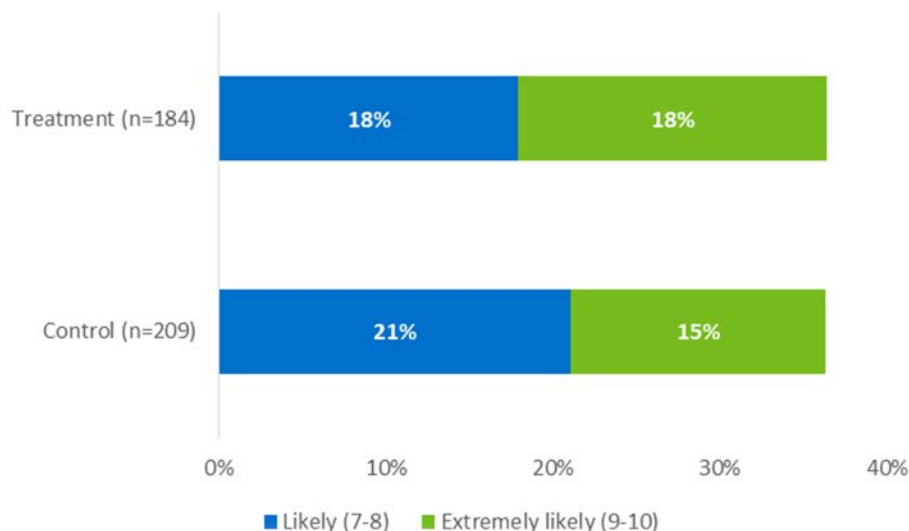
Online Account Activity	Treatment Group (n=180)	Control Group (n=204)
Never logged in	36%	37%
Pay my bill	36%	37%
Look for energy efficiency opportunities or ideas	16%	16%

As shown in Figure 4-6, control group households were more likely to report that they accessed the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make their home more energy efficient, but the difference is not statistically significant. Relatively small percentages of both groups report regular usage of the website for purposes other than bill payment.

**Figure 4-6: Frequency Accessing the Duke Energy Website to Search for Other Information - DEC**

Thirty-six percent of control group and treatment group customers, respectively, reported they would be likely to check the Duke Energy website for information before purchasing major household equipment. The portion of respondents rating their likelihood a “7” or higher on an 11-point scale of likelihood is plotted in Figure 4-7. Overall, MyHER has not produced a measurable change in customer engagement with Duke Energy’s standard online offerings (distinct from the online MyHER Interactive offering).

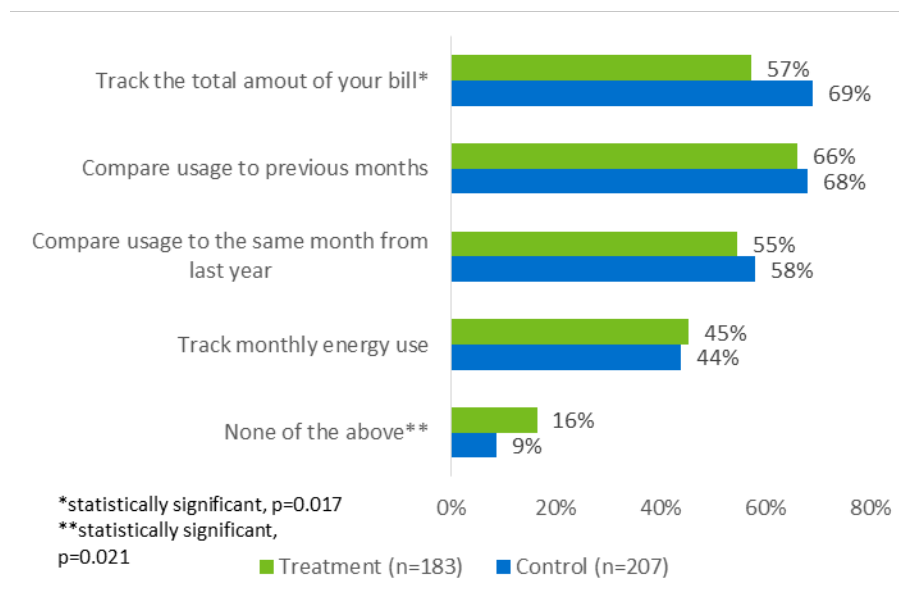
While we observe no effect on customer engagement with Duke Energy online resources attributable to MyHER, the survey responses across both treatment and control customers should be placed into context with their demographics. All survey respondents reside in single-family homes, since the MyHER program is only available to customers in single-family homes, so we should expect that the respondents of this survey should skew towards respondents who have attained a greater age than that might be expected of the general Duke Energy customer base. As we indeed show later in this section, the average age of respondents of this survey is older than what would be expected relative to U.S. Census estimates of the age distribution of the population in North and South Carolinas. About 43% of DEC treatment respondents are 65 years of age or older. About 47% of DEC control customers are included in that age bracket as well. This is in comparison to U.S. Census estimates that 16% of the population of the Carolinas falls into the same age bracket. Therefore, Duke Energy should interpret the responses of this survey as representing an older group of customers than their customer base overall. Residents of multi-family homes would be expected to be younger, on average, and would be hypothesized to report higher rates of engagement with Duke Energy’s online content.

**Figure 4-7: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment - DEC**

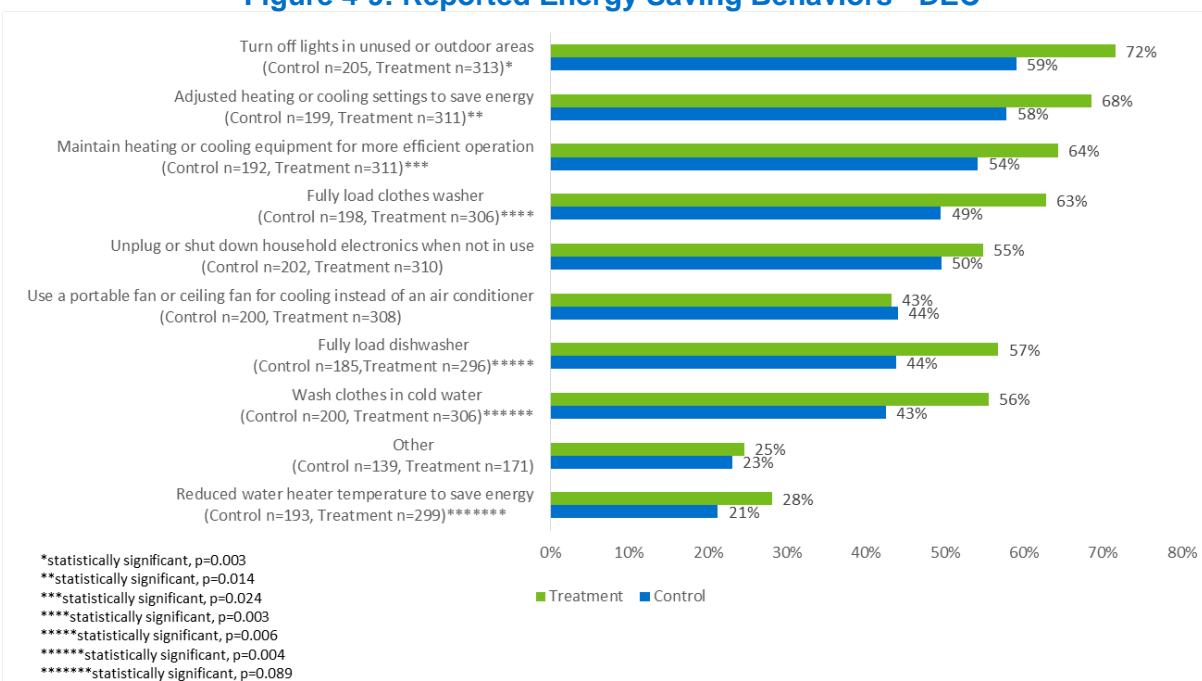
### Reported Energy Saving Behaviors

Treatment customers were much more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (73% to 63%;  $p = .013$ ). Treatment and control customers track information (bills and usage) related to their household's energy usage in the following ways (Figure 4-8):

- Fifty-seven percent of the treatment customers and 69% of the control customers reported tracking the total amount of the bill. The difference is statistically significant at the 90% level of confidence.
- About two-thirds of respondents compared usage to previous months. The difference between the treatment and control groups is not statistically significant.
- More than half of respondents compare usage to the same month from last year, but the difference in responses here between treatment and control groups is not statistically significant at the 90% level of confidence.

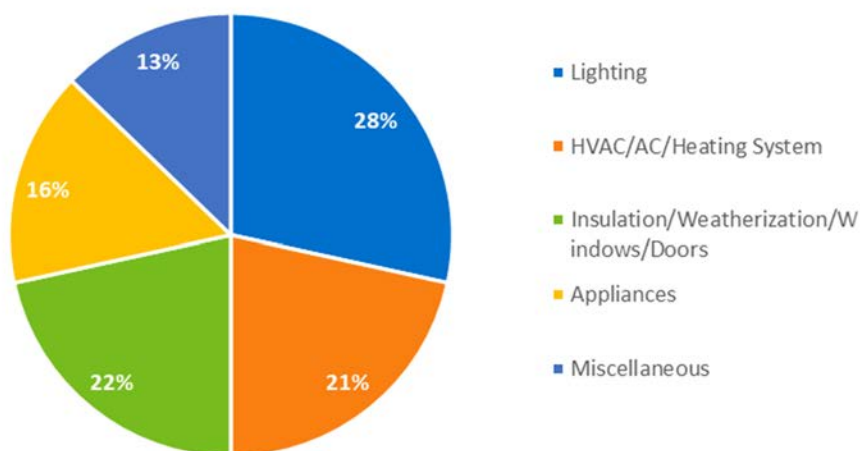
**Figure 4-8: “Which of the Following Do you Do with Regard to Your Household’s Energy Use?” - DEC**

Treatment group respondents were significantly more likely to turn off lights in unused or outdoor areas, adjust heating or cooling setting to save energy, maintain heating or cooling equipment for more efficient operation, fully load clothes washer, fully load dishwasher, wash clothes in cold water, and reduce water heater temperature to save energy than the control group, as shown in Figure 4-9. These differences are statistically significant at the 90% level of confidence.

**Figure 4-9: Reported Energy Saving Behaviors - DEC**

Ninety-six respondents (treatment and control customers in total) reported other energy savings actions. Nexant categorized these actions and the results are shown in Figure 4-10. The most commonly reported action, mentioned by 29 respondents, pertains to lighting, such as switching to LED bulbs, etc.

**Figure 4-10: Distribution of Other Energy Savings Behaviors - DEC**



### Reported Energy Efficiency Improvements Made

Respondents were provided with a list of energy efficiency improvements and asked if they had done each in the past year. The treatment group had a significantly higher percentage of customers reported having installed lighting with more energy efficient types than the control customers did (Table 4-8). None of the other differences were statistically significant at the 90% level of confidence.



**Table 4-8: Portion Indicating They Had Made Each Energy Efficiency Upgrade - DEC**

Upgrade	Control	Treatment
Install energy-efficient lighting (Control n=198, Treatment n=311)*	52%	60%
Purchase ENERGY STAR certified home electronic equipment (a television, for example) (Control n=187, Treatment n=298)	39%	43%
Install energy-efficient kitchen or laundry appliances (Control n=196, Treatment n=306)	34%	39%
Install energy-efficient heating/cooling equipment (Control n=196, Treatment n=302)	33%	34%
Install programmable thermostat or "smart" thermostat (Control n=197, Treatment n=307)	32%	34%
Caulk or weatherstrip (windows or doors) (Control n=194, Treatment n=307)	29%	36%
Install energy-efficient water heater (Control n=195, Treatment n=301)	26%	29%
Add insulation to attic, walls, or floors (Control n=197, Treatment n=301)	23%	23%
Replace windows or doors with more energy-efficient types (Control n=199, Treatment n=308)	20%	26%

\*statistically significant, p=0.084

### Behavior and Upgrade Category Variables

To examine broader patterns within the survey responses that cover many specific cases of energy saving behavior and upgrades, participant responses to the behavior and upgrade questions were combined into behavior vs. upgrade categories and were also combined into end-use categories. As shown in (Table 4-9), treatment group respondents were significantly more likely to engage in energy efficiency behaviors and improvements generally, and also undertook significantly more energy efficiency behaviors.

**Table 4-9: Percent of Households That Have Undertaken Energy Efficiency Actions - DEC**

Behaviors/Improvements	Treatment Group	Control Group
Any Energy Efficiency Behavior (Treatment n=314, Control n=206)*	73%	62%
Average Number of Behaviors**	5.13	4.24
Any Energy Efficiency Improvements (Treatment n=314, Control n=203)***	69%	61%
Average Number of Improvements	3.15	2.77

\*statistically significant, p=0.009

\*\*statistically significant, p=0.004

\*\*\*statistically significant, p=0.046

Additionally, Table 4-10 shows the proportion of respondents that had undertaken at least one behavior or upgrade in each end use category. In six of the nine categories, treatment group members were significantly more likely to have undertaken at least one of these activities.

These results demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers.

**Table 4-10: Percent of Households That Had Undertaken Energy Efficiency Actions, by End Use Category - DEC**

Behaviors/Improvements	Treatment Group	Control Group
Water Heating Behaviors and Upgrades (Treatment n=314, Control n=206)*	71%	61%
Water Heating Behaviors (Treatment n=314, Control n=204)**	71%	59%
Space Heating Behaviors and Upgrades (Treatment n=314, Control n=205)***	72%	62%
Space Heating Behaviors (Treatment n=314, Control n=205)****	72%	61%
Space Heating Upgrades (Treatment n=310, Control n=202)	45%	46%
Lighting Behaviors and Upgrades (Treatment n=314, Control n=206)*****	73%	61%
Electronics and Appliances Behaviors and Upgrades (Treatment n=314, Control n=205)*****	68%	59%
Electronics and Appliances Upgrades (Treatment n=312, Control n=199)	52%	48%
Sealing and Insulation Behaviors and Upgrades (Treatment n=312, Control n=200)	47%	43%

\*statistically significant, p=0.024

\*\*statistically significant, p=0.007

\*\*\*statistically significant, p=0.013

\*\*\*\*statistically significant, p=0.009

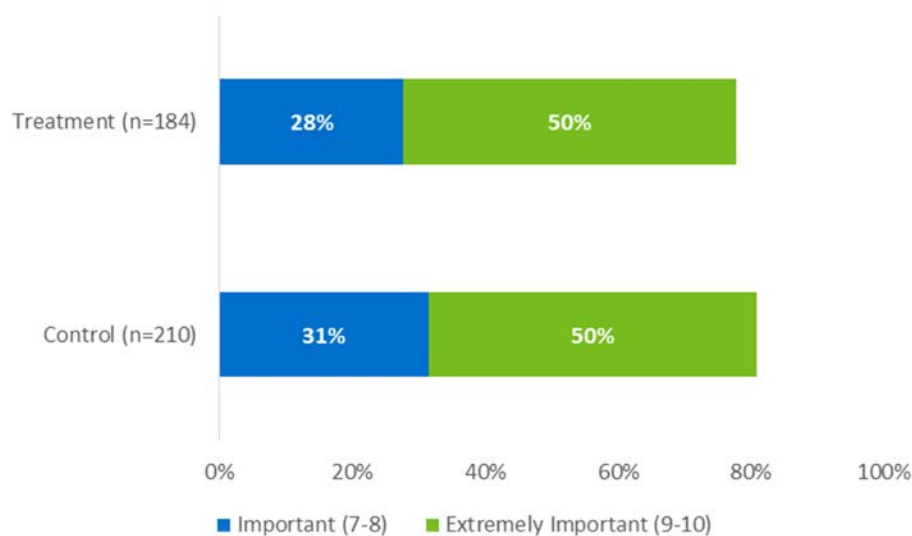
\*\*\*\*\*statistically significant, p=0.005

\*\*\*\*\*statistically significant, p=0.025

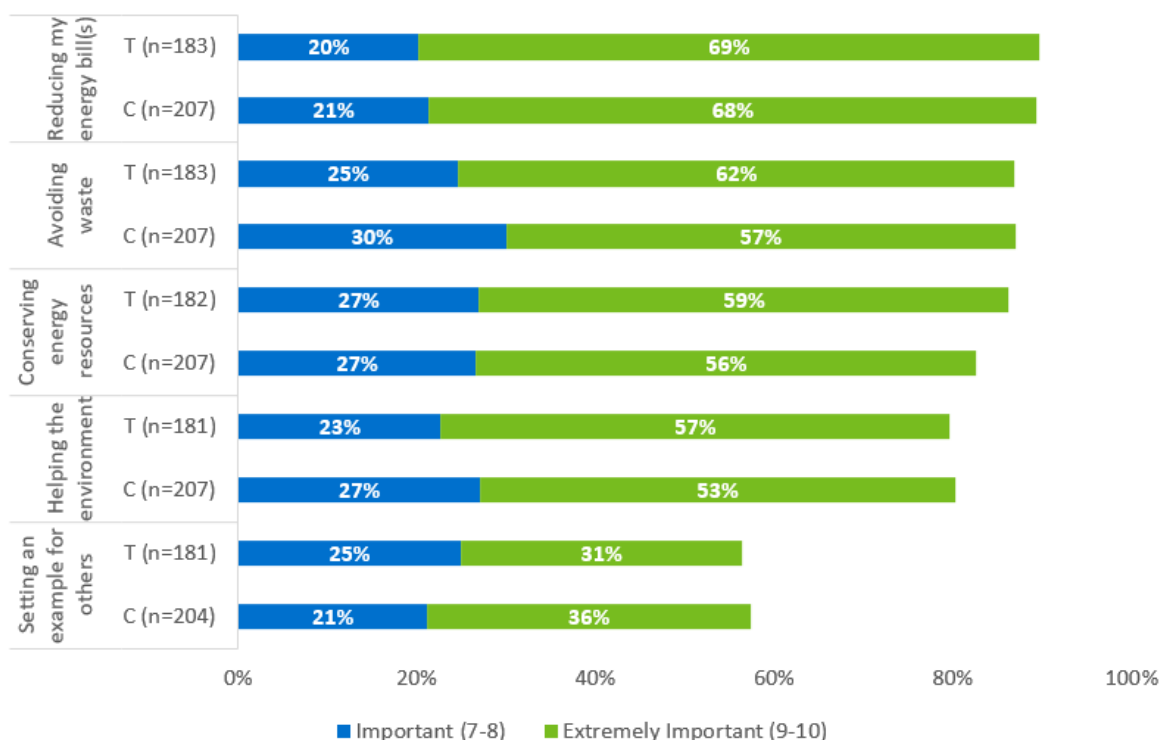
### Customer Motivation and Awareness

The control group and treatment groups report similar levels of motivation for saving energy. Eighty-one percent of control customers indicated that knowing they are using energy wisely is “important” or “extremely important”, compared to 78% of treatment customers. This difference is not statistically significant (Figure 4-11).

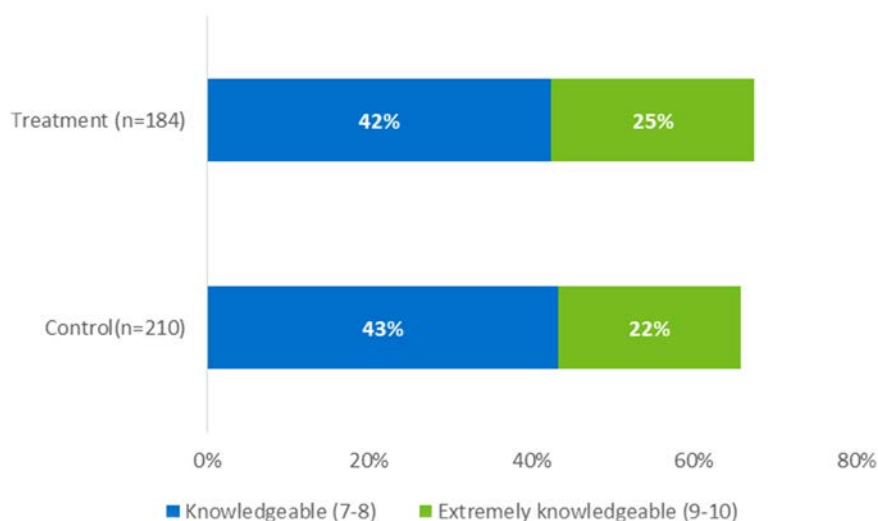
**Figure 4-11: “How Important Is It for You to Know if Your Household is Using Energy Wisely?” - DEC**



Customers were asked to rate, on a scale of 0 to 10, the importance of various reasons why they might try to reduce their home’s energy use. The strongest motivation for both groups is saving money on their energy bills, where 89% of treatment respondents and 89% of control respondents reported that saving money on their energy bills was “important” or “extremely important”. Eighty-seven percent of control respondents and treatment respondents respectively indicated that “avoiding waste” was “important” or “extremely important” to them. Eighty-six percent of treatment customers and 83% of control customers reported that “conserving energy resources” was “important” or “extremely important”. Eighty percent of treatment customers and control customers respectively reported that “helping the environment” was “important” or “extremely important”. None of the differences between treatment and control groups are statistically significant. Figure 4-12 contains the frequency of responses to this question, shown as a percentage for both treatment and control groups.

**Figure 4-12: “Please Indicate How Important Each Statement Is to You” - DEC**

As indicated by Figure 4-13, among treatment customers, 67% rated themselves above a seven on a 0-10 point scale of knowledgeability of ways to save energy, while 65% of control group customers rated themselves this way. The difference is not statistically significant at the 90% level of confidence.

**Figure 4-13: “How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?” - DEC**

Treatment respondents that took the treatment-only survey were asked how useful each MyHER feature was to their homes. A similar question was asked of both control group and treatment group respondents who took the primary survey rephrased to ask them how useful they *might expect* that information to be. Table 4-11 presents results of the portion rating each item a “7” or higher on an 11-point scale of the hypothetical usefulness from the control and treatment customers who took the primary survey, and Table 4-12 presents the comparison results between the actual usefulness of each item rated by treatment customers (treatment-only survey) and the hypothetical usefulness rated by control customers in the primary survey).<sup>12</sup>

The results from the hypothetical usefulness rating (Table 4-11) did not find statistically significant differences in expected usefulness of information that is found on MyHER reports. Comparisons between the responses of customers in the treatment-only survey and control customers in the primary survey show that treatment customers respond differently to questions about information presented in MyHERs if the questions are asked in the context of the actual MyHER reports, however the response patterns overall are similar – not much is seen by way of a significant separation between treatment and control customers in terms of usefulness of report content. However, there is one exception: Table 4-12 shows that control customers were significantly more likely to think that “Information about services and offers from Duke Energy” might be useful than treatment customers actually thought they were. This finding suggests that there may be an opportunity to improve the presentment of information in MyHERs about Duke Energy’s services and offerings.

**Table 4-11: Hypothetical Usefulness of HER Features Treatment and Control - DEC**

HER Feature	Control Group_Primary Survey	Treatment Group_Primary Survey
Graphs that display your home's energy use over time	71% (n=204)	66% (n=181)
Information about services and offers from Duke Energy	67% (n=205)	65% (n=181)
Tips to help you save money and energy	67% (n=205)	72% (n=183)
Examples of the energy use associated with common household items	67% (n=203)	66% (n=182)
Your home's energy use compared to that of similar homes	57% (n=202)	60% (n=181)
Customized suggestions for your home	56% (n=200)	63% (n=180)

<sup>12</sup> The implementation of a treatment-only survey, in addition to a primary survey provided to both treatment and control customers, afforded an opportunity to test the responses of treatment customers to a question asking about a MyHER feature they have actually seen vs. asking generally about how useful the information is (outside of the context of MyHER). This test leads us to the conclusion that the way customers are asked about this question matters and we recommend that in future surveys, MyHER treatment customers see questions about report content placed specifically in the context of them having seen the content in their reports, as opposed to in the hypothetical.

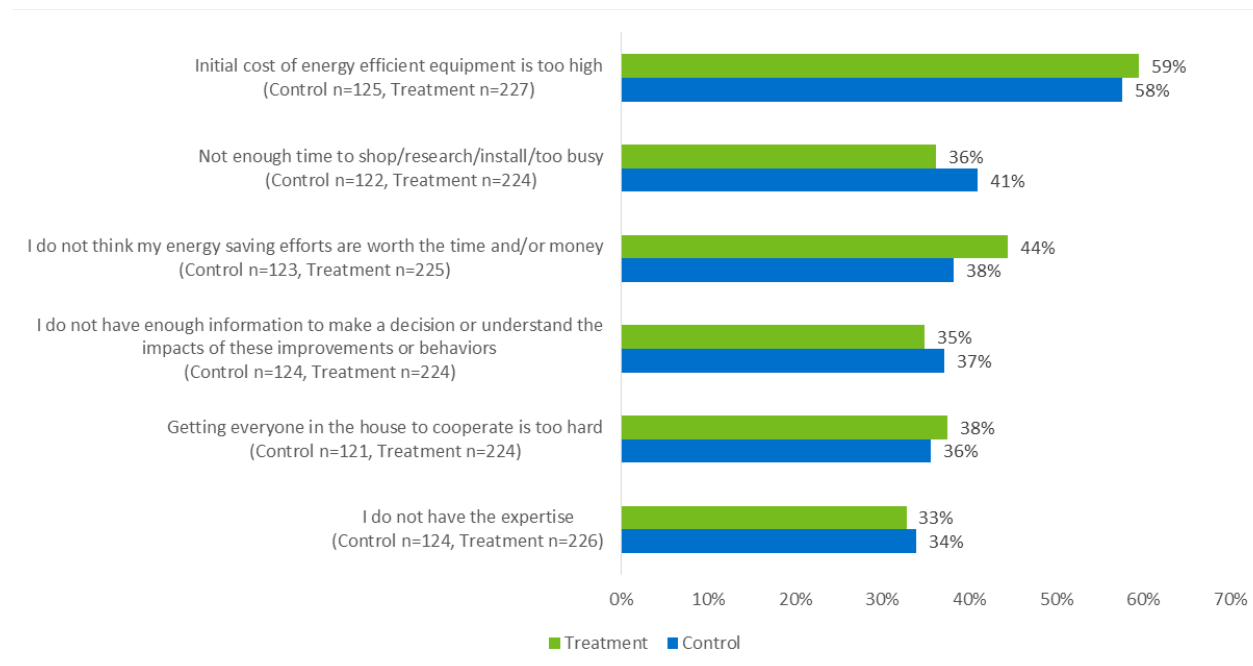
**Table 4-12: Actual Usefulness versus Hypothetical Usefulness of HER Features  
Treatment and Control - DEC**

HER Feature	Control Group_Primary Survey	Treatment Group_Treatment Only Survey
Graphs that display your home's energy use over time	71% (n=204)	76% (n=135)
Information about services and offers from Duke Energy*	67% (n=205)	58% (n=134)
Tips to help you save money and energy	67% (n=205)	66% (n=135)
Examples of the energy use associated with common household items	67% (n=203)	64% (n=135)
Comparison to similar homes	57% (n=202)	53% (n=135)
Customized suggestions for your home	56% (n=200)	59% (n=134)

\*statistically significant, p=0.089

**Barriers to Customers Undertaking Energy Savings Actions**

When asked the reasons why customers might not be able to save as much as energy as they would like, there were no statistically different response patterns between treatment and control customers, which indicates that MyHER is not making a measurable change in the potential barriers mentioned in this survey. The most commonly reported barrier is “the initial cost of energy efficient equipment is too high” (Figure 4-14): 59% of treatment respondents reported this as a barrier and 58% of control respondents did so as well. The least-commonly cited barrier was lack of expertise: 33% of treatment customers cited lack of expertise as a barrier as did 36% of control customers.

**Figure 4-14: Barriers to Customers Undertaking Energy Savings Actions - DEC**

### Suggestions about Duke Energy Improving Service Offerings

The survey provided an open-ended question to elicit suggestions about Duke Energy improving its service offerings to help customers reduce energy use. Only 22% (119 of 548, treatment and control customers in total) offered suggestions, including sixteen who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 42 of the 119 with suggestions, reflected a desire for more energy savings information, programs, free light bulbs, and more incentives:

- *“I would love to have a visit/walk through with someone who could look at our home and make suggestions”*
- *“Send free light bulbs”*
- *“Give rebates on appliances”*
- *“Continue to supply usage statistics”*
- *“Provide a smart device at the breaker box that would connect to your smartphone to tell you your energy consumption. Something real-time would be helpful. Then you would / could modify your daily activities real-time based on what you are seeing”*

Other comments centered on other suggestions, such as better communication and reducing price/providing senior and disability discounts. Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-13.

**Table 4-13: Suggestions about Duke Energy Improving Service Offerings - DEC**

Suggestion	Count	Percent of Respondents Mentioning (n=119)	Percent of Total Mentions (n=130)
Provide more energy savings information, programs, free light bulbs and more incentives	42	35%	32%
Better communication	23	19%	18%
Reduce price/provide senior and disability discounts	22	18%	17%
Appreciation	16	13%	12%
Miscellaneous	7	6%	5%
Reduce power outages	6	5%	5%
Improve website	4	3%	3%
Provide more detailed info in MyHER/offer MyHER to Townhomes/do more survey	5	4%	4%
Expressed Frustration	5	4%	4%

### Evidence of MyHER Effects

As noted above, while formal statistical testing found a number of differences among treatment and control group households for individual questions, the Nexant team sought to understand if



the overall pattern of survey responses differed among treatment and control households. To do this, we categorized each survey question by topic area and then counted any survey item in which the treatment households provided a more positive response than the control households. Table 4-14 presents the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category. A response is considered “favorable” if the treatment group gave a response that is consistent with the program objectives of MyHER.

**Table 4-14: Survey Response Pattern Index - DEC**

Question Category	Count of Questions where T>C	Number of Questions in Topic Area	Portion of Questions where T>C
Duke Energy's Public Stance on Energy Efficiency	3	3	100%
Customer Engagement with Duke Energy Website	2	5	40%
Customers' Reported Energy-saving Behaviors	10	11	91%
Customer's Reported Energy Efficiency Improvements Made	9	9	100%
Customer Motivation, Engagement & Awareness of Energy Efficiency	4	11	36%
Barriers to Customer Undertaking Energy Savings Actions	3	6	50%
Customer Satisfaction with Duke Energy	0	4	0%
<b>Total</b>	<b>31</b>	<b>49</b>	<b>63%</b>

Nexant's approach consists of the following logical elements:

- Assume the number of positive responses between treatment and control customers will be equal if MyHER lacks influence;
- Count the total number of topics and questions asked of both groups – there are seven topic areas and 49 questions;
- Note any item for which the treatment group outperformed the control group – the treatment group outperformed the control group in 31 questions, or 63% of the total questions;
- Since this value is more than 50% we can conclude that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey.
- Calculate the probability that the difference in response patterns is due to chance, rather than an underlying difference in populations – 2% (p-value = 0.021). Since this probability is less than 10%, we reject the null hypothesis (that the number of positive responses for treatment and control customers are equal) at the 90% level of confidence.

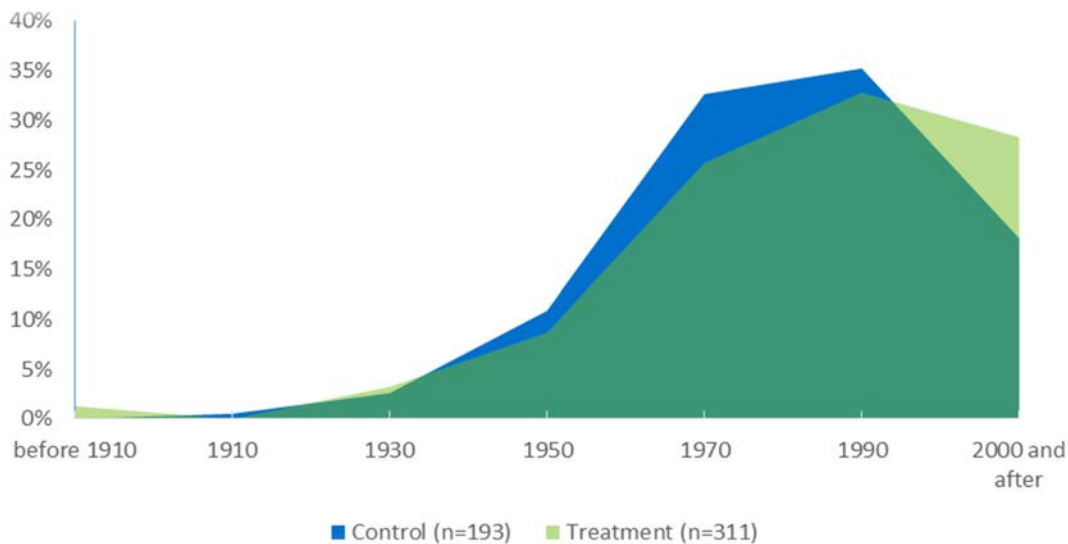
Because this analysis compares the response patterns between the treatment and control group, if the MyHER program did not influence customers, one would expect the treatment group to “score higher” on roughly half of the questions. In other words, if the MyHER is not influencing treatment group customers, there is a 50/50 chance that they will “outperform” the control group as many times as not. For a more detailed description of the index framework, see [Appendix G](#).

We call out the survey area covering general customer satisfaction with Duke Energy as an area of particular note: treatment customers reported lower satisfaction scores than control customers for all four general satisfaction questions. Nexant recommends that the MyHER program staff coordinate with any internal customer satisfaction data collection efforts to cross-reference these findings with any learnings on DEC customer satisfaction. The lower satisfaction scores for DEC treatment customers may indicate an opportunity for new MyHER messaging or content in DEC.

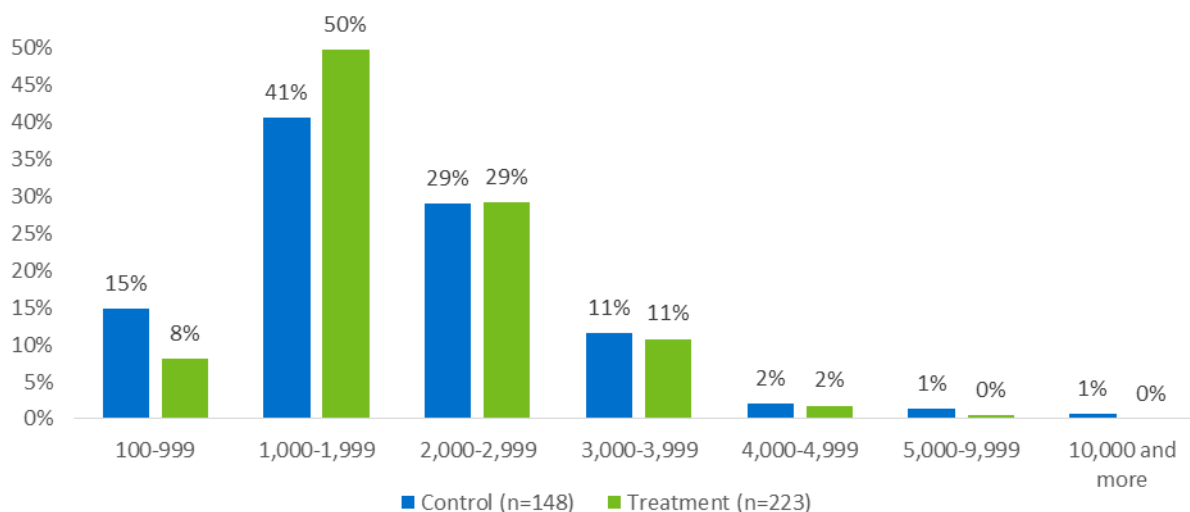
### Respondent Demographics

Nearly all respondents—93% of treatment group customers and 94% of control group customers—own their residence. More than half of households surveyed have two or fewer residents, but about 19% of treatment households and 20% of control households have four or more residents. There are no statistically significant differences in the distribution of ownership or age of homes assigned to the treatment and control groups ([Figure 4-15](#)) (chi-squared test).

**Figure 4-15: “In What Year Was Your Home Built?” - DEC**



[Figure 4-16](#) shows distribution of home square footage is similar between control and treatment households. The average square footage above ground is 2,031 for control households and 1,954 for treatment households, and the difference is not statistically significant.

**Figure 4-16: How many square feet is above ground living space? - DEC**

Respondent ages are relatively close to those reported by the U.S. Census American Community Survey (ACS) for Carolinas. The lowest age category (25-34) is often underrepresented when sampling based on residence in single family homes, given that many members of that population are in apartments, dormitories, or living with other family members. This common underrepresentation is true in this survey study, as well. Additionally, the average age is 62 for both control group respondents and treatment group respondents (see Table 4-15).

**Table 4-15: Respondent Age Relative to American Community Survey - DEC**

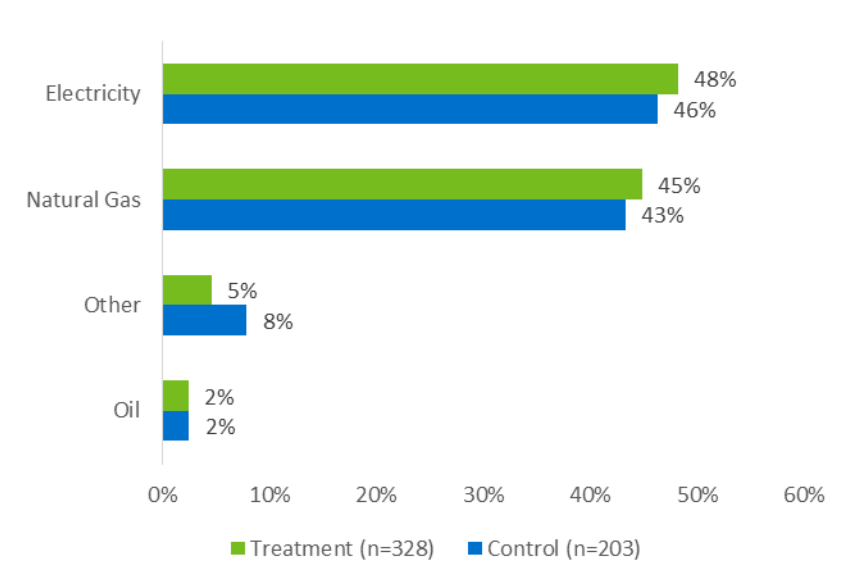
Age	Treatment Group (n=311)	Control Group (n=191)	2017 American Community Survey_Carolinas <sup>13</sup>
25-34	3%	3%	13%
35-44	8%	9%	13%
45-54	21%	19%	13%
55-64	25%	21%	13%
65 and over	43%	47%	16%

Figure 4-17 shows the primary heating fuel type used in control and treatment customers' households. Nearly half of treatment (48%) and control (46%) customers use electricity in their

<sup>13</sup> American Community Survey (ACS) is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_SPL\\_K200104&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_SPL_K200104&prodType=table)

households for heating. Forty-five percent of treatment customers and 43% of control customers use natural gas for heating. These differences are not statistically significant.

**Figure 4-17: Primary Heating Fuel in Households - DEC**

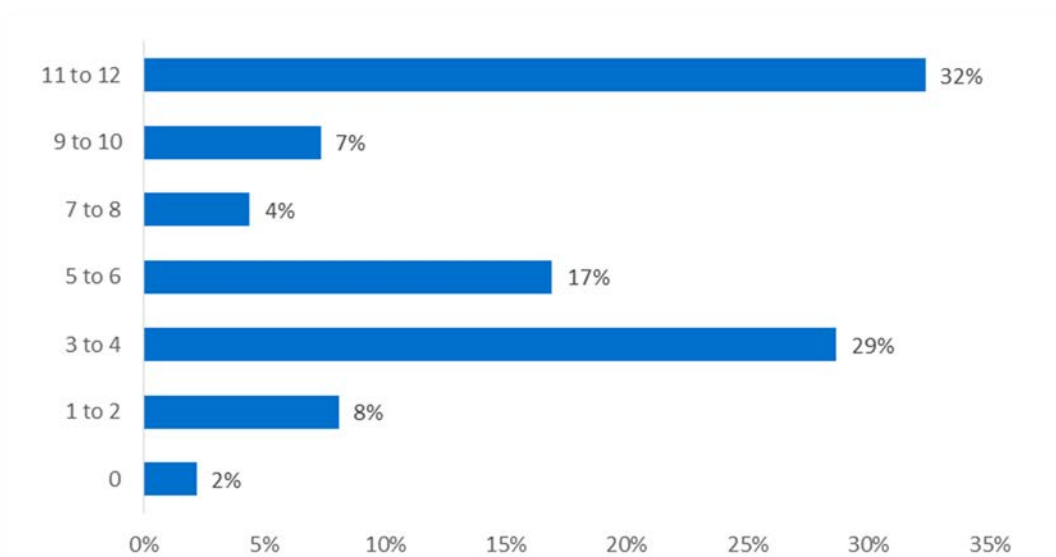


#### 4.2.2.2 Treatment Households: Experience and Satisfaction with MyHER - DEC

A large majority of Treatment Only household respondents, 93%, (142 of 152) recalled receiving at least one of the MyHER reports.

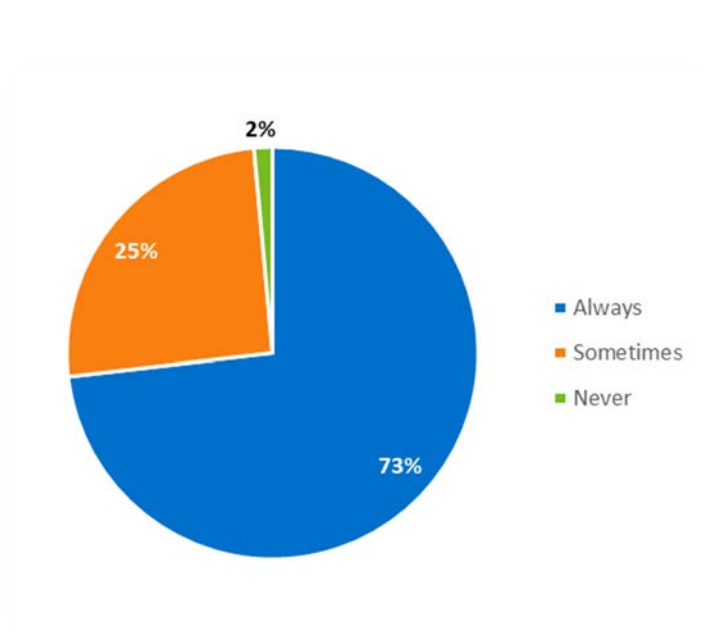
The survey asked those that could recall receiving at least one MyHER report if they could recall how many individual reports they had received “in the past 12 months” (Figure 4-18). The survey launched in January 2019, which means that most recipients would have received 8 MyHERs in the year since February 2018. Thirty-two percent (44 of 136) responded that they received 11 to 12 home energy reports in the past 12 months. The scattered distribution of responses related to recall is consistent with the difficulty of recalling an exact number of reports, however the question is valuable for grounding respondents in the experience of receiving a MyHER before asking them more specific questions about the document.

**Figure 4-18: Reported Number of MyHERs Received “In the past 12 months” (n=136) - DEC**



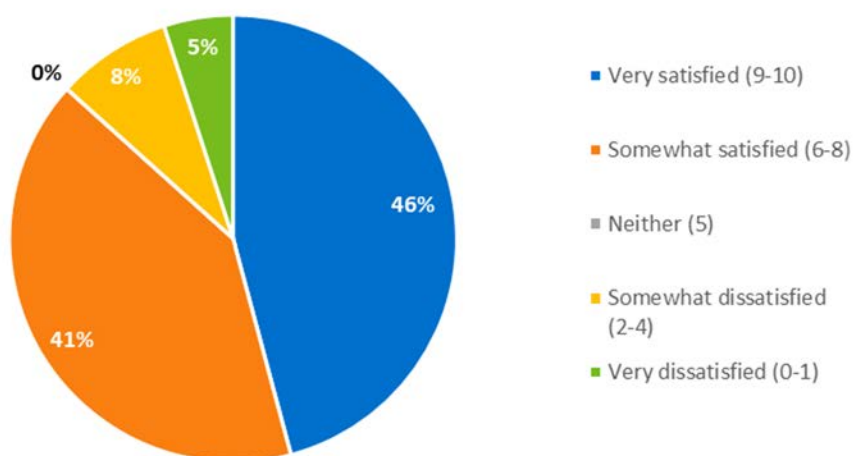
Survey respondents indicated high interest in the MyHER reports. As shown in Figure 4-19, when asked how often they read the reports, 99% of respondents indicated they “always” or “sometimes” read the reports. Two respondents (1%) indicated they do not read the reports.

**Figure 4-19: How Often Customers Report Reading the MyHER (n=138) - DEC**

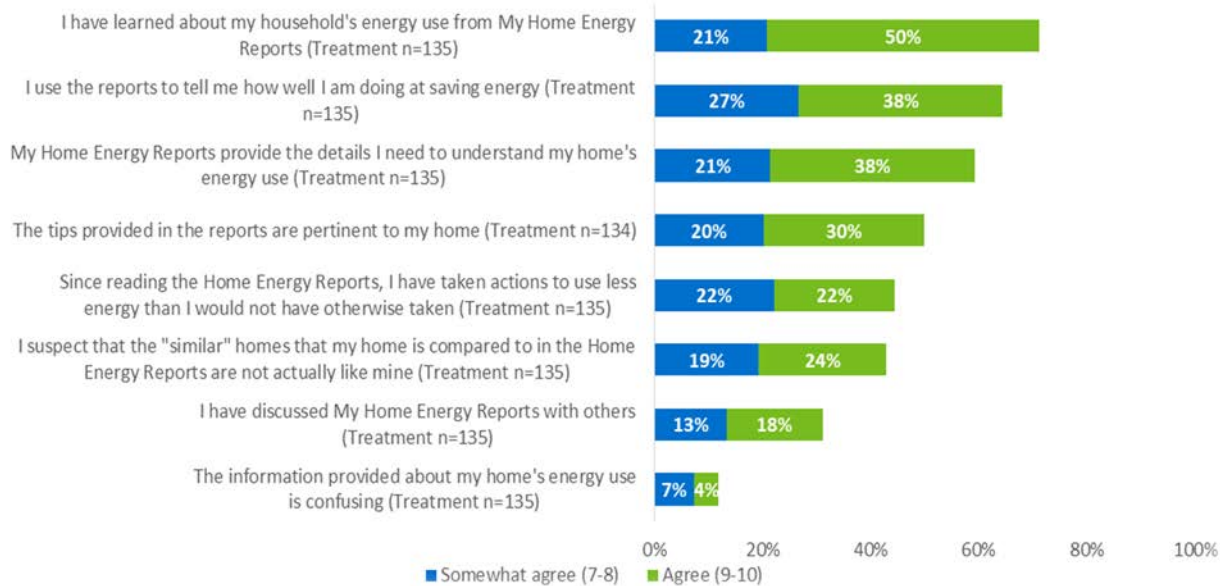


Eighty-seven percent (104 of the 120 respondents that provided a rating) reported being “somewhat” or “very” satisfied with the information contained in the reports (Figure 4-20). The survey asked a further question to the respondents of why they said so: sixty-one of the satisfied respondents provided reasons. Among customers who gave the highest satisfaction ratings, the most common comments on the MyHERs described the reports’ ability to engage the customer and provide greater awareness. The customers who reported being somewhat satisfied most often simply described the reports as “helpful.”

**Figure 4-20: Satisfaction with the Information in MyHER Reports (n=120) - DEC**



When asked to rate their agreement with a series of statements about MyHERs on a scale of 0 to 10, recipients largely agreed that the reports helped them understand their home’s energy use, with 71% of respondents rating their agreement a seven or higher on a 0-10 point scale, and that they use the report to gauge how successful they are at saving energy (65% rating a seven or higher). More than half (59%) agreed that the reports provided the details they needed to understand their home’s energy usage. Respondents provided weaker agreement to statements about the pertinence of the tips provided to their homes and whether they have taken actions to use less energy than they would not have since reading MyHERs. A relatively small percentage (11%) agreed with the statement that the information provided is confusing (Figure 4-21).

**Figure 4-21: Level of Agreement with Statements about MyHER (0-10 Scale) - DEC**

The survey provided an open-ended question to elicit suggestions about potential improvements to MyHER among those that had reported reading at least one report. Only 27% (37 of 136) offered suggestions, including seven who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 16 of the 37 with suggestions, questioned accuracy of the comparison in the report. Fifteen of the 37 with suggestions reflected a desire for more specific information or details about their home and specific actions they should take. Some of these requests reflected interest in understanding at a more granular level how their home uses energy and energy consumption information related to appliances:

- *"By explaining what factors influence our rating"*
- *"I know it's probably not possible but it would be nice to see the actual percentage of what in the household is using what energy..."*
- *"Be more specific as to which appliances, etc. are using how much energy compared to a standard or an efficient use"*
- *"Narrow the comparison to homes closer in size and age along with the number of household members to each consumer"*
- *"Pinpoint possible problems that could be causing energy waste"*

Other comments centered on other suggestions (such as providing free energy assessment, etc.), and a few respondents that simply did not see value in the reports. Responses coded as recommending production changes focus on changing the delivery method of MyHER reports as follows:

- *" Send via email..."*



- “Send them via email instead of wasting paper and stamps”

Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-16.

**Table 4-16: Distribution Suggestions for Improvement (Multiple Responses Allowed) - DEC**

Suggestion	Count	Percent of Respondents Mentioning (n=37)	Percent of Total Mentions (n=47)
Don't believe comparison/accuracy	16	43%	34%
Provide more specific information or details	15	41%	32%
Appreciate the Home Energy Report	7	19%	15%
Change production (mail, paper, format)	4	11%	9%
Expressed frustration	2	5%	4%
Other suggestions (such as providing home inspection, etc.)	2	5%	4%
Don't see value/dislike	1	3%	2%

Treatment households were also asked questions that focused on the awareness and use of MyHER Interactive, revealing low awareness of the online Interactive platform:

- Only 28% of treatment customers are aware of MyHER Interactive;
- Among aware customers, 92% reported that they had not signed up to use MyHER Interactive; and
- When asked why they haven't signed up to use MyHER Interactive, 30% of respondents reported that they were very busy, 22% reported that they were not interested in it, and 9% further reported that they did not know about it.

#### 4.2.3 Customer Surveys - DEP

As was the case for DEC, the DEP customer surveys included a section of questions focused specifically on the experience of and satisfaction with the information provided in MyHERs, and the awareness of MyHER Interactive—these questions were asked only of households in the treatment group. Both treatment and control households answered the remaining questions, which focused on assessing:

- Awareness of Duke Energy efficiency program offers;
- Satisfaction with the Duke Energy, and services Duke Energy provides to help households manage their energy use;
- Levels of awareness of and interest in household energy use; motivations and perceived importance;
- Reported behavioral or equipment-based upgrades; and

- Barriers that prevent customers from undertaking energy savings actions.

#### 4.2.3.1 Comparing Treatment and Control Responses

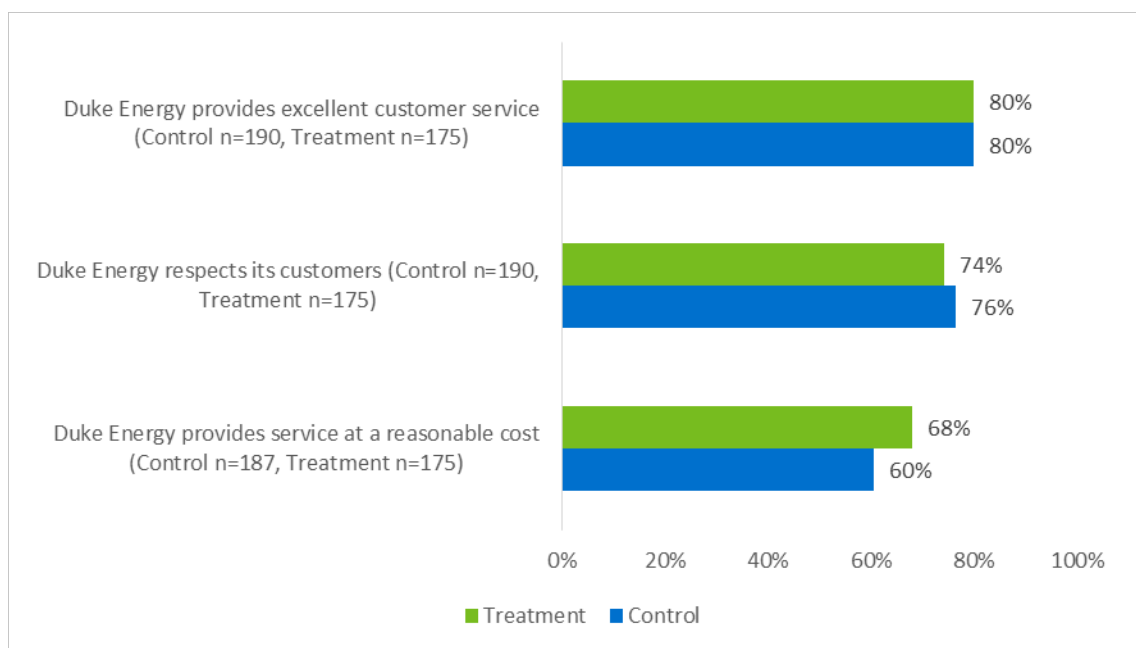
This section presents the results of survey questions asked of both treatment and control households in DEP and compares the response patterns between the two groups. Statistically significant differences between treatment and control households are noted.

#### Duke Energy Customer Satisfaction

Both treatment and control groups' overall satisfaction with Duke Energy are high. Seventy-six percent of treatment customers and 74% of control customers are satisfied or very satisfied with Duke Energy as their electric supplier (rated eight or higher on a 0-10 point scale); the difference is not statistically significant at the 90% level of confidence.

Treatment households rated Duke Energy higher on providing service at a reasonable cost, while control households rated Duke Energy higher on respecting its customers. These differences between treatment and control groups are also not statistically significant (Figure 4-22). Treatment and control households rated Duke Energy the same on providing excellent customer service. MyHER does not result in a measurable change in stated customer satisfaction with Duke Energy in DEP.

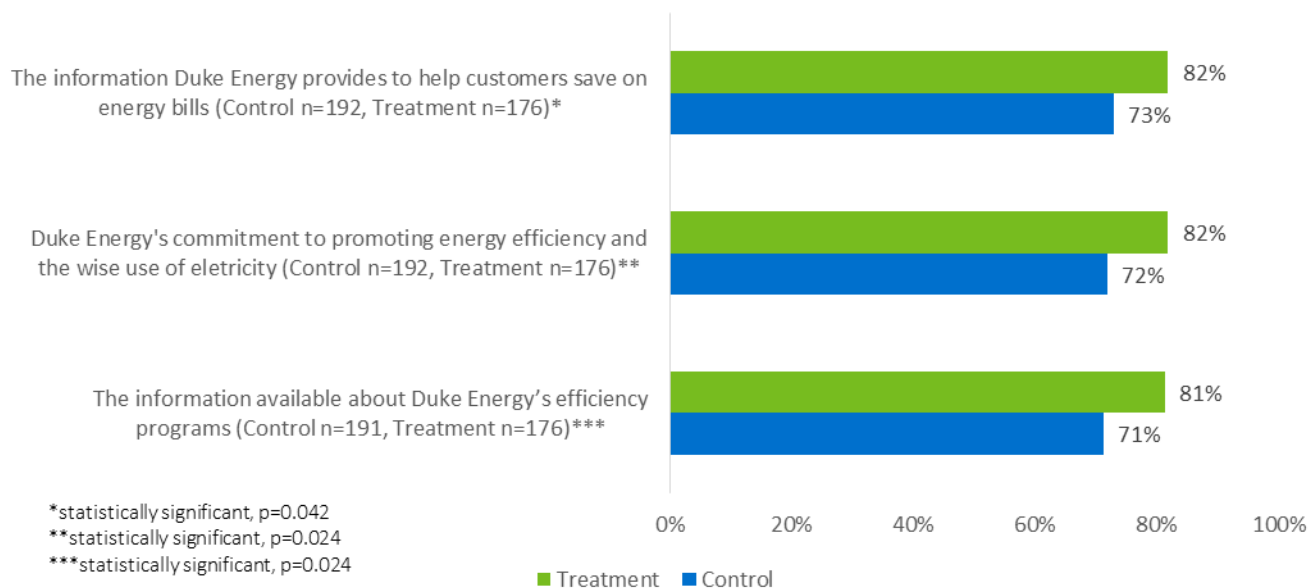
**Figure 4-22: Satisfaction with Various Aspects of Customer Service - DEP**



On the other hand, treatment group responses indicate that MyHER reports had a significant positive effect on customer satisfaction with certain aspects of Duke Energy's energy efficiency efforts (Figure 4-23). The differences between treatment and control customers with respect to satisfaction with the information available about Duke Energy's efficiency programs, the information Duke Energy provides to help customers save on energy bills, and Duke Energy's

commitment to promoting energy efficiency and the wise use of electricity are statistically significant at the 90% level of confidence.

**Figure 4-23: Portion Satisfied with Energy Efficiency Offerings and Information - DEP**



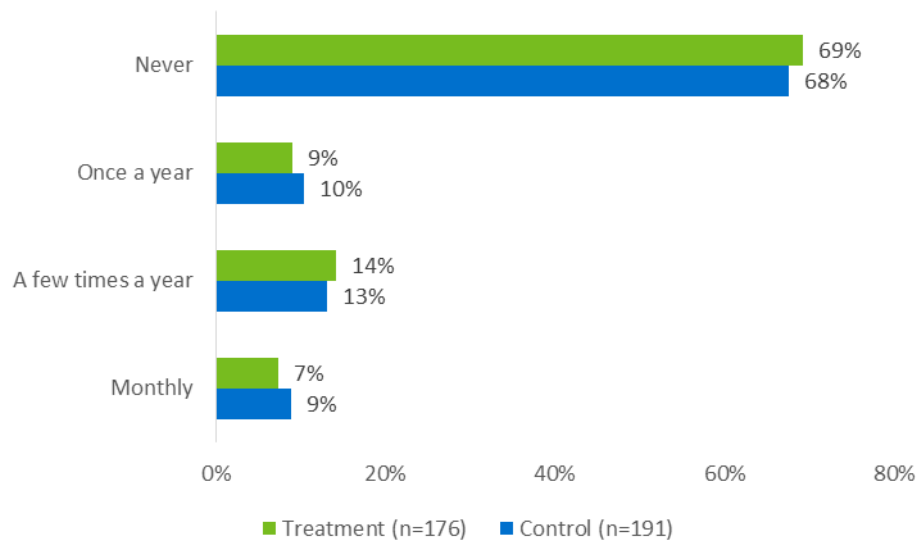
### Engagement with Duke Energy's Website

Both groups answered several questions about their use of the Duke Energy website, a proxy for overall engagement with information provided by the utility on energy efficiency and household energy use. Table 4-17 shows that 42% of the treatment group and 38% of the control group reported they had never logged in to their Duke Energy accounts. Among those that had logged in, the most commonly reported purpose was to pay their bill.

**Table 4-17: Use of Duke Energy Online Account - DEP**

Online Account Activity	Treatment Group (n=174)	Control Group (n=185)
Never logged in	42%	38%
Pay my bill	36%	38%
Look for energy efficiency opportunities or ideas	10%	8%

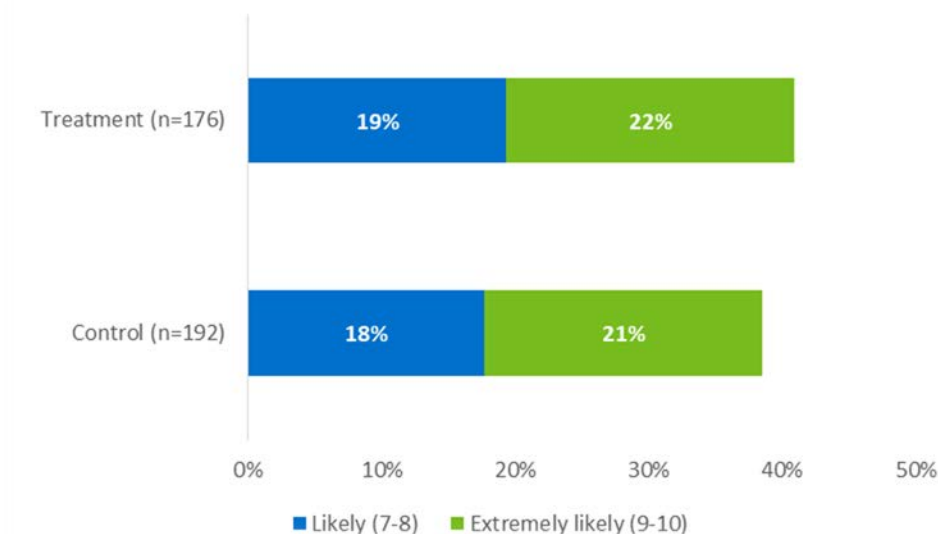
Treatment group households were more likely to report that they accessed the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make their home more energy efficient, but the difference is not statistically significant. Relatively small percentages of both groups report regular usage of the website for purposes other than bill payment, as shown in Figure 4-24.

**Figure 4-24: Frequency Accessing the Duke Energy Website to Search for Other Information - DEP**

Thirty-nine percent of control group and 41% of treatment group customers reported they would be likely to check the Duke Energy website for information before purchasing major household equipment. The difference between the control and treatment group is not statistically significant at the 90% level of confidence. The portion of respondents rating their likelihood a “7” or higher on an 11-point scale of likelihood is plotted in Figure 4-25.

Overall, MyHER has not produced a measurable change in customer engagement with Duke Energy’s standard online offerings (distinct from the online MyHER Interactive offering) at DEP. As stated earlier in the presentation of DEC survey findings, these survey responses relating to engagement with Duke Energy’s online resources should be placed into context with the DEP respondents’ demographics. All DEP survey respondents reside in single-family homes, since the MyHER program is only available to customers in single-family homes. We therefore expect that the DEP respondents of this survey should skew towards respondents who have attained a greater age than that might be expected of the general Duke Energy customer base. We indeed find, as we discuss at greater length later in this section, that the average age of respondents of this survey is older than what would be expected relative to U.S. Census estimates of the age distribution of the population in North and South Carolinas. About 45% of DEP treatment respondents are 65 years of age or older. About 44% of DEP control customers are included in that age bracket as well. This is in comparison to U.S. Census estimates that 16% of the population of the Carolinas falls into the same age bracket. Therefore, Duke Energy should interpret the responses of this survey as representing an older group of customers than their customer base overall. Residents of multi-family homes would be expected to be younger, on average, and would be hypothesized to report higher rates of engagement with Duke Energy’s online content.

**Figure 4-25: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment - DEP**

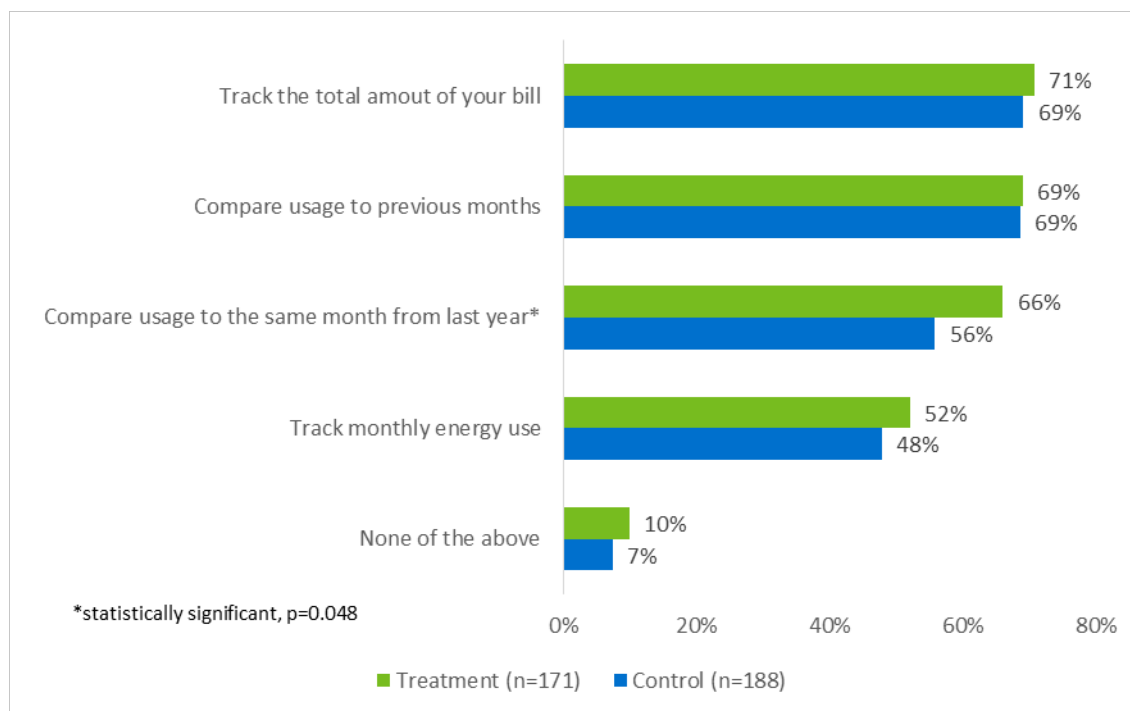


### Reported Energy Saving Behaviors

Treatment and control customers track information (bills and usage) related to their household's energy usage in the following ways (Figure 4-26):

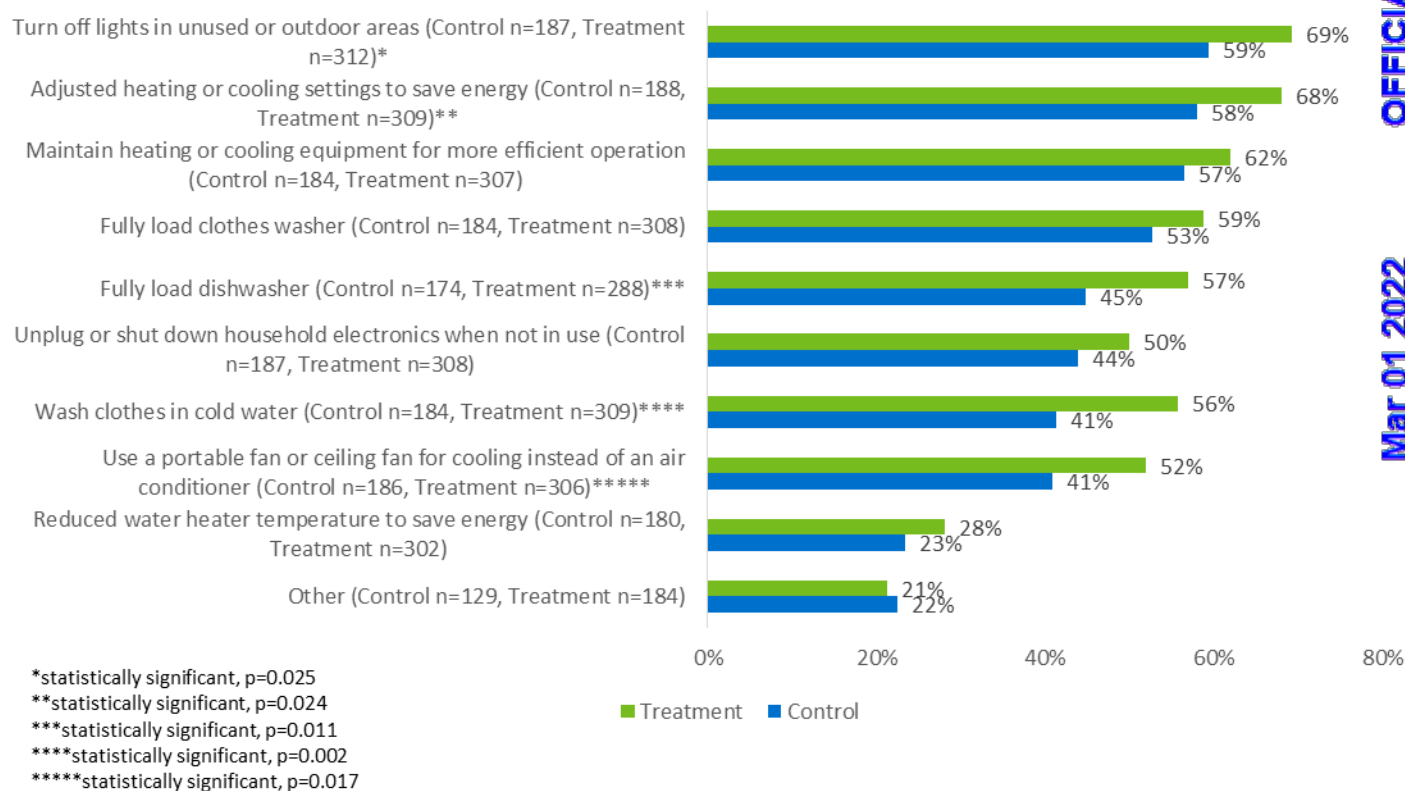
- Seventy-one percent of the treatment customers and 69% of the control customers reported tracking the total amount of the bill. The difference is not statistically significant at the 90% level of confidence.
- Sixty-nine percent of the treatment group and control group, respectively, compared usage to previous months. The difference is not statistically significant.
- Sixty-six percent of the treatment respondents and 56% of the control respondents compared usage to the same month from last year. The difference in responses here between treatment and control groups are statistically significant at the 90% level of confidence.

**Figure 4-26: “Which of the Following Do you Do with Regard to Your Household’s Energy Use?” - DEP**



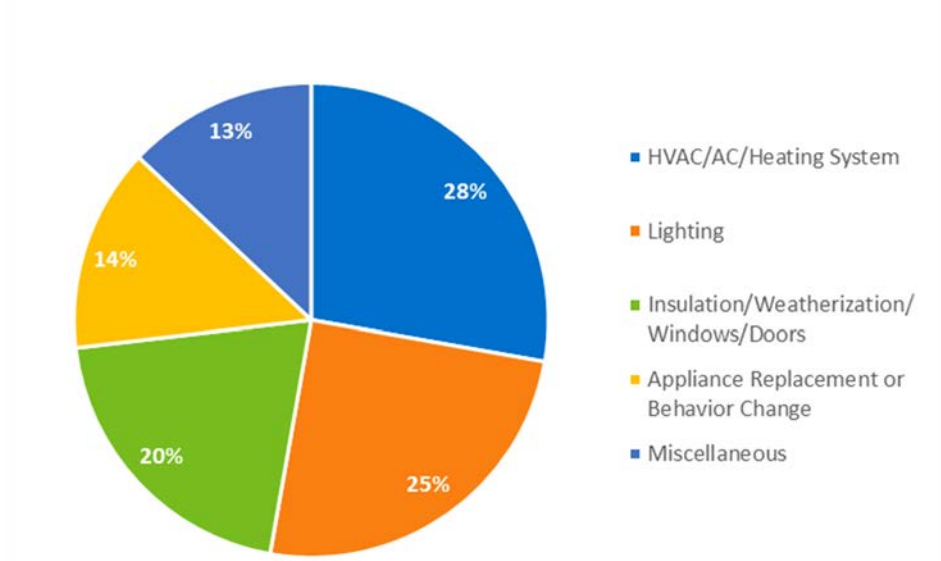
In general, treatment customers were more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (71% to 60%;  $p = 0.008$ ).

Specifically, the treatment group was more likely to turn off lights in unused or outdoor areas, adjust heating or cooling settings to save energy, fully load dishwasher, wash clothes in cold water and use a portable fan or ceiling fan for cooling than treatment group, as shown in Figure 4-27. These differences are statistically significant at the 90% level of confidence.

**Figure 4-27: Reported Energy Saving Behaviors - DEP**

Ninety-three respondents (treatment and control customers in total) reported other energy savings actions as free form text. Nexant categorized these actions and the results are shown in Figure 4-28. The most commonly reported action, mentioned by 30 respondents, pertains to HVAC/AC/Heating system, such as installing a new HVAC system.



**Figure 4-28: Distribution of Other Energy Savings Behaviors - DEP**

#### Reported Energy Efficiency Improvements Made

Respondents were provided with a list of energy efficiency improvements and asked if they had done each one in the past year. The treatment group had significantly higher percentages of customers who reported purchasing ENERGY STAR certified home electronic equipment, installing energy-efficient kitchen or laundry appliances, installing energy-efficient heating/cooling equipment, installing programmable thermostat or “smart” thermostat, and adding insulation to attic, walls, or floors than the control customers did (Table 4-18).

**Table 4-18: Portion Indicating They had Made Each Energy Efficiency Upgrade - DEP**

Upgrade	Control	Treatment
Install energy-efficient lighting (Control n=187, Treatment n=306)	50%	57%
Caulk or weatherstrip (windows or doors) (Control n=186, Treatment n=301)	35%	38%
Purchase ENERGY STAR certified home electronic equipment (a television, for example) (Control n=178, Treatment n=289)*	35%	45%
Install energy-efficient kitchen or laundry appliances (Control n=185, Treatment n=295)**	30%	45%
Install energy-efficient heating/cooling equipment (Control n=179, Treatment n=297)***	29%	38%
Install energy-efficient water heater (Control n=178, Treatment n=293)	28%	32%
Install programmable thermostat or "smart" thermostat (Control n=182, Treatment n=300)****	26%	36%
Replace windows or doors with more energy-efficient types (Control n=184, Treatment n=301)	22%	26%
Add insulation to attic, walls, or floors (Control n=180, Treatment n=299)*****	20%	28%

\*statistically significant, p=0.049

\*\*statistically significant, p=0.001

\*\*\*statistically significant, p=0.054

\*\*\*\*statistically significant, p=0.02

\*\*\*\*\*statistically significant, p=0.048

### Behavior and Upgrade Category Variables

To examine broader patterns within the survey responses that cover many specific cases of energy saving behavior and upgrades, participant responses to the behavior and upgrade responses were combined into their respective categories, and were also combined into end-use categories. As shown in Table 4-19, treatment group respondents were significantly more likely to engage in energy efficiency behaviors and improvements, and also undertook significantly more energy efficiency behaviors and upgrades. These results demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers in DEP.

**Table 4-19: Percent of Households That Had Undertaken Energy Efficiency Actions - DEP**

Behaviors/Improvements	Treatment Group	Control Group
Any Energy Efficiency Behavior (Treatment n=31, Control n=190)*	71%	60%
Average Number of Behaviors**	5.03	4.28
Any Energy Efficiency Improvements (Treatment n=313, Control n=189)***	70%	57%
Average Number of Improvements****	3.28	2.67

\*statistically significant, p=0.008

\*\*statistically significant, p=0.022

\*\*\*statistically significant, p=0.003

\*\*\*\*statistically significant, p=0.018

Further, Table 4-20 shows the proportion of respondents that had undertaken at least one behavior or upgrade in each end use category. In all nine categories, treatment group members were significantly more likely to have undertaken at least one of these activities. These results further demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers.

**Table 4-20: Percent of Households That Had Undertaken Energy Efficiency Actions, by End Use Category - DEP**

Behaviors/Improvements	Treatment Group	Control Group
Water Heating Behaviors/Upgrades (Treatment n=315, Control n=189)*	70%	59%
Water Heating Behaviors (Treatment n=315, Control n=187)**	70%	58%
Space Heating Behaviors/Upgrades (Treatment n=315, Control n=190)***	71%	60%
Space Heating Behaviors (Treatment n=315, Control n=190)****	71%	60%
Space Heating Upgrades (Treatment n=309, Control n=185)*****	49%	37%
Lighting Behaviors/Upgrades (Treatment n=314, Control n=190)*****	71%	60%
Electronics and Appliances Behaviors/Upgrades (Treatment n=315, Control n=189)*****	68%	53%
Electronics and Appliances Upgrades (Treatment n=306, Control n=186)*****	54%	43%
Sealing and Insulation Behaviors/Upgrades (Treatment n=306, Control n=187)*****	52%	42%

\*statistically significant, p=0.001

\*\*statistically significant, p=0.007

\*\*\*statistically significant, p=0.01

\*\*\*\*statistically significant, p=0.01

\*\*\*\*\*statistically significant, p=0.009

\*\*\*\*\*statistically significant, p=0.011

\*\*\*\*\*statistically significant, p=0.001

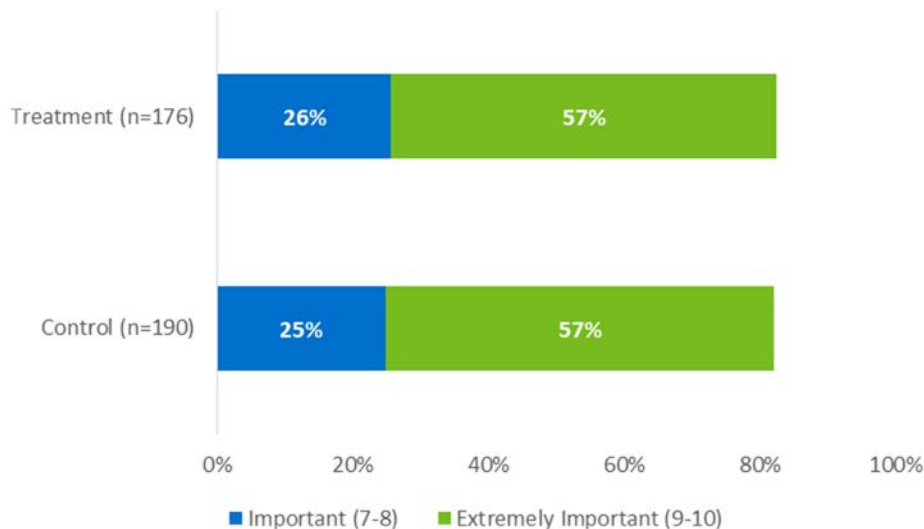
\*\*\*\*\*statistically significant, p=0.016

\*\*\*\*\*statistically significant, p=0.043

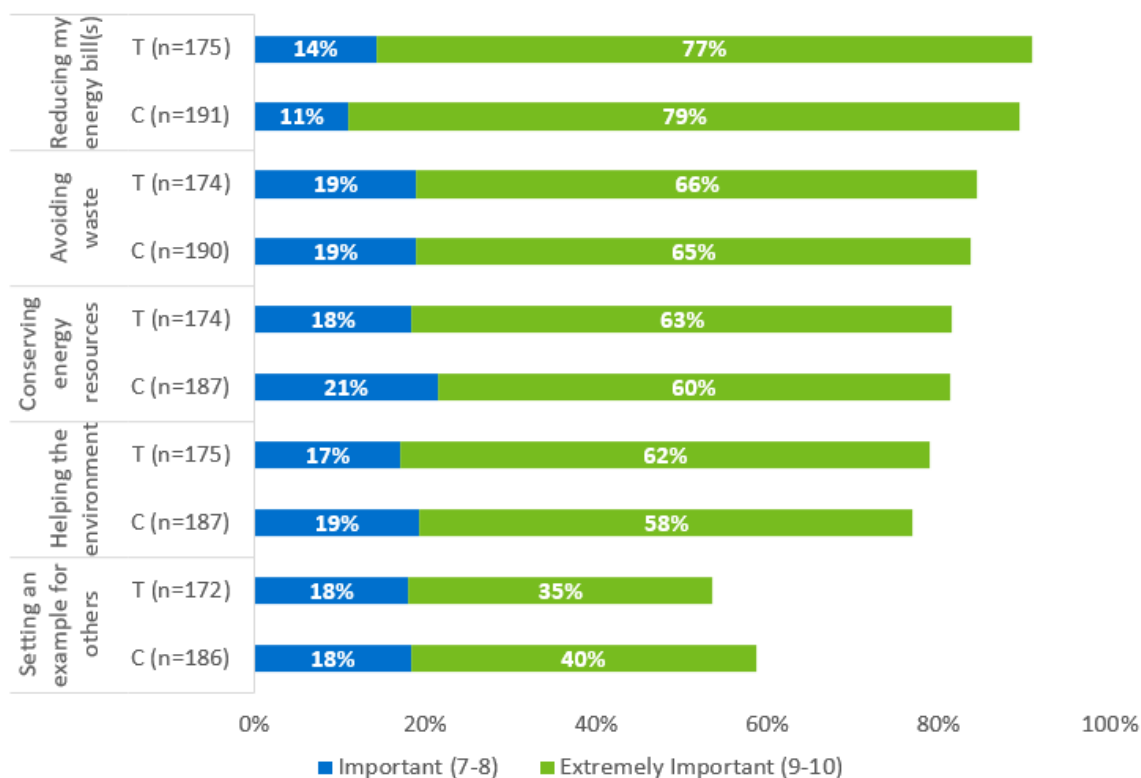
### Customer Motivation and Awareness

The control group and treatment groups report similar levels of motivation to save energy. Eighty-two percent of control customers and treatment customers respectively, indicated that knowing they are using energy wisely is important or “important” or “extremely important”. (Figure 4-29). The reported percentage for the Treatment group differs from that in the figure due to rounding.

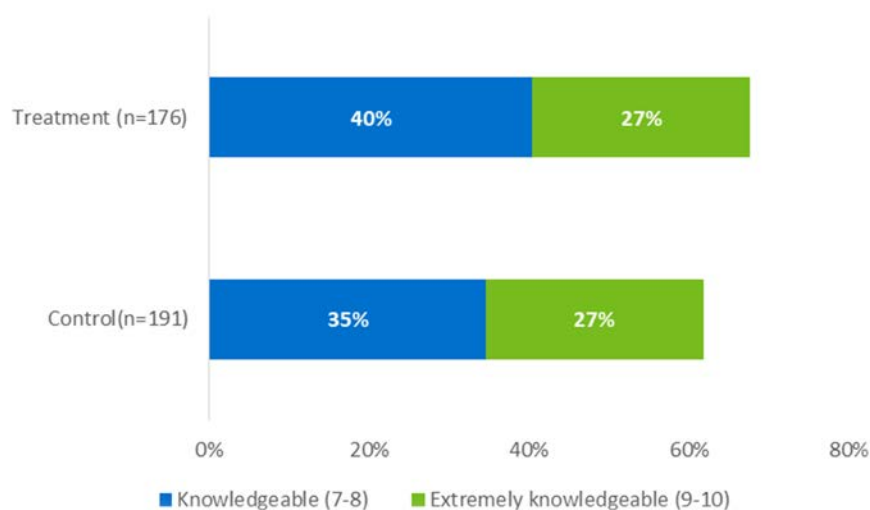
**Figure 4-29: “How Important Is It for You to Know if Your Household is Using Energy Wisely?” - DEP**



Customers were asked to rate, on a scale of 0 to 10, the importance of various reasons for why they might try to reduce their home’s energy use. The strongest motivation for both groups is saving money on their energy bills, where 91% of treatment respondents and 90% of control respondents reported that saving money on their energy bills was “important” or “extremely important”. Eighty-four percent of control respondents and 85% of treatment respondents, respectively, indicated that “avoiding waste” was important” or “extremely important” to them. Eighty-one percent of both treatment customers and control customers reported that “conserving energy resources” was important” or “extremely important”. Seventy-nine percent of treatment customers and 77% of control customers reported that “helping the environment” was “important” or “extremely important”. Those differences between the treatment and control group are not statistically significant. Figure 4-30 contains the frequency of responses to this question, shown as a percentage for both the treatment and control group.

**Figure 4-30: “Please Indicate How Important Each Statement Is to You” - DEP**

As indicated by Figure 4-31, 67% of treatment customers rated themselves above a seven on a 0-10 point scale of knowledgeability of ways to save energy, while 62% of control group customers rated themselves this way. The difference is not statistically significant at the 90% level of confidence.

**Figure 4-31: “How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?” - DEP**

Treatment respondents that took the treatment-only survey were asked how useful each MyHER feature was to their homes. A similar question was asked of both control group and treatment group respondents who took the primary survey rephrased to ask them how useful they *might expect* that information to be. Table 4-21 presents results of the portion, rating each item a “7” or higher on an 11-point scale of the hypothetical usefulness from the control and treatment customers who took the primary survey, and Table 4-22 presents the comparison results between the actual usefulness of each item rated by treatment customers (treatment-only survey) and the hypothetical usefulness rated by control customers in the primary survey).<sup>14</sup>

The results from the hypothetical usefulness rating (Table 4-21) did not find statistically significant differences in expected usefulness of information that is found on MyHER reports. Comparisons between the responses of customers in the treatment-only survey and control customers in the primary survey show that treatment customers respond differently to questions about information presented in MyHERs if the questions are asked in the context of the actual MyHER reports, however the response patterns show some limited significant separation between treatment and control customers in terms of usefulness of report content: Table 4-22 shows that control customers were significantly more likely to report that “Tips to help you save money and energy”, “Information about services and offers from Duke Energy”, and “Comparison to similar homes” would be useful than treatment customers reporting that they are actually useful. This finding suggests that there may be an opportunity to improve the presentment of this information in MyHERs.

**Table 4-21: Hypothetical Usefulness of HER Features Treatment and Control - DEP**

HER Feature	Control Group_Primary Survey	Treatment Group_Primary Survey
Tips to help you save money and energy	73% (n=188)	72% (n=173)
Graphs that display your home's energy use over time	72% (n=185)	73% (n=174)
Information about services and offers from Duke Energy	68% (n=186)	67% (n=172)
Examples of the energy use associated with common household items	67% (n=184)	67% (n=173)
Your home's energy use compared to that of similar homes	66% (n=183)	59% (n=173)
Customized suggestions for your home	60% (n=183)	66% (n=172)

<sup>14</sup> The implementation of a treatment-only survey, in addition to a primary survey provided to both treatment and control customers, afforded an opportunity to test the responses of treatment customers to a question asking about a MyHER feature they have actually seen vs. asking generally about how useful the information is (outside of the context of MyHER). This test leads us to the conclusion that the way customers are asked about this question matters and we recommend that in future surveys, MyHER treatment customers see questions about report content placed specifically in the context of them having seen the content in their reports, as opposed to in the hypothetical.

**Table 4-22: Usefulness or Hypothetical Usefulness of HER Features Treatment and Control - DEP**

HER Feature	Control Group_Primary Survey	Treatment Group_Treatment Only Survey
Tips to help you save money and energy*	73% (n=188)	64% (n=146)
Graphs that display your home's energy use over time	72% (n=185)	73% (n=147)
Information about services and offers from Duke Energy**	68% (n=186)	54% (n=145)
Examples of the energy use associated with common household items	67% (n=184)	60% (n=146)
Comparison to similar homes***	66% (n=183)	46% (n=146)
Customized suggestions for your home	60% (n=183)	54% (n=147)

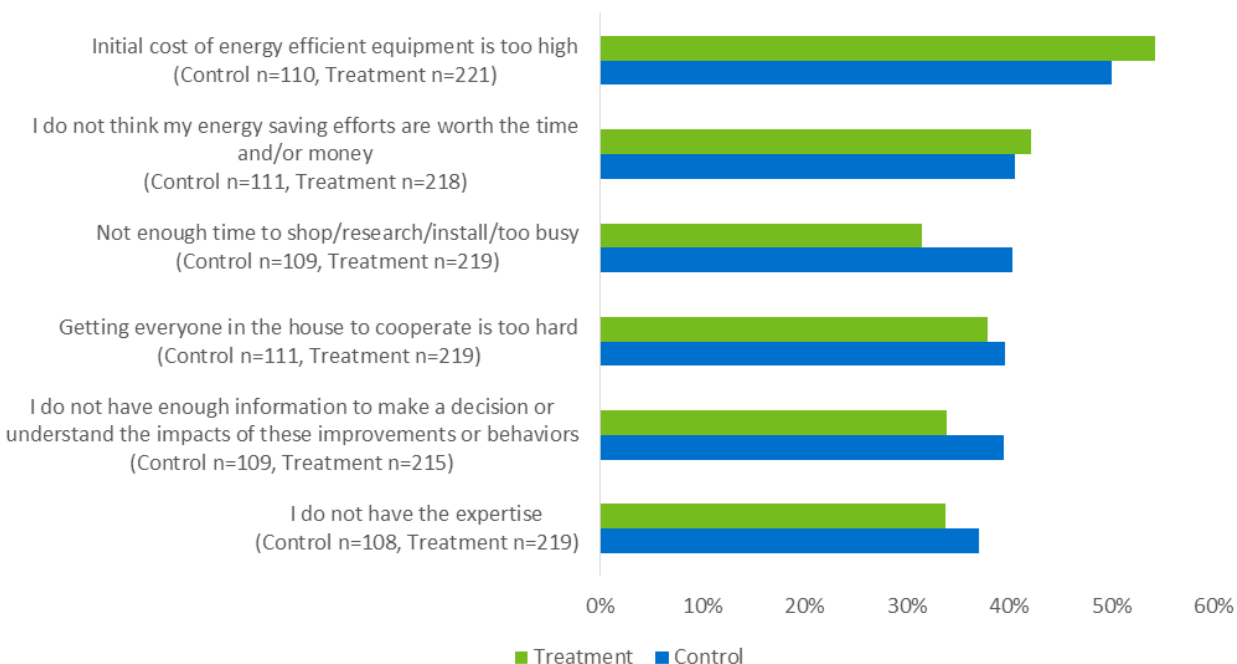
\*statistically significant, p=0.073

\*\*statistically significant, p=0.014

\*\*\*statistically significant, p=0.000

### Barriers to Customers Undertaking Energy Savings Actions

When asked the reasons why customers might not be able to save as much as energy as they would like, there were no statistically different response patterns between treatment and control customers, which indicates that MyHER is not making a measurable change in the potential barriers mentioned in this survey. The most commonly reported barrier is “the initial cost of energy efficient equipment is too high” (Figure 4-32): 54% of treatment respondents reported this as a barrier and 50% of control respondents did so as well. The least-commonly cited barrier was lack of expertise: 34% of treatment customers cited lack of expertise as a barrier as did 37% of control customers. The differences are not statistically significant.

**Figure 4-32: Barriers to Customers Undertaking Energy Savings Actions - DEP**



## Suggestions about Duke Energy Improving Service Offerings

The survey provided an open-ended question to elicit suggestions about Duke Energy improving its service offerings to help customers reduce energy use. Only 22% (116 of 539, treatment and control customers in total) offered suggestions, including fourteen who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 44 of the 116 with suggestions, reflected a desire for more energy savings information, programs, free light bulbs, and more incentives:

- *“They can make available those light bulbs, to us senior citizens that don't use computers. So we can order them”*
- *“Suggestions how to improve energy and reduce bill”*
- *“home energy inspections and a list of energy saving products that can be used to lower monthly costs”*
- *“Provide information regarding the amount of energy it takes to run dishwashers, lamps, televisions...”*
- *“Provide more rebates for large ticket items”*

Other comments centered on other suggestions, such as better communication, reducing price/providing senior and disability discounts, etc. Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-23.

**Table 4-23: Suggestions about Duke Energy Improving Service Offerings - DEP**

Suggestion	Count	Percent of Respondents Mentioning (n=116)	Percent of Total Mentions (n=137)
Provide more energy savings information, programs, free light bulbs and more incentives	44	38%	32%
Better communication	26	22%	19%
Reduce price/provide senior and disability discounts	21	18%	15%
Miscellaneous	16	14%	12%
Appreciation	14	12%	10%
Express Frustration	10	9%	7%
Reduce power outages	4	3%	3%
Provide more detailed info in MyHER / offer MyHER to Townhomes / do more surveys	1	1%	1%
Improve website	1	1%	1%

## Evidence of MyHER Effects

As noted above, while formal statistical testing found a number of differences among treatment and control group households for individual questions, the Nexant team sought to understand if the overall pattern of survey responses differed among treatment and control households. To do this, we categorized each survey question by topic area and then counted any survey item in which the treatment households provided a more positive response than the control households. Table 4-24 presents the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category. A response is considered “favorable” if the treatment group gave a response that is consistent with the program objectives of MyHER.

**Table 4-24: Survey Response Pattern Index - DEP**

Question Category	Count of Questions where T>C	Number of Questions in Topic Area	Portion of Questions where T>C
Duke Energy's Public Stance on Energy Efficiency	3	3	100%
Customer Engagement with Duke Energy Website	2	5	40%
Customers' Reported Energy-saving Behaviors	10	11	91%
Customer's Reported Energy Efficiency Improvements Made	9	9	100%
Customer Motivation, Engagement & Awareness of Energy Efficiency	10	11	91%
Barriers of Customer Not Undertaking Energy Savings Actions	4	6	67%
Customer Satisfaction with Duke Energy	2	4	50%
<b>Total</b>	<b>40</b>	<b>49</b>	<b>82%</b>

Nexant's approach consists of the following logical elements:

- Assume the number of positive responses between treatment and control customers will be equal if MyHER lacks influence;
- Count the total number of topics and questions asked of both groups – there are seven topic areas and 49 questions;
- Note any item for which the treatment group outperformed the control group – the treatment group outperformed the control group in 40 questions, or 82% of the total questions;
- Since this value is more than 50% we can conclude that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey.
- Considering these five areas, calculate the probability that the difference in response patterns is due to chance, rather than an underlying difference in populations – 0% (p-

value = 0.000). Since this probability is less than 10%, we reject the null hypothesis (that the number of positive responses for treatment and control customers is equal) at the 90% level of confidence.

Because this analysis compares the response patterns between the treatment and control group, if the MyHER program did not influence customers, one would expect the treatment group to “score higher” on roughly half of the questions. In other words, if the MyHER is not influencing treatment group customers, there is a 50/50 chance that they will “outperform” the control group as many times as not. For a more detailed description of the index framework, see [Appendix G](#).

### Respondent Demographics

Majority of all respondents—93% of treatment group customers and 88% of control group customers—own their residence. This difference is statistically significant. More than half of households surveyed have two or fewer residents, but about 22% of treatment households and control households respectively, have four or more residents. There are no statistically significant differences in the distribution of age of homes assigned to the treatment and control groups (Figure 4-33) (chi-squared test).

**Figure 4-33: “In What Year Was Your Home Built?” - DEP**

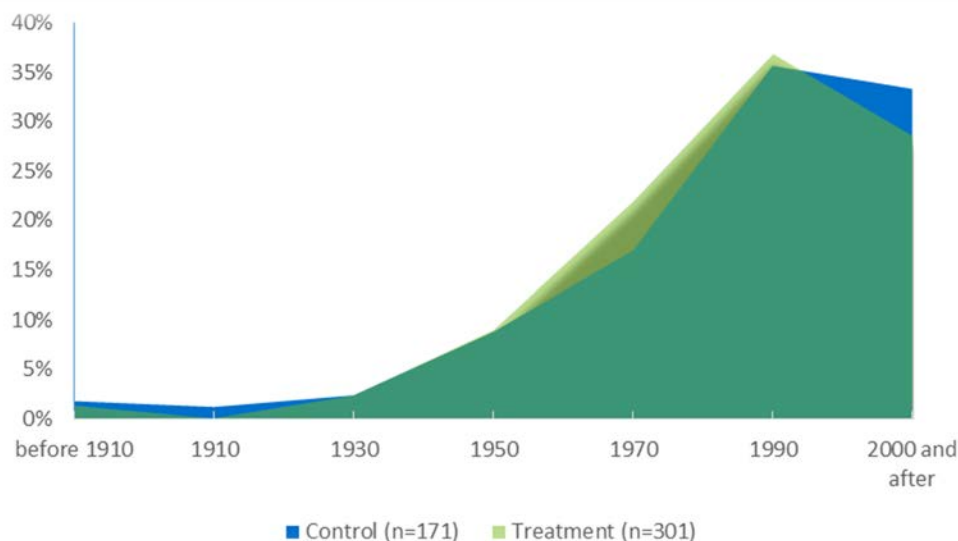
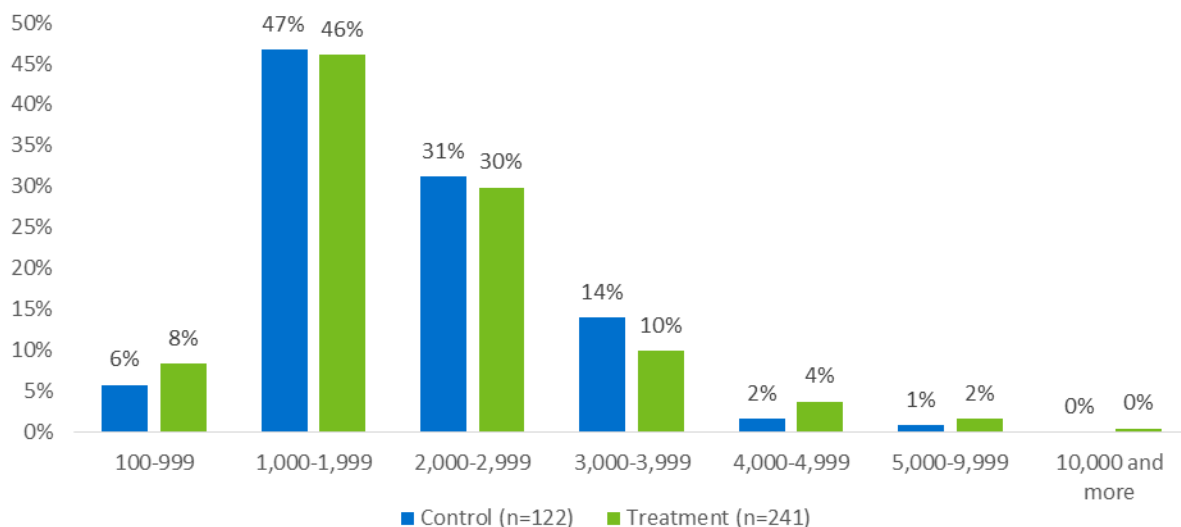


Figure 4-34 shows distribution of home square footage is similar between control and treatment households. The average square footage above ground is 2,022 for control households and 2,110 for treatment households.

**Figure 4-34: How many square feet is above ground living space? - DEP**

Respondent ages are relatively close to those reported by the U.S. Census American Community Survey (ACS) for Carolinas. The lowest age category (25-34) is often underrepresented when sampling based on residence in single family homes, given that many members of that population are in apartments, dormitories, or living with other family members. This common underrepresentation is true in this survey study, as well. The average age is 61 for control group respondents and 62 for treatment group respondents (see Table 4-25).

**Table 4-25: Respondent Age Relative to American Community Survey - DEP**

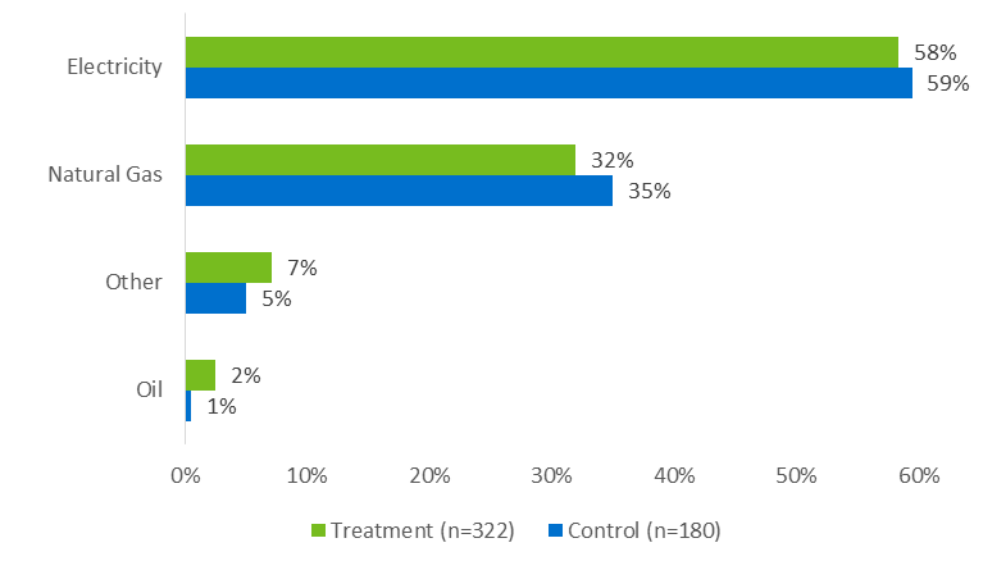
Age	Treatment Group (n=320)	Control Group (n=176)	2017 American Community Survey Carolinas <sup>15</sup>
25-34	3%	3%	13%
35-44	14%	9%	13%
45-54	19%	18%	13%
55-64	19%	26%	13%
65 and over	45%	44%	16%

Figure 4-35 shows the primary heating fuel type used in control and treatment customers' households. More than half of treatment (58%) and control (59%) customers use electricity in

<sup>15</sup> American Community Survey (ACS) is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_SPL\\_K200104&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_SPL_K200104&prodType=table)

their households for heating. Thirty-two percent of treatment customers and 35% of control customers use natural gas for heating.

**Figure 4-35: Primary Heating Fuel in Households - DEP**

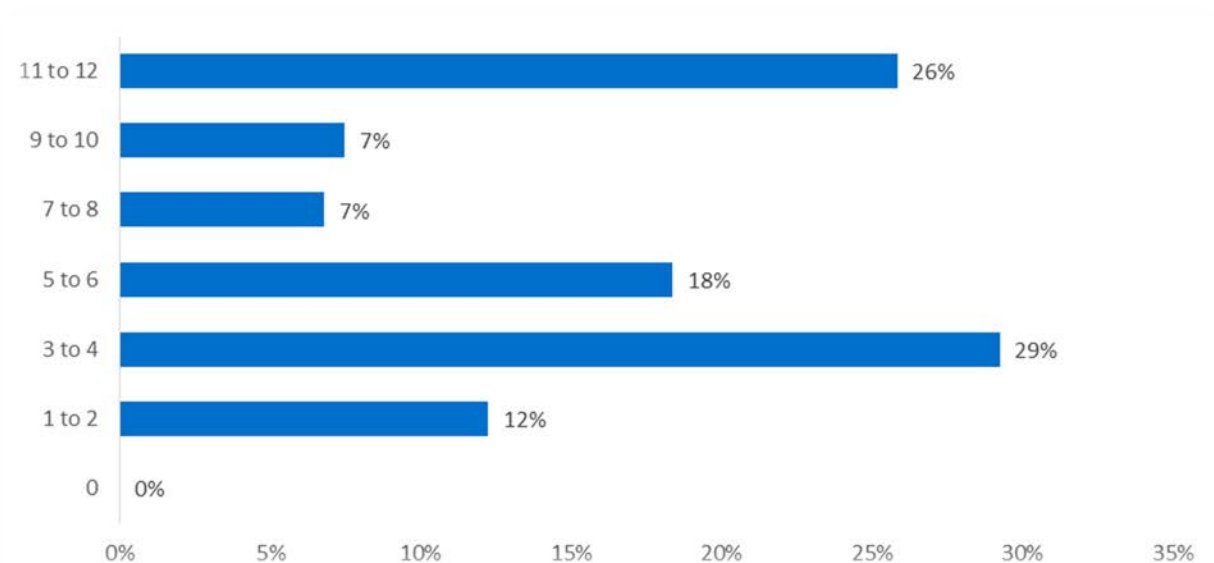


#### 4.2.3.2 Treatment Households: Experience and Satisfaction with MyHER - DEP

A large majority of treatment household respondents, 94%, (160 of 170) recalled receiving at least one of the MyHER reports.

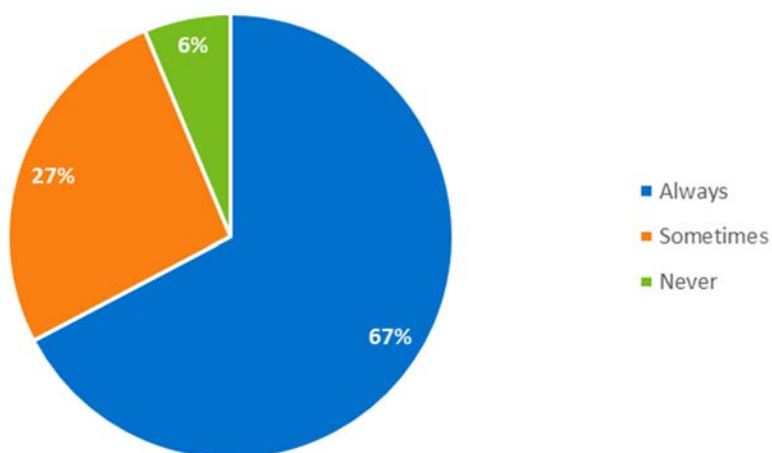
The survey asked those that could recall receiving at least one MyHER report if they could recall how many individual reports they had received “in the past 12 months” (Figure 4-36). The survey launched in January 2019, which means that most recipients would have received 8 MyHERs in the year since February 2018. Twenty-six percent (38 of 147) responded that they received 11 to 12 home energy reports in the past 12 months. The scattered distribution of responses related to recall is consistent with the difficulty of recalling an exact number of reports, however the question is valuable for grounding respondents in the experience of receiving a MyHER before asking them more specific questions about the document.

**Figure 4-36: Reported Number of MyHERs Received “In the past 12 months” (n=147) - DEP**



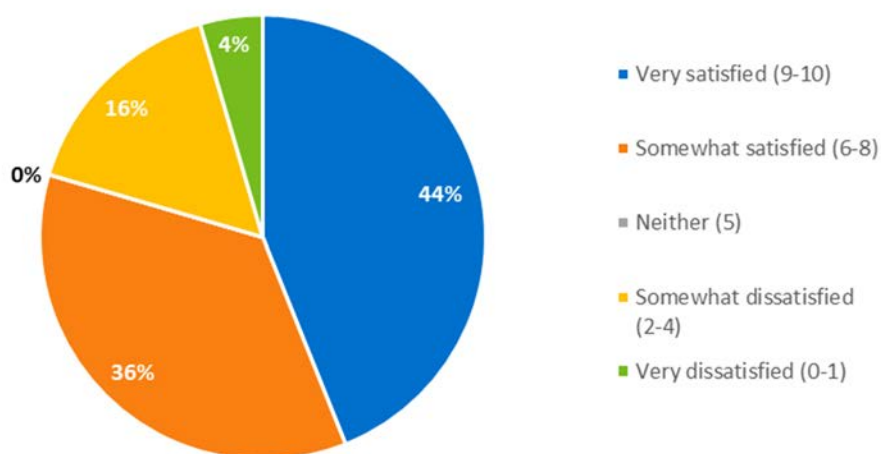
Survey respondents indicated high interest in the MyHER reports. As shown in Figure 4-37, when asked how often they read the reports, 94% of respondents indicated they “always” or “sometimes” read the reports. Ten respondents (6%) indicated they do not read the reports.

**Figure 4-37: How Often Customers Report Reading the MyHER (n=159) - DEP**



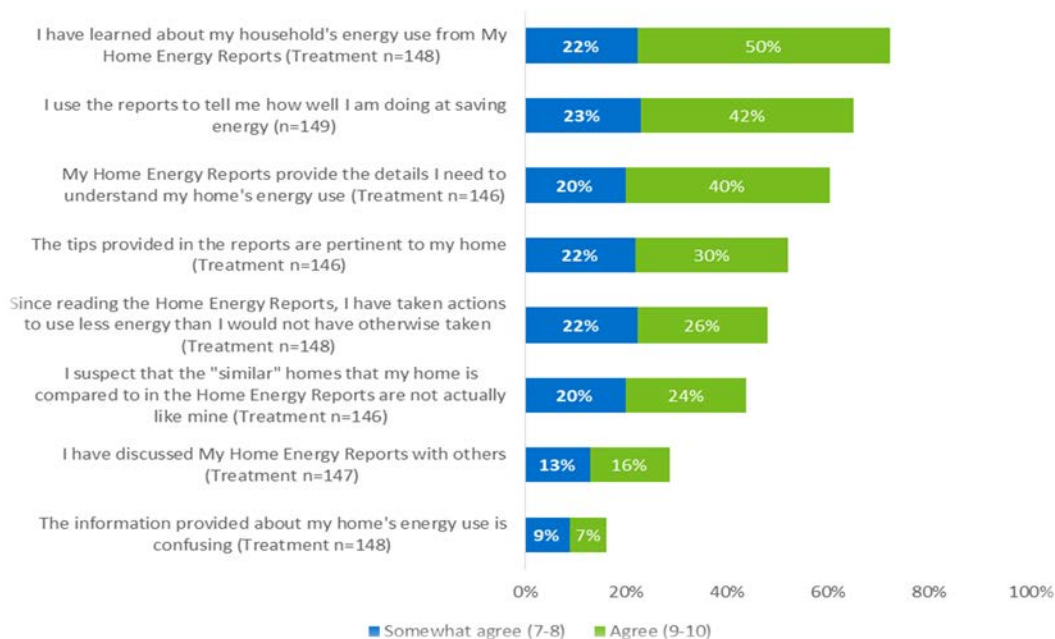
Eighty percent (105 of the 132 respondents that provided a rating) reported being “somewhat” or “very” satisfied with the information contained in the reports (Figure 4-38). The survey asked a further question to the respondents of why they said so: sixty-two of the satisfied respondents provided reasons. Among customers who gave the highest satisfaction ratings, the most common comments on the MyHERs described the reports’ ability to engage the customer and provide greater awareness. The customers who reported being somewhat satisfied most often simply described the reports as “useful.”

**Figure 4-38: Satisfaction with the Information in MyHER Reports (n=132) - DEP**



When asked to rate their agreement with a series of statements about MyHERs on a scale of 0 to 10, recipients largely agreed that the reports helped them understand their home’s energy use, with 72% of respondents rating their agreement a seven or higher on a 0-10 point scale, and that they use the report to gauge how successful they are at saving energy (65% rating a seven or higher). Sixty percent of respondents agreed that the reports provided the details they needed to understand their home’s energy usage. Respondents provided weaker agreement to statements about the pertinence of the tips provided to their homes and whether they have taken actions to use less energy than they would not have since reading MyHERs. A relatively small percentage (16%) agreed with the statement that the information provided is confusing. (Figure 4-39).



**Figure 4-39: Level of Agreement with Statements about MyHER (0-10 Scale) - DEP**

The survey provided an open-ended question to elicit suggestions about potential improvements to MyHER among those that had reported reading at least one report. Only 43% (64 of 149) offered suggestions, including six who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 23 of the 64 with suggestions, reflected a desire for more specific information or details about their home and specific actions they should take. Some of these requests reflected interest in understanding at a more granular level how their home uses energy and energy consumption information related to appliances:

- *"How is energy distributed amongst outlets, appliances, etc."*
- *"More specific about what electronics use the most energy so I can lower the usage"*
- *"Hours of use, including hours of the day, compare to previous months and or years"*
- *"Maybe by specifying where exactly do we need to focus in order to bring the bill payment down"*
- *"Provide size and age of houses compared to"*

Other comments centered on other suggestions (such as providing free energy assessment, etc.), disbelief in the relevance of comparison homes, and a few respondents that simply did not see value in the reports. Responses coded as recommending production changes focus on changing the delivery method of MyHER reports as follows:

- *"Make all these energy reports available online, so that consumer can view it any time"*
- *"Make it available online..."*

Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-26.

**Table 4-26: Distribution Suggestions for Improvement (Multiple Responses Allowed) - DEP**

Suggestion	Count	Percent of Respondents Mentioning (n=64)	Percent of Total Mentions (n=75)
Provide more specific information or details	23	36%	31%
Don't believe comparison/accuracy	16	25%	21%
Other suggestions (such as providing information on solar panels, etc.)	8	13%	11%
Appreciate the Home Energy Report	9	14%	12%
Address unique home/circumstances	5	8%	7%
Expressed frustration	5	8%	7%
Provide discounts/incentives/equipment upgrades	5	8%	7%
Change production (mail, paper, format)	3	5%	4%
Don't see value/dislike	1	2%	1%

Treatment households were also asked questions that focused on the awareness and use of MyHER Interactive, revealing low awareness of the online Interactive platform:

- Only 35% of treatment customers are aware of MyHER Interactive;
- Among aware customers, 86% reported that they had not signed up to use MyHER Interactive; and
- When asked why they haven't signed up to use MyHER Interactive, 23% of respondents reported that they were very busy, 23% reported that they were not interested in it, 18% reported that they did not have either a computer or internet access, and another 10% reported that they actually did not know about it.

### 4.3 Summary of Process Evaluation Findings

In-depth interviews with MyHER implementation staff reveal that the DEP and DEC MyHER program has benefited from a number of enhancements to the program and improvements in process and program management, and continues to operate effectively. Electronic MyHERs are now sent via email to all treatment customers that have provided Duke Energy with an email address. This enhancement means that report production is now a year-round process since the email reports are sent on a monthly basis for each month of the year. The MyHER report template was also refreshed to increase visual appeal and value to the customer. The new template includes the addition of a module that presents energy usage disaggregated by end-use category, on a looking-forward basis for the month ahead. Also, the template update

included the addition of images to the free form text (FFT) module of the reports. Lastly, the content and graphics of the email template was changed. There has also been increased enrollment for the MyHER Interactive online portal, which is emerging as a priority for Duke Energy and Tendril. The MyHER user experience is expected to be further enhanced in the future as the rollout of AMI meters and increased availability of AMI data continues.

From the backoffice perspective, Tendril, Duke Energy's MyHER program provider, implemented a number of process improvements. Tendril migrated their computational platform to Amazon Web Services (AWS), significantly reducing the time required to process data and generate batches of reports, and developed a pre-production platform to enable Duke Energy to review PDF drafts of MyHERs prior to promotion into production, which realized process efficiencies for Tendril. Additionally, Tendril has made progress on updating the "action tips" section of the report to "smart actions", by introducing the ability for these tips to be targeted to particular groups of MyHER recipients for which the tips are most appropriate. To date, roughly 20% of these tips are now "smart actions". Tendril also transitioned email MyHER production to Hypertext Markup Language (HTML) format to provide greater flexibility in Tendril's production processes.

Duke Energy and Tendril continue to collaborate for success through joint weekly status meetings, monthly operations meetings, and quarterly governance meetings. Working together, monthly key performance indicators (KPIs) such as in-home dates and percentage of treated customers treated are monitored. These meetings provide the venue for brainstorming and roadmapping activities as well as monitoring Duke Energy's MyHER product request list. This list is a priority for Duke Energy, and currently tracks about 25 items. Tendril has implemented an internal HER Improvement team to address the items on the list, and has made progress in this endeavor. Since the prior evaluation, Tendril has improved their performance in product quality, which is rigorously monitored by Duke Energy staff. These improvements have been attributed to a stable operations team at Tendril which has also expanded to include a quality control engineer. This engineer has designed and implemented automated QC checks, using AWS and other software, that have reduced errors in report production, increased the speed of the process, and reduced the staff necessary to manage it. This process will continue to change in 2019, as Tendril implements their HOMERS platform, allowing for increased efficiency in report production and quality control, as well as the implementation of the "self-serve" FFT tool that will eventually allow Duke Energy to produce and manage FFT content. This tool will eliminate the need for the highly resource-intensive collaboration procedure that has characterized FFT content production to this point.

Additionally, Tendril has also adopted a "Batch 0" strategy to implement significant changes to the MyHER reports on a test batch of data prior to producing a live batch to be mailed to customers. Batch 0 reports are tested for quality by both Tendril and Duke Energy and have allowed unexpected problems to be surfaced early and also to allow Duke Energy to fine tune the newly implemented changes. Improved product quality has resulted in fewer problems turning up in the quality control process.

In general, there was a strong emphasis on the development of procedures and strategies to prevent problems in the MyHER production process including a redesigned QC process, progress on the product request list, the management of messaging calendars, and the preparation for the rollout of HOMERS.

Though there has been continued success in communications and data transfers, there were some problems emerging from the process of reconciling customer email lists that resulted in the loss of emails that had been updated by Duke Energy customers, as well as some difficulty that Tendril experienced with importing AMI data from Duke Energy. The latter problem is being remedied with the implementation of a new data ingester, while the former is being addressed by a procedural change until the reconciliation process is automated. Other areas that were noted for potential improvement include improving the MyHER login requirements and Interactive profile questionnaire. The latter improvement is to address a larger concern among customers that the disaggregated energy use figures are not accurate.

### Survey Findings - DEC

Surveys of DEC treatment and control customers show that, among treatment group households:

- 93% recalled receiving at least one MyHER and 99% of those indicated that they “always” or “sometimes” read the reports.
- 87% reported being “very” or “somewhat” satisfied with the information provided by MyHERs.
- Only 28% of MyHER recipients are aware of MyHER Interactive, and only 8% of the aware recipients report that they have signed up to use it. When asked why they haven’t signed up to use MyHER Interactive, 30% of respondents reported that they were too busy, 22% reported that they were not interested in it, and 9% further reported that they did not know about it.
- Seventy-one percent of respondents strongly agree with the statement “I have learned about my household’s energy use from My Home Energy Reports”. Very few (12%) strongly agree with the idea that the energy usage information presented by the reports is confusing.
- The most useful features of the reports, as rated by treatment customer respondents, are the graphs that illustrate the home’s energy usage over time. The least useful-rated feature is customized suggestions for homes.
- 44% of treatment customers reported that MyHERs spurred them to undertake energy saving actions that they would not otherwise have done.
- Most (72%) respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently questioned the accuracy of the comparison, and requested more specific or detailed information in their MyHERs.

In comparing responses of treatment and control group respondents, there were a number of areas where treatment customers provided responses that more favorably reflected increased

awareness, engagement, or attitudes towards energy savings opportunities and actions relative to control customers:

- Treatment customers are significantly more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (73% to 63%).
- Treatment group respondents were significantly more likely to have engaged in 7 (out of 10) energy saving behaviors and 1 (out of 9) energy efficiency improvement than control respondents.

An index designed to account for overall survey-wide differences in response patterns found a more positive response pattern (31 positive responses out of a total of 49 questions) for treatment customers in simple frequencies across many facets of the survey. Using standard statistical techniques (specifically, the non-parametric sign test), Nexant calculates the probability of randomly obtaining positive results for 31 of 49 questions is 2% and is not likely due to chance. We conclude that exposure to MyHER is positively affecting customer awareness of, engagement in, and attitudes towards energy savings opportunities and actions. MyHER is also implemented with the goal of increasing customer satisfaction with Duke Energy and its stance on Energy Efficiency. These survey results do not show evidence of a measurable uplift in satisfaction in DEC that can be attributed to MyHER.

### Survey Findings - DEP

Surveys of DEP treatment and control customers show that, among treatment group households:

- 94% recalled receiving at least one MyHER and 94% of those indicated that they “always” or “sometimes” read the reports.
- 80% reported being “very” or “somewhat” satisfied with the information provided by MyHERs.
- Only 35% of MyHER recipients are aware of MyHER Interactive, and only 14% of the aware recipients report that they have signed up to use it. When those who hadn't signed up for MyHER Interactive were asked why, 23% of respondents reported that they were too busy, 23% reported that they were not interested in it, 18% reported that they did not have either a computer or internet access, and another 10% reported that they actually did not know about it.
- 48% of treatment-only group members reported that MyHERs spurred them to undertake energy saving actions that they would not otherwise have done.
- Seventy-two percent of respondents agree with the statement: “I have learned about my household’s energy use from My Home Energy Reports”. Few (16%) strongly agree with the idea that the energy usage information presented by the reports is confusing.
- The most useful features of the reports, as rated by treatment customer respondents, are the graphs that illustrate the home’s energy usage over time. The least useful-rated feature is comparison to similar homes.

- More than half (57%) of respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently reflected a desire for more specific information or details about their home and specific actions they should take in their MyHERs.

In comparing responses of treatment and control group respondents, there were a number of areas where treatment customers provided responses that more favorably reflected increased awareness, engagement, or attitudes towards energy savings opportunities and actions relative to control customers:

- Treatment customers significantly more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (71% to 60%).
- Treatment group respondents were significantly more likely to have engaged in 5 (of 10) energy saving behaviors and 5 (of 9) energy efficiency improvements than control respondents.
- Treatment group respondents reported significantly higher levels of satisfaction with the information Duke Energy makes available about energy efficiency programs, with the information Duke Energy provides to help customers save on energy bills, and with Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.

An index designed to account for overall survey-wide differences in response patterns finds a more positive response pattern for treatment customers in simple frequencies across the entire survey. Thirty-six out of 40 questions show more favorable responses for the treatment group. Using standard statistical techniques (specifically, the non-parametric sign test), Nexant calculates the probability of randomly obtaining this result is nearly 0% and thus extremely likely due to chance. We conclude that exposure to MyHER is increasing awareness of, engagement in, and attitudes towards energy savings opportunities of treatment customers relative to control customers.



## 5 Conclusions and Recommendations

Nexant finds that the MyHER program is an effective channel for increasing customer engagement with energy efficiency and demand side management. The RCT program design facilitates reliable estimates of program energy savings. Further, the energy savings generated by the program are corroborated by survey findings of respondent awareness of, engagement in, and focus on the importance of saving energy. As an additional benefit, Nexant finds that MyHER is a useful tool for enhancing Duke Energy and increases uptake in other Duke Energy efficiency programs. The MyHER program has achieved full deployment among Duke Energy Carolinas and Progress single-family home customers and Nexant recommends that Duke Energy continue to focus on program processes and operations to further increase the efficiency of program delivery.

Duke Energy also launched the MyHER Interactive portal in March 2015. The portal offers additional means for customers to customize or update Duke Energy's data on their premises, demographics, and other characteristics that affect consumption and the classification of each customer. The portal also provides additional custom tips based on updated data provided by the customer. MyHER Interactive sends email challenges to portal users that seek to engage customer in active energy management, additional efficiency upgrades, and conservation behavior. Nexant evaluated the impacts of the MyHER Interactive portal using a matched comparison group because the MyHER Interactive portal was not deployed as a randomized controlled trial (RCT).

### 5.1 Impact Findings

Nexant estimates that the MyHER program saved a total of 292.2 GWh at Duke Energy Carolinas and 141.1 GWh at Duke Energy Progress during the period June 2017 to May 2018. The confidence and relative precision of the estimate is 90% and 6.4%, respectively for DEC and 9.4% for DEP. This impact estimate accounts for the fact that MyHER increases uptake of other Duke Energy programs; 6.0 kWh has been subtracted from the average household program impact to account for the MyHER uplift in other programs in both DEC and DEP. Without such a correction, those savings (6.0, kWh per household per year) would be double counted by Duke Energy.

Nexant estimates that DEC customers that sign up to use the MyHER Interactive Portal saved an additional 21 kWh per month, representing an additional 1.6% in energy savings during the period June 2017 to May 2018. These savings are statistically significant at the 90% level of confidence and are incremental, or over and above the savings that MyHER alone delivers. However, only a relatively small group of DEC MyHER recipients are signed up to use the portal, as of May 2018 38,190 DEC customers are Interactive users, out of 1,151,896 DEC MyHER recipients overall. It's important to note that since MyHER Interactive portal customers volunteered to participate in the portal product, their savings may not represent the expected



savings if all customers were assigned to the portal product by default. DEP MyHER participants do not generate statistically significant energy savings during the period June 2017 to May 2018.

## 5.2 Process Findings

The DEP and DEC MyHER programs are Duke Energy's most mature behavioral programs in terms of delivered energy savings in each jurisdiction. The large volume of data required to generate MyHER and support the program delivery schedule is the primary driver of program activities and focus. Duke Energy and its implementation contractor, Tendril, are successfully managing this process and providing DEP and DEC customers' valuable information for managing home energy consumption.

The DEP and DEC MyHER programs have benefited from a number of process and product management improvements. Careful change management and a stable operations team at Tendril have been key enablers of maintaining a production process that consistently meets MyHER quality control standards.

MyHER participants have been found in this evaluation's customer surveys to display higher levels or incidence of a number of energy savings behaviors, opinions, attitudes, and engagement with energy efficiency. MyHER is also positively affecting customer's perception of Duke Energy's public stance on energy efficiency for DEP, and some aspects of customers' monitoring and tracking household energy consumption habits in both DEC and DEP.

## 5.3 Program Recommendations

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective statuses in a single billing month, to the extent that is technically feasible.
- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.
- **Increase MyHER participant awareness of Interactive.** The process evaluation finds that current awareness of Interactive among DEP and DEC MyHER participants is very low, so another program objective above actual engagement with Interactive is to more effectively get the word out about its existence.
- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other

Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.

- **Continue to operate MyHER with an eye towards change management.** MyHER's implementer Tendril has made great strides in improving quality control performance since the prior evaluation in the automating of this process. Effective change management and stable staffing have been notable contributors to these improvements and they should continue to be emphasized in MyHER program operations, especially as Tendril's new HER production platform, HOMERS (the Home Energy Reporting Service), is rolled out and its implementation is optimized.
- **Continue to prioritize the structuring of the processes and schedules for program elements.** This organization of tasks for elements such as the FFT report module has been a significant success in the operations of the MyHER program and has made reactive responses to impending deadlines and emergent challenges that characterized these operations in the past much less common. Program staff should seek out additional opportunities for the optimization of program schedules, tasks, and long term goals in this manner.

## Appendix A Summary Forms

### MyHER Carolinas Completed EMV Fact Sheet

#### Description of program

Duke Energy offers the My Home Energy Report (MyHER) to residential customers. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to a peer group of similar homes.

Date	July 10, 2019
Region(s)	Carolinas
Evaluation Period	June 2017 – May 2018
Annual kWh Savings	292,174,507 kWh (Report) 7,378,007 kWh (Portal)
Per Participant kWh Savings	247.7 kWh/home (Report) 255.1 kWh/home (Portal)
Coincident kW Impact	0.069 kW/home (Report) 0.071 kW/home (Portal)
Net-to-Gross Ratio	Not Applicable
Process Evaluation	Yes
Previous Evaluation(s)	2017 – Nexant 2014 – TecMarket Works

#### Evaluation Methodology

##### Impact Evaluation Activities

- Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.
- The impact estimate is based on monthly billing data and program participation data provided by Duke Energy.
- The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program.

##### Impact Evaluation Findings

- Realization rate = 108% for energy impacts; 247.7 kWh per home (Report)

##### Process Evaluation Activities

- 337 surveys of treatment customers, 211 surveys for control group customers and staff interviews.

##### Process Evaluation Findings

- 93% of MyHER recipients recall receiving the reports.
- 87% of MyHER recipients are “very” or “somewhat” satisfied with the information provided by the reports.
- 28% of MyHER recipients are aware of MyHER Interactive.
- MyHER produces an uplift in customer awareness of, engagement in, and attitudes towards energy savings opportunities and actions

## MyHER Progress

### Completed EMV Fact Sheet

Duke Energy offers the My Home Energy Report (MyHER) to residential customers. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to a peer group of similar homes.

Date	July 10, 2019
Region(s)	Progress
Evaluation Period	June 2017 – May 2018
Annual kWh Savings	141,099,476 kWh
Per Participant kWh Savings	201.2 kWh/home
Coincident kW Impact	0.071 kW/home
Net-to-Gross Ratio	Not Applicable
Process Evaluation	Yes
Previous Evaluation(s)	2017 – Nexant

## Evaluation Methodology

### Impact Evaluation Activities

- Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.
- The impact estimate is based on monthly billing data and program participation data provided by Duke Energy.
- The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program.

### Impact Evaluation Findings

- Realization rate = 137% for energy impacts; 201.2 kWh per home

### Process Evaluation Activities

- 347 surveys of treatment customers, 192 surveys for control group customers and staff interviews.

### Process Evaluation Findings

- 94% of MyHER recipients recall receiving the reports.
- 80% of MyHER recipients are “very” or “somewhat” satisfied with the information provided by the reports.
- 35% of MyHER recipients are aware of MyHER Interactive.
- MyHER produces an uplift in customer awareness of, engagement in, and attitudes towards energy savings opportunities and actions

## Appendix B Measure Impact Results

Table B-1: DSMore Measure Impact Results

Measure Category	Prod Code	Jurisdiction	Gross Energy Savings (kWh)	Gross Summer Coincident Demand (kW)	Gross Winter Coincident Demand (kW)	Net to Gross Ratio	Net Energy Savings (kWh)	Net Summer Coincident Demand (kW)	Net Winter Coincident Demand (kW)	Measure Life
NC_ My Home Energy Report	HECR	DEC	248	0.0691	N/A	100%	248	0.0691	N/A	1
MyHER Interactive		DEC	255	0.0712	N/A	100%	255	0.0712	N/A	1
NC_ My Home Energy Report	HECR	DEP	201	0.0712	N/A	100%	201	0.0712	N/A	1

## Appendix C Survey Instruments

### Primary Survey

Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.

Not at all Satisfied						Completely Satisfied					
0	1	2	3	4	5	6	7	8	9	10	

Q2. Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.

	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied
The information available about Duke Energy's efficiency programs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The information Duke Energy provides to help customers save on energy bills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q3. Have you logged in to your Duke Energy account to do any of the following? Check all that apply.

- ☐ I have never logged in
- ☐ Pay my bill
- ☐ Review energy consumption graphs
- ☐ Look for energy efficiency opportunities or ideas
- ☐ None of the above

Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.

- ☐ Monthly
- ☐ Once a year
- ☐ A few times a year
- ☐ Never

Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?

Not at all Likely						Extremely Likely					
0	1	2	3	4	5	6	7	8	9	10	

Q6. How important is it for you to know if your household is using energy wisely?

Not at all Important						Extremely Important					
0	1	2	3	4	5	6	7	8	9	10	

Q7. How would you rate your knowledge of the different ways you can save energy in your home?

Not at all Knowledgeable						Extremely Knowledgeable					
0	1	2	3	4	5	6	7	8	9	10	



Q8. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?

☐ Yes

☐ No – **Skip to Q12**

Q9. Which actions have been taken?

	Yes	No	Don't Know
Adjusted heating or cooling settings to save energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduced water heater temperature to save energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash clothes in cold water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fully load clothes washer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fully load dishwasher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turn off lights in unused or outdoor areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unplug or shut down household electronics when not in use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintain heating or cooling equipment for more efficient operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use a portable fan or ceiling fan for cooling instead of an air conditioner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify:			
Other, please specify:			

Q10. Which energy efficiency improvements have been made?

	Yes	No	Don't Know
Install energy-efficient kitchen or laundry appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install energy-efficient heating/cooling equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install energy-efficient water heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Replace windows or doors with more energy-efficient types	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caulk or weatherstrip (windows or doors)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Add insulation to attic, walls, or floors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install energy-efficient lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install programmable thermostat or "smart" thermostat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchase ENERGY STAR certified home electronic equipment (a television, for example)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





Q15. Please indicate your level of agreement with each of the following statements:

	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
Duke Energy provides excellent customer service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Duke Energy respects its customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Duke Energy provides service at a reasonable cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?

☐ Yes

☐ No – **Skip to Q17**

Q16a. How many **free** light bulbs have you ordered through the Duke Energy website this year? \_\_\_\_\_

Q16b. How many **discounted** light bulbs have you ordered through the Duke Energy website this year? \_\_\_\_\_

Q17. How could Duke Energy improve upon its service offerings to help you reduce your energy usage?

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Q18. Do you own or rent this residence? ☐ Own ☐ Rent

Q19. Including yourself, how many people live in your home? \_\_\_\_\_

Q20. In what year was your home built? \_\_\_\_\_

Q21. How many square feet is the above-ground living space? \_\_\_\_\_

Q22. What is your primary heating fuel? ☐ Electricity ☐ Natural Gas ☐ Oil ☐ Other

Q23. In what year were you born? \_\_\_\_\_

**Thank you! Please return your completed survey using the enclosed envelope.**

NEXID

## Treatment-only Survey

Q1. Duke Energy sends a personalized report called *My Home Energy Report* to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?

☐ Yes

☐ No – **Skip to Q13**

Q2. About how many *My Home Energy Reports* have you received in the past 12 months? \_\_\_\_ **If zero, skip to Q13**

Q3. How often do you read the *My Home Energy Reports*?

☐ Always

☐ Sometimes

☐ Never – **Skip to Q13**

Q4. How much do you agree or disagree with the following statements about *My Home Energy Reports*?

Scale: 0 = Strongly Disagree; 10 = Strongly Agree

	Strongly Disagree										Strongly Agree									
I have learned about my household's energy use from <i>My Home Energy Reports</i> .	0	1	2	3	4	5	6	7	8	9	10									
I use the reports to tell me how well I am doing at saving energy.	0	1	2	3	4	5	6	7	8	9	10									
The tips provided in the reports are pertinent to my home.	0	1	2	3	4	5	6	7	8	9	10									
<i>My Home Energy Reports</i> provide the details I need to understand my home's energy use.	0	1	2	3	4	5	6	7	8	9	10									
I have discussed <i>My Home Energy Reports</i> with others.	0	1	2	3	4	5	6	7	8	9	10									
The information provided about my home's energy use is confusing.	0	1	2	3	4	5	6	7	8	9	10									
I suspect that the "similar" homes that my home is compared to in the <i>Home Energy Reports</i> are not actually like mine.	0	1	2	3	4	5	6	7	8	9	10									
I like receiving the <i>Home Energy Reports</i> .	0	1	2	3	4	5	6	7	8	9	10									
Since reading the <i>Home Energy Reports</i> , I have taken actions to use less energy than I would not have otherwise taken.	0	1	2	3	4	5	6	7	8	9	10									

Q5. How could Duke Energy make *My Home Energy Reports* more useful for your household? Please provide any suggestions you may have to improve the reports.

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Q6. Please rate how useful each feature of the *Home Energy Report* is to you.

Scale: 0 = Not at all Useful; 10 = Extremely Useful

	Not at all Useful										Extremely Useful
Comparison to similar homes	0	1	2	3	4	5	6	7	8	9	10
Tips to help you save money and energy	0	1	2	3	4	5	6	7	8	9	10
Examples of the energy use associated with common household items	0	1	2	3	4	5	6	7	8	9	10
Customized suggestions for your home	0	1	2	3	4	5	6	7	8	9	10
Graphs that display your home's energy use over time	0	1	2	3	4	5	6	7	8	9	10
Information about services and offers from Duke Energy	0	1	2	3	4	5	6	7	8	9	10

Q7. Overall, how satisfied are you with the information in the *My Home Energy Reports* you've received?

Scale: 0 = Not at all Satisfied; 10 = Completely Satisfied

Not at all Satisfied										Completely Satisfied	
0	1	2	3	4	5	6	7	8	9	10	

Q7a. Why do you say that? \_\_\_\_\_

Q8. Are you aware that you can go online to *My Home Energy Interactive* to access more information, above and beyond that found in the *My Home Energy Report*, which describes more ways to save energy?

☐ Yes

☐ No – **Skip to Q9**

Q8a. Have you signed up to use *My Home Energy Interactive*?

☐ Yes

☐ No – **Skip to Q8c**

Q8b. How useful is *My Home Energy Interactive* to you for saving energy?

Scale: 0 = Not at all Useful; 10 = Extremely Useful

Not at all Useful										Extremely Useful	
0	1	2	3	4	5	6	7	8	9	10	

Q8c. Why haven't you signed up to use *My Home Energy Interactive*?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?

☐ Yes

☐ No – **Skip to Q13**

Q10. Which actions have been taken?

	Yes	No	Don't Know
Adjusted heating or cooling settings to save energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduced water heater temperature to save energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash clothes in cold water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fully load clothes washer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fully load dishwasher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turn off lights in unused or outdoor areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unplug or shut down household electronics when not in use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintain heating or cooling equipment for more efficient operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use a portable fan or ceiling fan for cooling instead of an air conditioner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify:			
Other, please specify:			

Q11. Which energy efficiency improvements have been made?

	Yes	No	Don't Know
Install energy-efficient kitchen or laundry appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install energy-efficient heating/cooling system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install energy-efficient water heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Replace windows or doors with more energy-efficient types	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caulk or weatherstrip (windows or doors)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Add insulation to attic, walls, or floors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install energy-efficient lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install programmable thermostat or "smart" thermostat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchase ENERGY STAR-certified home electronic equipment (a television, for example)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons? Scale: 0 = Not at all Important; 10 = Extremely Important

	Not at all Important										Extremely Important
Initial cost of energy efficient equipment is too high	0	1	2	3	4	5	6	7	8	9	10
Not enough time to shop/research/install /Too busy	0	1	2	3	4	5	6	7	8	9	10
I do not have the expertise	0	1	2	3	4	5	6	7	8	9	10
I do not have enough information to make a decision or understand the impacts of these improvements or behaviors	0	1	2	3	4	5	6	7	8	9	10
Getting everyone in the house to cooperate is too hard	0	1	2	3	4	5	6	7	8	9	10
I do not think my energy saving efforts are worth the time and/or money	0	1	2	3	4	5	6	7	8	9	10

Q13. Do you own or rent this residence? ☐ Own ☐ Rent

Q14. Including yourself, how many people live in your home? \_\_\_\_\_

Q15. In what year was your home built? \_\_\_\_\_

Q16. How many square feet is the above-ground living space? \_\_\_\_\_

Q17. What is your primary heating fuel? ☐ Electricity ☐ Natural Gas ☐ Oil ☐ Other

Q18. In what year were you born? \_\_\_\_\_

**Thank you! Please return your completed survey using the enclosed envelope.**

NEXID

## Appendix D Survey Frequencies: DEC

**PRI\_Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	2	1	0	1	2	11	6	24	37	40	86	1	211
Percent	1	0	0	0	1	5	3	11	18	19	41	0	100
Treatment	2	0	1	1	1	14	7	23	35	35	65	0	184
Percent	1	0	1	1	1	8	4	13	19	19	35	0	100
Total	4	1	1	2	3	25	13	47	72	75	151	1	395
Percent	1	0	0	1	1	6	3	12	18	19	38	0	100

**PRI\_Q2 Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.**

**PRI\_Q2\_1 The information available about Duke Energy's efficiency programs.**

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	No Response	Total
Control	86	72	38	6	7	2	211
Percent	41	34	18	3	3	1	100
Treatment	82	60	28	5	8	1	184
Percent	45	33	15	3	4	1	100
Total	168	132	66	11	15	3	395
Percent	43	33	17	3	4	1	100

**PRI\_Q2\_2 Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.**

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	No Response	Total
Control	93	66	35	8	7	2	211
Percent	44	31	17	4	3	1	100
Treatment	80	61	27	5	9	2	184
Percent	43	33	15	3	5	1	100
Total	173	127	62	13	16	4	395
Percent	44	32	16	3	4	1	100



**PRI\_Q2\_3 The information Duke Energy provides to help customers save on energy bills.**

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	No Response	Total
Control	93	76	23	11	5	3	211
Percent	44	36	11	5	2	1	100
Treatment	90	59	18	7	8	2	184
Percent	49	32	10	4	4	1	100
Total	183	135	41	18	13	5	395
Percent	46.33	34	10	5	3	1	100

**PRI\_Q3 Have you logged in to your Duke Energy account to do any of the following?  
Check all that apply.****PRI\_Q3\_1 I have never logged in**

Group	Not Checked	Checked	Total
Control	129	75	204
Percent	63	37	100
Treatment	115	65	180
Percent	64	36	100
Total	244	140	384
Percent	64	36	100

**PRI\_Q3\_2 Pay my bill**

Group	Not Checked	Checked	Total
Control	128	76	204
Percent	63	37	100
Treatment	116	64	180
Percent	64	36	100
Total	244	140	384
Percent	64	36	100

**PRI\_Q3\_3 Review energy consumption graphs**

Group	Not Checked	Checked	Total
Control	163	41	204
Percent	80	20	100
Treatment	146	34	180
Percent	81	19	100
Total	309	75	384
Percent	80	20	100

**PRI\_Q3\_4 Look for energy efficiency opportunities or ideas**

Group	Not Checked	Checked	Total
Control	172	32	204
Percent	84	16	100
Treatment	151	29	180
Percent	84	16	100
Total	323	61	384
Percent	84	16	100

**PRI\_Q3\_5 None of the above**

Group	Not Checked	Checked	Total
Control	171	33	204
percent	84	16	100
Treatment	149	31	180
percent	83	17	100
Total	320	64	384
percent	83	17	100

**PRI\_Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.**

Group	Monthly	Once a year	A few times a year	Never	No Response	Total
Control	14	18	48	130	1	211
Percent	7	9	23	62	0	100
Treatment	14	13	34	123	0	184
Percent	8	7	18	67	0	100
Total	28	31	82	253	1	395
Percent	7	8	21	64	0	100

**PRI\_Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	47	12	14	14	4	20	22	21	23	18	14	2	211
Percent	22	6	7	7	2	9	10	10	11	9	7	1	100
Treatment	46	10	9	10	7	27	8	13	20	12	22	0	184
Percent	25	5	5	5	4	15	4	7	11	7	12	0	100
Total	93	22	23	24	11	47	30	34	43	30	36	2	395
Percent	24	6	6	6	3	12	8	9	11	8	9	1	100

**PRI\_Q6. How important is it for you to know if your household is using energy wisely?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	2	1	3	3	11	19	26	40	34	70	1	211
Percent	0	1	0	1	1	5	9	12	19	16	33	0	100
Treatment	3	1	2	0	2	22	11	22	29	24	68	0	184
Percent	2	1	1	0	1	12	6	12	16	13	37	0	100
Total	4	3	3	3	5	33	30	48	69	58	138	1	395
Percent	1	1	1	1	1	8	8	12	17	15	35	0	100

**PRI\_Q7. How would you rate your knowledge of the different ways you can save energy in your home?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	2	0	8	6	6	31	19	43	48	26	21	1	211
Percent	1	0	4	3	3	15	9	20	23	12	10	0	100
Treatment	2	1	4	2	5	28	18	32	46	21	25	0	184
Percent	1	1	2	1	3	15	10	17	25	11	14	0	100
Total	4	1	12	8	11	59	37	75	94	47	46	1	395
Percent	1	0	3	2	3	15	9	19	24	12	12	0	100

***PRI\_Q8 & TRE\_Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?***

Group	Yes	No	No Response	Missing	Total
Control	129	77	5	0	211
Percent	61	36	2	0	100
Treatment	229	85	6	17	337
Percent	68	25	2	5	100
Total	358	162	11	17	548
Percent	65	30	2	3	100

***PRI\_Q9 & TRE\_Q10. Which actions have been taken?***

***PRI\_Q9\_1 & TRE\_Q10\_1. Adjusted heating or cooling settings to save energy***

Group	Yes	No	Don't Know	No Response	Total
Control	115	7	2	5	129
Percent	89	5	2	4	100
Treatment	213	13	1	2	229
Percent	93	6	0	1	100
Total	328	20	3	7	358
Percent	92	6	1	2	100

***PRI\_Q9\_2 & TRE\_Q10\_2. Reduced water heater temperature to save energy***

Group	Yes	No	Don't Know	No Response	Total
Control	41	75	6	7	129
Percent	32	58	5	5	100
Treatment	84	130	8	7	229
Percent	37	57	3	3	100
Total	125	205	14	14	358
Percent	35	57	4	4	100

***PRI\_Q9\_3 & TRE\_Q10\_3. Wash clothes in cold water***

Group	Yes	No	Don't Know	No Response	Total
Control	85	38	1	5	129
Percent	66	29	1	4	100
Treatment	170	51	5	3	229
Percent	74	22	2	1	100
Total	255	89	6	8	358
Percent	71	25	2	2	100

***PRI\_Q9\_4 & TRE\_Q10\_4. Fully load clothes washer***

Group	Yes	No	Don't Know	No Response	Total
Control	98	23	3	5	129
Percent	76	18	2	4	100
Treatment	192	29	5	3	229
Percent	84	13	2	1	100
Total	290	52	8	8	358
Percent	81	15	2	2	100

***PRI\_Q9\_5 & TRE\_Q10\_5. Fully load dishwasher***

Group	Yes	No	Don't Know	No Response	Total
Control	81	27	12	9	129
Percent	63	21	9	7	100
Treatment	168	43	12	6	229
Percent	73	19	5	3	100
Total	249	70	24	15	358
Percent	70	20	7	4	100

***PRI\_Q9\_6 & TRE\_Q10\_6. Turn off lights in unused or outdoor areas***

Group	Yes	No	No Response	Total
Control	121	7	1	129
Percent	94	5	1	100
Treatment	224	4	1	229
Percent	98	2	0	100
Total	345	11	2	358
Percent	96	3	1	100

***PRI\_Q9\_7 & TRE\_Q10\_7. Unplug or shut down household electronics when not in use***

Group	Yes	No	No Response	Total
Control	100	25	4	129
Percent	78	19	3	100
Treatment	170	55	4	229
Percent	74	24	2	100
Total	270	80	8	358
Percent	75	22	2	100

***PRI\_Q9\_8 & TRE\_Q10\_8. Maintain heating or cooling equipment for more efficient operation***

Group	Yes	No	Don't Know	No Response	Total
Control	104	11	5	9	129
Percent	81	9	4	7	100
Treatment	200	26	2	1	229
Percent	87	11	1	0	100
Total	304	37	7	10	358
Percent	85	10	2	3	100

***PRI\_Q9\_9 & TRE\_Q10\_9. Use a portable fan or ceiling fan for cooling instead of an air conditioner***

Group	Yes	No	Don't Know	No Response	Total
Control	88	35	3	3	129
Percent	68	27	2	2	100
Treatment	133	90	5	1	229
Percent	58	39	2	0	100
Total	221	125	8	4	358
Percent	62	35	2	1	100

***PRI\_Q9\_10 & TRE\_Q10\_10. Other, please specify:***

Group	Yes	No	Don't Know	No Response	Total
Control	32	30	41	26	129
Percent	25	23	32	20	100
Treatment	42	44	98	45	229
Percent	18	19	43	20	100
Total	74	74	139	71	358
Percent	21	21	39	20	100

***PRI\_Q9\_11 & TRE\_Q10\_11. Other, please specify:***

Group	Yes	No	Don't Know	No Response	Total
Control	8	48	44	29	129
Percent	6	37	34	22	100
Treatment	15	59	107	48	229
Percent	7	26	47	21	100
Total	23	107	151	77	358
Percent	6	30	42	22	100

***PRI\_Q10 & TRE\_Q11. Which energy efficiency improvements have been made?******PRI\_Q10\_1 & TRE\_Q11\_1. Install energy-efficient kitchen or laundry appliances***

Group	Yes	No	Don't Know	No Response	Total
Control	66	53	6	4	129
Percent	51	41	5	3	100
Treatment	120	101	6	2	229
Percent	52	44	3	1	100
Total	186	154	12	6	358
Percent	52	43	3	2	100

***PRI\_Q10\_2 & TRE\_Q11\_2. Install energy-efficient heating/cooling equipment***

Group	Yes	No	Don't Know	No Response	Total
Control	65	54	5	5	129
Percent	50	42	4	4	100
Treatment	104	113	10	2	229
Percent	45	49	4	1	100
Total	169	167	15	7	358
Percent	47	47	4	2	100

***PRI\_Q10\_3 & TRE\_Q11\_3. Install energy-efficient water heater***

Group	Yes	No	Don't Know	No Response	Total
Control	51	67	6	5	129
Percent	40	52	5	4	100
Treatment	88	128	10	3	229
Percent	38	56	4	1	100
Total	139	195	16	8	358
Percent	39	54	4	2	100

***PRI\_Q10\_4 & TRE\_Q11\_4. Replace windows or doors with more energy-efficient types)***

Group	Yes	No	Don't Know	No Response	Total
Control	39	83	1	6	129
Percent	30	64	1	5	100
Treatment	79	144	3	3	229
Percent	35	63	1	1	100
Total	118	227	4	9	358
Percent	33	63	1	3	100



***PRI\_Q10\_5 & TRE\_Q11\_5. Caulk or weatherstrip (windows or doors)***

Group	Yes	No	Don't Know	No Response	Total
Control	57	60	6	6	129
Percent	44	47	5	5	100
Treatment	111	111	3	4	229
Percent	48	48	1	2	100
Total	168	171	9	10	358
Percent	47	48	3	3	100

***PRI\_Q10\_6 & TRE\_Q11\_6. Add insulation to attic, walls, or floors***

Group	Yes	No	Don't Know	No Response	Total
Control	45	75	3	6	129
Percent	35	58	2	5	100
Treatment	69	147	4	9	229
Percent	30	64	2	4	100
Total	114	222	7	15	358
Percent	32	62	2	4	100

***PRI\_Q10\_7 & TRE\_Q11\_7. Install energy-efficient lighting***

Group	Yes	No	Don't Know	No Response	Total
Control	103	18	3	5	129
Percent	80	14	2	4	100
Treatment	186	40	2	1	229
Percent	81	17	1	0	100
Total	289	58	5	6	358
Percent	81	16	1	2	100

***PRI\_Q10\_8 & TRE\_Q11\_8. Install programmable thermostat or "smart" thermostat***

Group	Yes	No	Don't Know	No Response	Total
Control	64	56	4	5	129
Percent	50	43	3	4	100
Treatment	103	119	4	3	229
Percent	45	52	2	1	100
Total	167	175	8	8	358
Percent	47	49	2	2	100

***PRI\_Q10\_9 & TRE\_Q11\_9. Purchase ENERGY STAR certified home electronic equipment (a television, for example)***

Group	Yes	No	Don't Know	No Response	Total
Control	73	37	12	7	129
Percent	57	29	9	5	100
Treatment	128	85	13	3	229
Percent	56	37	6	1	100
Total	201	122	25	10	358
Percent	56	34	7	3	100

***PRI\_Q11 & TRE\_Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons?***

***PRI\_Q11\_1 & TRE\_Q12\_1. Initial cost of energy efficient equipment is too high***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	10	2	3	5	7	19	7	18	15	14	25	4	129
Percent	8	2	2	4	5	15	5	14	12	11	19	3	100
Treatment	14	8	8	7	8	39	8	21	33	16	65	2	229
Percent	6	3	3	3	3	17	3	9	14	7	28	1	100
Total	24	10	11	12	15	58	15	39	48	30	90	6	358
Percent	7	3	3	3	4	16	4	11	13	8	25	2	100

***PRI\_Q11\_2 & TRE\_Q12\_2. Not enough time to shop/research/install/too busy***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	20	3	7	7	3	23	9	15	10	9	16	7	129
Percent	16	2	5	5	2	18	7	12	8	7	12	5	100
Treatment	39	12	11	10	8	57	6	17	26	10	28	5	229
Percent	17	5	5	4	3	25	3	7	11	4	12	2	100
Total	59	15	18	17	11	80	15	32	36	19	44	12	358
Percent	16	4	5	5	3	22	4	9	10	5	12	3	100

***PRI\_Q11\_3 & TRE\_Q12\_3. I do not have the expertise***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	22	4	6	6	7	28	9	11	9	8	14	5	129
Percent	17	3	5	5	5	22	7	9	7	6	11	4	100
Treatment	41	12	8	12	9	57	13	21	14	11	28	3	229
Percent	18	5	3	5	4	25	6	9	6	5	12	1	100
Total	63	16	14	18	16	85	22	32	23	19	42	8	358
Percent	18	4	4	5	4	24	6	9	6	5	12	2	100

***PRI\_Q11\_4 & TRE\_Q12\_4. I do not have enough information to make a decision or understand the impacts of these improvements or behaviors***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	23	4	6	6	7	23	9	19	12	6	9	5	129
Percent	18	3	5	5	5	18	7	15	9	5	7	4	100
Treatment	40	6	14	9	9	48	20	16	22	5	35	5	229
Percent	17	3	6	4	4	21	9	7	10	2	15	2	100
Total	63	10	20	15	16	71	29	35	34	11	44	10	358
Percent	18	3	6	4	4	20	8	10	10	3	12	3	100

***PRI\_Q11\_5 & TRE\_Q12\_5. Getting everyone in the house to cooperate is too hard***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	26	6	3	7	6	22	8	6	7	5	25	8	129
Percent	20	5	2	5	5	17	6	5	5	4	19	6	100
Treatment	60	12	9	5	7	37	10	14	22	10	38	5	229
Percent	26	5	4	2	3	16	4	6	10	4	17	2	100
Total	86	18	12	12	13	59	18	20	29	15	63	13	358
Percent	24	5	3	3	4	16	5	6	8	4	18	4	100

***PRI\_Q11\_6 & TRE\_Q12\_6. I do not think my energy saving efforts are worth the time and/or money***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	23	9	5	5	8	20	6	4	12	8	23	6	129
Percent	18	7	4	4	6	16	5	3	9	6	18	5	100
Treatment	38	16	12	10	3	37	9	13	23	13	51	4	229
Percent	17	7	5	4	1	16	4	6	10	6	22	2	100
Total	61	25	17	15	11	57	15	17	35	21	74	10	358
Percent	17	7	5	4	3	16	4	5	10	6	21	3	100

***PRI\_Q12 Which of the following do you do with regard to your household's energy use? Check all that apply.******PRI\_Q12\_1 Track monthly energy use***

Group	Not Checked	Checked	Total
Control	116	91	207
Percent	56	44	100
Treatment	100	83	183
Percent	55	45	100
Total	216	174	390
Percent	55	45	100

***PRI\_Q12\_2 Track the total amount of your bill***

Group	Not Checked	Checked	Total
Control	64	143	207
Percent	31	69	100
Treatment	78	105	183
Percent	43	57	100
Total	142	248	390
Percent	36	64	100

***PRI\_Q12\_3 Compare usage to previous months***

Group	Not Checked	Checked	Total
Control	66	141	207
Percent	32	68	100
Treatment	62	121	183
Percent	34	66	100
Total	128	262	390
Percent	33	67	100

**PRI\_Q12\_4 Compare usage to the same month from last year**

Group	Not Checked	Checked	Total
Control	87	120	207
Percent	42	58	100
Treatment	83	100	183
Percent	45	55	100
Total	170	220	390
Percent	44	56	100

**PRI\_Q12\_5 None of the above**

Group	Not Checked	Checked	Total
Control	189	18	207
Percent	91	9	100
Treatment	153	30	183
Percent	84	16	100
Total	342	48	390
Percent	88	12	100

**PRI\_Q13. Thinking about the information you could have about your home's energy use, please rate how useful each of the following items would be for your household.**

**PRI\_Q13\_1. Your home's energy use compared to that of similar homes**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	17	5	5	11	4	34	10	27	22	21	46	9	211
Percent	8	2	2	5	2	16	5	13	10	10	22	4	100
Treatment	18	5	7	3	7	24	8	26	25	11	47	3	184
Percent	10	3	4	2	4	13	4	14	14	6	26	2	100
Total	35	10	12	14	11	58	18	53	47	32	93	12	395
Percent	9	3	3	4	3	15	5	13	12	8	24	3	100

**PRI\_Q13\_2. Tips to help you save money and energy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	5	2	2	3	7	32	16	24	26	24	64	6	211
Percent	2	1	1	1	3	15	8	11	12	11	30	3	100
Treatment	10	3	3	4	2	24	5	28	29	17	58	1	184
Percent	5	2	2	2	1	13	3	15	16	9	32	1	100
Total	15	5	5	7	9	56	21	52	55	41	122	7	395
Percent	4	1	1	2	2	14	5	13	14	10	31	2	100

**PRI\_Q13\_3. Examples of the energy use associated with common household items**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	6	2	5	2	9	31	12	27	25	21	63	8	211
Percent	3	1	2	1	4	15	6	13	12	10	30	4	100
Treatment	16	3	3	2	3	24	11	27	28	20	45	2	184
Percent	9	2	2	1	2	13	6	15	15	11	24	1	100
Total	22	5	8	4	12	55	23	54	53	41	108	10	395
Percent	6	1	2	1	3	14	6	14	13	10	27	3	100

**PRI\_Q13\_4. Customized suggestions for your home**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	13	1	10	7	9	35	14	22	16	19	54	11	211
Percent	6	0	5	3	4	17	7	10	8	9	26	5	100
Treatment	15	5	4	7	2	23	11	23	28	19	43	4	184
Percent	8	3	2	4	1	13	6	13	15	10	23	2	100
Total	28	6	14	14	11	58	25	45	44	38	97	15	395
Percent	7	2	4	4	3	15	6	11	11	10	25	4	100

**PRI\_Q13\_5. Graphs that display your home's energy use over time**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	11	2	7	3	2	25	10	26	30	19	69	7	211
Percent	5	1	3	1	1	12	5	12	14	9	33	3	100
Treatment	13	5	3	5	4	25	7	26	24	20	49	3	184
Percent	7	3	2	3	2	14	4	14	13	11	27	2	100
Total	24	7	10	8	6	50	17	52	54	39	118	10	395
Percent	6	2	3	2	2	13	4	13	14	10	30	3	100

**PRI\_Q13\_6. Information about services and offers from Duke Energy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	9	1	4	4	5	30	14	20	28	24	66	6	211
Percent	4	0	2	2	2	14	7	9	13	11	31	3	100
Treatment	11	2	5	4	5	27	9	29	20	13	56	3	184
Percent	6	1	3	2	3	15	5	16	11	7	30	2	100
Total	20	3	9	8	10	57	23	49	48	37	122	9	395
Percent	5	1	2	2	3	14	6	12	12	9	31	2	100

***PRI\_Q14. The statements below provide reasons why households might try to reduce their home's energy use. Please indicate how important each statement is to you.***

***PRI\_Q14\_1. Reducing my energy bill(s)***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	0	1	0	1	11	8	15	29	20	121	4	211
Percent	0	0	0	0	0	5	4	7	14	9	57	2	100
Treatment	3	0	1	1	1	8	5	16	21	27	100	1	184
Percent	2	0	1	1	1	4	3	9	11	15	54	1	100
Total	4	0	2	1	2	19	13	31	50	47	221	5	395
Percent	1	0	1	0	1	5	3	8	13	12	56	1	100

***PRI\_Q14\_2. Helping the environment***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	2	0	3	4	4	18	10	22	34	18	92	4	211
Percent	1	0	1	2	2	9	5	10	16	9	44	2	100
Treatment	4	2	2	4	5	14	6	21	20	24	79	3	184
Percent	2	1	1	2	3	8	3	11	11	13	43	2	100
Total	6	2	5	8	9	32	16	43	54	42	171	7	395
Percent	2	1	1	2	2	8	4	11	14	11	43	2	100

***PRI\_Q14\_3. Setting an example for others***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	14	5	8	6	5	33	16	20	23	10	64	7	211
Percent	7	2	4	3	2	16	8	9	11	5	30	3	100
Treatment	21	6	1	5	9	26	11	24	21	16	41	3	184
Percent	11	3	1	3	5	14	6	13	11	9	22	2	100
Total	35	11	9	11	14	59	27	44	44	26	105	10	395
Percent	9	3	2	3	4	15	7	11	11	7	27	3	100



**PRI\_Q14\_4. Avoiding waste**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	0	3	2	2	13	6	22	40	24	94	4	211
Percent	0	0	1	1	1	6	3	10	19	11	45	2	100
Treatment	2	1	0	2	4	8	7	15	30	29	85	1	184
Percent	1	1	0	1	2	4	4	8	16	16	46	1	100
Total	3	1	3	4	6	21	13	37	70	53	179	5	395
Percent	1	0	1	1	2	5	3	9	18	13	45	1	100

**PRI\_Q14\_5. Conserving energy resources**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	0	2	4	1	17	11	22	33	23	93	4	211
Percent	0	0	1	2	0	8	5	10	16	11	44	2	100
Treatment	3	1	0	2	1	13	5	24	25	33	75	2	184
Percent	2	1	0	1	1	7	3	13	14	18	41	1	100
Total	4	1	2	6	2	30	16	46	58	56	168	6	395
Percent	1	0	1	2	1	8	4	12	15	14	43	2	100

**PRI\_Q15. Please indicate your level of agreement with each of the following statements****PRI\_Q15\_1. Duke Energy provides excellent customer service**

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	3	7	20	87	93	1	211
Percent	1	3	9	41	44	0	100
Treatment	1	4	26	72	79	2	184
Percent	1	2	14	39	43	1	100
Total	4	11	46	159	172	3	395
Percent	1	3	12	40	44	1	100

***PRI\_Q15\_2. Duke Energy respects its customers***

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	5	14	23	76	90	3	211
Percent	2	7	11	36	43	1	100
Treatment	3	10	36	66	68	1	184
Percent	2	5	20	36	37	1	100
Total	8	24	59	142	158	4	395
Percent	2	6	15	36	40	1	100

***PRI\_Q15\_3. Duke Energy provides service at a reasonable cost***

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	7	23	30	100	48	3	211
Percent	3	11	14	47	23	1	100
Treatment	4	22	39	75	42	2	184
Percent	2	12	21	41	23	1	100
Total	11	45	69	175	90	5	395
Percent	3	11	17	44	23	1	100

***PRI\_Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?***

Group	Yes	No	No Response	Total
Control	156	52	3	211
Percent	74	25	1	100
Treatment	118	63	3	184
Percent	64	34	2	100
Total	274	115	6	395
Percent	69	29	2	100

**PRI\_Q16a. How many free light bulbs have you ordered through the Duke Energy website this year?**

Group	0	1	2	3	4	5	6	8	10	12	14	15	16	20	24	30	50	N.R.	M.	T.
Control	92	8	3	1	1	1	3	4	2	15	1	4	0	1	1	1	1	3	14	156
Percent	59	5	2	1	1	1	2	3	1	10	1	3	0	1	1	1	1	2	9	100
Treatment	71	8	0	0	1	1	5	3	3	12	0	0	2	2	0	0	0	0	10	118
Percent	60	7	0	0	1	1	4	3	3	10	0	0	2	2	0	0	0	0	8	100
Total	163	16	3	1	2	2	8	7	5	27	1	4	2	3	1	1	1	3	24	274
Percent	59	6	1	0	1	1	3	3	2	10	0	1	1	1	0	0	0	1	9	100

**PRI\_Q16b. How many discounted light bulbs have you ordered through the Duke Energy website this year?**

Group	0	1	2	4	5	6	8	12	15	16	20	24	30	No Response	Missing	Total
Control	128	1	0	1	0	0	1	5	1	0	2	2	1	1	13	156
Percent	82	1	0	1	0	0	1	3	1	0	1	1	1	1	8	100
Treatment	95	3	1	1	1	2	0	0	0	2	1	0	0	0	12	118
Percent	81	3	1	1	1	2	0	0	0	2	1	0	0	0	10	100
Total	223	4	1	2	1	2	1	5	1	2	3	2	1	1	25	274
Percent	81	1	0	1	0	1	0	2	0	1	1	1	0	0	9	100

**PRI\_Q18 & TRE\_Q13. Do you own or rent this residence?**

Group	Own	Rent	Missing	Total
Control	192	13	6	211
Percent	91	6	3	100
Treatment	306	24	7	337
Percent	91	7	2	100
Total	498	37	13	548
Percent	91	7	2	100

**PRI\_Q19 & TRE\_Q14. Including yourself, how many people live in your home?**

Group	1	2	3	4	5	6	7	9	10	No Response	Missing	Total
Control	43	95	27	26	11	1	1	0	1	0	6	211
Percent	20	45	13	12	5	0	0	0	0	0	3	100
Treatment	65	149	50	40	16	5	1	1	0	1	9	337
Percent	19	44	15	12	5	1	0	0	0	0	3	100
Total	108	244	77	66	27	6	2	1	1	1	15	548
Percent	20	45	14	12	5	1	0	0	0	0	3	100

**PRI\_Q22 & TRE\_Q17. What is your primary heating fuel?**

Group	Electricity	Natural Gas	Oil	Other	Missing	Total
Control	94	88	5	16	8	211
Percent	45	42	2	8	4	100
Treatment	158	147	8	15	9	337
Percent	47	44	2	4	3	100
Total	252	235	13	31	17	548
Percent	46	43	2	6	3	100

**TRE\_Q1. Duke Energy sends a personalized report called My Home Energy Report to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?**

Group	Yes	No	No Response	Total
Treatment	142	10	1	153
Percent	93	7	1	100

**TRE\_Q2. About how many My Home Energy Reports have you received in the past 12 months?**

Group	0	1	2	3	4	5	6	7	8	9	10	11	12	24	No Response	Missing	Total
Treatment	3	2	9	12	27	3	20	1	5	3	7	2	42	1	5	1	143
Percent	2	1	6	8	19	2	14	1	4	2	5	1	29	1	4	1	100

**TRE\_Q3. How often do you read the My Home Energy Reports?**

Group	Always	Sometimes	Never	No Response	Missing	Total
Treatment	100	35	2	1	2	140
Percent	71	25	1	1	1	100

**TRE\_Q4. How much do you agree or disagree with the following statements about My Home Energy Reports?**

**TRE\_Q4\_1. I have learned about my household's energy use from My Home Energy Reports.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	2	2	0	6	7	13	9	17	11	20	48	1	2	138
Percent	1	1	0	4	5	9	7	12	8	14	35	1	1	100

**TRE\_Q4\_2. I use the reports to tell me how well I am doing at saving energy.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	6	2	3	6	5	20	6	18	18	12	39	1	2	138
Percent	4	1	2	4	4	14	4	13	13	9	28	1	1	100

**TRE\_Q4\_3. The tips provided in the reports are pertinent to my home.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	5	6	5	7	19	21	9	18	13	27	2	2	138
Percent	3	4	4	4	5	14	15	7	13	9	20	1	1	100

**TRE\_Q4\_4. My Home Energy Reports provide the details I need to understand my home's energy use.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	6	2	2	5	9	17	14	16	13	15	36	1	2	138
Percent	4	1	1	4	7	12	10	12	9	11	26	1	1	100

**TRE\_Q4\_5. I have discussed My Home Energy Reports with others.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	36	17	6	4	7	16	7	8	10	2	22	1	2	138
Percent	26	12	4	3	5	12	5	6	7	1	16	1	1	100

**TRE\_Q4\_6. The information provided about my home's energy use is confusing.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	51	24	10	12	6	14	2	5	5	3	3	1	2	138
Percent	37	17	7	9	4	10	1	4	4	2	2	1	1	100

**TRE\_Q4\_7. I suspect that the "similar" homes that my home is compared to in the Home Energy Reports are not actually like mine.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	13	11	4	6	4	29	10	14	12	9	23	1	2	138
Percent	9	8	3	4	3	21	7	10	9	7	17	1	1	100

**TRE\_Q4\_8. Since reading the Home Energy Reports, I have taken actions to use less energy than I would not have otherwise taken.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	11	5	5	4	12	28	10	17	13	9	21	1	2	138
Percent	8	4	4	3	9	20	7	12	9	7	15	1	1	100

**TRE\_Q6. Please rate how useful each feature of the Home Energy Report is to you.**

**TRE\_Q6\_1. Comparison to similar homes**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	15	9	7	8	5	9	11	18	23	9	21	1	2	138
Percent	11	7	5	6	4	7	8	13	17	7	15	1	1	100

**TRE\_Q6\_2. Tips to help you save money and energy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	0	2	2	7	20	10	21	24	9	35	1	2	138
Percent	4	0	1	1	5	14	7	15	17	7	25	1	1	100

**TRE\_Q6\_3. Examples of the energy use associated with common household items**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	6	1	2	7	5	19	9	18	21	13	34	1	2	138
Percent	4	1	1	5	4	14	7	13	15	9	25	1	1	100

**TRE\_Q6\_4. Customized suggestions for your home**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	9	2	2	6	8	19	9	22	18	10	29	2	2	138
Percent	7	1	1	4	6	14	7	16	13	7	21	1	1	100

**TRE\_Q6\_5. Graphs that display your home's energy use over time**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	2	3	1	2	10	9	13	20	19	51	1	2	138
Percent	4	1	2	1	1	7	7	9	14	14	37	1	1	100

**TRE\_Q6\_6. Information about services and offers from Duke Energy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	4	1	3	7	28	9	21	17	9	31	2	2	138
Percent	3	3	1	2	5	20	7	15	12	7	22	1	1	100

**TRE\_Q7. Overall, how satisfied are you with the information in the My Home Energy Reports you've received?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	1	5	2	3	0	8	20	21	15	40	16	2	138
Percent	4	1	4	1	2	0	6	14	15	11	29	12	1	100

**TRE\_Q8. Are you aware that you can go online to My Home Energy Interactive to access more information, above and beyond that found in the My Home Energy Report, which describes more ways to save energy?**

Group	Yes	No	No Response	Missing	Total
Treatment	38	97	1	2	138
Percent	28	70	1	1	100

**TRE\_Q8a. Have you signed up to use My Home Energy Interactive?**

Group	Yes	No	Missing	Total
Treatment	3	35	3	41
Percent	7	85	7	100

**TRE\_Q8b. How useful is My Home Energy Interactive to you for saving energy?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	0	0	0	0	0	1	0	0	0	0	2	0	3	6
Percent	0	0	0	0	0	17	0	0	0	0	33	0	50	100



## Appendix E Survey Frequencies: DEP

**PRI\_Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	0	0	4	2	10	10	22	37	35	69	2	192
Percent	1	0	0	2	1	5	5	11	19	18	36	1	100
Treatment	0	1	0	2	0	10	11	18	38	23	69	4	176
Percent	0	1	0	1	0	6	6	10	22	13	39	2	100
Total	1	1	0	6	2	20	21	40	75	58	138	6	368
Percent	0	0	0	2	1	5	6	11	20	16	38	2	100

**PRI\_Q2 Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.**

**PRI\_Q2\_1 The information available about Duke Energy's efficiency programs.**

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	No Response	Total
Control	71	65	44	5	6	1	192
Percent	37	34	23	3	3	1	100
Treatment	83	60	22	7	4	0	176
Percent	47	34	13	4	2	0	100
Total	154	125	66	12	10	1	368
Percent	42	34	18	3	3	0	100

**PRI\_Q2\_2 Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.**

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	Total
Control	70	68	40	8	6	192
Percent	36	35	21	4	3	100
Treatment	83	61	18	9	5	176
Percent	47	35	10	5	3	100
Total	153	129	58	17	11	368
Percent	42	35	16	5	3	100

**PRI\_Q2\_3 The information Duke Energy provides to help customers save on energy bills.**

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	Total
Control	70	70	37	10	5	192
Percent	36	36	19	5	3	100
Treatment	83	61	16	12	4	176
Percent	47	35	9	7	2	100
Total	153	131	53	22	9	368
Percent	41.58	36	14	6	2	100

**PRI\_Q3 Have you logged in to your Duke Energy account to do any of the following?  
Check all that apply.****PRI\_Q3\_1 I have never logged in**

Group	Not Checked	Checked	Total
Control	114	71	185
Percent	62	38	100
Treatment	101	73	174
Percent	58	42	100
Total	215	144	359
Percent	60	40	100

**PRI\_Q3\_2 Pay my bill**

Group	Not Checked	Checked	Total
Control	114	71	185
Percent	62	38	100
Treatment	112	62	174
Percent	64	36	100
Total	226	133	359
Percent	63	37	100

**PRI\_Q3\_3 Review energy consumption graphs**

Group	Not Checked	Checked	Total
Control	145	40	185
Percent	78	22	100
Treatment	141	33	174
Percent	81	19	100
Total	286	73	359
Percent	80	20	100

**PRI\_Q3\_4 Look for energy efficiency opportunities or ideas**

Group	Not Checked	Checked	Total
Control	170	15	185
Percent	92	8	100
Treatment	156	18	174
Percent	90	10	100
Total	326	33	359
Percent	91	9	100

**PRI\_Q3\_5 None of the above**

Group	Not Checked	Checked	Total
Control	154	31	185
percent	83	17	100
Treatment	142	32	174
percent	82	18	100
Total	296	63	359
percent	82	18	100

**PRI\_Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.**

Group	Monthly	One a year	A few times a year	Never	No Response	Total
Control	17	20	25	129	1	192
Percent	9	10	13	67	1	100
Treatment	13	16	25	122	0	176
Percent	7	9	14	69	0	100
Total	30	36	50	251	1	368
Percent	8	10	14	68	0	100

**PRI\_Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?**

Group	0	1	2	3	4	5	6	7	8	9	10	Total
Control	53	9	5	9	1	29	12	13	21	8	32	192
Percent	28	5	3	5	1	15	6	7	11	4	17	100
Treatment	39	6	8	11	6	28	6	18	16	19	19	176
Percent	22	3	5	6	3	16	3	10	9	11	11	100
Total	92	15	13	20	7	57	18	31	37	27	51	368
Percent	25	4	4	5	2	15	5	8	10	7	14	100

**PRI\_Q6. How important is it for you to know if your household is using energy wisely?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	3	0	2	3	0	15	11	15	32	30	79	2	192
Percent	2	0	1	2	0	8	6	8	17	16	41	1	100
Treatment	3	0	2	3	0	14	9	19	26	29	71	0	176
Percent	2	0	1	2	0	8	5	11	15	16	40	0	100
Total	6	0	4	6	0	29	20	34	58	59	150	2	368
Percent	2	0	1	2	0	8	5	9	16	16	41	1	100

**PRI\_Q7. How would you rate your knowledge of the different ways you can save energy in your home?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	5	1	5	5	5	29	23	35	31	30	22	1	192
Percent	3	1	3	3	3	15	12	18	16	16	11	1	100
Treatment	2	3	0	4	2	29	17	29	42	27	21	0	176
Percent	1	2	0	2	1	16	10	16	24	15	12	0	100
Total	7	4	5	9	7	58	40	64	73	57	43	1	368
Percent	2	1	1	2	2	16	11	17	20	15	12	0	100

***PRI\_Q8 & TRE\_Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?***

Group	Yes	No	No Response	Missing	Total
Control	114	76	2	0	192
Percent	59	40	1	0	100
Treatment	225	90	10	22	347
Percent	65	26	3	6	100
Total	339	166	12	22	539
Percent	63	31	2	4	100

***PRI\_Q9 & TRE\_Q10. Which actions have been taken?***

***PRI\_Q9\_1 & TRE\_Q10\_1. Adjusted heating or cooling settings to save energy***

Group	Yes	No	Don't know	No Response	Total
Control	109	3	0	2	114
Percent	96	3	0	2	100
Treatment	210	9	2	4	225
Percent	93	4	1	2	100
Total	319	12	2	6	339
Percent	94	4	1	2	100

***PRI\_Q9\_2 & TRE\_Q10\_2. Reduced water heater temperature to save energy***

Group	Yes	No	Don't know	No Response	Total
Control	42	62	3	7	114
Percent	37	54	3	6	100
Treatment	85	127	8	5	225
Percent	38	56	4	2	100
Total	127	189	11	12	339
Percent	37	56	3	4	100

***PRI\_Q9\_3 & TRE\_Q10\_3. Wash clothes in cold water***

Group	Yes	No	Don't know	No Response	Total
Control	76	32	2	4	114
Percent	67	28	2	4	100
Treatment	172	47	2	4	225
Percent	76	21	1	2	100
Total	248	79	4	8	339
Percent	73	23	1	2	100

***PRI\_Q9\_4 & TRE\_Q10\_4. Fully load clothes washer***

Group	Yes	No	Don't know	No Response	Total
Control	97	11	2	4	114
Percent	85	10	2	4	100
Treatment	181	37	2	5	225
Percent	80	16	1	2	100
Total	278	48	4	9	339
Percent	82	14	1	3	100

***PRI\_Q9\_5 & TRE\_Q10\_5. Fully load dishwasher***

Group	Yes	No	Don't know	No Response	Total
Control	78	20	5	11	114
Percent	68	18	4	10	100
Treatment	164	34	16	11	225
Percent	73	15	7	5	100
Total	242	54	21	22	339
Percent	71	16	6	6	100

***PRI\_Q9\_6 & TRE\_Q10\_6. Turn off lights in unused or outdoor areas***

Group	Yes	No	No Response	Total
Control	111	0	3	114
Percent	97	0	3	100
Treatment	216	6	3	225
Percent	96	3	1	100
Total	327	6	6	339
Percent	96	2	2	100

***PRI\_Q9\_7 & TRE\_Q10\_7. Unplug or shut down household electronics when not in use***

Group	Yes	No	Don't know	No Response	Total
Control	82	29	1	2	114
Percent	72	25	1	2	100
Treatment	154	64	4	3	225
Percent	68	28	2	1	100
Total	236	93	5	5	339
Percent	70	27	1	1	100

***PRI\_Q9\_8 & TRE\_Q10\_8. Maintain heating or cooling equipment for more efficient operation***

Group	Yes	No	Don't know	No Response	Total
Control	104	4	3	3	114
Percent	<b>91</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>100</b>
Treatment	190	27	6	2	225
Percent	<b>84</b>	<b>12</b>	<b>3</b>	<b>1</b>	<b>100</b>
Total	294	31	9	5	339
Percent	<b>87</b>	<b>9</b>	<b>3</b>	<b>1</b>	<b>100</b>

***PRI\_Q9\_9 & TRE\_Q10\_9. Use a portable fan or ceiling fan for cooling instead of an air conditioner***

Group	Yes	No	Don't know	No Response	Total
Control	76	34	1	3	114
Percent	<b>67</b>	<b>30</b>	<b>1</b>	<b>3</b>	<b>100</b>
Treatment	159	57	5	4	225
Percent	<b>71</b>	<b>25</b>	<b>2</b>	<b>2</b>	<b>100</b>
Total	235	91	6	7	339
Percent	<b>69</b>	<b>27</b>	<b>2</b>	<b>2</b>	<b>100</b>

***PRI\_Q9\_10 & TRE\_Q10\_10. Other, please specify:***

Group	Yes	No	Don't know	No Response	Total
Control	29	24	34	27	114
Percent	<b>25</b>	<b>21</b>	<b>30</b>	<b>24</b>	<b>100</b>
Treatment	39	55	78	53	225
Percent	<b>17</b>	<b>24</b>	<b>35</b>	<b>24</b>	<b>100</b>
Total	68	79	112	80	339
Percent	<b>20</b>	<b>23</b>	<b>33</b>	<b>24</b>	<b>100</b>

***PRI\_Q9\_11 & TRE\_Q10\_11. Other, please specify:***

Group	Yes	No	Don't know	No Response	Total
Control	10	36	39	29	114
Percent	<b>9</b>	<b>32</b>	<b>34</b>	<b>25</b>	<b>100</b>
Treatment	15	71	82	57	225
Percent	<b>7</b>	<b>32</b>	<b>36</b>	<b>25</b>	<b>100</b>
Total	25	107	121	86	339
Percent	<b>7</b>	<b>32</b>	<b>36</b>	<b>25</b>	<b>100</b>

**PRI\_Q10 & TRE\_Q11. Which energy efficiency improvements have been made?****PRI\_Q10\_1 & TRE\_Q11\_1. Install energy-efficient kitchen or laundry appliances**

Group	Yes	No	Don't know	No Response	Total
Control	56	53	3	2	114
Percent	49	46	3	2	100
Treatment	133	72	11	9	225
Percent	59	32	5	4	100
Total	189	125	14	11	339
Percent	56	37	4	3	100

**PRI\_Q10\_2 & TRE\_Q11\_2. Install energy-efficient heating/cooling equipment**

Group	Yes	No	Don't know	No Response	Total
Control	52	51	8	3	114
Percent	46	45	7	3	100
Treatment	112	95	14	4	225
Percent	50	42	6	2	100
Total	164	146	22	7	339
Percent	48	43	6	2	100

**PRI\_Q10\_3 & TRE\_Q11\_3. Install energy-efficient water heater**

Group	Yes	No	Don't know	No Response	Total
Control	50	52	9	3	114
Percent	44	46	8	3	100
Treatment	95	108	17	5	225
Percent	42	48	8	2	100
Total	145	160	26	8	339
Percent	43	47	8	2	100

**PRI\_Q10\_4 & TRE\_Q11\_4. Replace windows or doors with more energy-efficient types)**

Group	Yes	No	Don't know	No Response	Total
Control	41	67	3	3	114
Percent	36	59	3	3	100
Treatment	78	133	6	8	225
Percent	35	59	3	4	100
Total	119	200	9	11	339
Percent	35	59	3	3	100



***PRI\_Q10\_5 & TRE\_Q11\_5. Caulk or weatherstrip (windows or doors)***

Group	Yes	No	Don't know	No Response	Total
Control	66	44	3	1	114
Percent	<b>58</b>	<b>39</b>	<b>3</b>	<b>1</b>	<b>100</b>
Treatment	115	96	6	8	225
Percent	<b>51</b>	<b>43</b>	<b>3</b>	<b>4</b>	<b>100</b>
Total	181	140	9	9	339
Percent	<b>53</b>	<b>41</b>	<b>3</b>	<b>3</b>	<b>100</b>

***PRI\_Q10\_6 & TRE\_Q11\_6. Add insulation to attic, walls, or floors***

Group	Yes	No	Don't know	No Response	Total
Control	36	68	5	5	114
Percent	<b>32</b>	<b>60</b>	<b>4</b>	<b>4</b>	<b>100</b>
Treatment	84	125	8	8	225
Percent	<b>37</b>	<b>56</b>	<b>4</b>	<b>4</b>	<b>100</b>
Total	120	193	13	13	339
Percent	<b>35</b>	<b>57</b>	<b>4</b>	<b>4</b>	<b>100</b>

***PRI\_Q10\_7 & TRE\_Q11\_7. Install energy-efficient lighting***

Group	Yes	No	Don't know	No Response	Total
Control	93	18	3	0	114
Percent	<b>82</b>	<b>16</b>	<b>3</b>	<b>0</b>	<b>100</b>
Treatment	173	43	5	4	225
Percent	<b>77</b>	<b>19</b>	<b>2</b>	<b>2</b>	<b>100</b>
Total	266	61	8	4	339
Percent	<b>78</b>	<b>18</b>	<b>2</b>	<b>1</b>	<b>100</b>

***PRI\_Q10\_8 & TRE\_Q11\_8. Install programmable thermostat or "smart" thermostat***

Group	Yes	No	Don't know	No Response	Total
Control	47	59	3	5	114
Percent	<b>41</b>	<b>52</b>	<b>3</b>	<b>4</b>	<b>100</b>
Treatment	108	102	8	7	225
Percent	<b>48</b>	<b>45</b>	<b>4</b>	<b>3</b>	<b>100</b>
Total	155	161	11	12	339
Percent	<b>46</b>	<b>47</b>	<b>3</b>	<b>4</b>	<b>100</b>

**PRI\_Q10\_9 & TRE\_Q11\_9. Purchase ENERGY STAR certified home electronic equipment (a television, for example)**

Group	Yes	No	Don't know	No Response	Total
Control	63	39	10	2	114
Percent	55	34	9	2	100
Treatment	129	70	16	10	225
Percent	57	31	7	4	100
Total	192	109	26	12	339
Percent	57	32	8	4	100

**PRI\_Q11 & TRE\_Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons?****PRI\_Q11\_1 & TRE\_Q12\_1. Initial cost of energy efficient equipment is too high**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	8	4	3	4	6	19	11	11	9	12	23	4	114
Percent	7	4	3	4	5	17	10	10	8	11	20	4	100
Treatment	20	6	4	8	13	35	15	24	27	10	59	4	225
Percent	9	3	2	4	6	16	7	11	12	4	26	2	100
Total	28	10	7	12	19	54	26	35	36	22	82	8	339
Percent	8	3	2	4	6	16	8	10	11	6	24	2	100

**PRI\_Q11\_2 & TRE\_Q12\_2. Not enough time to shop/research/install/too busy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	17	7	4	2	5	25	5	15	12	6	11	5	114
Percent	15	6	4	2	4	22	4	13	11	5	10	4	100
Treatment	42	8	9	13	16	49	13	18	17	7	27	6	225
Percent	19	4	4	6	7	22	6	8	8	3	12	3	100
Total	59	15	13	15	21	74	18	33	29	13	38	11	339
Percent	17	4	4	4	6	22	5	10	9	4	11	3	100

***PRI\_Q11\_3 & TRE\_Q12\_3. I do not have the expertise***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	22	5	7	8	6	16	4	22	3	2	13	6	114
Percent	19	4	6	7	5	14	4	19	3	2	11	5	100
Treatment	42	10	8	13	8	53	11	21	14	7	32	6	225
Percent	19	4	4	6	4	24	5	9	6	3	14	3	100
Total	64	15	15	21	14	69	15	43	17	9	45	12	339
Percent	19	4	4	6	4	20	4	13	5	3	13	4	100

***PRI\_Q11\_4 & TRE\_Q12\_4. I do not have enough information to make a decision or understand the impacts of these improvements or behaviors***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	22	7	7	1	4	19	6	16	10	3	14	5	114
Percent	19	6	6	1	4	17	5	14	9	3	12	4	100
Treatment	37	13	13	11	8	52	8	18	15	8	32	10	225
Percent	16	6	6	5	4	23	4	8	7	4	14	4	100
Total	59	20	20	12	12	71	14	34	25	11	46	15	339
Percent	17	6	6	4	4	21	4	10	7	3	14	4	100

***PRI\_Q11\_5 & TRE\_Q12\_5. Getting everyone in the house to cooperate is too hard***

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	34	7	3	2	5	12	4	12	9	3	20	3	114
Percent	30	6	3	2	4	11	4	11	8	3	18	3	100
Treatment	53	12	11	5	6	42	7	19	16	10	38	6	225
Percent	24	5	5	2	3	19	3	8	7	4	17	3	100
Total	87	19	14	7	11	54	11	31	25	13	58	9	339
Percent	26	6	4	2	3	16	3	9	7	4	17	3	100

**PRI\_Q11\_6 & TRE\_Q12\_6. I do not think my energy saving efforts are worth the time and/or money**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	26	4	5	3	5	19	4	4	10	3	28	3	114
Percent	23	4	4	3	4	17	4	4	9	3	25	3	100
Treatment	47	12	15	5	8	30	9	20	19	11	42	7	225
Percent	21	5	7	2	4	13	4	9	8	5	19	3	100
Total	73	16	20	8	13	49	13	24	29	14	70	10	339
Percent	22	5	6	2	4	14	4	7	9	4	21	3	100

**PRI\_Q12 Which of the following do you do with regard to your household's energy use? Check all that apply.****PRI\_Q12\_1 Track monthly energy use**

Group	Not Checked	Checked	Total
Control	98	90	188
Percent	52	48	100
Treatment	82	89	171
Percent	48	52	100
Total	180	179	359
Percent	50	50	100

**PRI\_Q12\_2 Track the total amount of your bill**

Group	Not Checked	Checked	Total
Control	58	130	188
Percent	31	69	100
Treatment	50	121	171
Percent	29	71	100
Total	108	251	359
Percent	30	70	100

**PRI\_Q12\_3 Compare usage to previous months**

Group	Not Checked	Checked	Total
Control	59	129	188
Percent	31	69	100
Treatment	53	118	171
Percent	31	69	100
Total	112	247	359
Percent	31	69	100

**PRI\_Q12\_4 Compare usage to the same month from last year**

Group	Not Checked	Checked	Total
Control	83	105	188
Percent	44	56	100
Treatment	58	113	171
Percent	34	66	100
Total	141	218	359
Percent	39	61	100

**PRI\_Q12\_5 None of the above**

Group	Not Checked	Checked	Total
Control	174	14	188
Percent	93	7	100
Treatment	154	17	171
Percent	90	10	100
Total	328	31	359
Percent	91	9	100

**PRI\_Q13. Thinking about the information you could have about your home's energy use, please rate how useful each of the following items would be for your household.**

**PRI\_Q13\_1. Your home's energy use compared to that of similar homes**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	19	3	4	5	3	22	6	19	26	24	52	9	192
Percent	10	2	2	3	2	11	3	10	14	13	27	5	100
Treatment	23	3	4	7	4	16	14	19	18	19	46	3	176
Percent	13	2	2	4	2	9	8	11	10	11	26	2	100
Total	42	6	8	12	7	38	20	38	44	43	98	12	368
Percent	11	2	2	3	2	10	5	10	12	12	27	3	100

**PRI\_Q13\_2. Tips to help you save money and energy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	14	3	3	0	5	20	6	15	22	31	69	4	192
Percent	7	2	2	0	3	10	3	8	11	16	36	2	100
Treatment	9	2	2	2	4	22	8	10	28	26	60	3	176
Percent	5	1	1	1	2	13	5	6	16	15	34	2	100
Total	23	5	5	2	9	42	14	25	50	57	129	7	368
Percent	6	1	1	1	2	11	4	7	14	15	35	2	100

**PRI\_Q13\_3. Examples of the energy use associated with common household items**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	14	6	2	3	5	22	9	21	24	19	59	8	192
Percent	7	3	1	2	3	11	5	11	13	10	31	4	100
Treatment	11	3	1	2	6	25	9	16	32	24	44	3	176
Percent	6	2	1	1	3	14	5	9	18	14	25	2	100
Total	25	9	3	5	11	47	18	37	56	43	103	11	368
Percent	7	2	1	1	3	13	5	10	15	12	28	3	100

**PRI\_Q13\_4. Customized suggestions for your home**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	23	3	6	3	8	23	8	21	15	21	52	9	192
Percent	12	2	3	2	4	12	4	11	8	11	27	5	100
Treatment	11	3	3	4	4	25	9	16	22	22	53	4	176
Percent	6	2	2	2	2	14	5	9	13	13	30	2	100
Total	34	6	9	7	12	48	17	37	37	43	105	13	368
Percent	9	2	2	2	3	13	5	10	10	12	29	4	100

**PRI\_Q13\_5. Graphs that display your home's energy use over time**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	20	2	3	0	4	17	5	15	27	21	71	7	192
Percent	10	1	2	0	2	9	3	8	14	11	37	4	100
Treatment	12	4	1	2	3	14	11	13	30	25	59	2	176
Percent	7	2	1	1	2	8	6	7	17	14	34	1	100
Total	32	6	4	2	7	31	16	28	57	46	130	9	368
Percent	9	2	1	1	2	8	4	8	15	13	35	2	100

**PRI\_Q13\_6. Information about services and offers from Duke Energy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	19	1	4	0	5	22	9	22	23	23	58	6	192
Percent	10	1	2	0	3	11	5	11	12	12	30	3	100
Treatment	10	4	1	5	7	22	8	22	26	17	50	4	176
Percent	6	2	1	3	4	13	5	13	15	10	28	2	100
Total	29	5	5	5	12	44	17	44	49	40	108	10	368
Percent	8	1	1	1	3	12	5	12	13	11	29	3	100

**PRI\_Q14. The statements below provide reasons why households might try to reduce their home's energy use. Please indicate how important each statement is to you.**

**PRI\_Q14\_1. Reducing my energy bill(s)**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	4	2	1	0	0	11	2	7	14	28	122	1	192
Percent	2	1	1	0	0	6	1	4	7	15	64	1	100
Treatment	3	0	1	1	2	5	4	4	21	27	107	1	176
Percent	2	0	1	1	1	3	2	2	12	15	61	1	100
Total	7	2	2	1	2	16	6	11	35	55	229	2	368
Percent	2	1	1	0	1	4	2	3	10	15	62	1	100

**PRI\_Q14\_2. Helping the environment**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	9	1	2	3	2	17	9	13	23	13	95	5	192
Percent	5	1	1	2	1	9	5	7	12	7	49	3	100
Treatment	7	0	3	5	3	10	9	14	16	24	84	1	176
Percent	4	0	2	3	2	6	5	8	9	14	48	1	100
Total	16	1	5	8	5	27	18	27	39	37	179	6	368
Percent	4	0	1	2	1	7	5	7	11	10	49	2	100

**PRI\_Q14\_3. Setting an example for others**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	28	4	2	7	6	21	9	13	21	16	59	6	192
Percent	15	2	1	4	3	11	5	7	11	8	31	3	100
Treatment	23	6	3	7	7	22	12	12	19	15	46	4	176
Percent	13	3	2	4	4	13	7	7	11	9	26	2	100
Total	51	10	5	14	13	43	21	25	40	31	105	10	368
Percent	14	3	1	4	4	12	6	7	11	8	29	3	100

**PRI\_Q14\_4. Avoiding waste**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	7	2	3	2	0	12	5	7	29	22	101	2	192
Percent	4	1	2	1	0	6	3	4	15	11	53	1	100
Treatment	4	0	2	1	3	11	6	11	22	25	89	2	176
Percent	2	0	1	1	2	6	3	6	13	14	51	1	100
Total	11	2	5	3	3	23	11	18	51	47	190	4	368
Percent	3	1	1	1	1	6	3	5	14	13	52	1	100

**PRI\_Q14\_5. Conserving energy resources**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	8	1	2	1	1	15	7	15	25	17	95	5	192
Percent	4	1	1	1	1	8	4	8	13	9	49	3	100
Treatment	4	0	2	2	2	15	7	8	24	25	85	2	176
Percent	2	0	1	1	1	9	4	5	14	14	48	1	100
Total	12	1	4	3	3	30	14	23	49	42	180	7	368
Percent	3	0	1	1	1	8	4	6	13	11	49	2	100

**PRI\_Q15. Please indicate your level of agreement with each of the following statements****PRI\_Q15\_1. Duke Energy provides excellent customer service**

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	7	9	22	69	83	2	192
Percent	4	5	11	36	43	1	100
Treatment	2	10	23	62	78	1	176
Percent	1	6	13	35	44	1	100
Total	9	19	45	131	161	3	368
Percent	2	5	12	36	44	1	100



**PRI\_Q15\_2. Duke Energy respects its customers**

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	8	11	26	57	88	2	192
Percent	4	6	14	30	46	1	100
Treatment	4	9	32	54	76	1	176
Percent	2	5	18	31	43	1	100
Total	12	20	58	111	164	3	368
Percent	3	5	16	30	45	1	100

**PRI\_Q15\_3. Duke Energy provides service at a reasonable cost**

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	6	25	43	69	44	5	192
Percent	3	13	22	36	23	3	100
Treatment	5	27	24	86	33	1	176
Percent	3	15	14	49	19	1	100
Total	11	52	67	155	77	6	368
Percent	3	14	18	42	21	2	100

**PRI\_Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?**

Group	Yes	No	No Response	Total
Control	39	150	3	192
Percent	20	78	2	100
Treatment	39	134	3	176
Percent	22	76	2	100
Total	78	284	6	368
Percent	21	77	2	100

**PRI\_Q16a. How many free light bulbs have you ordered through the Duke Energy website this year?**

Group	0	1	4	6	10	12	14	30	Missing	Total
Control	32	1	0	0	0	1	0	0	5	39
Percent	82	3	0	0	0	3	0	0	13	100
Treatment	32	0	1	1	1	0	1	1	2	39
Percent	82	0	3	3	3	0	3	3	5	100
Total	64	1	1	1	1	1	1	1	7	78
Percent	82	1	1	1	1	1	1	1	9	100

**PRI\_Q16b. How many discounted light bulbs have you ordered through the Duke Energy website this year?**

Group	0	6	10	12	20	24	25	30	Missing	Total
Control	32	0	0	1	0	1	1	0	4	39
Percent	82	0	0	3	0	3	3	0	10	100
Treatment	33	1	1	0	1	0	0	1	2	39
Percent	85	3	3	0	3	0	0	3	5	100
Total	65	1	1	1	1	1	1	1	6	78
Percent	83	1	1	1	1	1	1	1	8	100

**PRI\_Q18 & TRE\_Q13. Do you own or rent this residence?**

Group	Own	Rent	Missing	No Response	Total
Control	161	21	8	2	192
Percent	84	11	4	1	100
Treatment	310	24	10	3	347
Percent	89	7	3	1	100
Total	471	45	18	5	539
Percent	87	8	3	1	100

**PRI\_Q19 & TRE\_Q14. Including yourself, how many people live in your home?**

Group	1	2	3	4	5	6	7	8	9	19	No Response	Missing	Total
Control	49	66	28	22	11	4	0	1	1	1	1	8	192
Percent	26	34	15	11	6	2	0	1	1	1	1	4	100
Treatment	65	155	39	47	17	5	1	0	0	1	7	10	347
Percent	19	45	11	14	5	1	0	0	0	0	2	3	100
Total	114	221	67	69	28	9	1	1	1	2	8	18	539
Percent	21	41	12	13	5	2	0	0	0	0	1	3	100

**PRI\_Q22 & TRE\_Q17. What is your primary heating fuel?**

Group	Electricity	Natural Gas	Oil	Other	Don't know	No Response	Missing	Total
Control	107	63	1	9	3	1	8	192
Percent	56	33	1	5	2	1	4	100
Treatment	188	103	8	23	3	3	19	347
Percent	54	30	2	7	1	1	5	100
Total	295	166	9	32	6	4	27	539
Percent	55	31	2	6	1	1	5	100

**TRE\_Q1. Duke Energy sends a personalized report called My Home Energy Report to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?**

Group	Yes	No	No Response	Total
Treatment	160	10	1	171
Percent	94	6	1	100

**TRE\_Q2. About how many My Home Energy Reports have you received in the past 12 months?**

Group	1	2	3	4	5	6	7	8	9	10	11	12	No Response	Missing	Total
Treatment	4	14	14	29	6	21	2	8	2	9	1	37	13	1	161
Percent	2	9	9	18	4	13	1	5	1	6	1	23	8	1	100

**TRE\_Q3. How often do you read the My Home Energy Reports?**

Group	Always	Sometimes	Never	No Response	Missing	Total
Treatment	107	42	10	1	1	161
Percent	66	26	6	1	1	100

**TRE\_Q4. How much do you agree or disagree with the following statements about My Home Energy Reports?**

**TRE\_Q4\_1. I have learned about my household's energy use from My Home Energy Reports.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	2	2	4	2	16	10	14	19	22	52	1	2	151
Percent	3	1	1	3	1	11	7	9	13	15	34	1	1	100

**TRE\_Q4\_2. I use the reports to tell me how well I am doing at saving energy.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	6	1	5	10	6	16	6	20	14	19	44	2	2	151
Percent	4	1	3	7	4	11	4	13	9	13	29	1	1	100

**TRE\_Q4\_3. The tips provided in the reports are pertinent to my home.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	3	7	10	9	22	15	13	19	15	29	3	2	151
Percent	3	2	5	7	6	15	10	9	13	10	19	2	1	100

**TRE\_Q4\_4. My Home Energy Reports provide the details I need to understand my home's energy use.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	2	6	3	6	24	12	14	15	15	44	3	2	151
Percent	3	1	4	2	4	16	8	9	10	10	29	2	1	100

**TRE\_Q4\_5. I have discussed My Home Energy Reports with others.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	43	19	10	8	6	13	6	10	9	5	18	2	2	151
Percent	28	13	7	5	4	9	4	7	6	3	12	1	1	100

**TRE\_Q4\_6. The information provided about my home's energy use is confusing.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	41	24	17	18	7	13	4	6	7	4	7	1	2	151
Percent	27	16	11	12	5	9	3	4	5	3	5	1	1	100

**TRE\_Q4\_7. I suspect that the "similar" homes that my home is compared to in the Home Energy Reports are not actually like mine.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	15	6	12	13	7	22	7	7	22	9	26	3	2	151
Percent	10	4	8	9	5	15	5	5	15	6	17	2	1	100

**TRE\_Q4\_8. Since reading the Home Energy Reports, I have taken actions to use less energy than I would not have otherwise taken.**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	13	5	6	9	7	27	10	17	16	12	26	1	2	151
Percent	9	3	4	6	5	18	7	11	11	8	17	1	1	100

**TRE\_Q6. Please rate how useful each feature of the Home Energy Report is to you.**

**TRE\_Q6\_1. Comparison to similar homes**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	19	10	3	7	12	21	7	17	18	7	25	3	2	151
Percent	13	7	2	5	8	14	5	11	12	5	17	2	1	100

**TRE\_Q6\_2. Tips to help you save money and energy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	3	7	4	3	8	20	8	16	22	17	38	3	2	151
Percent	2	5	3	2	5	13	5	11	15	11	25	2	1	100

**TRE\_Q6\_3. Examples of the energy use associated with common household items**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	8	3	3	2	3	30	10	15	24	13	35	3	2	151
Percent	5	2	2	1	2	20	7	10	16	9	23	2	1	100

**TRE\_Q6\_4. Customized suggestions for your home**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	4	11	2	12	25	9	16	20	13	31	2	2	151
Percent	3	3	7	1	8	17	6	11	13	9	21	1	1	100

**TRE\_Q6\_5. Graphs that display your home's energy use over time**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	3	3	1	5	5	12	10	13	24	20	51	2	2	151
Percent	2	2	1	3	3	8	7	9	16	13	34	1	1	100

**TRE\_Q6\_6. Information about services and offers from Duke Energy**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	7	8	5	13	21	8	14	19	16	30	4	2	151
Percent	3	5	5	3	9	14	5	9	13	11	20	3	1	100

**TRE\_Q7. Overall, how satisfied are you with the information in the My Home Energy Reports you've received?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	2	0	15	6	0	10	18	19	15	43	17	2	151
Percent	3	1	0	10	4	0	7	12	13	10	28	11	1	100

**TRE\_Q8. Are you aware that you can go online to My Home Energy Interactive to access more information, above and beyond that found in the My Home Energy Report, which describes more ways to save energy?**

Group	Yes	No	No Response	Missing	Total
Treatment	50	93	6	2	151
Percent	33	62	4	1	100

**TRE\_Q8a. Have you signed up to use My Home Energy Interactive?**

Group	Yes	No	Missing	Total
Treatment	7	44	7	58
Percent	12	76	12	100

**TRE\_Q8b. How useful is My Home Energy Interactive to you for saving energy?**

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	0	0	1	0	0	1	1	0	2	1	1	0	7	14
Percent	0	0	7	0	0	7	7	0	14	7	7	0	50	100

## Appendix F Detailed Regression Outputs/Models

**Table F-1: Regression Coefficients for DEC Cohort 1**

Number of obs = 1762110  
 F(211,1746190) = 3462.28  
 Prob>F = 0.0000  
 R-squared = 0.6990  
 AdjR-squared = 0.6963  
 Root MSE = 14.2230

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2008	5.191487	.2007457	25.86	0.000	4.798033	5.584942
01/2009	8.474034	.2007376	42.21	0.000	8.080595	8.867473
02/2009	4.944045	.2007376	24.63	0.000	4.550607	5.337484
03/2009	-4.473073	.2007376	-22.28	0.000	-4.866511	-4.079634
04/2009	-10.36862	.2007399	-51.65	0.000	-10.76206	-9.975177
05/2009	-5.134012	.2007376	-25.58	0.000	-5.52745	-4.740573
06/2009	8.447003	.2007622	42.07	0.000	8.053516	8.84049
07/2009	12.29769	.2007376	61.26	0.000	11.90425	12.69113
08/2009	10.50211	.2007376	52.32	0.000	10.10867	10.89554
09/2009	-1.928812	.2007376	-9.61	0.000	-2.322251	-1.535373
10/2009	-10.3154	.2007376	-51.39	0.000	-10.70884	-9.921959
11/2009	-5.556012	.2007376	-27.68	0.000	-5.949451	-5.162574
12/2009	12.49879	.2007376	62.26	0.000	12.10535	12.89222
01/2010	17.97165	.2007376	89.53	0.000	17.57821	18.36509
02/2010	12.75866	.2007376	63.56	0.000	12.36522	13.1521
03/2010	-2.580372	.2007376	-12.85	0.000	-2.973811	-2.186933
05/2010	-1.914499	.2193415	-8.73	0.000	-2.3444	-1.484597
06/2010	13.97785	.2193415	63.73	0.000	13.54795	14.40775
07/2010	21.27298	.2193415	96.99	0.000	20.84308	21.70289
08/2010	16.37607	.2193517	74.66	0.000	15.94615	16.806
09/2010	3.002323	.2193415	13.69	0.000	2.572421	3.432225
10/2010	-10.85536	.2193415	-49.49	0.000	-11.28526	-10.42546
11/2010	-2.931544	.2193415	-13.37	0.000	-3.361445	-2.501642
12/2010	15.42983	.2193415	70.35	0.000	14.99993	15.85973
01/2011	16.05199	.2193467	73.18	0.000	15.62208	16.4819
02/2011	1.516525	.2193467	6.91	0.000	1.086613	1.946437

03/2011	-8.668877	.2193467	-39.52	0.000	-9.098789	-8.238966
04/2011	-10.7024	.2193467	-48.79	0.000	-11.13231	-10.27249
05/2011	-2.066455	.2193467	-9.42	0.000	-2.496367	-1.636544
06/2011	11.27938	.2193467	51.42	0.000	10.84947	11.70929
07/2011	18.50946	.2193467	84.38	0.000	18.07955	18.93937
08/2011	15.38748	.2193467	70.15	0.000	14.95757	15.81739
09/2011	-2.419517	.2193467	-11.03	0.000	-2.849429	-1.989605
10/2011	-11.95917	.2193467	-54.52	0.000	-12.38908	-11.52925
11/2011	-6.773594	.2193467	-30.88	0.000	-7.203506	-6.343682
12/2011	.3503983	.2193467	1.60	0.110	-.0795136	.7803101
01/2012	2.137307	.2193467	9.74	0.000	1.707396	2.567219
02/2012	-2.023987	.2193467	-9.23	0.000	-2.453899	-1.594075
03/2012	-10.96786	.2193467	-50.00	0.000	-11.39777	-10.53795
04/2012	-12.02501	.2193467	-54.82	0.000	-12.45493	-11.5951
05/2012	-5.344883	.2193467	-24.37	0.000	-5.774795	-4.914972
06/2012	5.043491	.2193467	22.99	0.000	4.613579	5.473403
07/2012	15.05386	.2193467	68.63	0.000	14.62395	15.48378
08/2012	7.429274	.2193467	33.87	0.000	6.999362	7.859186
09/2012	-4.481343	.2193467	-20.43	0.000	-4.911255	-4.051431
10/2012	-11.71996	.2193467	-53.43	0.000	-12.14987	-11.29005
11/2012	-3.644662	.2193467	-16.62	0.000	-4.074574	-3.21475
12/2012	-.3900915	.2193467	-1.78	0.075	-.8200034	.0398203
01/2013	3.125439	.2193467	14.25	0.000	2.695527	3.555351
02/2013	4.334034	.2193467	19.76	0.000	3.904122	4.763946
03/2013	-1.639171	.2193467	-7.47	0.000	-2.069083	-1.209259
04/2013	-10.92128	.2193467	-49.79	0.000	-11.3512	-10.49137
05/2013	-9.073495	.2193467	-41.37	0.000	-9.503407	-8.643583
06/2013	1.977657	.2193467	9.02	0.000	1.547745	2.407569
07/2013	6.9278	.2193467	31.58	0.000	6.497888	7.357712
08/2013	4.202586	.2193467	19.16	0.000	3.772674	4.632497
09/2013	-3.535703	.2193467	-16.12	0.000	-3.965615	-3.105791
10/2013	-12.08457	.2193467	-55.09	0.000	-12.51448	-11.65466
11/2013	-4.151322	.2193467	-18.93	0.000	-4.581234	-3.72141
12/2013	5.982545	.2193467	27.27	0.000	5.552633	6.412457
01/2014	13.94471	.2193467	63.57	0.000	13.5148	14.37462
02/2014	6.439797	.2193467	29.36	0.000	6.009885	6.869709
03/2014	-4.763844	.2193467	-21.72	0.000	-5.193755	-4.333932
04/2014	-11.30048	.2193467	-51.52	0.000	-11.73039	-10.87057
05/2014	-5.923049	.2193518	-27.00	0.000	-6.352971	-5.493127
06/2014	5.586936	.2193518	25.47	0.000	5.157014	6.016858
07/2014	6.807551	.2193518	31.03	0.000	6.377629	7.237473

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08/2014	4.594464	.2193467	20.95	0.000	4.164553	5.024376
09/2014	-2.844089	.2193467	-12.97	0.000	-3.274001	-2.414177
10/2014	-12.83725	.2193467	-58.52	0.000	-13.26717	-12.40734
11/2014	-3.794079	.2193467	-17.30	0.000	-4.223991	-3.364168
12/2014	5.624176	.2193415	25.64	0.000	5.194275	6.054078
01/2015	7.697574	.2193415	35.09	0.000	7.267672	8.127475
02/2015	8.480056	.2193415	38.66	0.000	8.050154	8.909958
03/2015	-6.031693	.2193415	-27.50	0.000	-6.461595	-5.601791
04/2015	-13.39654	.2193415	-61.08	0.000	-13.82644	-12.96664
05/2015	-5.456317	.2193415	-24.88	0.000	-5.886219	-5.026415
06/2015	7.45144	.2193415	33.97	0.000	7.021538	7.881341
07/2015	13.00821	.2193415	59.31	0.000	12.57831	13.43811
08/2015	8.063715	.2193415	36.76	0.000	7.633813	8.493616
09/2015	-5.04434	.2193415	-23.00	0.000	-5.474241	-4.614438
10/2015	-14.22894	.2193415	-64.87	0.000	-14.65884	-13.79903
11/2015	-10.26639	.2193415	-46.81	0.000	-10.69629	-9.836487
12/2015	-4.744726	.2193415	-21.63	0.000	-5.174627	-4.314824
01/2016	4.96105	.2193465	22.62	0.000	4.531139	5.390962
02/2016	2.108975	.2193816	9.61	0.000	1.678995	2.538955
03/2016	-11.48936	.2195124	-52.34	0.000	-11.9196	-11.05912
04/2016	-13.86226	.2197353	-63.09	0.000	-14.29294	-13.43159
05/2016	-7.251094	.2199293	-32.97	0.000	-7.682147	-6.82004
06/2016	7.00792	.2201299	31.84	0.000	6.576473	7.439367
07/2016	15.72801	.2204102	71.36	0.000	15.29602	16.16001
08/2016	11.98578	.2206354	54.32	0.000	11.55334	12.41821
09/2016	1.356097	.220921	6.14	0.000	.9230997	1.789095
10/2016	-12.62069	.221172	-57.06	0.000	-13.05418	-12.1872
11/2016	-9.658069	.2213335	-43.64	0.000	-10.09188	-9.224264
12/2016	-.6289618	.2215121	-2.84	0.005	-1.063118	-.1948056
01/2017	-2.849558	.2216975	-12.85	0.000	-3.284077	-2.415039
02/2017	-8.607431	.221851	-38.80	0.000	-9.042251	-8.172611
03/2017	-10.77751	.2220055	-48.55	0.000	-11.21263	-10.34238
04/2017	-13.76509	.2222722	-61.93	0.000	-14.20073	-13.32944
05/2017	-8.217315	.2225359	-36.93	0.000	-8.653478	-7.781152
06/2017	1.158951	.2228875	5.20	0.000	.722099	1.595803
07/2017	8.833328	.2231686	39.58	0.000	8.395925	9.270731
08/2017	4.53006	.2234059	20.28	0.000	4.092192	4.967928
09/2017	-5.786104	.2236804	-25.87	0.000	-6.22451	-5.347698
10/2017	-11.066	.2239339	-49.42	0.000	-11.5049	-10.62709
11/2017	-8.475153	.2241597	-37.81	0.000	-8.914499	-8.035808
12/2017	4.758375	.2243693	21.21	0.000	4.318619	5.198131

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01/2018	9.863339	.2246289	43.91	0.000	9.423074	10.3036
02/2018	-5.781853	.2248725	-25.71	0.000	-6.222595	-5.34111
03/2018	-9.912905	.2250997	-44.04	0.000	-10.35409	-9.471718
04/2018	-13.94758	.2253348	-61.90	0.000	-14.38923	-13.50593
05/2018	-6.950921	.2255593	-30.82	0.000	-7.393009	-6.508832
i.ym#c.treatme nt						
05/2010	-.1910499	.2394967	-0.80	0.425	-.6604551	.2783552
06/2010	-.2860475	.2394967	-1.19	0.232	-.7554527	.1833577
07/2010	-.5401676	.2394967	-2.26	0.024	-1.009573	-.0707624
08/2010	-.4921973	.239506	-2.06	0.040	-.9616208	-.0227738
09/2010	-.463216	.2394967	-1.93	0.053	-.9326212	.0061891
10/2010	-.5357518	.2394967	-2.24	0.025	-1.005157	-.0663467
11/2010	-.1931776	.2394967	-0.81	0.420	-.6625827	.2762276
12/2010	.0610646	.2394967	0.25	0.799	-.4083406	.5304697
01/2011	.0866716	.2395014	0.36	0.717	-.3827428	.556086
02/2011	.0078406	.2395126	0.03	0.974	-.4615958	.477277
03/2011	-.454115	.2395126	-1.90	0.058	-.9235514	.0153213
04/2011	-.484397	.2395126	-2.02	0.043	-.9538333	-.0149606
05/2011	-.7348654	.2395238	-3.07	0.002	-1.204324	-.2654072
06/2011	-.5874111	.2395126	-2.45	0.014	-1.056847	-.1179747
07/2011	-.8212494	.2395126	-3.43	0.001	-1.290686	-.3518131
08/2011	-.6037938	.2395126	-2.52	0.012	-1.07323	-.1343574
09/2011	-.5673285	.2395126	-2.37	0.018	-1.036765	-.0978922
10/2011	-.5760798	.2395126	-2.41	0.016	-1.045516	-.1066434
11/2011	-.4092845	.2395126	-1.71	0.087	-.8787209	.0601518
12/2011	-.3575161	.2395126	-1.49	0.136	-.8269524	.1119203
01/2012	-.2747792	.2395126	-1.15	0.251	-.7442156	.1946571
02/2012	-.3863291	.2395126	-1.61	0.107	-.8557654	.0831073
03/2012	-.556866	.2395126	-2.32	0.020	-1.026302	-.0874297
04/2012	-.685426	.2395126	-2.86	0.004	-1.154862	-.2159896
05/2012	-.5552546	.2395126	-2.32	0.020	-1.024691	-.0858182
06/2012	-.6511456	.2395126	-2.72	0.007	-1.120582	-.1817092
07/2012	-.5138519	.2395126	-2.15	0.032	-.9832883	-.0444155
08/2012	-.6455145	.2395126	-2.70	0.007	-1.114951	-.1760781
09/2012	-.5557067	.2395126	-2.32	0.020	-1.025143	-.0862704
10/2012	-.6565749	.2395014	-2.74	0.006	-1.125989	-.1871605
11/2012	-.983766	.2395014	-4.11	0.000	-1.45318	-.5143516
12/2012	-.4109544	.2395014	-1.72	0.086	-.8803688	.05846
01/2013	-.2759519	.2395014	-1.15	0.249	-.7453663	.1934625
02/2013	-.3054777	.2395014	-1.28	0.202	-.7748921	.1639367

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03/2013	-.5427792	.2395014	-2.27	0.023	-1.012194	-.0733648
04/2013	-.582956	.2395014	-2.43	0.015	-1.05237	-.1135416
05/2013	-.7678896	.2395014	-3.21	0.001	-1.237304	-.2984752
06/2013	-.8816336	.2395014	-3.68	0.000	-1.351048	-.4122192
07/2013	-1.034716	.2395014	-4.32	0.000	-1.504131	-.565302
08/2013	-.9875511	.2395014	-4.12	0.000	-1.456966	-.5181367
09/2013	-.6532961	.2395014	-2.73	0.006	-1.122711	-.1838818
10/2013	-.6239904	.2395014	-2.61	0.009	-1.093405	-.154576
11/2013	-.3569448	.2395014	-1.49	0.136	-.8263592	.1124696
12/2013	-.1515506	.2395014	-0.63	0.527	-.620965	.3178638
01/2014	-.2228782	.2395014	-0.93	0.352	-.6922926	.2465362
02/2014	-.1320108	.2395014	-0.55	0.582	-.6014252	.3374036
03/2014	-.36386	.2395014	-1.52	0.129	-.8332744	.1055544
04/2014	-.6727505	.2395014	-2.81	0.005	-1.142165	-.2033362
05/2014	-.6869799	.2395061	-2.87	0.004	-1.156403	-.2175563
06/2014	-.9441145	.2395061	-3.94	0.000	-1.413538	-.474691
07/2014	-.9629565	.2395061	-4.02	0.000	-1.43238	-.4935329
08/2014	-.9183834	.2395014	-3.83	0.000	-1.387798	-.448969
09/2014	-.7614144	.2395014	-3.18	0.001	-1.230829	-.292
10/2014	-.6365438	.2395014	-2.66	0.008	-1.105958	-.1671294
11/2014	-.4433267	.2395014	-1.85	0.064	-.9127411	.0260877
12/2014	-.2697246	.2394967	-1.13	0.260	-.7391298	.1996806
01/2015	-.2573507	.2394967	-1.07	0.283	-.7267559	.2120545
02/2015	-.3339995	.2394967	-1.39	0.163	-.8034046	.1354057
03/2015	-.5212122	.2394967	-2.18	0.030	-.9906174	-.0518071
04/2015	-.6320871	.2394967	-2.64	0.008	-1.101492	-.1626819
05/2015	-.6295939	.2394967	-2.63	0.009	-1.098999	-.1601887
06/2015	-.5415726	.2394967	-2.26	0.024	-1.010978	-.0721674
07/2015	-.4877207	.2394967	-2.04	0.042	-.9571259	-.0183156
08/2015	-.5460176	.2394967	-2.28	0.023	-1.015423	-.0766125
09/2015	-.6018334	.2394967	-2.51	0.012	-1.071239	-.1324282
10/2015	-.6344547	.2394967	-2.65	0.008	-1.10386	-.1650496
11/2015	-.4519346	.2394967	-1.89	0.059	-.9213398	.0174705
12/2015	-.2701377	.2394967	-1.13	0.259	-.7395429	.1992674
01/2016	-.0118044	.2395238	-0.05	0.961	-.4812627	.457654
02/2016	.0119737	.2396241	0.05	0.960	-.4576812	.4816286
03/2016	-.3992353	.2399267	-1.66	0.096	-.8694835	.0710128
04/2016	-.5908526	.2403388	-2.46	0.014	-1.061908	-.1197969
05/2016	-.6390015	.2408954	-2.65	0.008	-1.111148	-.1668549
06/2016	-.6533725	.2413804	-2.71	0.007	-1.12647	-.1802753
07/2016	-.6972425	.2419413	-2.88	0.004	-1.171439	-.223046

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08/2016	-.5881896	.2424409	-2.43	0.015	-1.063365	-.1130138
09/2016	-.533938	.2431858	-2.20	0.028	-1.010574	-.0573022
10/2016	-.6331126	.243749	-2.60	0.009	-1.110852	-.1553731
11/2016	-.4772002	.2442789	-1.95	0.051	-.9559785	.001578
12/2016	-.3995216	.2446356	-1.63	0.102	-.8789989	.0799558
01/2017	-.5412792	.244975	-2.21	0.027	-1.021422	-.0611367
02/2017	-.4773872	.2453217	-1.95	0.052	-.9582092	.0034348
03/2017	-.5299467	.2456578	-2.16	0.031	-1.011427	-.048466
04/2017	-.6764316	.2462687	-2.75	0.006	-1.15911	-.1937534
05/2017	-.6656495	.2469533	-2.70	0.007	-1.149669	-.1816296
06/2017	-.7430946	.2477597	-3.00	0.003	-1.228695	-.2574941
07/2017	-.723818	.2483676	-2.91	0.004	-1.21061	-.2370262
08/2017	-.7733249	.2489882	-3.11	0.002	-1.261333	-.2853167
09/2017	-.9654595	.2495057	-3.87	0.000	-1.454482	-.476437
10/2017	-.725397	.2499668	-2.90	0.004	-1.215323	-.2354707
11/2017	-.6503956	.2504678	-2.60	0.009	-1.141304	-.1594875
12/2017	-.6432011	.2509038	-2.56	0.010	-1.134964	-.1514384
01/2018	-.8176798	.2513993	-3.25	0.001	-1.310414	-.3249459
02/2018	-.7727947	.2518814	-3.07	0.002	-1.266473	-.2791159
03/2018	-.7919056	.2523102	-3.14	0.002	-1.286425	-.2973863
04/2018	-.6624927	.2527603	-2.62	0.009	-1.157894	-.1670912
05/2018	-.7587147	.2532945	-3.00	0.003	-1.255163	-.2622664
06/2018	-.8077236	.2681764	-3.01	0.003	-1.33334	-.2821072
cons	45.77712	.1655728	276.48	0.000	45.4526	46.10163

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**Table F-2: Regression Coefficients for DEC Cohort 2**

Number of obs = 66019536  
 F(184,65383332) = 107813.97  
 Prob>F = 0.0000  
 R-squared = 0.6861  
 AdjR-squared = 0.6831  
 Root MSE = 14.5232

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2008	15.60621	3.538483	4.41	0.000	8.670906	22.54151
01/2009	18.55965	3.538483	5.25	0.000	11.62435	25.49495
02/2009	15.16359	3.538483	4.29	0.000	8.228292	22.09889
03/2009	6.65773	3.538483	1.88	0.060	-.2775681	13.59303
04/2009	.6109856	3.538482	0.17	0.863	-6.324312	7.546284
05/2009	4.159499	3.538482	1.18	0.240	-2.775798	11.0948
06/2009	14.83888	3.538482	4.19	0.000	7.903585	21.77418
07/2009	18.6593	3.538481	5.27	0.000	11.72401	25.5946
08/2009	17.93512	3.538481	5.07	0.000	10.99982	24.87041
09/2009	6.611174	3.538481	1.87	0.062	-.3241207	13.54647
10/2009	.494279	3.53848	0.14	0.889	-6.441015	7.429573
11/2009	5.650804	3.53848	1.60	0.110	-1.28449	12.5861
12/2009	21.0607	3.53848	5.95	0.000	14.1254	27.99599
01/2010	25.40384	3.53848	7.18	0.000	18.46855	32.33914
02/2010	21.15344	3.538479	5.98	0.000	14.21814	28.08873
03/2010	7.036302	3.538479	1.99	0.047	.1010102	13.97159
04/2010	-.1561714	3.538479	-0.04	0.965	-7.091462	6.779119
05/2010	6.554885	3.538478	1.85	0.064	-.3804053	13.49017
06/2010	20.61625	3.538478	5.83	0.000	13.68096	27.55154
07/2010	26.5117	3.538477	7.49	0.000	19.57641	33.44699
08/2010	22.42108	3.538477	6.34	0.000	15.48579	29.35637
09/2010	10.95032	3.538477	3.09	0.002	4.015031	17.88561
10/2010	.0531436	3.538477	0.02	0.988	-6.882143	6.988431
11/2010	7.951184	3.538476	2.25	0.025	1.015897	14.88647
12/2010	24.3034	3.538476	6.87	0.000	17.36811	31.23868
01/2011	24.59635	3.538476	6.95	0.000	17.66107	31.53164
02/2011	12.14872	3.538476	3.43	0.001	5.213439	19.08401
03/2011	3.271488	3.538475	0.92	0.355	-3.663796	10.20677
04/2011	.0254961	3.538475	0.01	0.994	-6.909788	6.96078
05/2011	6.722884	3.538475	1.90	0.057	-.2123994	13.65817
06/2011	18.30611	3.538475	5.17	0.000	11.37082	25.24139

07/2011	24.57749	3.538474	6.95	0.000	17.6422	31.51277
08/2011	21.24229	3.538474	6.00	0.000	14.307	28.17757
09/2011	6.32984	3.538474	1.79	0.074	-6.05441	13.26512
10/2011	-7.090731	3.538473	-0.20	0.841	-7.644354	6.226207
11/2011	4.789263	3.538473	1.35	0.176	-2.146016	11.72454
12/2011	11.08201	3.538473	3.13	0.002	4.146733	18.01729
01/2012	12.99586	3.538472	3.67	0.000	6.060582	19.93114
02/2012	9.304971	3.538472	2.63	0.009	2.369693	16.24025
03/2012	.2922054	3.538472	0.08	0.934	-6.643072	7.227483
04/2012	-1.444199	3.538472	-0.41	0.683	-8.379476	5.491079
05/2012	3.84496	3.538476	1.09	0.277	-3.090325	10.78025
06/2012	13.37637	3.538477	3.78	0.000	6.441086	20.31166
07/2012	22.48779	3.538472	6.36	0.000	15.55251	29.42307
08/2012	15.61638	3.53847	4.41	0.000	8.681104	22.55165
10/2012	-.1389972	3.539339	-0.04	0.969	-7.075974	6.797979
11/2012	6.747932	3.539339	1.91	0.057	-.1890448	13.68491
12/2012	11.72247	3.539339	3.31	0.001	4.785494	18.65945
01/2013	15.2848	3.539339	4.32	0.000	8.347819	22.22177
02/2013	16.0512	3.539339	4.54	0.000	9.114225	22.98818
03/2013	10.31997	3.539329	2.92	0.004	3.383015	17.25693
04/2013	.7307316	3.539329	0.21	0.836	-6.206225	7.667688
05/2013	2.014527	3.539329	0.57	0.569	-4.92243	8.951484
06/2013	10.40249	3.539329	2.94	0.003	3.465537	17.33945
07/2013	15.21497	3.539329	4.30	0.000	8.278016	22.15193
08/2013	12.16316	3.539329	3.44	0.001	5.226203	19.10012
09/2013	4.993709	3.539329	1.41	0.158	-1.943248	11.93067
10/2013	-.5978868	3.539329	-0.17	0.866	-7.534844	6.33907
11/2013	8.227127	3.539329	2.32	0.020	1.29017	15.16408
12/2013	17.12029	3.539329	4.84	0.000	10.18333	24.05724
01/2014	23.99797	3.539329	6.78	0.000	17.06102	30.93493
02/2014	18.12497	3.539329	5.12	0.000	11.18801	25.06192
03/2014	8.762832	3.539329	2.48	0.013	1.825875	15.69979
04/2014	.3260062	3.539329	0.09	0.927	-6.610951	7.262963
05/2014	3.696197	3.539329	1.04	0.296	-3.24076	10.63315
06/2014	13.51021	3.539329	3.82	0.000	6.57325	20.44716
07/2014	13.74943	3.539329	3.88	0.000	6.812471	20.68639
08/2014	12.28417	3.539329	3.47	0.001	5.347213	19.22113
09/2014	5.353721	3.539329	1.51	0.130	-1.583237	12.29068
10/2014	-1.159543	3.539329	-0.33	0.743	-8.096501	5.777415
11/2014	8.391809	3.539329	2.37	0.018	1.454851	15.32877
12/2014	16.67983	3.539329	4.71	0.000	9.742874	23.61679

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01/2015	19.03981	3.539328	5.38	0.000	12.10285	25.97677
02/2015	21.99416	3.539329	6.21	0.000	15.0572	28.93112
03/2015	7.006767	3.539329	1.98	0.048	.0698103	13.94372
04/2015	-1.618107	3.539329	-0.46	0.648	-8.555064	5.31885
05/2015	4.506174	3.539329	1.27	0.203	-2.430783	11.44313
06/2015	16.51763	3.539329	4.67	0.000	9.580674	23.45459
07/2015	20.28945	3.539329	5.73	0.000	13.35249	27.22641
08/2015	15.72859	3.539329	4.44	0.000	8.791636	22.66555
09/2015	4.758353	3.539329	1.34	0.179	-2.178604	11.69531
10/2015	-2.040086	3.539329	-0.58	0.564	-8.977043	4.896871
11/2015	2.449674	3.539329	0.69	0.489	-4.487283	9.386632
12/2015	7.374783	3.539329	2.08	0.037	.4378261	14.31174
01/2016	16.87508	3.539329	4.77	0.000	9.93812	23.81204
02/2016	14.81747	3.53933	4.19	0.000	7.880515	21.75443
03/2016	1.449485	3.539335	0.41	0.682	-5.487484	8.386454
04/2016	-1.655205	3.539341	-0.47	0.640	-8.592187	5.281777
05/2016	2.03059	3.539348	0.57	0.566	-4.906405	8.967584
06/2016	13.63592	3.539355	3.85	0.000	6.698916	20.57293
07/2016	21.68849	3.539363	6.13	0.000	14.75146	28.62551
08/2016	19.69544	3.539369	5.56	0.000	12.75841	26.63248
09/2016	10.20204	3.539377	2.88	0.004	3.264991	17.13909
10/2016	-1.283525	3.539383	-0.36	0.717	-8.220589	5.653538
11/2016	2.897853	3.539389	0.82	0.413	-4.039222	9.834927
12/2016	12.58997	3.539395	3.56	0.000	5.652881	19.52705
01/2017	10.76085	3.539401	3.04	0.002	3.823751	17.69795
02/2017	4.390035	3.539406	1.24	0.215	-2.547074	11.32714
03/2017	2.278205	3.539411	0.64	0.520	-4.658913	9.215322
04/2017	-1.117221	3.539417	-0.32	0.752	-8.05435	5.819909
05/2017	2.517216	3.539423	0.71	0.477	-4.419927	9.454358
06/2017	10.64104	3.539432	3.01	0.003	3.703883	17.5782
07/2017	17.42826	3.539439	4.92	0.000	10.49109	24.36544
08/2017	12.37889	3.539445	3.50	0.000	5.441705	19.31608
09/2017	4.11828	3.539452	1.16	0.245	-2.81892	11.05548
10/2017	-.1526433	3.539458	-0.04	0.966	-7.089855	6.784568
11/2017	4.710299	3.539466	1.33	0.183	-2.226926	11.64752
12/2017	18.23206	3.539472	5.15	0.000	11.29482	25.16929
01/2018	21.79532	3.539477	6.16	0.000	14.85807	28.73257
02/2018	7.776363	3.539483	2.20	0.028	.8391038	14.71362
03/2018	4.591732	3.539489	1.30	0.195	-2.345538	11.529
04/2018	-1.023749	3.539494	-0.29	0.772	-7.961031	5.913532
05/2018	4.715948	3.539501	1.33	0.183	-2.221346	11.65324

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06/2018	8.871852	3.539601	2.51	0.012	1.934362	15.80934
i.ym#c.treatment						
10/2012	-.840534	.0857929	-9.80	0.000	-1.008685	-.672383
11/2012	-.6158147	.0849309	-7.25	0.000	-.7822762	-.4493533
12/2012	-.9676389	.0849346	-11.39	0.000	-1.134108	-.8011701
01/2013	-.6976332	.0849016	-8.22	0.000	-.8640373	-.5312291
02/2013	-.8442805	.0848814	-9.95	0.000	-1.010645	-.6779161
03/2013	-.9611976	.084455	-11.38	0.000	-1.126726	-.7956688
04/2013	-.5014042	.0844052	-5.94	0.000	-.6668354	-.335973
05/2013	-.6168377	.0844077	-7.31	0.000	-.7822737	-.4514016
06/2013	.2525404	.0844003	2.99	0.003	.0871189	.417962
07/2013	.1679476	.0843964	1.99	0.047	.0025337	.3333615
08/2013	-.1075249	.0843856	-1.27	0.203	-.2729176	.0578677
09/2013	.185229	.0843737	2.20	0.028	.0198595	.3505985
10/2013	-.6812523	.0843209	-8.08	0.000	-.8465182	-.5159864
11/2013	-1.086973	.0842983	-12.89	0.000	-1.252195	-.9217514
12/2013	-.9384901	.0842995	-11.13	0.000	-1.103714	-.773266
01/2014	-.8469811	.0842631	-10.05	0.000	-1.012134	-.6818285
02/2014	-1.160827	.0842618	-13.78	0.000	-1.325977	-.9956765
03/2014	-1.102494	.0842631	-13.08	0.000	-1.267647	-.9373415
04/2014	-.8452056	.0842631	-10.03	0.000	-1.010358	-.680053
05/2014	-.3981435	.0842655	-4.72	0.000	-.5633009	-.2329861
06/2014	-.0148477	.084268	-0.18	0.860	-.1800099	.1503146
07/2014	.3927861	.0842692	4.66	0.000	.2276214	.5579508
08/2014	-.3569773	.0842717	-4.24	0.000	-.5221468	-.1918078
09/2014	.146575	.0842717	1.74	0.082	-.0185945	.3117445
10/2014	-.8074913	.0842742	-9.58	0.000	-.9726656	-.642317
11/2014	-.8933922	.0842742	-10.60	0.000	-1.058567	-.7282179
12/2014	-.5790381	.0842482	-6.87	0.000	-.7441616	-.4139147
01/2015	-.753809	.084247	-8.95	0.000	-.9189301	-.5886879
02/2015	-1.536854	.0842507	-18.24	0.000	-1.701982	-1.371726
03/2015	-1.178561	.0842507	-13.99	0.000	-1.343689	-1.013432
04/2015	-.7316073	.0842532	-8.68	0.000	-.8967405	-.5664741
05/2015	-.216203	.0842544	-2.57	0.010	-.3813386	-.0510673
06/2015	-.0699967	.0842557	-0.83	0.406	-.2351348	.0951414
07/2015	.0738049	.0842569	0.88	0.381	-.0913357	.2389455
08/2015	.0956977	.0842583	1.14	0.256	-.0694454	.2608409
09/2015	-.2657058	.0842583	-3.15	0.002	-.430849	-.1005626
10/2015	-.8266346	.0842608	-9.81	0.000	-.9917828	-.6614864
11/2015	-1.18499	.0842609	-14.06	0.000	-1.350139	-1.019842
12/2015	-.8655857	.084261	-10.27	0.000	-1.030734	-.7004371

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01/2016	-.7369833	.0842738	-8.75	0.000	-.9021568	-.5718098
02/2016	-1.372489	.0843195	-16.28	0.000	-1.537752	-1.207226
03/2016	-1.1059	.0845333	-13.08	0.000	-1.271582	-.9402177
04/2016	-.9229459	.0848208	-10.88	0.000	-1.089192	-.7567001
05/2016	-.3351069	.085112	-3.94	0.000	-.5019234	-.1682904
06/2016	.3111512	.0854262	3.64	0.000	.143719	.4785835
07/2016	.416008	.0857828	4.85	0.000	.2478768	.5841393
08/2016	.3587588	.086059	4.17	0.000	.1900863	.5274312
09/2016	-.0348806	.0864056	-0.40	0.686	-.2042326	.1344713
10/2016	-.7398302	.0866785	-8.54	0.000	-.909717	-.5699435
11/2016	-.961785	.0869257	-11.06	0.000	-1.132156	-.7914139
12/2016	-1.424701	.0871976	-16.34	0.000	-1.595605	-1.253797
01/2017	-1.330731	.0874459	-15.22	0.000	-1.502122	-1.159341
02/2017	-.9211357	.0876705	-10.51	0.000	-1.092967	-.7493047
03/2017	-1.004827	.0878734	-11.43	0.000	-1.177056	-.8325988
04/2017	-1.222549	.0881431	-13.87	0.000	-1.395306	-1.049791
05/2017	-.530477	.0884276	-6.00	0.000	-.7037919	-.3571621
06/2017	-.2310028	.088785	-2.60	0.009	-.4050183	-.0569873
07/2017	.164544	.0891015	1.85	0.065	-.0100917	.3391797
08/2017	.1487353	.0893719	1.66	0.096	-.0264303	.3239009
09/2017	-.593236	.0896693	-6.62	0.000	-.7689846	-.4174875
10/2017	-.4416378	.0899238	-4.91	0.000	-.6178851	-.2653905
11/2017	-1.13602	.0902223	-12.59	0.000	-1.312853	-.959188
12/2017	-1.967648	.0904728	-21.75	0.000	-2.144971	-1.790324
01/2018	-1.022046	.0907028	-11.27	0.000	-1.199821	-.8442722
02/2018	-1.24192	.0909442	-13.66	0.000	-1.420167	-1.063672
03/2018	-1.294107	.0911858	-14.19	0.000	-1.472828	-1.115386
04/2018	-1.025383	.0914225	-11.22	0.000	-1.204567	-.8461979
05/2018	-.6825252	.0916871	-7.44	0.000	-.8622286	-.5028219
06/2018	.5910098	.0958751	6.16	0.000	.403098	.7789215
07/2018	4.231694	3.611954	1.17	0.241	-2.847607	11.31099
cons	32.27554	3.538422	9.12	0.000	25.34036	39.21072

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**Table F-3: Regression Coefficients for DEC Cohort 3**

Number of obs = 40604310  
 F(157,40091478) = 70899.87  
 Prob>F = 0.0000  
 R-squared = 0.6872  
 AdjR-squared = 0.6832  
 Root MSE = 14.5430

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2008	4.800107	3.052301	1.57	0.116	-1.182292	10.78251
01/2009	8.610748	3.0523	2.82	0.005	2.628349	14.59315
02/2009	5.412161	3.052299	1.77	0.076	-.5702365	11.39456
03/2009	-3.517968	3.052299	-1.15	0.249	-9.500363	2.464428
04/2009	-8.94665	3.052298	-2.93	0.003	-14.92904	-2.964255
05/2009	-5.550734	3.052297	-1.82	0.069	-11.53313	.4316593
06/2009	5.096909	3.052297	1.67	0.095	-.8854824	11.0793
07/2009	9.083436	3.052296	2.98	0.003	3.101046	15.06583
08/2009	8.128167	3.052295	2.66	0.008	2.145779	14.11055
09/2009	-3.162188	3.052294	-1.04	0.300	-9.144574	2.820198
10/2009	-9.100818	3.052293	-2.98	0.003	-15.0832	-3.118434
11/2009	-4.361905	3.052292	-1.43	0.153	-10.34429	1.620478
12/2009	11.13158	3.052292	3.65	0.000	5.149194	17.11396
01/2010	14.49521	3.052291	4.75	0.000	8.512831	20.47759
02/2010	10.89715	3.05229	3.57	0.000	4.914774	16.87953
03/2010	-3.095136	3.05229	-1.01	0.311	-9.077514	2.887242
04/2010	-9.618042	3.052289	-3.15	0.002	-15.60042	-3.635665
05/2010	-3.324066	3.052288	-1.09	0.276	-9.306441	2.658308
06/2010	10.91221	3.052287	3.58	0.000	4.929841	16.89459
07/2010	16.63914	3.052286	5.45	0.000	10.65677	22.62151
08/2010	12.89966	3.052286	4.23	0.000	6.917294	18.88203
09/2010	1.158567	3.052285	0.38	0.704	-4.823801	7.140936
10/2010	-9.297072	3.052284	-3.05	0.002	-15.27944	-3.314705
11/2010	-2.228662	3.052283	-0.73	0.465	-8.211028	3.753704
12/2010	13.72268	3.052281	4.50	0.000	7.740317	19.70504
01/2011	14.22493	3.05228	4.66	0.000	8.242569	20.20729
02/2011	1.972608	3.05228	0.65	0.518	-4.009751	7.954967
03/2011	-6.208965	3.052279	-2.03	0.042	-12.19132	-.226607
04/2011	-9.801175	3.052279	-3.21	0.001	-15.78353	-3.818819
05/2011	-2.970979	3.052278	-0.97	0.330	-8.953334	3.011376
06/2011	8.251382	3.052277	2.70	0.007	2.269028	14.23374

07/2011	15.05179	3.052276	4.93	0.000	9.069437	21.03414
08/2011	11.00737	3.052276	3.61	0.000	5.025023	16.98972
09/2011	-3.53773	3.052275	-1.16	0.246	-9.520079	2.444619
10/2011	-10.13682	3.052274	-3.32	0.001	-16.11917	-4.154473
11/2011	-5.304448	3.052274	-1.74	0.082	-11.2868	.6778992
12/2011	1.088651	3.052274	0.36	0.721	-4.893697	7.070998
01/2012	2.56618	3.052274	0.84	0.400	-3.416166	8.548527
02/2012	-.4115271	3.052273	-0.13	0.893	-6.393873	5.570819
03/2012	-9.293764	3.052273	-3.04	0.002	-15.27611	-3.311419
04/2012	-10.83941	3.052272	-3.55	0.000	-16.82175	-4.857068
05/2012	-5.790665	3.052271	-1.90	0.058	-11.77301	.1916767
06/2012	4.227752	3.05227	1.39	0.166	-1.754588	10.21009
07/2012	12.66149	3.052269	4.15	0.000	6.679154	18.64383
08/2012	6.13941	3.052268	2.01	0.044	.1570739	12.12175
09/2012	-5.064978	3.052267	-1.66	0.097	-11.04731	.9173565
10/2012	-10.21502	3.052267	-3.35	0.001	-16.19735	-4.232688
11/2012	-3.700038	3.052266	-1.21	0.225	-9.68237	2.282293
12/2012	1.193116	3.052264	0.39	0.696	-4.789211	7.175444
01/2013	4.405621	3.052262	1.44	0.149	-1.576703	10.38794
02/2013	5.09963	3.05226	1.67	0.095	-.882689	11.08195
03/2013	-.4906964	3.052257	-0.16	0.872	-6.473011	5.491619
04/2013	-9.723053	3.052255	-3.19	0.001	-15.70536	-3.740742
05/2013	-8.05872	3.052253	-2.64	0.008	-14.04103	-2.076414
06/2013	.551404	3.05225	0.18	0.857	-5.430897	6.533705
07/2013	5.409738	3.052248	1.77	0.076	-.5725577	11.39203
08/2013	2.308546	3.052245	0.76	0.449	-3.673745	8.290836
09/2013	-5.072823	3.052243	-1.66	0.097	-11.05511	.9094641
10/2013	-10.80706	3.052241	-3.54	0.000	-16.78934	-4.824778
11/2013	-2.349596	3.052239	-0.77	0.441	-8.331875	3.632683
12/2013	6.189431	3.052238	2.03	0.043	.2071557	12.17171
01/2014	12.71102	3.052238	4.16	0.000	6.728742	18.6933
02/2014	6.987426	3.052235	2.29	0.022	1.005156	12.9697
03/2014	-2.046078	3.052237	-0.67	0.503	-8.028352	3.936196
04/2014	-10.05183	3.052231	-3.29	0.001	-16.03409	-4.069567
05/2014	-6.329871	3.052232	-2.07	0.038	-12.31214	-.347607
06/2014	3.61481	3.052228	1.18	0.236	-2.367448	9.597068
07/2014	3.793964	3.052227	1.24	0.214	-2.188291	9.776219
08/2014	2.388031	3.052224	0.78	0.434	-3.594219	8.370281
09/2014	-4.630212	3.052221	-1.52	0.129	-10.61246	1.352033
10/2014	-11.21452	3.052222	-3.67	0.000	-17.19677	-5.232276
11/2014	-1.953173	3.052218	-0.64	0.522	-7.935411	4.029064

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01/2015	8.419659	3.05412	2.76	0.006	2.433694	14.40562
02/2015	12.0633	3.053307	3.95	0.000	6.078928	18.04767
03/2015	-2.622299	3.053307	-0.86	0.390	-8.606671	3.362072
04/2015	-10.99208	3.053307	-3.60	0.000	-16.97645	-5.00771
05/2015	-4.858547	3.053307	-1.59	0.112	-10.84292	1.125825
06/2015	6.97091	3.053307	2.28	0.022	.9865374	12.95528
07/2015	10.56639	3.053307	3.46	0.001	4.582019	16.55076
08/2015	6.219886	3.053307	2.04	0.042	.2355132	12.20426
09/2015	-4.476623	3.053307	-1.47	0.143	-10.461	1.507749
10/2015	-11.29456	3.053307	-3.70	0.000	-17.27893	-5.31019
11/2015	-7.138996	3.053307	-2.34	0.019	-13.12337	-1.154623
12/2015	-2.345706	3.053307	-0.77	0.442	-8.330078	3.638667
01/2016	7.305592	3.053004	2.39	0.017	1.321814	13.28937
02/2016	5.167734	3.053005	1.69	0.091	-.8160463	11.15151
03/2016	-7.910725	3.053013	-2.59	0.010	-13.89452	-1.92693
04/2016	-10.89657	3.053025	-3.57	0.000	-16.88039	-4.91275
05/2016	-7.143642	3.053036	-2.34	0.019	-13.12748	-1.1598
06/2016	4.332453	3.05305	1.42	0.156	-1.651414	10.31632
07/2016	12.35783	3.053063	4.05	0.000	6.373932	18.34172
08/2016	10.63225	3.053075	3.48	0.000	4.648337	16.61617
09/2016	1.210586	3.053091	0.40	0.692	-4.773363	7.194534
10/2016	-10.36873	3.053103	-3.40	0.001	-16.3527	-4.384755
11/2016	-6.557732	3.053113	-2.15	0.032	-12.54172	-.5737399
12/2016	2.734994	3.053123	0.90	0.370	-3.249018	8.719005
01/2017	1.080316	3.053131	0.35	0.723	-4.903711	7.064344
02/2017	-5.081815	3.05314	-1.66	0.096	-11.06586	.9022294
03/2017	-7.07275	3.053148	-2.32	0.021	-13.05681	-1.088689
04/2017	-10.3789	3.05316	-3.40	0.001	-16.36298	-4.394817
05/2017	-6.473595	3.05317	-2.12	0.034	-12.4577	-.4894912
06/2017	1.672422	3.053184	0.55	0.584	-4.311709	7.656553
07/2017	8.493432	3.053196	2.78	0.005	2.509278	14.47759
08/2017	3.566817	3.053209	1.17	0.243	-2.417362	9.550996
09/2017	-4.763079	3.053222	-1.56	0.119	-10.74728	1.221127
10/2017	-8.978536	3.053233	-2.94	0.003	-14.96276	-2.99431
11/2017	-4.669028	3.053244	-1.53	0.126	-10.65328	1.315221
12/2017	8.236015	3.053254	2.70	0.007	2.251748	14.22028
01/2018	12.3005	3.053262	4.03	0.000	6.31622	18.28479
02/2018	-1.551407	3.05327	-0.51	0.611	-7.535706	4.432893
03/2018	-4.526992	3.053278	-1.48	0.138	-10.51131	1.457323
04/2018	-10.04692	3.053288	-3.29	0.001	-16.03126	-4.062587
05/2018	-3.988248	3.053299	-1.31	0.191	-9.972604	1.996108

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06/2018	.6335512	3.053467	0.21	0.836	-5.351135	6.618238
i.ym#c.treatment						
01/2015	.0377955	.114059	0.33	0.740	-.1857559	.261347
02/2015	-.833235	.0892735	-9.33	0.000	-1.008208	-.6582621
03/2015	-.7262734	.0892039	-8.14	0.000	-.9011097	-.551437
04/2015	-.5938088	.0891373	-6.66	0.000	-.7685147	-.419103
05/2015	-.306374	.0891457	-3.44	0.001	-.4810964	-.1316517
06/2015	.1450813	.0889965	1.63	0.103	-.0293486	.3195113
07/2015	.3757419	.0889162	4.23	0.000	.2014694	.5500144
08/2015	.0726542	.0888267	0.82	0.413	-.1014431	.2467514
09/2015	-.4029971	.0887425	-4.54	0.000	-.5769292	-.2290651
10/2015	-.682674	.0887454	-7.69	0.000	-.8566118	-.5087363
11/2015	-.6008986	.0887482	-6.77	0.000	-.7748419	-.4269552
12/2015	-.6356207	.0887498	-7.16	0.000	-.8095671	-.4616743
01/2016	-.9710795	.0774821	-12.53	0.000	-1.122942	-.8192174
02/2016	-.8419055	.0775239	-10.86	0.000	-.9938496	-.6899613
03/2016	-.7040577	.077845	-9.04	0.000	-.8566311	-.5514843
04/2016	-.6087804	.0783888	-7.77	0.000	-.7624197	-.4551411
05/2016	-.3715941	.0788764	-4.71	0.000	-.5261889	-.2169992
06/2016	-.0540306	.0794407	-0.68	0.496	-.2097315	.1016704
07/2016	.1053861	.0799999	1.32	0.188	-.0514108	.262183
08/2016	-.1484794	.0805214	-1.84	0.065	-.3062985	.0093396
09/2016	-.2846716	.081177	-3.51	0.000	-.4437757	-.1255676
10/2016	-.53451	.081661	-6.55	0.000	-.6945627	-.3744573
11/2016	-.6804318	.0820996	-8.29	0.000	-.841344	-.5195196
12/2016	-.6992574	.082492	-8.48	0.000	-.8609388	-.537576
01/2017	-.8758714	.0828364	-10.57	0.000	-1.038228	-.7135151
02/2017	-.8394719	.0831888	-10.09	0.000	-1.002519	-.6764248
03/2017	-.8224493	.0835177	-9.85	0.000	-.986141	-.6587576
04/2017	-.5234548	.0839714	-6.23	0.000	-.6880358	-.3588738
05/2017	-.4768314	.0844012	-5.65	0.000	-.6422547	-.3114082
06/2017	-.2849351	.0849403	-3.35	0.001	-.4514151	-.1184552
07/2017	-.2419255	.0854177	-2.83	0.005	-.4093411	-.0745099
08/2017	-.3216228	.0859063	-3.74	0.000	-.4899961	-.1532495
09/2017	-.37507	.0864309	-4.34	0.000	-.5444715	-.2056684
10/2017	-.7246407	.0868411	-8.34	0.000	-.8948461	-.5544353
11/2017	-.9305442	.0872721	-10.66	0.000	-1.101594	-.7594939
12/2017	-.8993463	.0876383	-10.26	0.000	-1.071114	-.7275784
01/2018	-1.502409	.0879592	-17.08	0.000	-1.674806	-1.330012
02/2018	-1.09973	.0882721	-12.46	0.000	-1.27274	-.9267195
03/2018	-1.204989	.0885769	-13.60	0.000	-1.378596	-1.031381

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04/2018	-.8783212	.0889505	-9.87	0.000	-1.052661	-.7039813
05/2018	-.5710127	.0893625	-6.39	0.000	-.7461601	-.3958654
06/2018	-.7933233	.0953859	-8.32	0.000	-.9802761	-.6063704
07/2018	-1.619952	3.283889	-0.49	0.622	-8.056256	4.816353
cons	40.62169	3.05215	13.31	0.000	34.63958	46.60379

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**Table F-4: Regression Coefficients for DEC Cohort 4**

Number of obs = 2786506  
 F(66,2704706) = 11996.52  
 Prob>F = 0.0000  
 R-squared = 0.6768  
 AdjR-squared = 0.6670  
 Root MSE = 13.4629

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
11/2014	-2.129968	.5160509	-4.13	0.000	-3.141409	-1.118526
12/2014	.7995394	.1809991	4.42	0.000	.4447874	1.154291
01/2015	3.89335	.159155	24.46	0.000	3.581412	4.205288
02/2015	5.849923	.1488146	39.31	0.000	5.558252	6.141594
03/2015	-9.51515	.1428783	-66.60	0.000	-9.795186	-9.235113
04/2015	-15.97402	.1391285	-114.81	0.000	-16.24671	-15.70133
05/2015	-9.411435	.1361754	-69.11	0.000	-9.678333	-9.144536
06/2015	1.840266	.1343183	13.70	0.000	1.577007	2.103525
07/2015	5.658733	.1337927	42.29	0.000	5.396504	5.920962
08/2015	2.205322	.1337911	16.48	0.000	1.943097	2.467548
09/2015	-7.724652	.1337896	-57.74	0.000	-7.986875	-7.462429
10/2015	-13.9259	.1337888	-104.09	0.000	-14.18812	-13.66368
11/2015	-9.326421	.1337878	-69.71	0.000	-9.58864	-9.064201
12/2015	-4.45948	.133787	-33.33	0.000	-4.721698	-4.197262
01/2016	5.543039	.1337978	41.43	0.000	5.2808	5.805278
02/2016	3.400328	.1337861	25.42	0.000	3.138111	3.662544
03/2016	-9.983961	.1337864	-74.63	0.000	-10.24618	-9.721744
04/2016	-12.95555	.133787	-96.84	0.000	-13.21777	-12.69333
05/2016	-9.032726	.1337919	-67.51	0.000	-9.294954	-8.770499
07/2016	9.598957	.1560437	61.51	0.000	9.293117	9.904797
08/2016	8.037947	.1566562	51.31	0.000	7.730906	8.344988
09/2016	-8.8432209	.157321	-5.36	0.000	-1.151565	-.5348773
10/2016	-12.11847	.1579077	-76.74	0.000	-12.42796	-11.80898
11/2016	-8.161454	.1584371	-51.51	0.000	-8.471985	-7.850923
12/2016	1.069164	.1589149	6.73	0.000	.7576961	1.380631
01/2017	-.5059034	.1593422	-3.17	0.001	-.8182085	-.1935983
02/2017	-6.49126	.1597712	-40.63	0.000	-6.804406	-6.178114
03/2017	-8.551896	.1602284	-53.37	0.000	-8.865938	-8.237854
04/2017	-11.85432	.1608505	-73.70	0.000	-12.16958	-11.53906
05/2017	-7.881329	.1613408	-48.85	0.000	-8.197551	-7.565107
06/2017	.0995906	.1620685	0.61	0.539	-.218058	.4172392



07/2017	6.745274	.1628356	41.42	0.000	6.426122	7.064426
08/2017	2.178437	.1635059	13.32	0.000	1.857971	2.498903
09/2017	-5.947133	.1640964	-36.24	0.000	-6.268756	-5.62551
10/2017	-10.11436	.1645538	-61.47	0.000	-10.43688	-9.791838
11/2017	-6.043799	.1651138	-36.60	0.000	-6.367416	-5.720181
12/2017	6.906876	.1655694	41.72	0.000	6.582366	7.231386
01/2018	11.01763	.1659428	66.39	0.000	10.69239	11.34287
02/2018	-2.829121	.1663363	-17.01	0.000	-3.155134	-2.503107
03/2018	-6.102164	.1667903	-36.59	0.000	-6.429067	-5.775261
04/2018	-11.26316	.1672252	-67.35	0.000	-11.59092	-10.9354
05/2018	-4.986363	.1679172	-29.70	0.000	-5.315475	-4.657251
i.ym#c.treatment						
07/2016	.1828978	.113821	1.61	0.108	-.0401874	.4059831
08/2016	.0753366	.1150448	0.65	0.513	-.1501472	.3008203
09/2016	.0573918	.1164161	0.49	0.622	-.1707796	.2855632
10/2016	-.0432637	.1175481	-0.37	0.713	-.2736539	.1871265
11/2016	-.2011198	.1185656	-1.70	0.090	-.4335042	.0312646
12/2016	-.3388227	.11946	-2.84	0.005	-.5729601	-.1046853
01/2017	-.4191447	.1202964	-3.48	0.000	-.6549213	-.1833681
02/2017	-.322171	.1211429	-2.66	0.008	-.5596067	-.0847353
03/2017	-.3026794	.1220086	-2.48	0.013	-.5418119	-.0635469
04/2017	-.305068	.1231544	-2.48	0.013	-.5464463	-.0636897
05/2017	-.2628031	.1240657	-2.12	0.034	-.5059675	-.0196386
06/2017	-.2290852	.1254093	-1.83	0.068	-.4748829	.0167126
07/2017	-.1646681	.1268028	-1.30	0.194	-.4131971	.0838609
08/2017	-.1280379	.1280134	-1.00	0.317	-.3789398	.1228639
09/2017	-.1215365	.1290981	-0.94	0.346	-.3745642	.1314913
10/2017	-.2776967	.129931	-2.14	0.033	-.5323568	-.0230365
11/2017	-.5977234	.1309114	-4.57	0.000	-.8543051	-.3411417
12/2017	-.7841506	.1317133	-5.95	0.000	-1.042304	-.5259972
01/2018	-.6980149	.1323786	-5.27	0.000	-.9574723	-.4385574
02/2018	-.6492616	.1330744	-4.88	0.000	-.9100827	-.3884404
03/2018	-.6414613	.1338591	-4.79	0.000	-.9038203	-.3791022
04/2018	-.4786892	.1346351	-3.56	0.000	-.7425691	-.2148092
05/2018	-.3898461	.1357834	-2.87	0.004	-.6559768	-.1237155
06/2018	-.2791806	.1445601	-1.93	0.053	-.5625133	.004152
cons	40.93424	.1251303	327.13	0.000	40.68899	41.17949

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**Table F-5: Regression Coefficients for DEC Cohort 5**

Number of obs = 5015283  
 F(55,4813508) = 24906.39  
 Prob>F = 0.0000  
 R-squared = 0.6783  
 AdjR-squared = 0.6648  
 Root MSE = 13.3705

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.y						
11/2014	-.5435081	.5493008	-0.99	0.322	-1.620118	.5331018
12/2014	2.555639	.1699153	15.04	0.000	2.222611	2.888667
01/2015	5.198331	.1671576	31.10	0.000	4.870708	5.525954
02/2015	7.457801	.164184	45.42	0.000	7.136006	7.779595
03/2015	-8.452811	.1610993	-52.47	0.000	-8.76856	-8.137062
04/2015	-16.87648	.1581985	-106.68	0.000	-17.18654	-16.56642
05/2015	-11.28277	.1552743	-72.66	0.000	-11.5871	-10.97844
06/2015	-.2107536	.1507475	-1.40	0.162	-.5062134	.0847061
07/2015	2.855071	.1288381	22.16	0.000	2.602553	3.107589
08/2015	-2.192529	.1159251	-18.91	0.000	-2.419738	-1.96532
09/2015	-11.72147	.1103524	-106.22	0.000	-11.93775	-11.50518
10/2015	-16.57337	.106735	-155.28	0.000	-16.78257	-16.36417
11/2015	-11.69213	.1046589	-111.72	0.000	-11.89726	-11.487
12/2015	-7.018907	.102948	-68.18	0.000	-7.220681	-6.817132
01/2016	3.029555	.1017131	29.79	0.000	2.830201	3.228909
02/2016	.2910354	.1006586	2.89	0.004	.0937482	.4883227
03/2016	-12.67847	.0996331	-127.25	0.000	-12.87374	-12.48319
04/2016	-15.18306	.0987026	-153.83	0.000	-15.37651	-14.9896
05/2016	-11.15793	.0979399	-113.93	0.000	-11.34989	-10.96597
06/2016	.2973939	.0971935	3.06	0.002	.1068981	.4878897
07/2016	7.903994	.0965266	81.88	0.000	7.714806	8.093183
08/2016	6.071698	.0959907	63.25	0.000	5.883559	6.259836
09/2016	-2.666698	.0956047	-27.89	0.000	-2.85408	-2.479316
10/2016	-13.20457	.0955226	-138.24	0.000	-13.3918	-13.01735
11/2016	-8.784182	.0955225	-91.96	0.000	-8.971403	-8.596961
12/2016	.493144	.0955222	5.16	0.000	.3059239	.6803641
01/2017	-1.243375	.095522	-13.02	0.000	-1.430595	-1.056156
02/2017	-7.227807	.0955222	-75.67	0.000	-7.415027	-7.040587
03/2017	-9.279795	.0955247	-97.15	0.000	-9.46702	-9.09257
04/2017	-12.69417	.0955735	-132.82	0.000	-12.88149	-12.50685
06/2017	-.9581217	.1736778	-5.52	0.000	-1.298524	-.6177193

07/2017	5.859184	.1751748	33.45	0.000	5.515847	6.20252
08/2017	1.226236	.1766362	6.94	0.000	.8800355	1.572437
09/2017	-6.870248	.1780275	-38.59	0.000	-7.219175	-6.52132
10/2017	-11.16482	.1791494	-62.32	0.000	-11.51594	-10.81369
11/2017	-6.590741	.1181327	-55.79	0.000	-6.822276	-6.359205
12/2017	5.810316	.1184699	49.04	0.000	5.57812	6.042513
01/2018	9.980797	.1187885	84.02	0.000	9.747976	10.21362
02/2018	-3.575404	.1191229	-30.01	0.000	-3.80888	-3.341927
03/2018	-6.785102	.1194497	-56.80	0.000	-7.019219	-6.550985
04/2018	-11.58747	.1198312	-96.70	0.000	-11.82234	-11.35261
05/2018	-4.981079	.1203004	-41.41	0.000	-5.216863	-4.745294
i.ym#c.treatment						
06/2017	-.5173647	.1557323	-3.32	0.001	-.8225946	-.2121349
07/2017	-.6983529	.1575726	-4.43	0.000	-1.00719	-.3895162
08/2017	-.5044947	.1593592	-3.17	0.002	-.8168331	-.1921563
09/2017	-.4812305	.1610643	-2.99	0.003	-.7969108	-.1655502
10/2017	-.2823175	.1624306	-1.74	0.082	-.6006757	.0360408
11/2017	-.4001677	.0892927	-4.48	0.000	-.5751782	-.2251573
12/2017	-.0392246	.0899129	-0.44	0.663	-.2154507	.1370015
01/2018	-.0004226	.0904822	-0.00	0.996	-.1777645	.1769192
02/2018	-.3374415	.091078	-3.70	0.000	-.5159511	-.1589318
03/2018	-.3964715	.0916601	-4.33	0.000	-.5761219	-.216821
04/2018	-.7122844	.092324	-7.72	0.000	-.8932362	-.5313325
05/2018	-1.211497	.0931284	-13.01	0.000	-1.394026	-1.028969
06/2018	-1.349513	.0995255	-13.56	0.000	-1.54458	-1.154447
cons	41.63829	.0909139	458.00	0.000	41.4601	41.81647

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**Table F-6: Regression Coefficients for DEC Cohort 6**

Number of obs = 932468  
 F(79,912163) = 4651.03  
 Prob>F = 0.0000  
 R-squared = 0.6947  
 AdjR-squared = 0.6879  
 Root MSE = 14.3218

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2008	5.041887	.1955036	25.79	0.000	4.658706	5.425067
01/2009	8.460343	.1955007	43.28	0.000	8.077168	8.843518
02/2009	4.973629	.1955007	25.44	0.000	4.590455	5.356804
03/2009	-4.451376	.1955007	-22.77	0.000	-4.834551	-4.068201
04/2009	-10.17105	.1955022	-52.03	0.000	-10.55422	-9.787869
05/2009	-4.912101	.1955007	-25.13	0.000	-5.295276	-4.528927
06/2009	8.786893	.1955198	44.94	0.000	8.403681	9.170105
07/2009	12.66884	.1955007	64.80	0.000	12.28567	13.05202
08/2009	10.79143	.1955007	55.20	0.000	10.40826	11.17461
09/2009	-1.687633	.1955007	-8.63	0.000	-2.070807	-1.304458
10/2009	-10.13697	.1955007	-51.85	0.000	-10.52015	-9.753796
11/2009	-5.4866	.1955007	-28.06	0.000	-5.869774	-5.103425
12/2009	12.36428	.1955007	63.24	0.000	11.98111	12.74746
01/2010	17.60885	.1955007	90.07	0.000	17.22567	17.99202
02/2010	12.61609	.1955007	64.53	0.000	12.23291	12.99926
03/2010	-2.469856	.1955007	-12.63	0.000	-2.853031	-2.086681
11/2015	-10.18717	.2210844	-46.08	0.000	-10.62049	-9.753851
12/2015	-4.665506	.2210844	-21.10	0.000	-5.098824	-4.232187
01/2016	5.039164	.2210892	22.79	0.000	4.605837	5.472491
02/2016	2.188841	.2211231	9.90	0.000	1.755447	2.622235
03/2016	-11.4052	.2212496	-51.55	0.000	-11.83884	-10.97155
04/2016	-13.77942	.2214656	-62.22	0.000	-14.21349	-13.34536
05/2016	-7.164986	.2216541	-32.33	0.000	-7.59942	-6.730551
06/2016	7.092381	.2218493	31.97	0.000	6.657564	7.527198
07/2016	15.79796	.2221225	71.12	0.000	15.36261	16.23332
08/2016	12.0507	.2223425	54.20	0.000	11.61492	12.48648
09/2016	1.411673	.2226219	6.34	0.000	.9753416	1.848004
10/2016	-12.57083	.2228677	-56.40	0.000	-13.00764	-12.13401
11/2016	-9.608094	.223026	-43.08	0.000	-10.04522	-9.17097
12/2016	-5.816872	.2232015	-2.61	0.009	-1.019155	-1.1442198
01/2017	-2.80344	.2233837	-12.55	0.000	-3.241264	-2.365615

02/2017	-8.565695	.2235348	-38.32	0.000	-9.003816	-8.127574
03/2017	-10.73747	.2236869	-48.00	0.000	-11.17589	-10.29905
04/2017	-13.73371	.2239498	-61.32	0.000	-14.17265	-13.29478
05/2017	-8.190045	.22421	-36.53	0.000	-8.629489	-7.750601
06/2017	1.173897	.2245572	5.23	0.000	.7337723	1.614021
07/2017	8.841137	.2248349	39.32	0.000	8.400468	9.281806
08/2017	4.531975	.2250696	20.14	0.000	4.090846	4.973104
09/2017	-5.786436	.2253412	-25.68	0.000	-6.228098	-5.344775
10/2017	-11.07195	.2255921	-49.08	0.000	-11.51411	-10.6298
11/2017	-8.484853	.2258159	-37.57	0.000	-8.927445	-8.042262
12/2017	4.745923	.2260237	21.00	0.000	4.302925	5.188922
01/2018	9.844017	.2262811	43.50	0.000	9.400514	10.28752
02/2018	-5.799516	.2265228	-25.60	0.000	-6.243493	-5.355538
03/2018	-9.931726	.2267483	-43.80	0.000	-10.37615	-9.487307
04/2018	-13.96921	.2269819	-61.54	0.000	-14.41409	-13.52433
05/2018	-6.979706	.2272049	-30.72	0.000	-7.42502	-6.534392
i.ym#c.treatment						
11/2015	.08458	.2079576	0.41	0.684	-.3230099	.4921699
12/2015	.1099624	.2079576	0.53	0.597	-.2976275	.5175523
01/2016	-.2175456	.2079633	-1.05	0.296	-.6251467	.1900555
02/2016	-.1796001	.2080442	-0.86	0.388	-.5873598	.2281596
03/2016	-.0315635	.2083977	-0.15	0.880	-.440016	.3768891
04/2016	-.0395616	.2088236	-0.19	0.850	-.4488488	.3697257
05/2016	-.0551549	.2092673	-0.26	0.792	-.4653118	.3550019
06/2016	-.0480782	.2097605	-0.23	0.819	-.4592019	.3630455
07/2016	-.0691823	.2103488	-0.33	0.742	-.4814589	.3430942
08/2016	-.0422501	.2108154	-0.20	0.841	-.4554414	.3709411
09/2016	-.1268783	.2114394	-0.60	0.548	-.5412925	.2875358
10/2016	-.208193	.2118933	-0.98	0.326	-.6234967	.2071108
11/2016	-.4404545	.2123196	-2.07	0.038	-.8565939	-.0243151
12/2016	-.5706292	.2127374	-2.68	0.007	-.9875875	-.153671
01/2017	-.6035371	.2131731	-2.83	0.005	-1.021349	-.185725
02/2017	-.3146924	.2134679	-1.47	0.140	-.7330823	.1036975
03/2017	-.2962436	.2137588	-1.39	0.166	-.7152036	.1227165
04/2017	-.1736185	.2143096	-0.81	0.418	-.5936581	.2464212
05/2017	-.1094373	.2148385	-0.51	0.610	-.5305137	.311639
06/2017	-.2106441	.2155687	-0.98	0.328	-.6331515	.2118633
07/2017	-.3139904	.2161692	-1.45	0.146	-.7376749	.1096941
08/2017	-.4149419	.2166938	-1.91	0.056	-.8396545	.0097707
09/2017	-.4059735	.2172397	-1.87	0.062	-.8317561	.0198091
10/2017	-.351112	.2177589	-1.61	0.107	-.7779122	.0756882

11/2017	-.5587344	.2182237	-2.56	0.010	-.9864456	-.1310232
12/2017	-.62449	.2186823	-2.86	0.004	-1.0531	-.19588
01/2018	-.8825185	.2191279	-4.03	0.000	-1.312002	-.4530352
02/2018	-.5237236	.2196562	-2.38	0.017	-.9542425	-.0932047
03/2018	-.6866934	.2200998	-3.12	0.002	-1.118082	-.2553052
04/2018	-.4439611	.2206005	-2.01	0.044	-.8763306	-.0115916
05/2018	-.499444	.2210376	-2.26	0.024	-.9326702	-.0662177
06/2018	-.6342094	.2331416	-2.72	0.007	-1.091159	-.1772597
cons	45.58088	.1674973	272.13	0.000	45.25259	45.90917

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**Table F-7: Regression Coefficients for DEC Cohort 7**

Number of obs = 8299134  
 F(108,8180957) = 22249.73  
 Prob>F = 0.0000  
 R-squared = 0.7006  
 AdjR-squared = 0.6963  
 Root MSE = 14.8302

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.y						
12/2008	6.63468	.1067528	62.15	0.000	6.425448	6.843912
01/2009	10.50638	.1067023	98.46	0.000	10.29725	10.71552
02/2009	7.248244	.1066483	67.96	0.000	7.039217	7.457271
03/2009	-1.858576	.1065871	-17.44	0.000	-2.067483	-1.649669
04/2009	-7.724038	.106532	-72.50	0.000	-7.932836	-7.515239
05/2009	-4.904396	.1064595	-46.07	0.000	-5.113053	-4.695739
06/2009	5.135311	.1063953	48.27	0.000	4.926781	5.343842
07/2009	8.90383	.1063155	83.75	0.000	8.695456	9.112205
08/2009	8.088819	.1062409	76.14	0.000	7.880591	8.297047
09/2009	-2.589432	.1061753	-24.39	0.000	-2.797532	-2.381332
10/2009	-7.883209	.1060962	-74.30	0.000	-8.091154	-7.675264
11/2009	-2.734342	.1060323	-25.79	0.000	-2.942161	-2.526522
12/2009	12.9659	.1059685	122.36	0.000	12.7582	13.17359
01/2010	16.56347	.1059189	156.38	0.000	16.35587	16.77106
02/2010	12.76491	.105867	120.57	0.000	12.55741	12.9724
03/2010	-1.560876	.1058037	-14.75	0.000	-1.768248	-1.353505
04/2010	-8.540132	.1057297	-80.77	0.000	-8.747359	-8.332906
05/2010	-2.732645	.1056449	-25.87	0.000	-2.939705	-2.525584
06/2010	10.76693	.1055719	101.99	0.000	10.56001	10.97385
07/2010	16.23684	.1054992	153.90	0.000	16.03006	16.44361
08/2010	12.6379	.1054367	119.86	0.000	12.43124	12.84455
09/2010	1.491803	.1053833	14.16	0.000	1.285256	1.698351
10/2010	-8.168209	.1053197	-77.56	0.000	-8.374632	-7.961786
11/2010	-5.088313	.1052718	-4.83	0.000	-7.151602	-3.025024
12/2010	15.77979	.1052173	149.97	0.000	15.57357	15.98601
01/2011	16.31188	.1051705	155.10	0.000	16.10575	16.51801
02/2011	3.798693	.1051237	36.14	0.000	3.592654	4.004731
03/2011	-4.666683	.105064	-44.42	0.000	-4.872605	-4.460761
04/2011	-8.529953	.1050072	-81.23	0.000	-8.735764	-8.324143
05/2011	-2.30731	.1049513	-21.98	0.000	-2.513011	-2.101609
06/2011	8.407116	.1048911	80.15	0.000	8.201534	8.612699

07/2011	14.8288	.1048115	141.48	0.000	14.62337	15.03422
08/2011	11.00042	.1047064	105.06	0.000	10.7952	11.20564
09/2011	-2.913439	.1045977	-27.85	0.000	-3.118447	-2.708432
10/2011	-8.915685	.1045466	-85.28	0.000	-9.120592	-8.710777
11/2011	-3.662732	.1045456	-35.03	0.000	-3.867638	-3.457827
12/2011	2.784185	.1045443	26.63	0.000	2.579281	2.989088
01/2012	4.476587	.1045273	42.83	0.000	4.271717	4.681457
02/2012	1.30326	.10448	12.47	0.000	1.098483	1.508037
03/2012	-7.954345	.1044434	-76.16	0.000	-8.15905	-7.74964
04/2012	-9.741258	.1044409	-93.27	0.000	-9.945959	-9.536558
05/2012	-4.950153	.1044409	-47.40	0.000	-5.154854	-4.745453
06/2012	4.580658	.104441	43.86	0.000	4.375958	4.785359
07/2012	12.81242	.1044409	122.68	0.000	12.60772	13.01712
08/2012	6.515639	.104441	62.39	0.000	6.310938	6.720339
11/2015	-6.372445	.1256059	-50.73	0.000	-6.618628	-6.126262
12/2015	-1.447519	.1256059	-11.52	0.000	-1.693702	-1.201336
01/2016	8.053045	.1256142	64.11	0.000	7.806845	8.299244
02/2016	5.993706	.125644	47.70	0.000	5.747449	6.239964
03/2016	-7.376266	.1257824	-58.64	0.000	-7.622795	-7.129737
04/2016	-10.48149	.1259675	-83.21	0.000	-10.72838	-10.2346
05/2016	-6.797012	.1261557	-53.88	0.000	-7.044273	-6.549752
06/2016	4.808092	.1263586	38.05	0.000	4.560434	5.055751
07/2016	12.85767	.1265898	101.57	0.000	12.60956	13.10578
08/2016	10.86405	.126768	85.70	0.000	10.61559	11.11251
09/2016	1.366338	.126994	10.76	0.000	1.117434	1.615242
10/2016	-10.12053	.127172	-79.58	0.000	-10.36978	-9.871275
11/2016	-5.940203	.1273335	-46.65	0.000	-6.189772	-5.690634
12/2016	3.746748	.1275126	29.38	0.000	3.496828	3.996668
01/2017	1.91543	.1276766	15.00	0.000	1.665188	2.165672
02/2017	-4.458172	.1278252	-34.88	0.000	-4.708705	-4.207639
03/2017	-6.570818	.1279588	-51.35	0.000	-6.821613	-6.320024
04/2017	-9.967335	.1281367	-77.79	0.000	-10.21848	-9.716192
05/2017	-6.33538	.1283256	-49.37	0.000	-6.586894	-6.083867
06/2017	1.787446	.1285641	13.90	0.000	1.535465	2.039426
07/2017	8.571358	.1287744	66.56	0.000	8.318965	8.823751
08/2017	3.520584	.1289543	27.30	0.000	3.267838	3.77333
09/2017	-4.741817	.1291531	-36.71	0.000	-4.994952	-4.488681
10/2017	-9.012064	.1293237	-69.69	0.000	-9.265534	-8.758594
11/2017	-4.150784	.1295249	-32.05	0.000	-4.404649	-3.89692
12/2017	9.370016	.129694	72.25	0.000	9.115821	9.624212
01/2018	12.93185	.1298495	99.59	0.000	12.67735	13.18635

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02/2018	-1.087792	.1300131	-8.37	0.000	-1.342613	-.8329714
03/2018	-4.273792	.1301772	-32.83	0.000	-4.528935	-4.018649
04/2018	-9.890106	.1303374	-75.88	0.000	-10.14556	-9.634649
05/2018	-4.150729	.1305172	-31.80	0.000	-4.406538	-3.89492
i.ym#c.treatment						
11/2015	-.0371516	.0982694	-0.38	0.705	-.2297561	.1554529
12/2015	-.1025569	.0982697	-1.04	0.297	-.295162	.0900482
01/2016	-.0952013	.0982833	-0.97	0.333	-.2878331	.0974305
02/2016	-.1078629	.0983325	-1.10	0.273	-.300591	.0848653
03/2016	-.1347891	.0985748	-1.37	0.172	-.3279923	.058414
04/2016	-.1659005	.0989088	-1.68	0.093	-.3597582	.0279572
05/2016	-.181293	.0992522	-1.83	0.068	-.3758239	.0132378
06/2016	-.2988676	.0996305	-3.00	0.003	-.4941399	-.1035953
07/2016	-.3339437	.1000505	-3.34	0.001	-.5300392	-.1378483
08/2016	-.3068337	.1003827	-3.06	0.002	-.5035802	-.1100872
09/2016	-.2748773	.1007907	-2.73	0.006	-.4724236	-.0773311
10/2016	-.1441438	.1011125	-1.43	0.154	-.3423207	.054033
11/2016	-.123375	.1014063	-1.22	0.224	-.3221278	.0753777
12/2016	-.2335462	.1017181	-2.30	0.022	-.4329101	-.0341823
01/2017	-.2909031	.1020073	-2.85	0.004	-.4908337	-.0909724
02/2017	-.2518571	.1022726	-2.46	0.014	-.4523077	-.0514065
03/2017	-.2672344	.1025103	-2.61	0.009	-.4681508	-.0663179
04/2017	-.3105615	.1028324	-3.02	0.003	-.5121093	-.1090138
05/2017	-.3154442	.1031603	-3.06	0.002	-.5176348	-.1132536
06/2017	-.3646096	.1035768	-3.52	0.000	-.5676165	-.1616027
07/2017	-.5011984	.1039479	-4.82	0.000	-.7049326	-.2974642
08/2017	-.4079286	.1042687	-3.91	0.000	-.6122916	-.2035657
09/2017	-.3313687	.1046242	-3.17	0.002	-.5364284	-.126309
10/2017	-.2276498	.1049184	-2.17	0.030	-.4332861	-.0220135
11/2017	-.2772142	.1052634	-2.63	0.008	-.4835266	-.0709018
12/2017	-.4037421	.1055507	-3.83	0.000	-.6106177	-.1968664
01/2018	-.5183084	.1058129	-4.90	0.000	-.7256979	-.3109189
02/2018	-.3762491	.1060947	-3.55	0.000	-.5841909	-.1683073
03/2018	-.3108275	.1063713	-2.92	0.003	-.5193115	-.1023435
04/2018	-.2742283	.1066624	-2.57	0.010	-.4832827	-.0651739
05/2018	-.2879504	.1069818	-2.69	0.007	-.4976308	-.07827
06/2018	-.3500807	.1116893	-3.13	0.002	-.5689878	-.1311737
cons	40.30704	.0950932	423.87	0.000	40.12066	40.49342

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**Table F-8: Regression Coefficients for DEC Cohort 8**

Number of obs = 5307646  
 F(135,5231818) = 9498.05  
 Prob>F = 0.0000  
 R-squared = 0.7128  
 AdjR-squared = 0.7087  
 Root MSE = 14.9134

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2008	4.665554	.1284077	36.33	0.000	4.41388	4.917229
01/2009	7.884682	.1283026	61.45	0.000	7.633213	8.13615
02/2009	4.619858	.1282018	36.04	0.000	4.368587	4.871129
03/2009	-3.759741	.1281051	-29.35	0.000	-4.010823	-3.50866
04/2009	-9.435569	.1279839	-73.72	0.000	-9.686413	-9.184726
05/2009	-5.94497	.1278607	-46.50	0.000	-6.195572	-5.694367
06/2009	4.577267	.1277431	35.83	0.000	4.326895	4.827639
07/2009	8.525671	.1275873	66.82	0.000	8.275604	8.775737
08/2009	7.816227	.1274158	61.34	0.000	7.566497	8.065958
09/2009	-3.59539	.1272721	-28.25	0.000	-3.844838	-3.345941
10/2009	-9.605671	.1271463	-75.55	0.000	-9.854873	-9.356468
11/2009	-4.805069	.1270129	-37.83	0.000	-5.05401	-4.556128
12/2009	10.12117	.1269192	79.74	0.000	9.872409	10.36992
01/2010	14.09355	.1268292	111.12	0.000	13.84497	14.34213
02/2010	10.33827	.1267061	81.59	0.000	10.08993	10.58661
03/2010	-3.474907	.1265927	-27.45	0.000	-3.723024	-3.22679
04/2010	-10.14663	.1264552	-80.24	0.000	-10.39448	-9.898786
05/2010	-3.688045	.126273	-29.21	0.000	-3.935536	-3.440555
06/2010	10.36194	.1261212	82.16	0.000	10.11475	10.60914
07/2010	16.14098	.125978	128.13	0.000	15.89406	16.38789
08/2010	12.15247	.1258577	96.56	0.000	11.90579	12.39914
09/2010	.6684701	.1257539	5.32	0.000	.421997	.9149432
10/2010	-10.00717	.125636	-79.65	0.000	-10.25342	-9.760931
11/2010	-2.711028	.1255112	-21.60	0.000	-2.957026	-2.465031
12/2010	13.08271	.1248498	104.79	0.000	12.83801	13.32741
01/2011	13.41232	.1247462	107.52	0.000	13.16782	13.65682
02/2011	1.505877	.1246218	12.08	0.000	1.261622	1.750131
03/2011	-6.780822	.1245043	-54.46	0.000	-7.024846	-6.536798
04/2011	-10.25104	.1243865	-82.41	0.000	-10.49483	-10.00724
05/2011	-3.707322	.1242591	-29.84	0.000	-3.950865	-3.463779
06/2011	7.670862	.1241328	61.80	0.000	7.427567	7.914158

07/2011	14.08484	.1239602	113.62	0.000	13.84188	14.3278
08/2011	10.43422	.123824	84.27	0.000	10.19153	10.67691
09/2011	-4.085844	.1236838	-33.03	0.000	-4.32826	-3.843428
10/2011	-10.76552	.1235026	-87.17	0.000	-11.00758	-10.52346
11/2011	-5.747247	.1233199	-46.60	0.000	-5.98895	-5.505545
12/2011	.4708192	.1231544	3.82	0.000	.2294409	.7121975
01/2012	2.229247	.1229934	18.12	0.000	1.988185	2.47031
02/2012	-1.142252	.1227078	-9.31	0.000	-1.382755	-.9017493
03/2012	-10.24984	.1216331	-84.27	0.000	-10.48824	-10.01144
04/2012	-11.85453	.1205722	-98.32	0.000	-12.09084	-11.61821
05/2012	-7.040986	.1194806	-58.93	0.000	-7.275164	-6.806809
06/2012	2.522609	.1180561	21.37	0.000	2.291224	2.753995
07/2012	10.63797	.1164128	91.38	0.000	10.4098	10.86613
08/2012	4.200655	.1159483	36.23	0.000	3.9734	4.427909
09/2012	-6.141831	.1158662	-53.01	0.000	-6.368924	-5.914737
10/2012	-10.94715	.1157883	-94.54	0.000	-11.17409	-10.72021
11/2012	-4.144843	.115706	-35.82	0.000	-4.371622	-3.918063
12/2012	.5006342	.1156251	4.33	0.000	.2740131	.7272553
01/2013	4.159401	.1154921	36.01	0.000	3.933041	4.385761
02/2013	4.623465	.1141373	40.51	0.000	4.399759	4.84717
03/2013	-1.691674	.1119129	-15.12	0.000	-1.911019	-1.472328
04/2013	-10.71707	.1108811	-96.65	0.000	-10.93439	-10.49975
05/2013	-9.385884	.1105303	-84.92	0.000	-9.602519	-9.169249
06/2013	-8.121385	.1104983	-7.35	0.000	-1.028711	-.5955657
07/2013	4.019102	.1104702	36.38	0.000	3.802584	4.235619
08/2013	1.097629	.1104415	9.94	0.000	.8811679	1.314091
09/2013	-5.601978	.1104156	-50.74	0.000	-5.818388	-5.385567
10/2013	-11.1088	.1103913	-100.63	0.000	-11.32516	-10.89244
11/2013	-2.61966	.1103726	-23.73	0.000	-2.835986	-2.403333
12/2013	5.934792	.1103622	53.78	0.000	5.718486	6.151097
01/2014	12.70092	.1103539	115.09	0.000	12.48463	12.91721
02/2014	7.079014	.1103435	64.15	0.000	6.862744	7.295283
03/2014	-1.800152	.110331	-16.32	0.000	-2.016397	-1.583907
04/2014	-10.18771	.1103205	-92.35	0.000	-10.40394	-9.971489
05/2014	-6.75133	.1103119	-61.20	0.000	-6.967538	-6.535123
06/2014	2.93814	.1103014	26.64	0.000	2.721953	3.154327
07/2014	3.363768	.1102713	30.50	0.000	3.14764	3.579896
08/2014	1.527332	.1097456	13.92	0.000	1.312235	1.74243
09/2014	-5.125591	.1092542	-46.91	0.000	-5.339726	-4.911457
10/2014	-11.57056	.1087406	-106.41	0.000	-11.78369	-11.35743
11/2014	-2.212373	.1083036	-20.43	0.000	-2.424644	-2.000102

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11/2015	-7.786029	.1195374	-65.13	0.000	-8.020318	-7.55174
12/2015	-2.99641	.1195383	-25.07	0.000	-3.2307	-2.762119
01/2016	6.667491	.1195434	55.77	0.000	6.43319	6.901792
02/2016	4.529995	.1195698	37.89	0.000	4.295642	4.764348
03/2016	-8.547934	.1197704	-71.37	0.000	-8.78268	-8.313189
04/2016	-11.53369	.1201094	-96.03	0.000	-11.7691	-11.29828
05/2016	-7.779562	.1204119	-64.61	0.000	-8.015565	-7.543559
06/2016	3.698339	.1207616	30.63	0.000	3.46165	3.935027
07/2016	11.72515	.1211075	96.82	0.000	11.48778	11.96251
08/2016	10.00137	.1214333	82.36	0.000	9.763361	10.23937
09/2016	.5802458	.1218473	4.76	0.000	.3414294	.8190622
10/2016	-10.99863	.1221547	-90.04	0.000	-11.23805	-10.75921
11/2016	-7.187041	.1224334	-58.70	0.000	-7.427006	-6.947076
12/2016	2.105999	.1226829	17.17	0.000	1.865545	2.346453
01/2017	.4515227	.1229016	3.67	0.000	.2106399	.6924054
02/2017	-5.710318	.1231276	-46.38	0.000	-5.951644	-5.468993
03/2017	-7.701129	.1233379	-62.44	0.000	-7.942867	-7.459391
04/2017	-11.00663	.1236309	-89.03	0.000	-11.24894	-10.76432
05/2017	-7.101803	.1239091	-57.31	0.000	-7.344661	-6.858946
06/2017	1.044401	.1242602	8.40	0.000	.8008555	1.287947
07/2017	7.866372	.1245683	63.15	0.000	7.622222	8.110521
08/2017	2.939208	.1248888	23.53	0.000	2.69443	3.183985
09/2017	-5.390468	.1252344	-43.04	0.000	-5.635923	-5.145013
10/2017	-9.605647	.1255052	-76.54	0.000	-9.851633	-9.359661
11/2017	-5.296113	.1257904	-42.10	0.000	-5.542657	-5.049568
12/2017	7.608321	.1260331	60.37	0.000	7.361301	7.855342
01/2018	11.67184	.1262456	92.45	0.000	11.4244	11.91927
02/2018	-2.180505	.1264529	-17.24	0.000	-2.428348	-1.932662
03/2018	-5.155833	.1266551	-40.71	0.000	-5.404072	-4.907593
04/2018	-10.67642	.1269045	-84.13	0.000	-10.92515	-10.42769
05/2018	-4.617779	.1271795	-36.31	0.000	-4.867046	-4.368512
i.ym#c.treatment						
11/2015	-.104931	.110377	-0.95	0.342	-.321266	.1114041
12/2015	-.0904764	.110382	-0.82	0.412	-.3068212	.1258684
01/2016	-.240037	.1103935	-2.17	0.030	-.4564043	-.0236696
02/2016	-.365843	.1104566	-3.31	0.001	-.582334	-.1493521
03/2016	-.2549059	.1109388	-2.30	0.022	-.472342	-.0374698
04/2016	-.2275735	.1117059	-2.04	0.042	-.4465131	-.0086339
05/2016	-.2434956	.1124013	-2.17	0.030	-.4637981	-.0231931
06/2016	-.2538641	.1132241	-2.24	0.025	-.4757794	-.0319488
07/2016	-.1666165	.1140145	-1.46	0.144	-.3900809	.056848

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08/2016	-.1863185	.1147453	-1.62	0.104	-.4112152	.0385783
09/2016	-.205087	.1156041	-1.77	0.076	-.4316669	.021493
10/2016	-.2845099	.1162077	-2.45	0.014	-.5122729	-.0567469
11/2016	-.2214904	.1167966	-1.90	0.058	-.4504076	.0074269
12/2016	-.2502649	.1173095	-2.13	0.033	-.4801873	-.0203425
01/2017	-.3032699	.1177743	-2.58	0.010	-.5341034	-.0724364
02/2017	-.3129059	.1182413	-2.65	0.008	-.5446545	-.0811573
03/2017	-.3410571	.1186914	-2.87	0.004	-.573688	-.1084262
04/2017	-.3438212	.1192805	-2.88	0.004	-.5776067	-.1100358
05/2017	-.3832894	.1198336	-3.20	0.001	-.618159	-.1484199
06/2017	-.3325817	.1205142	-2.76	0.006	-.5687853	-.096378
07/2017	-.2901547	.1211789	-2.39	0.017	-.5276611	-.0526483
08/2017	-.4532241	.1218012	-3.72	0.000	-.6919501	-.214498
09/2017	-.5107921	.1224879	-4.17	0.000	-.750864	-.2707202
10/2017	-.5119521	.1230486	-4.16	0.000	-.7531229	-.2707812
11/2017	-.4492225	.1236348	-3.63	0.000	-.6915423	-.2069026
12/2017	-.6012704	.1240946	-4.85	0.000	-.8444913	-.3580494
01/2018	-.7673052	.124539	-6.16	0.000	-1.011397	-.5232132
02/2018	-.5773163	.1249784	-4.62	0.000	-.8222695	-.332363
03/2018	-.5391807	.1253574	-4.30	0.000	-.7848768	-.2934845
04/2018	-.4942607	.1258908	-3.93	0.000	-.7410022	-.2475191
05/2018	-.6235547	.126472	-4.93	0.000	-.8714354	-.375674
06/2018	-.6160671	.1352241	-4.56	0.000	-.8811016	-.3510327
cons	40.88909	.093722	436.28	0.000	40.7054	41.07278

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**Table F-9: Regression Coefficients for DEP Cohort 1**

Number of obs = 33350747  
 F(95,32692933) = 116722.9  
 Prob>F = 0.0000  
 R-squared = 0.7049  
 AdjR-squared = 0.6990  
 Root MSE = 14.7490

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2013	12.2834	.0643833	190.79	0.000	12.15721	12.40959
01/2014	16.09035	.0642157	250.57	0.000	15.96449	16.21621
02/2014	11.61602	.0641994	180.94	0.000	11.49019	11.74184
03/2014	.194614	.0641805	3.03	0.002	.0688227	.3204054
04/2014	-9.439009	.0641602	-147.12	0.000	-9.56476	-9.313257
05/2014	-7.483544	.0641366	-116.68	0.000	-7.60925	-7.357838
06/2014	3.605807	.0641143	56.24	0.000	3.480145	3.731469
07/2014	3.776511	.0640892	58.93	0.000	3.650899	3.902124
08/2014	.7913161	.0640772	12.35	0.000	.6657271	.9169051
09/2014	-4.432772	.0640772	-69.18	0.000	-4.558361	-4.307183
10/2014	-10.87639	.0640773	-169.74	0.000	-11.00198	-10.7508
11/2014	-.953653	.0640774	-14.88	0.000	-1.079242	-.8280636
01/2015	12.46407	.0808453	154.17	0.000	12.30562	12.62252
02/2015	15.36702	.0808455	190.08	0.000	15.20857	15.52547
03/2015	-7.267612	.0808463	-89.89	0.000	-7.426068	-7.109157
04/2015	-13.06598	.0808473	-161.61	0.000	-13.22444	-12.90752
05/2015	-7.276841	.0808513	-90.00	0.000	-7.435307	-7.118376
06/2015	6.42289	.0808513	79.44	0.000	6.264424	6.581356
07/2015	9.933711	.0808515	122.86	0.000	9.775245	10.09218
08/2015	4.242141	.0808502	52.47	0.000	4.083677	4.400605
09/2015	-5.783397	.0808505	-71.53	0.000	-5.941861	-5.624933
10/2015	-13.42975	.0808515	-166.10	0.000	-13.58821	-13.27128
11/2015	-9.268152	.080852	-114.63	0.000	-9.426619	-9.109685
12/2015	-2.697141	.0808502	-33.36	0.000	-2.855605	-2.538678
01/2016	8.638449	.0808523	106.84	0.000	8.479981	8.796916
02/2016	5.955176	.0808522	73.66	0.000	5.796709	6.113644
03/2016	-8.873138	.080874	-109.72	0.000	-9.031648	-8.714628
04/2016	-13.3391	.0808945	-164.89	0.000	-13.49765	-13.18055
05/2016	-9.483721	.0809217	-117.20	0.000	-9.642325	-9.325117
06/2016	2.159006	.081034	26.64	0.000	2.000182	2.31783
07/2016	11.7407	.0811849	144.62	0.000	11.58158	11.89982

08/2016	10.27816	.0813185	126.39	0.000	10.11877	10.43754
09/2016	-2.21304	.0814679	-27.16	0.000	-2.372714	-2.053366
10/2016	-13.0337	.081593	-159.74	0.000	-13.19362	-12.87378
11/2016	-7.00772	.0817209	-85.75	0.000	-7.16789	-6.84755
12/2016	3.412713	.0818273	41.71	0.000	3.252335	3.573092
01/2017	1.293354	.0819326	15.79	0.000	1.132769	1.453939
02/2017	-5.060346	.0820269	-61.69	0.000	-5.221116	-4.899576
03/2017	-7.398162	.0821172	-90.09	0.000	-7.559108	-7.237215
04/2017	-10.65626	.0822438	-129.57	0.000	-10.81745	-10.49506
05/2017	-6.130672	.0823515	-74.45	0.000	-6.292078	-5.969266
06/2017	1.350413	.0824829	16.37	0.000	1.188749	1.512076
07/2017	8.146761	.0826304	98.59	0.000	7.984809	8.308714
08/2017	2.655059	.0827752	32.08	0.000	2.492823	2.817296
09/2017	-5.745961	.0829125	-69.30	0.000	-5.908467	-5.583456
10/2017	-10.83542	.0830296	-130.50	0.000	-10.99816	-10.67269
11/2017	-5.806494	.0831559	-69.83	0.000	-5.969476	-5.643511
12/2017	11.02851	.0832607	132.46	0.000	10.86532	11.1917
01/2018	15.14194	.0833635	181.64	0.000	14.97855	15.30533
02/2018	-2.588517	.0834621	-31.01	0.000	-2.7521	-2.424934
03/2018	-5.478516	.0835579	-65.57	0.000	-5.642286	-5.314745
04/2018	-11.58877	.0836662	-138.51	0.000	-11.75275	-11.42478
05/2018	-6.145086	.0837831	-73.35	0.000	-6.309298	-5.980874
i.ym#c.treatment						
01/2015	-.4817097	.0607594	-7.93	0.000	-.600796	-.3626235
02/2015	-.436845	.0606836	-7.20	0.000	-.5557827	-.3179072
03/2015	-.1174143	.0606575	-1.94	0.053	-.2363008	.0014722
04/2015	-.0673995	.0606275	-1.11	0.266	-.1862273	.0514283
05/2015	-.1747214	.0606331	-2.88	0.004	-.29356	-.0558828
06/2015	-.4916212	.0605496	-8.12	0.000	-.6102963	-.3729461
07/2015	-1.060098	.0604023	-17.55	0.000	-1.178484	-.9417117
08/2015	-.0259156	.0603607	-0.43	0.668	-.1442204	.0923892
09/2015	.5182035	.0603221	8.59	0.000	.3999744	.6364326
10/2015	-.5007566	.0603235	-8.30	0.000	-.6189885	-.3825246
11/2015	-.5913001	.0603244	-9.80	0.000	-.7095337	-.4730665
12/2015	-.8549834	.0603219	-14.17	0.000	-.9732122	-.7367546
01/2016	-.9830312	.0603248	-16.30	0.000	-1.101266	-.8647967
02/2016	-1.071648	.0603251	-17.76	0.000	-1.189883	-.9534131
03/2016	-.6991122	.0603606	-11.58	0.000	-.8174168	-.5808076
04/2016	-.5303321	.060395	-8.78	0.000	-.6487041	-.41196
05/2016	-.6681653	.0604398	-11.06	0.000	-.7866251	-.5497055
06/2016	-.9008946	.0606266	-14.86	0.000	-1.019721	-.7820686

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07/2016	.3912485	.0608749	6.43	0.000	.2719359	.510561
08/2016	.6585321	.0610927	10.78	0.000	.5387926	.7782715
09/2016	-.5908955	.0613353	-9.63	0.000	-.7111105	-.4706806
10/2016	-.4819024	.0615381	-7.83	0.000	-.6025148	-.36129
11/2016	-.8080836	.0617412	-13.09	0.000	-.9290941	-.6870732
12/2016	-.9301903	.0619118	-15.02	0.000	-1.051535	-.8088453
01/2017	-.7288759	.0620791	-11.74	0.000	-.8505488	-.607203
02/2017	-.6644125	.0622298	-10.68	0.000	-.7863807	-.5424443
03/2017	-.5728819	.0623733	-9.18	0.000	-.6951314	-.4506325
04/2017	-.6203572	.0625727	-9.91	0.000	-.7429974	-.497717
05/2017	-.747571	.0627427	-11.91	0.000	-.8705444	-.6245977
06/2017	-.734003	.0629484	-11.66	0.000	-.8573796	-.6106264
07/2017	-.6906028	.0631787	-10.93	0.000	-.8144309	-.5667748
08/2017	-.7995024	.0634028	-12.61	0.000	-.9237696	-.6752353
09/2017	-.0924717	.0636168	-1.45	0.146	-.2171584	.032215
10/2017	.3488348	.063798	5.47	0.000	.2237929	.4738767
11/2017	-.8007647	.0639923	-12.51	0.000	-.9261874	-.6753421
12/2017	-1.339632	.0641537	-20.88	0.000	-1.46537	-1.213893
01/2018	-1.25309	.0643109	-19.48	0.000	-1.379137	-1.127043
02/2018	-.8744615	.0644618	-13.57	0.000	-1.000804	-.7481186
03/2018	-.6129992	.0646076	-9.49	0.000	-.7396277	-.4863707
04/2018	-.6321574	.0647741	-9.76	0.000	-.7591122	-.5052025
05/2018	-.6934061	.0649537	-10.68	0.000	-.8207129	-.5660992
06/2018	-.9752954	.0654621	-14.90	0.000	-1.103599	-.846992
cons	44.96266	.0614262	731.98	0.000	44.84226	45.08305

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**Table F-10: Regression Coefficients for DEP Cohort 2**

Number of obs = 1324363  
 F(83,1291654) = 5018.47  
 Prob>F = 0.0000  
 R-squared = 0.6873  
 AdjR-squared = 0.6793  
 Root MSE = 14.3698

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2013	10.59739	.2911435	36.40	0.000	10.02676	11.16802
01/2014	18.6943	.284998	65.59	0.000	18.13571	19.25288
02/2014	14.98298	.282832	52.97	0.000	14.42864	15.53732
03/2014	.0714642	.2802071	0.26	0.799	-.4777321	.6206605
04/2014	-9.570875	.2778032	-34.45	0.000	-10.11536	-9.02639
05/2014	-10.6451	.2752273	-38.68	0.000	-11.18453	-10.10566
06/2014	3.708345	.2729562	13.59	0.000	3.17336	4.24333
07/2014	4.282465	.2704597	15.83	0.000	3.752373	4.812557
08/2014	-3.142081	.2451161	-12.82	0.000	-3.6225	-2.661662
09/2014	-9.089674	.2293094	-39.64	0.000	-9.539113	-8.640236
10/2014	-12.47666	.2211061	-56.43	0.000	-12.91002	-12.0433
11/2014	-3.60765	.2168758	-16.63	0.000	-4.032719	-3.182581
12/2014	4.460534	.2154846	20.70	0.000	4.038191	4.882876
01/2015	10.01601	.215483	46.48	0.000	9.593666	10.43834
02/2015	12.8998	.2154815	59.87	0.000	12.47747	13.32214
03/2015	-8.531963	.215477	-39.60	0.000	-8.954291	-8.109636
04/2015	-14.4935	.2154747	-67.26	0.000	-14.91582	-14.07118
05/2015	-9.523378	.2154734	-44.20	0.000	-9.945698	-9.101057
06/2015	2.650262	.21547	12.30	0.000	2.227948	3.072576
07/2015	5.867211	.2154669	27.23	0.000	5.444903	6.289519
08/2015	1.184402	.2154642	5.50	0.000	.7620995	1.606705
09/2015	-7.280168	.2154631	-33.79	0.000	-7.702468	-6.857867
10/2015	-13.87055	.2154625	-64.38	0.000	-14.29285	-13.44825
11/2015	-9.83021	.2154619	-45.62	0.000	-10.25251	-9.407912
01/2016	7.759313	.2538258	30.57	0.000	7.261823	8.256803
02/2016	5.457167	.2538377	21.50	0.000	4.959654	5.954681
03/2016	-9.121958	.2540502	-35.91	0.000	-9.619888	-8.624028
04/2016	-13.48322	.2542302	-53.04	0.000	-13.9815	-12.98494
05/2016	-10.04955	.2545241	-39.48	0.000	-10.54841	-9.550696
06/2016	.5504089	.2554268	2.15	0.031	.0497812	1.051037
07/2016	9.391358	.2564471	36.62	0.000	8.88873	9.893986



08/2016	8.828805	.2573584	34.31	0.000	8.324392	9.333219
09/2016	-2.198706	.2586277	-8.50	0.000	-2.705608	-1.691805
10/2016	-12.65787	.2597651	-48.73	0.000	-13.167	-12.14874
11/2016	-7.470831	.2608013	-28.65	0.000	-7.981993	-6.959669
12/2016	2.649381	.2619808	10.11	0.000	2.135907	3.162854
01/2017	.8161692	.2626015	3.11	0.002	.3014793	1.330859
02/2017	-5.108788	.2633038	-19.40	0.000	-5.624854	-4.592721
03/2017	-7.10749	.2639027	-26.93	0.000	-7.62473	-6.590249
04/2017	-10.36758	.2649704	-39.13	0.000	-10.88691	-9.848242
05/2017	-6.229106	.265656	-23.45	0.000	-6.749783	-5.708429
06/2017	.6069767	.2664214	2.28	0.023	.0847999	1.129153
07/2017	7.115578	.267587	26.59	0.000	6.591117	7.640039
08/2017	2.278062	.2686861	8.48	0.000	1.751447	2.804678
09/2017	-5.002681	.2696091	-18.56	0.000	-5.531106	-4.474257
10/2017	-9.639181	.2704857	-35.64	0.000	-10.16932	-9.109038
11/2017	-5.715277	.2715362	-21.05	0.000	-6.247478	-5.183075
12/2017	10.73481	.2722424	39.43	0.000	10.20122	11.2684
01/2018	15.18117	.2728966	55.63	0.000	14.6463	15.71604
02/2018	-2.281692	.2734719	-8.34	0.000	-2.817688	-1.745696
03/2018	-4.950265	.274138	-18.06	0.000	-5.487566	-4.412964
04/2018	-10.96508	.2748404	-39.90	0.000	-11.50376	-10.4264
05/2018	-5.712968	.2756631	-20.72	0.000	-6.253259	-5.172678
i.ym#c.treatment						
01/2016	-.2940158	.1902775	-1.55	0.122	-.6669533	.0789217
02/2016	-.3127838	.1902194	-1.64	0.100	-.6856073	.0600396
03/2016	.140052	.1906249	0.73	0.463	-.2335662	.5136702
04/2016	.1417772	.1909861	0.74	0.458	-.2325491	.5161035
05/2016	-.0330458	.1915494	-0.17	0.863	-.4084761	.3423844
06/2016	-.372274	.1932973	-1.93	0.054	-.75113	.0065821
07/2016	-.4670928	.1953296	-2.39	0.017	-.8499321	-.0842535
08/2016	-.3679604	.1971357	-1.87	0.062	-.7543396	.0184187
09/2016	-.0095294	.1995383	-0.05	0.962	-.4006176	.3815588
10/2016	.0961081	.2016543	0.48	0.634	-.2991274	.4913436
11/2016	.0530629	.2035533	0.26	0.794	-.3458947	.4520205
12/2016	-.1555799	.2055601	-0.76	0.449	-.5584707	.2473108
01/2017	.06298	.2067812	0.30	0.761	-.342304	.4682641
02/2017	.0083661	.2080313	0.04	0.968	-.3993681	.4161003
03/2017	-.034834	.2091218	-0.17	0.868	-.4447055	.3750376
04/2017	-.0862931	.2109464	-0.41	0.682	-.4997408	.3271546
05/2017	-.2581741	.2121577	-1.22	0.224	-.6739959	.1576478
06/2017	-.1880658	.2136218	-0.88	0.379	-.6067572	.2306255

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07/2017	-.3441835	.2155689	-1.60	0.110	-.7666912	.0783241
08/2017	-.3619368	.217431	-1.66	0.096	-.7880942	.0642205
09/2017	-.3588089	.2190726	-1.64	0.101	-.7881838	.0705659
10/2017	-.1918852	.2205187	-0.87	0.384	-.6240943	.240324
11/2017	-.2994767	.2222814	-1.35	0.178	-.7351407	.1361874
12/2017	-.6200525	.2235098	-2.77	0.006	-1.058124	-.181981
01/2018	-.8011186	.2246129	-3.57	0.000	-1.241352	-.360885
02/2018	-.2764544	.2256365	-1.23	0.220	-.7186943	.1657855
03/2018	-.1774399	.2267308	-0.78	0.434	-.6218245	.2669448
04/2018	-.0360123	.2279476	-0.16	0.874	-.4827819	.4107573
05/2018	-.2245772	.2293994	-0.98	0.328	-.6741923	.2250378
06/2018	-.5141316	.2321059	-2.22	0.027	-.9690513	-.0592119
cons	42.70114	.2000864	213.41	0.000	42.30898	43.0933

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**Table F-11: Regression Coefficients for DEP Cohort 3**

Number of obs = 1870493  
 F(77,1816295) = 7279.54  
 Prob>F = 0.0000  
 R-squared = 0.6797  
 AdjR-squared = 0.6701  
 Root MSE = 14.2891

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2013	10.82818	.2712209	39.92	0.000	10.2966	11.35977
01/2014	18.34483	.2662765	68.89	0.000	17.82293	18.86672
02/2014	11.2674	.2652203	42.48	0.000	10.74758	11.78722
03/2014	1.056151	.2635461	4.01	0.000	.5396102	1.572692
04/2014	-6.794034	.2621178	-25.92	0.000	-7.307776	-6.280292
05/2014	-13.44633	.2607022	-51.58	0.000	-13.95729	-12.93536
06/2014	5.899975	.2591258	22.77	0.000	5.392098	6.407853
07/2014	4.434636	.2570903	17.25	0.000	3.930748	4.938524
08/2014	-5.645866	.2546092	-22.17	0.000	-6.144891	-5.146841
09/2014	-8.477301	.252634	-33.56	0.000	-8.972454	-7.982147
10/2014	-13.62876	.2503069	-54.45	0.000	-14.11935	-13.13817
11/2014	1.833326	.2473004	7.41	0.000	1.348626	2.318026
12/2014	7.201564	.2141278	33.63	0.000	6.781881	7.621247
01/2015	8.699186	.1891209	46.00	0.000	8.328515	9.069856
02/2015	11.62882	.1760723	66.05	0.000	11.28373	11.97392
03/2015	-10.73633	.1675336	-64.08	0.000	-11.0647	-10.40797
04/2015	-17.14845	.1621513	-105.76	0.000	-17.46626	-16.83064
05/2015	-10.3839	.1579611	-65.74	0.000	-10.6935	-10.0743
06/2015	1.264688	.1549842	8.16	0.000	.9609247	1.568452
07/2015	3.672569	.1536792	23.90	0.000	3.371363	3.973775
08/2015	-.4947735	.1536774	-3.22	0.001	-.7959758	-.1935712
09/2015	-8.55043	.1536764	-55.64	0.000	-8.851631	-8.24923
10/2015	-14.85945	.1536758	-96.69	0.000	-15.16065	-14.55825
11/2015	-10.77076	.153676	-70.09	0.000	-11.07196	-10.46956
12/2015	-4.687162	.1536744	-30.50	0.000	-4.988359	-4.385966
01/2016	6.938365	.1536736	45.15	0.000	6.63717	7.23956
02/2016	4.435331	.1536731	28.86	0.000	4.134137	4.736525
03/2016	-9.808236	.1536719	-63.83	0.000	-10.10943	-9.507044
04/2016	-14.08789	.1536704	-91.68	0.000	-14.38908	-13.7867
05/2016	-10.66267	.1536698	-69.39	0.000	-10.96386	-10.36148
07/2016	9.336595	.1778265	52.50	0.000	8.988062	9.685129

08/2016	8.777054	.178728	49.11	0.000	8.426754	9.127355
09/2016	-3.221495	.1797014	-17.93	0.000	-3.573704	-2.869287
10/2016	-12.94114	.1804582	-71.71	0.000	-13.29483	-12.58745
11/2016	-7.751709	.1810579	-42.81	0.000	-8.106576	-7.396842
12/2016	2.048704	.1816174	11.28	0.000	1.692741	2.404668
01/2017	.3949252	.1823009	2.17	0.030	.0376217	.7522286
02/2017	-5.390989	.182895	-29.48	0.000	-5.749457	-5.032521
03/2017	-7.458004	.1835123	-40.64	0.000	-7.817681	-7.098326
04/2017	-10.65468	.1842414	-57.83	0.000	-11.01579	-10.29358
05/2017	-6.517875	.1849133	-35.25	0.000	-6.880298	-6.155451
06/2017	.4418084	.1857929	2.38	0.017	.0776607	.805956
07/2017	6.906229	.1868015	36.97	0.000	6.540104	7.272353
08/2017	1.924281	.1877588	10.25	0.000	1.55628	2.292282
09/2017	-5.264901	.1886116	-27.91	0.000	-5.634574	-4.895229
10/2017	-9.717548	.1892761	-51.34	0.000	-10.08852	-9.346573
11/2017	-6.194776	.1900108	-32.60	0.000	-6.567191	-5.822362
12/2017	9.584095	.1906094	50.28	0.000	9.210507	9.957683
01/2018	14.15336	.191097	74.06	0.000	13.77882	14.52791
02/2018	-2.432517	.1916147	-12.69	0.000	-2.808076	-2.056959
03/2018	-5.172238	.1921078	-26.92	0.000	-5.548763	-4.795714
04/2018	-11.03074	.1928141	-57.21	0.000	-11.40865	-10.65283
05/2018	-5.66916	.1936228	-29.28	0.000	-6.048654	-5.289666
i.ym#c.treatment						
07/2016	-.2364876	.1381473	-1.71	0.087	-.5072516	.0342764
08/2016	-.3991652	.1399745	-2.85	0.004	-.6735103	-.1248201
09/2016	-.3619444	.1419405	-2.55	0.011	-.6401429	-.0837459
10/2016	-.2975852	.1434501	-2.07	0.038	-.5787425	-.0164279
11/2016	-.0660174	.1446492	-0.46	0.648	-.3495248	.21749
12/2016	.0485513	.1457605	0.33	0.739	-.2371342	.3342368
01/2017	.0044539	.1470077	0.03	0.976	-.2836761	.2925838
02/2017	-.2270715	.14815	-1.53	0.125	-.5174404	.0632974
03/2017	-.2801664	.1493279	-1.88	0.061	-.5728438	.012511
04/2017	-.3360605	.1507459	-2.23	0.026	-.6315172	-.0406038
05/2017	-.3775782	.1520177	-2.48	0.013	-.6755276	-.0796289
06/2017	-.5042509	.153686	-3.28	0.001	-.8054702	-.2030316
07/2017	-.6311936	.1555855	-4.06	0.000	-.9361358	-.3262514
08/2017	-.5327004	.1573394	-3.39	0.001	-.8410802	-.2243207
09/2017	-.5532146	.1589	-3.48	0.000	-.8646531	-.2417761
10/2017	-.5722229	.1600786	-3.57	0.000	-.8859713	-.2584744
11/2017	-.3548008	.1613668	-2.20	0.028	-.6710741	-.0385276
12/2017	-.0669128	.1624294	-0.41	0.680	-.3852689	.2514432

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01/2018	-.070757	.1633214	-0.43	0.665	-.3908613	.2493473
02/2018	-.5025356	.1642171	-3.06	0.002	-.8243954	-.1806758
03/2018	-.4768844	.1651377	-2.89	0.004	-.8005486	-.1532202
04/2018	-.6556493	.1663534	-3.94	0.000	-.9816961	-.3296024
05/2018	-.7246817	.1677257	-4.32	0.000	-1.053418	-.3959451
06/2018	-.7034253	.1699905	-4.14	0.000	-1.036601	-.3702498
cons	43.09341	.1406951	306.29	0.000	42.81765	43.36917

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**Table F-12: Regression Coefficients for DEP Cohort 4**

Number of obs = 3127601  
 F(53,3025223) = 18311.52  
 Prob>F = 0.0000  
 R-squared = 0.6566  
 AdjR-squared = 0.6450  
 Root MSE = 16.0197

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
01/2015	42.0015	.3640951	115.36	0.000	41.28789	42.71511
02/2015	25.7931	.2910192	88.63	0.000	25.22271	26.36349
03/2015	.0888886	.2507836	0.35	0.723	-.4026383	.5804156
04/2015	-14.44873	.2431523	-59.42	0.000	-14.9253	-13.97216
05/2015	10.60925	.2426207	43.73	0.000	10.13372	11.08477
06/2015	19.84851	.2420862	81.99	0.000	19.37403	20.32299
07/2015	8.1361	.2393017	34.00	0.000	7.667077	8.605123
08/2015	9.29721	.2359954	39.40	0.000	8.834668	9.759753
09/2015	3.484304	.2338265	14.90	0.000	3.026012	3.942596
10/2015	-13.16111	.2321962	-56.68	0.000	-13.61621	-12.70602
11/2015	-9.894599	.2312317	-42.79	0.000	-10.34781	-9.441393
12/2015	-4.300453	.230293	-18.67	0.000	-4.751819	-3.849087
01/2016	8.334057	.2296242	36.29	0.000	7.884001	8.784112
02/2016	4.889433	.2290246	21.35	0.000	4.440553	5.338313
03/2016	-9.80188	.2283662	-42.92	0.000	-10.24947	-9.35429
04/2016	-13.17324	.2278224	-57.82	0.000	-13.61976	-12.72671
05/2016	-9.909555	.2276834	-43.52	0.000	-10.35581	-9.463304
06/2016	1.198147	.2276833	5.26	0.000	.751896	1.644399
07/2016	17.49121	.2276832	76.82	0.000	17.04496	17.93747
08/2016	17.71617	.2276828	77.81	0.000	17.26992	18.16242
09/2016	-.5585539	.2276826	-2.45	0.014	-1.004804	-.1123039
10/2016	-11.81609	.2276824	-51.90	0.000	-12.26234	-11.36984
11/2016	-6.418996	.2276823	-28.19	0.000	-6.865245	-5.972746
12/2016	4.27747	.2276823	18.79	0.000	3.83122	4.723719
01/2017	2.675342	.2276823	11.75	0.000	2.229093	3.121591
02/2017	-3.752356	.227682	-16.48	0.000	-4.198605	-3.306107
03/2017	-5.521757	.2276941	-24.25	0.000	-5.96803	-5.075485
04/2017	-9.230526	.2278002	-40.52	0.000	-9.677007	-8.784046
06/2017	1.854392	.2929733	6.33	0.000	1.280175	2.42861
07/2017	8.380718	.2942959	28.48	0.000	7.803908	8.957527
08/2017	3.328861	.2957553	11.26	0.000	2.749191	3.908531

09/2017	-.3274947	.2971527	-1.10	0.270	-.9099035	.2549142
10/2017	-3.762946	.2981534	-12.62	0.000	-4.347316	-3.178576
11/2017	-4.289536	.2992498	-14.33	0.000	-4.876055	-3.703017
12/2017	11.58691	.3003237	38.58	0.000	10.99829	12.17553
01/2018	16.63571	.301101	55.25	0.000	16.04556	17.22586
02/2018	-1.299607	.3019557	-4.30	0.000	-1.891429	-.707784
03/2018	-3.266138	.3028899	-10.78	0.000	-3.859791	-2.672484
04/2018	-10.0344	.3040123	-33.01	0.000	-10.63025	-9.438546
05/2018	-4.759072	.3050362	-15.60	0.000	-5.356933	-4.161212
i.ym#c.treatment						
06/2017	-.2840964	.2083152	-1.36	0.173	-.6923868	.1241941
07/2017	-.1798442	.2105184	-0.85	0.393	-.5924529	.2327645
08/2017	-.1314894	.2128982	-0.62	0.537	-.5487623	.2857835
09/2017	-.1687879	.2151689	-0.78	0.433	-.5905113	.2529356
10/2017	-.0873951	.2167886	-0.40	0.687	-.5122931	.337503
11/2017	-.283198	.2185507	-1.30	0.195	-.7115497	.1451537
12/2017	-.4871267	.2202422	-2.21	0.027	-.9187937	-.0554597
01/2018	-.4412774	.2214845	-1.99	0.046	-.8753793	-.0071755
02/2018	-.4264186	.2228336	-1.91	0.056	-.8631647	.0103275
03/2018	-.2953128	.2242871	-1.32	0.188	-.7349076	.1442821
04/2018	-.2095437	.2260123	-0.93	0.354	-.6525198	.2334324
05/2018	-.030492	.2276016	-0.13	0.893	-.4765831	.4155991
06/2018	-.1604255	.2305315	-0.70	0.486	-.6122591	.2914082
cons	42.04246	.2220709	189.32	0.000	41.60721	42.47772

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**Table F-13: Regression Coefficients for DEP Cohort 5**

Number of obs	=	1042278
F(46,995879)	=	5675.15
Prob>F	=	0.0000
R-squared	=	0.6913
AdjR-squared	=	0.6769
Root MSE	=	13.8521

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
02/2015	7.859332	1.03145	7.62	0.000	5.837724	9.880939
03/2015	-14.72819	.5009908	-29.40	0.000	-15.71012	-13.74627
04/2015	-19.22476	.4593114	-41.86	0.000	-20.12499	-18.32452
05/2015	-12.46654	.4538566	-27.47	0.000	-13.35609	-11.577
06/2015	-2.073978	.4480566	-4.63	0.000	-2.952154	-1.195802
07/2015	-.6775616	.4404268	-1.54	0.124	-1.540783	.1856601
08/2015	-4.209871	.4292188	-9.81	0.000	-5.051125	-3.368616
09/2015	-11.54887	.4149626	-27.83	0.000	-12.36218	-10.73555
11/2015	-14.48223	.3958936	-36.58	0.000	-15.25817	-13.70629
12/2015	-9.743026	.3854937	-25.27	0.000	-10.49858	-8.987471
01/2016	-.4357276	.375123	-1.16	0.245	-1.170956	.2995008
02/2016	-3.248327	.3616983	-8.98	0.000	-3.957243	-2.53941
03/2016	-16.40977	.3412315	-48.09	0.000	-17.07857	-15.74096
04/2016	-20.83725	.2979269	-69.94	0.000	-21.42118	-20.25332
05/2016	-14.20739	.2083906	-68.18	0.000	-14.61583	-13.79895
06/2016	-3.413052	.175071	-19.50	0.000	-3.756185	-3.069919
07/2016	6.838243	.1635854	41.80	0.000	6.517621	7.158865
08/2016	5.001092	.1577112	31.71	0.000	4.691983	5.310201
09/2016	-4.802548	.1547891	-31.03	0.000	-5.105929	-4.499166
10/2016	-14.16475	.1541552	-91.89	0.000	-14.46689	-13.86261
11/2016	-9.006045	.154155	-58.42	0.000	-9.308183	-8.703906
12/2016	1.722556	.1541532	11.17	0.000	1.420421	2.024691
01/2017	.118167	.1541529	0.77	0.443	-.1839676	.4203015
02/2017	-6.008087	.1541516	-38.98	0.000	-6.310219	-5.705955
03/2017	-7.882833	.1541514	-51.14	0.000	-8.184965	-7.580702
04/2017	-11.17579	.1541501	-72.50	0.000	-11.47792	-10.87366
05/2017	-7.152663	.1541477	-46.40	0.000	-7.454788	-6.850539
06/2017	-.2981455	.1541465	-1.93	0.053	-.6002675	.0039764
07/2017	5.948751	.1541447	38.59	0.000	5.646632	6.250869
08/2017	1.368454	.1541421	8.88	0.000	1.066341	1.670568
09/2017	-4.875907	.1542055	-31.62	0.000	-5.178145	-4.57367



11/2017	-6.410534	.1874958	-34.19	0.000	-6.77802	-6.043049
12/2017	8.676972	.1881879	46.11	0.000	8.30813	9.045814
01/2018	13.12556	.1888482	69.50	0.000	12.75542	13.4957
02/2018	-3.244625	.1895723	-17.12	0.000	-3.61618	-2.873069
03/2018	-5.659177	.1902589	-29.74	0.000	-6.032078	-5.286276
04/2018	-10.97504	.1910124	-57.46	0.000	-11.34941	-10.60066
05/2018	-5.355889	.1918697	-27.91	0.000	-5.731947	-4.979831
i.ym#c.treatment						
11/2017	.3283646	.1541795	2.13	0.033	.0261781	.6305512
12/2017	.9927588	.1554924	6.38	0.000	.687999	1.297519
01/2018	1.069641	.1566775	6.83	0.000	.7625586	1.376724
02/2018	.4895946	.1579523	3.10	0.002	.1800135	.7991757
03/2018	.3649788	.1591562	2.29	0.022	.053038	.6769196
04/2018	-.1933651	.1604854	-1.20	0.228	-.507911	.1211808
05/2018	-.5897201	.161981	-3.64	0.000	-.9071974	-.2722427
06/2018	-.7145588	.1645078	-4.34	0.000	-1.036989	-.3921291
cons	42.01288	.1400189	300.05	0.000	41.73845	42.28731

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**Table F-14: Regression Coefficients for DEP Cohort 6**

Number of obs = 5818963  
 F(75,5679812) = 25017.65  
 Prob>F = 0.0000  
 R-squared = 0.7158  
 AdjR-squared = 0.7089  
 Root MSE = 14.2181

Variable	Coefficient	Std. Err.	t	P >  t	95% Conf. Interval	
i.ym						
12/2013	11.70871	.070371	166.39	0.000	11.57079	11.84663
01/2014	15.49768	.0697846	222.08	0.000	15.3609	15.63445
02/2014	12.08945	.0697845	173.24	0.000	11.95267	12.22622
03/2014	-.1279688	.0697845	-1.83	0.067	-.2647439	.0088064
04/2014	-10.09903	.0697843	-144.72	0.000	-10.2358	-9.962251
05/2014	-6.837694	.0697841	-97.98	0.000	-6.974468	-6.70092
06/2014	3.284255	.0697841	47.06	0.000	3.147481	3.42103
07/2014	4.081132	.069784	58.48	0.000	3.944358	4.217906
08/2014	1.764097	.0697838	25.28	0.000	1.627324	1.900871
09/2014	-3.757227	.069784	-53.84	0.000	-3.894001	-3.620452
10/2014	-10.33492	.0697845	-148.10	0.000	-10.4717	-10.19815
11/2014	-1.688237	.0697846	-24.19	0.000	-1.825012	-1.551461
11/2015	-9.232248	.0779718	-118.40	0.000	-9.38507	-9.079426
12/2015	-2.661476	.0779701	-34.13	0.000	-2.814295	-2.508657
01/2016	8.674027	.077972	111.25	0.000	8.521205	8.82685
02/2016	5.9907	.077972	76.83	0.000	5.837878	6.143522
03/2016	-8.838062	.0779925	-113.32	0.000	-8.990925	-8.6852
04/2016	-13.30352	.0780119	-170.53	0.000	-13.45643	-13.15062
05/2016	-9.44699	.0780375	-121.06	0.000	-9.599941	-9.294039
06/2016	2.194711	.0781436	28.09	0.000	2.041552	2.34787
07/2016	11.77389	.0782866	150.39	0.000	11.62045	11.92733
08/2016	10.30823	.0784133	131.46	0.000	10.15454	10.46192
09/2016	-2.183175	.0785551	-27.79	0.000	-2.33714	-2.029209
10/2016	-13.0053	.078674	-165.31	0.000	-13.1595	-12.8511
11/2016	-6.980919	.0787958	-88.60	0.000	-7.135356	-6.826482
12/2016	3.439117	.0788971	43.59	0.000	3.284481	3.593752
01/2017	1.318201	.0789975	16.69	0.000	1.163369	1.473033
02/2017	-5.036775	.0790875	-63.69	0.000	-5.191783	-4.881766
03/2017	-7.376649	.0791736	-93.17	0.000	-7.531826	-7.221471
04/2017	-10.63689	.0792945	-134.14	0.000	-10.7923	-10.48147
05/2017	-6.112698	.0793975	-76.99	0.000	-6.268314	-5.957082

06/2017	1.366243	.079523	17.18	0.000	1.210381	1.522105
07/2017	8.161536	.0796641	102.45	0.000	8.005397	8.317675
08/2017	2.668037	.0798028	33.43	0.000	2.511626	2.824448
09/2017	-5.734664	.0799342	-71.74	0.000	-5.891332	-5.577996
10/2017	-10.82592	.0800463	-135.25	0.000	-10.98281	-10.66903
11/2017	-5.79847	.0801673	-72.33	0.000	-5.955595	-5.641345
12/2017	11.03428	.0802677	137.47	0.000	10.87696	11.1916
01/2018	15.14574	.0803662	188.46	0.000	14.98822	15.30325
02/2018	-2.586148	.0804608	-32.14	0.000	-2.743848	-2.428448
03/2018	-5.476302	.0805527	-67.98	0.000	-5.634182	-5.318422
04/2018	-11.58772	.0806566	-143.67	0.000	-11.7458	-11.42963
05/2018	-6.145941	.0807687	-76.09	0.000	-6.304244	-5.987637
i.ym#c.treatment						
11/2015	-.1657308	.0794857	-2.09	0.037	-.32152	-.0099416
12/2015	-.2809974	.0794828	-3.54	0.000	-.4367809	-.1252139
01/2016	-.4857805	.0794845	-6.11	0.000	-.6415674	-.3299937
02/2016	-.5875254	.0794857	-7.39	0.000	-.7433146	-.4317362
03/2016	-.3260493	.079533	-4.10	0.000	-.4819312	-.1701674
04/2016	-.1940438	.0795805	-2.44	0.015	-.3500187	-.0380688
05/2016	-.1250364	.0796366	-1.57	0.116	-.2811213	.0310485
06/2016	-.0957303	.0798921	-1.20	0.231	-.252316	.0608554
07/2016	-.0052869	.0802199	-0.07	0.947	-.162515	.1519411
08/2016	-.0813614	.0805005	-1.01	0.312	-.2391395	.0764166
09/2016	-.1006956	.0808235	-1.25	0.213	-.2591068	.0577156
10/2016	-.197732	.0810956	-2.44	0.015	-.3566765	-.0387876
11/2016	-.324476	.0813496	-3.99	0.000	-.4839184	-.1650337
12/2016	-.3983929	.0815737	-4.88	0.000	-.5582744	-.2385113
01/2017	-.3999776	.0817827	-4.89	0.000	-.5602688	-.2396864
02/2017	-.3528999	.0819735	-4.31	0.000	-.513565	-.1922349
03/2017	-.326023	.0821581	-3.97	0.000	-.4870499	-.1649961
04/2017	-.2227447	.0824171	-2.70	0.007	-.3842792	-.0612102
05/2017	-.1700432	.082627	-2.06	0.040	-.3319892	-.0080972
06/2017	-.097265	.0829011	-1.17	0.241	-.2597482	.0652182
07/2017	-.0851771	.0831946	-1.02	0.306	-.2482355	.0778814
08/2017	-.1316635	.0834652	-1.58	0.115	-.2952524	.0319254
09/2017	-.1896956	.0837418	-2.27	0.023	-.3538266	-.0255646
10/2017	-.2170639	.0839737	-2.58	0.010	-.3816494	-.0524785
11/2017	-.4155898	.0842191	-4.93	0.000	-.5806562	-.2505234
12/2017	-.7004644	.084429	-8.30	0.000	-.8659422	-.5349866
01/2018	-.6509102	.0846283	-7.69	0.000	-.8167788	-.4850417
02/2018	-.4346815	.0848319	-5.12	0.000	-.600949	-.268414

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03/2018	-.4591289	.0850171	-5.40	0.000	-.6257594	-.2924984
04/2018	-.3998165	.0852301	-4.69	0.000	-.5668645	-.2327686
05/2018	-.2731368	.0854661	-3.20	0.001	-.4406473	-.1056262
06/2018	-.2636914	.0861242	-3.06	0.002	-.4324918	-.0948909
cons	45.07433	.058409	771.70	0.000	44.95985	45.18881

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## Appendix G Awareness and Engagement

The increased engagement and awareness generated by the MyHER program can be difficult to measure. Nexant designed a survey approach that measures different aspects of the MyHER effect, but no one survey question can fully capture the numerous and subtle effects of MyHER that ultimately resulted in the observed energy impacts. Instead, one might expect the overall pattern of survey responses to signal a difference in behavior and attitudes between the MyHER treatment and control group.

Nexant developed a framework for measuring this pattern of MyHER influence by applying straightforward statistical concepts to develop a holistic look at the program's influence on customer behavior. While a single survey question may not result in statistically significant differences between the treatment and control group, if the treatment group responds more favorably than the control group to a set of survey questions, then we can estimate the probability that the collection of responses fits a hypothesis of MyHER influence.

Nexant assigned each survey question a category. [Table G-1](#) and [Table G-2](#) shows the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category, for each jurisdiction. A response is considered “favorable” if the treatment group gave a response that is consistent with the program objectives of MyHER.

**Table G-1: Classification of Survey Responses and Treatment Group “Success Rate” - DEC**

Question Category	Count of Questions where T>C	Number of Questions in Topic Area	Portion of Questions where T>C
Duke Energy's Public Stance on Energy Efficiency	3	3	100%
Customer Engagement with Duke Energy Website	2	5	40%
Customers' Reported Energy-savings Behaviors	10	11	91%
Customer's Reported Energy Efficiency Improvements Made	9	9	100%
Customer Motivation, Engagement & Awareness of Energy Efficiency	4	11	36%
Barriers of Customer Not Undertaking Energy Savings Actions	3	6	50%
Customer Satisfaction with Duke Energy	0	4	0%
<b>Total</b>	<b>31</b>	<b>49</b>	<b>63%</b>

**Table G-2: Classification of Survey Responses and Treatment Group “Success Rate” - DEP**

Question Category	Count of Questions where T>C	Number of Questions in Topic Area	Portion of Questions where T>C
Duke Energy's Public Stance on Energy Efficiency	3	3	100%
Customer Engagement with Duke Energy Website	2	5	40%
Customers' Reported Energy-saving Behaviors	10	11	91%
Customer's Reported Energy Efficiency Improvements Made	9	9	100%
Customer Motivation, Engagement & Awareness of Energy Efficiency	10	11	91%
Barriers of Customer Not Undertaking Energy Savings Actions	4	6	67%
Customer Satisfaction with Duke Energy	2	4	50%
<b>Total</b>	<b>40</b>	<b>49</b>	<b>82%</b>

If the MyHER program had no effect on participants' awareness, attitudes, and opinions, then we would expect the control group to score better than the treatment group on approximately half of the survey questions. The DEC treatment group provided answers consistent with a MyHER treatment effect in approximately 63% of the survey questions, and 82% in the case of DEP, which represents an uplift from the expected percentage of 50% if the null hypothesis were true. Thus we cannot make the case that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey. Using standard statistical techniques (the non-parametric sign test), Nexant calculates the probability of randomly obtaining this result in the case of DEC is 2% and in the case of DEP essentially 0%.

What do those 2% and 0% probabilities mean? Consider a series of coin flips. What is the probability of obtaining 40 heads in 49 coin flips if there is a 50/50 chance of obtaining a heads or tails on any one coin flip? This same principle can be applied to the survey: what is the probability that the treatment group gives a more favorable response to 40 out of 49 survey questions if MyHER has no influence on customer engagement and energy usage behavior? The answer, 0%, is “exceedingly low”. The same logic applies to the 2% probability we calculate for DEC. Thus we conclude that the survey responses in these two jurisdictions favorably affects DEC and DEP customer attitudes and actions related to energy-saving behavior.<sup>16</sup>

<sup>16</sup> The technical way of putting this is to say that we reject the hypothesis that MyHERs have no effect on customer engagement with energy-saving behaviors.



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2020									
	Product Code	System Energy Reduction (kWh)	System NPV of Avoided Costs	Total Cost	Incentive	NC Retail kWh Sales Allocation Factor	NC Revenue Requirement	NC Lost Revenue 2020	NC Lost Revenue 2021
Residential Energy Assessments									
12873: Home Energy House Call - Smart Thermostat -Elec	HCNSTE	6,414	2,266	\$ 15,700	\$ (750)	73.2212736%	\$ 10,946	\$ 46	\$ 354
12874: Home Energy House Call - Smart Thermostat -Only CAC Fuel Htd	HCNSTE	19,564	6,910					\$ 86	\$ 751
12875: Home Energy House Call - Specialty Candelabra LED	HCCNDL	122,474	79,466	\$ -	\$ 9,139	73.2212736%	\$ 6,691	\$ 1,537	\$ 5,977
12876: Home Energy House Call - Specialty Globe LED	HCGLOB	78,599	42,419	\$ -	\$ 4,878	73.2212736%	\$ 3,572	\$ 1,052	\$ 4,362
12877: Home Energy House Call - Specialty Recessed LED	HCRCSO	117,720	63,532	\$ -	\$ 7,306	73.2212736%	\$ 5,350	\$ 1,331	\$ 5,411
12878: Home Energy House Call - Specialty Showerhead	HCHHSH	16,002	5,455	\$ -	\$ 627	73.2212736%	\$ 459	\$ 207	\$ 787
Power Manager®									
11429: Bring Your Own Thermostat	BYOT		2,633,902	\$ 2,912,271	\$ (32,012)	74.1953449%	\$ 2,137,018		
Energy Efficient Appliances and Devices									
11790: Marketplace Dehumidifier	MPESDH	840	564	\$ 451,688	\$ (51,879)	73.2212736%	\$ 292,745	\$ 11	\$ 34
2021									
	Product Code	System Energy Reduction (kWh)	System NPV of Avoided Costs	Total Cost	Incentive	NC Retail kWh Sales Allocation Factor	NC Revenue Requirement	NC Lost Revenue 2021	
Residential Energy Assessments									
12872: Home Energy House Call - Assess Kit w LEDs Blower Door	HCBLRD	3,316	1,694	\$ -	\$ 195	73.5233682%	\$ 143	\$ -	\$ 4
12873: Home Energy House Call - Smart Thermostat -Elec	HCNSTE	150,098	45,726	\$ 68,775	\$ 1,720	73.5233682%	\$ 51,830	\$ -	\$ 3,764
12874: Home Energy House Call - Smart Thermostat -Only CAC Fuel Htd	HCNSTE	124,761	38,007					\$ -	\$ 3,286
12875: Home Energy House Call - Specialty Candelabra LED	HCCNDL	156,244	81,793	\$ 5,196	\$ 8,809	73.5233682%	\$ 10,296	\$ -	\$ 3,982
12876: Home Energy House Call - Specialty Globe LED	HCGLOB	138,969	59,717	\$ 3,324	\$ 6,485	73.5233682%	\$ 7,212	\$ -	\$ 4,245
12877: Home Energy House Call - Specialty Recessed LED	HCRCSO	160,425	68,934	\$ 3,150	\$ 7,565	73.5233682%	\$ 7,878	\$ -	\$ 4,100
12878: Home Energy House Call - Specialty Showerhead	HCHHSH	23,508	7,409	\$ 1,082	\$ 728	73.5233682%	\$ 1,331	\$ -	\$ 591
Power Manager®									
11429: Bring Your Own Thermostat	BYOT		5,896,878	\$ 4,172,109	\$ 198,349	74.4110767%	\$ 3,252,104		
Energy Efficient Appliances and Devices									
11790: Marketplace Dehumidifier	MPESDH	16,913	7,449	\$ (447,921)	\$ 52,368	73.5233682%	\$ (290,824)	\$ -	\$ 330
Low Income Energy Efficiency and Weatherization Assistance									
12759: NES Attic Insulation	HWLI	24,779	39,698	\$ 957,151	\$ (100,990)	73.5233682%	\$ 629,478	\$ -	\$ 299
12760: NES Air Sealing	HWLI	11,614	10,965					\$ -	\$ 155
12761: NES Duct Sealing	HWLI	21,157	24,573					\$ -	\$ 227
12762: NES Smart Thermostat	HWLI	12,279	3,741					\$ -	\$ 171
13980: Weatherization HVAC Replacement	WZELEC	506,462	368,433	\$ 3,467,853	\$ (279,729)	73.5233682%	\$ 2,344,017	\$ -	\$ 12,462
14001: Low Income Weatherization Tier 2 Modified	WZELEC	916,880	666,996					\$ -	\$ 27,114
Multi-Family Energy Efficiency									
13858: LF Showerhead MF Direct 1.25 GPM	MFEESH	171,156	88,340	\$ 83,633	\$ 541	73.5233682%	\$ 61,888	\$ -	\$ 4,378
Small Business Energy Saver									
13700: SMTPTH Existing Lighting w_Controls 8760	SMTPTH	365,982	109,380	\$ 766,603	\$ 48,340	73.5233682%	\$ 599,174	\$ -	\$ 4,497
13709: SMTPTH New Lighting w_Controls 8760	SMTPTH	299,925	157,688					\$ -	\$ 3,884
13710: SMTPTH New Lighting w_Controls Daylighting	SMTPTH	798,867	586,052					\$ -	\$ 8,466
13714: SBBDIR C&I Equipment	SMTPTH	58	29					\$ -	\$ 0
13801: SMTPTH Lighting Daylighting	SMTPTH	455,023	333,806					\$ -	\$ 0

For Product Code HCNSTE, Incentive calculated on one measure using combined Avoided Costs and Program costs

Product Codes HWLI and MFEESH include other measures not included here that were previously existing prior to 2020. Thus costs are overstated compared to avoided costs in this view.



20. With the exception of Low-Income Programs or other non-cost-effective programs with similar societal benefits as approved by the Commission, all programs submitted for approval will have an estimated UCT result greater than 1.00. Additionally, for purposes of calculating cost-effectiveness for program approval, consistent with the Commission's Orders in Docket Nos. E-7, Sub 1130 and E-7, Sub 1164, the Company shall use projected avoided capacity and energy benefits specifically calculated for the program, as derived from the underlying resource plan, production cost model, and cost inputs that generated the avoided capacity and avoided energy credits reflected in the most recent Commission-approved Biennial Determination of Avoided Cost Rates for Electric Utility Purchases from Qualifying Facilities as of the date of the filing for the new program approval.

20A. However, for the calculation of the underlying avoided energy credits to be used to derive the program-specific avoided energy benefits, the calculation will be based on the projected EE portfolio hourly shape, rather than the assumed 24x7 100 MW reduction typically used to represent a qualifying facility. For purposes of determining cost-effectiveness, estimated incremental EM&V costs attributable to each program shall be included in program costs. Duke Energy Carolinas will comply, however, with Rule R8- 60(i)(6)(iii), which requires that Duke Energy Carolinas' biennial Integrated Resource Plan, revised as applicable in its annual report, include certain information regarding the measures and programs that it evaluated but rejected.

20B. Moreover, for the Calculation of the underlying avoided capacity benefits, when authorized pursuant to Commission Rule R8-69(c) and unless the Commission determines otherwise in a G.S. 62-133.9 DSM/EE Rider proceeding, the Company shall be permitted to recognize the impact of the Reserve Margin Adjustment Factor used in the determination of the PPI and PRI values for its energy efficiency programs.

The Reserve Margin Adjustment Factor is equivalent to  $(1 + \text{Reserve Margin}) / (\text{Performance Adjustment Factor})$  and will be applied to the avoided capacity costs of all energy efficiency programs.

The Reserve Margin employed shall be based upon the value reflected in the most recent Commission accepted Integrated Resource Plan proceeding as of December 31 of the year immediately preceding the date of the annual DSM/EE rider filing. The Performance Adjustment Factor employed shall be based upon value reflected in the most recent Commission approved Biennial Avoided Cost proceeding as of December 31 of the year immediately preceding the date of the annual DSM/EE rider filing.



