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My Home Energy Report Program Evaluation

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1.1 Program Summary

This report describes process and impact evaluation 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 and multi-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.[1] 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 estimates the annual energy impacts associated with MyHER delivery for the period February 2020 to January 2021[2] 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 260.5 kWh per household for SF and 77.0 kWh per household for MF. The energy savings generated by the DEP MyHER program

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

[2] Nexant analyses the impacts for all months since the prior evaluation, comprising the period June 2018 to January 2020. The reported savings reflect the final 12-month period since the prior evaluation, which is February 2020 through January 2021.

are presented in Table 1-2, showing that the evaluated impacts of the program are 243.2 kWh per household for SF customers and 64.1 kWh per household for MF. These evaluated energy savings for the MyHER program are net of additional energy savings achieved through increased 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[3]

	Energy (kWh)	Confidence/Precision
DEC SF Evaluated Impacts	260.5	90/9
DEC SF Deemed Impacts	247.7	N/A
DEC MF Evaluated Impacts	77.0	90/30
DEC MF Deemed Impacts	94.7	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 MF Deemed and Evaluated Energy Impacts per Participating Household

	Energy (kWh)	Confidence/Precision
DEP SF Evaluated Impacts	243.2	90/10
DEP SF Deemed Impacts	201.2	N/A
DEP MF Evaluated Impacts	64.1	90/51
DEP MF Deemed Impacts	86.9	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[4]

Evaluation Component	Start	End
Impact Evaluation Period	February 2020	January 2021
Customer Survey Period	January 2020	December 2020

[3] Values (kWh) are rounded to one decimal point.

[4] Values (kWh) are rounded to one decimal point.

1.3 Evaluation Recommendations

This evaluation finds the DEC SF and MF MyHER programs realized 105% and 81%, respectively, of their claimed impacts. The DEP SF and MF MyHER programs realized 121% and 74% respectively, of their 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 10 years.

Duke Energy continued to work closely with Uplight, the implementation contractor, in the planning and coordination of MyHER report delivery. throughout the duration of their contract in planning and coordinating the delivery of MyHER reports. The end of this evaluation period marks the end of the Uplight implementation at Duke Energy – February 2021 marked the launch of Duke Energy's in-house implementation of the program. The program as evaluated for this study has benefited from improved production processes that allowed 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[5], Uplight 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 a number of areas of interest including enhancing customer motivation, awareness, and attention to saving energy.

Nexant has the following 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 Duke Energy should always 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 single-family accounts to MyHER treatment and control groups 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.

[5] DEP and DEC Single Family were previously evaluated in 2019

- **Consider using larger control groups for the multi-family program.** This is the first evaluation in the DEC and DEP service territories and Nexant finds that the 90% confidence bands around the impact estimates for multi-family are very wide. This may improve over time as the first multi-family cohorts mature, but the opportunity for maturation may be less than for single-family due to the more frequent account turnover among multi-family customers. Maturation also may not include less variability in impacts so Duke Energy should consider larger control groups for this program segment.
- **Build on previous successes of Interactive awareness campaigns.** The process evaluation finds that current awareness of Interactive among MyHER participants has slightly increased for single family customers since the last evaluation (DEC: 28% to 31%, DEP: 35% to 38%), but is still somewhat low.
- **Leveraging AMI data and producing content.** In 2019, this data was presented in a pilot project to a small number of eHER recipients in the form of hourly weekday usage graphs. In addition, this data was leveraged to improve the housing model to improve disaggregation modeling. Considering that AMI meters deployment has reached nearly 100% in the DEC and DEP jurisdiction, and the presentation of this data offers older cohorts novel content, Duke Energy should continue to cost-effectively leverage AMI data.
- **Work to improve report satisfaction.** Compared to the previous evaluation, ~~on~~ satisfaction with information in the reports dropped (DEC single family: from 87% to 58%; DEP single family: from 80% to 63%). In addition, single-family and multi-family control customers' expectations regarding the usefulness of some features of HERs tend to be significantly higher than treatment customers' ratings of their actual usefulness, indicating an opportunity to improve these features and align customers' expectations with reality.
- **Tune in to relevant energy-saving behaviors of multi-family customers.** While multi-family customers report high levels of engagement and interest in HERs, their reported energy investments are lower than those of single family customers. While some of these differences are attributable to differing equipment saturation levels between the two segments, these disparities do indicate a need to understand more fully the energy-relevant behaviors, and barriers to energy saving behavior, of multi-family customers so as to make HERs more useful to customers in this segment.
- **Work to inspire trust in report accuracy.** Uplight has continued work to improve the model used for building comparison home groups, including refining customers' accounts who have pools and electric vehicles. In open-ended responses to survey questions regarding suggested improvements to the reports, 24% of the comments for DEC and DEP single family, and 56% of the comments for DEP multi-family centered around concerns about the accuracy and applicability of the reports to their home.
- **Target Interactive customers' summertime usage as an opportunity to increase annual Interactive savings.** Currently, Interactive customers are showing statistically significant uplifts in winter savings, over and above the savings attributable to the report. However, on an annual basis, those savings are eroded by significant increases in energy use in the summertime. MyHER should leverage opportunities to remind Interactive users not to backslide with energy savings behaviors in the summer.

2 Introduction and Program Description

This section presents a brief description of the My Home Energy Report (MyHER) program as it was 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 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 to single family customers eight times a year, and 12 times a year by email to customers that have provided Duke Energy with their email address.[6] In the case of multi-family customers, the report is sent by mail four times a year and by email 12 times a year to those customers that have provided Duke Energy with their email address.

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 focus on no or low cost actions such as behavioral changes. An additional feature presents a month-ahead forecast of energy usage disaggregated by end-use type. During this evaluation period, Duke Energy contracted with Uplight, Inc. for the management and delivery of its MyHER product.

The MyHER program includes on online component, called MyHER Interactive Portal.[7] MyHER Interactive seeks to engage customers in a responsive energy information and education dialogue. When customers enroll to access 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 and multi-family homes with an individual electric meter and at least thirteen months of electricity consumption history are eligible for MyHER in the DEC and

[6] 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.

[7] We refer to the MyHER Interactive Portal simply as "Interactive" in the remainder of this report.

DEP 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 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 do not receive MyHERs or communications about MyHER.

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 Uplight, Inc., a behavioral science and analytics contractor that prepares and distributes the MyHER reports according to a pre-determined annual calendar. Uplight also generates and disseminates the MyHER Interactive Portal content and email reports, energy savings tips, and energy savings challenges. Uplight 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.

2.2.1 Eligibility

The MyHER program targets residential customers living in either single family or multi-family dwellings, that are single metered, non-commercial residences with at least thirteen months of electricity consumption history. Approximately 1.2 million DEC and 800,000 DEP residential customers met those requirements as of February 2020 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, missing bills[8], 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 0-2% of assigned DEC customers and 0-1% of assigned DEP customers are ineligible for the program in any given month after having been assigned. Nexant addresses this topic by applying an intention-to-treat analysis (ITT); refer to Section 3.1.2.

[8] Customers must not have more than two missing bills in at least thirteen previous months of consumption history. A missing bill is defined as a bill with less than 150 kWh for customers that are not already enrolled in MyHER.

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 electricity consumption (kWh) and electric demand (kW). 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 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 participants 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 since 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 uses a large volume of participation and billing data from Duke Energy's data warehouse. 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.
- **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 Energy 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.[9] The combined billing dataset includes 2,898,721 distinct DEC accounts and 1,555,640 distinct DEP accounts (however, the number of accounts in analysis varies by month). A number of treatment and control accounts in this dataset have closed prior to the start of this evaluation period and they have been dropped from the analysis dataset. Across DEC and DEP there have been 438,208 such customers not included in analysis due to account closure prior to the start of this evaluation period. Nexant also removed the following accounts or data points from the analysis (total for DEC and DEP and for single family and multi-family):

- 68,420 accounts that had a negative value for billed kWh, where no net energy metering NEM status is present;
- 310 records with unrealistically high usage: any month with greater than six times the 99th percentile value for daily kWh usage, or approximately 900 kWh per day.

Like most electric utilities, Duke Energy does not bill all of its residential customers for usage by calendar month. 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 monthly 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 MyHERs 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 a report include the following:

- **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.

[9] 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.

- **Implausible Bill** – if a home's billed usage for the previous month is less than 150 kWh or greater than 10,000 kWh, Uplight does not mail the MyHER.
- **Insufficient Matching Households** – this filter is referred to as "Small Neighborhood" by Uplight and is a function of the clustering algorithm Uplight 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 Uplight 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 DEC MF customers. The average proportion of assigned accounts that were treated during the period of February 2020 to January 2021 was 98% for DEC SF customers and 99.5%, rounding to 100%, for DEC MF customers. The ITT calculation for DEP customers is presented by month in Table 3-3 and Table 3-4. The average proportion of assigned accounts that were treated during the period of February 2020 to January 2021 was 99% for DEC SF customers and 97% for DEC MF customers.

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

Month	Treatment Homes Analyzed	DEC Participant Count	% Treated
Feb-20	1,240,618	1,211,859	98%
Mar-20	1,232,861	1,210,755	98%
Apr-20	1,223,328	1,203,318	98%
May-20	1,215,700	1,199,355	99%
Jun-20	1,208,469	1,193,259	99%
Jul-20	1,256,262	1,221,119	97%
Aug-20	1,244,968	1,223,132	98%
Sep-20	1,234,562	1,216,836	99%
Oct-20	1,224,792	1,211,764	99%
Nov-20	1,214,988	1,201,904	99%
Dec-20	1,205,209	1,191,807	99%
Jan-21	1,195,687	1,182,251	99%
12-month Average Proportion			**98%**

Table 3-2: DEC MF Calculation of Treatment Percentage by Bill Month

Month	Treatment Homes Analyzed	DEC Participant Count	% Treated
20-Feb	197,933	197,607	100%
20-Mar	194,281	194,057	100%
20-Apr	189,715	188,944	100%
20-May	186,317	185,155	99%
20-Jun	182,876	181,900	99%
20-Jul	177,982	177,346	100%
20-Aug	173,082	173,809	100%
20-Sep	168,480	169,085	100%
20-Oct	164,697	164,134	100%
20-Nov	161,448	159,810	99%
20-Dec	158,121	156,140	99%
21-Jan	155,138	152,839	99%
12-month Average Proportion			**100%**

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

Month	Treatment Homes Analyzed	DEP Participant Count	% Treated
20-Feb	740,536	725,283	98%
20-Mar	735,142	725,212	99%
20-Apr	728,397	719,344	99%
20-May	724,174	716,929	99%
20-Jun	720,002	714,581	99%
20-Jul	750,040	737,309	98%
20-Aug	742,628	738,331	99%
20-Sep	736,292	734,948	100%
20-Oct	729,724	731,763	100%
20-Nov	723,593	711,645	98%
20-Dec	717,862	705,104	98%
21-Jan	711,773	700,447	98%
12-month Average Proportion			**99%**

Table 3-4: DEP MF Calculation of Treatment Percentage by Bill Month

Month	Treatment Homes Analyzed	DEP Participant Count	% Treated
20-Feb	79,939	77,591	97%
20-Mar	78,360	76,233	97%
20-Apr	76,748	74,236	97%
20-May	75,535	72,746	96%
20-Jun	74,263	72,110	97%
20-Jul	72,580	70,702	97%
20-Aug	70,606	69,398	98%
20-Sep	69,096	67,637	98%
20-Oct	67,636	65,929	97%
20-Nov	66,307	64,486	97%
20-Dec	65,030	63,061	97%
21-Jan	63,741	61,710	97%
12-month Average Proportion			**97%**

The monthly participation counts shown in Table 3-1 and Table 3-3 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 four following statements about the MyHER impact analysis reflect absolute precision:

- DEC SF MyHER saved an average of 260.5 kWh per home during the 12-month period February 2020 to January 2021, ± 22.7 kWh. Homes in the treatment group reduced electric consumption by an average of 1.83%, ± 0.16%.
- DEC MF MyHER saved an average of 77.0 kWh per home during the 12-month period February 2020 to January 2021, ± 23.4 kWh. Homes in the treatment group reduced electric consumption by an average of 0.74%, ± 0.22%.
- DEP SF MyHER saved an average of 243.2 kWh per home during the 12-month period February 2020 to January 2021, ± 24.0 kWh. Homes in the treatment group reduced electric consumption by an average of 1.61%, ± 0.16%.
- DEP MF MyHER saved an average of 64.1kWh per home during the 12-month period February 2020 to January 2021, ± 32.9 kWh. Homes in the treatment group reduced electric consumption by an average of 0.64%, ± 0.32%.

In these examples, the uncertainty of the estimate, or margin of error (denoted by "±"), 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 SF MyHER during the 12-month period February 2020 to January 2021 is 260.5 kWh with a relative precision of ± 8.71%. In this case, ± 8.71% is determined by dividing the absolute margin of error by the impact estimate: 22.7÷260.5.0 = 0.0871 = 8.71%.

- The average treatment effect of DEC MF MyHER during the 12-month period February 2020 to January 2021 is 77.0 kWh with a relative precision of ± 30.39%. In this case, ± 30.39% is determined by dividing the absolute margin of error by the impact estimate: 23.4÷77.0 = 0.3039 = 30.39%.

- The average treatment effect of DEP SF MyHER during the 12-month period February 2020 to January 2021 is 243.2 kWh with a relative precision of ± 9.87%. In this case, ± 9.87% is determined by dividing the absolute margin of error by the impact estimate: 24.0÷243.2 = 0.0987 = 9.87%.

- The average treatment effect of DEP MF MyHER during the 12-month period February 2020 to January 2021 is 64.1 kWh with a relative precision of ± 51.33%. In this case, ± 51.33% is determined by dividing the absolute margin of error by the impact estimate: 32.9÷64.1 = 0.5133 = 51.33%.

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

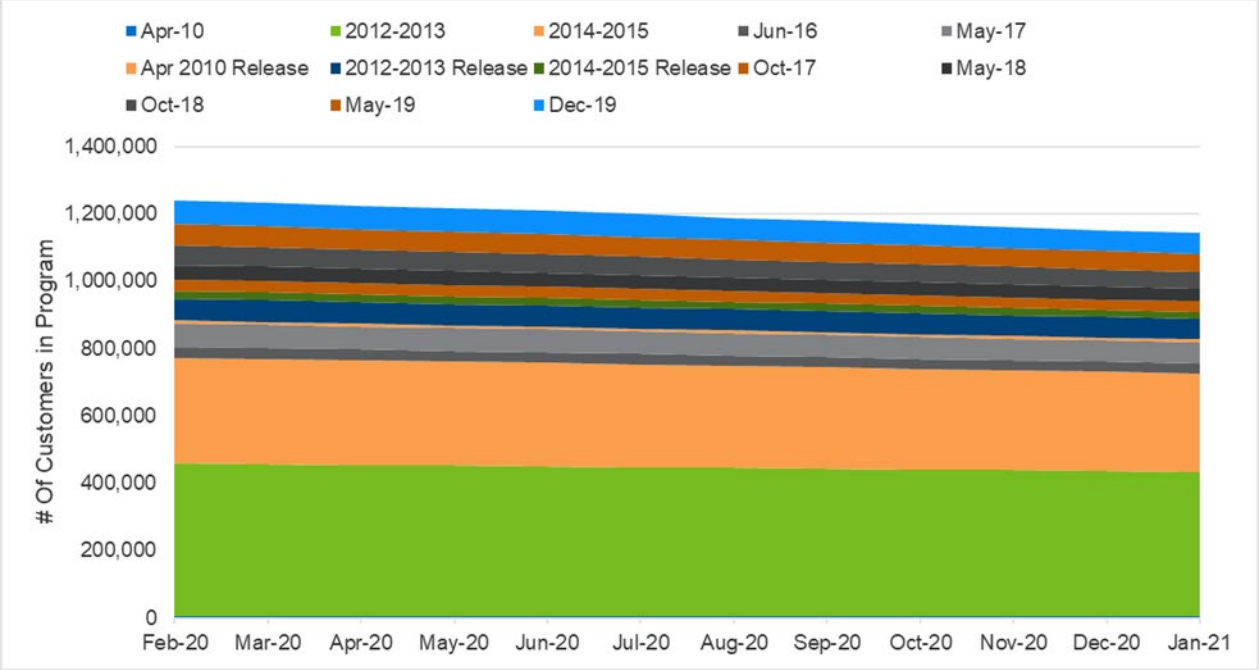
3.1.4.1 Duke Energy Carolinas Single Family

The DEC SF and MF MyHER program has been growing over time since its SF launch in 2010 and MF launch in 2016. Nexant mapped the DEC MyHER population into thirteen SF cohorts and six MF 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 from February 2020 to January 2021. At the beginning of the 2020 evaluation period there were about 1.2 million DEC SF customers enrolled in the program. 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 new customers met the program's eligibility criteria. In October 2015, Duke Energy also released a 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.[10] These customers were released into treatment starting in October 2015 and began producing impacts in November 2015. Recent cohorts (customers added from May 2018 to Dec 2019) have been smaller, each constituting about 100,000 customers.

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



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 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 the randomization worked as planned.

Table 3-5 presents summary information for each of the thirteen cohorts included in Nexant's DEC SF 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 8 ("2014-2015 Release").

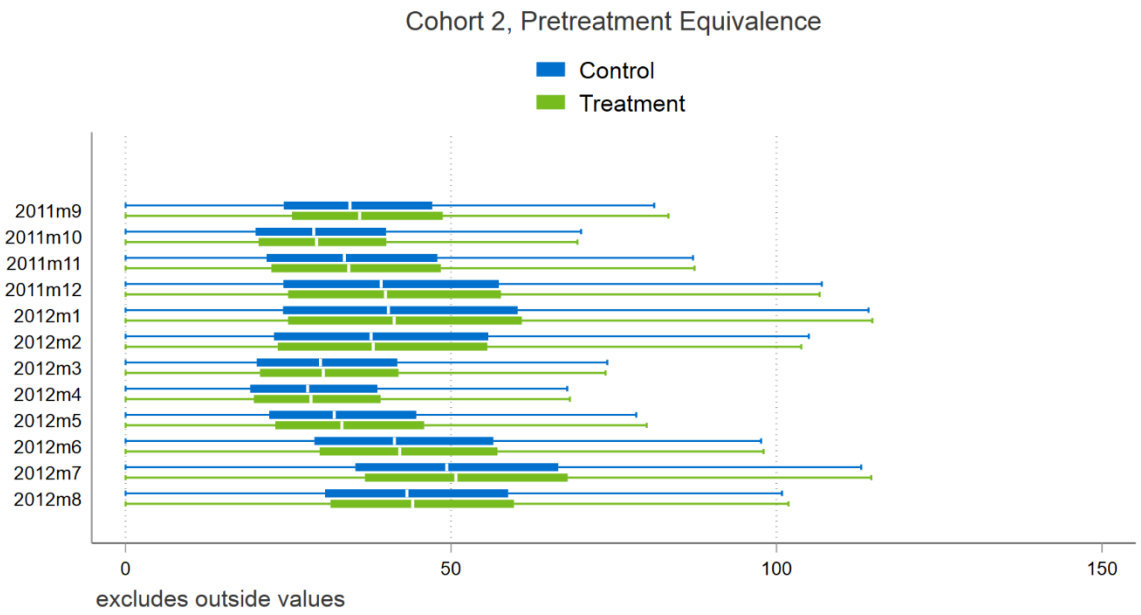
[10] Duke Energy commissioned a review of the MyHER control groups in 2015 to assess whether or not there were any control groups that were larger than necessary for the purpose of EM&V. Four relatively small releases (approximately 110,000 customers total) from the DEC jurisdiction was recommended by 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.

Table 3-5: DEC SF 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	7,733	5,124	18,024	18,071
2	2012-2013	09/2011	08/2012	22,979	406,584	14,661	14,738
3	2014-2015	12/2013	11/2014	17,954	269,221	15,120	14,995
4	Jun 2016	06/2015	05/2016	10,781	33,927	13,538	13,624
5	May 2017	05/2016	04/2017	5,303	71,593	14,162	14,000
6	Apr 2010 Release	04/2009	03/2010	7,733	8,658	18,024	17,997
7	2012-2013 Release	09/2011	08/2012	24,023	64,737	14,745	14,730
8	2014-2015 Release	12/2013	11/2014	21,266	24,003	14,839	15,102
9	Oct 2017	10/2016	09/2017	14,523	34,773	13,210	13,105
10	May 2018	05/2017	04/2018	6,842	43,381	13,535	13,580
11	Oct 2018	10/2017	09/2018	7,451	59,925	13,990	13,980
12	May 2019	05/2018	04/2019	8,380	63,861	14,428	14,355
13	Dec 2019	12/2018	11/2019	7,931	73,819	13,773	13,794

Since MyHER is evaluated on a monthly basis, a more important equivalency check is on month-to-month comparability between treatment and control groups. Figure 3-2 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 3-2 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 13 DEC cohorts, the number of pretreatment months that show statistically different differences between treatment and control customers ranges from 0 to 12, with the newer cohorts having stronger pretreatment equivalence. These differences will need to be addressed by the estimation procedure, as we describe later in this section.

Figure 3-2: DEC SF Difference in Average Pre-treatment Billed Consumption (kWh)



3.1.4.2 Duke Energy Carolinas Multi-family

Figure 3-3 shows the timeline of DEC MF program expansion by cohort from February 2020 to January 2021. A small original cohort started the program in November 2016, followed by two larger cohorts in May 2017 and October 2017. There were two smaller cohorts added in May 2018 and October 2018, followed by the largest cohort starting treatment in December 2019. Compared to the SF customers, MF customers have a higher account closure rate which is expected for customers of most electric utilities.

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

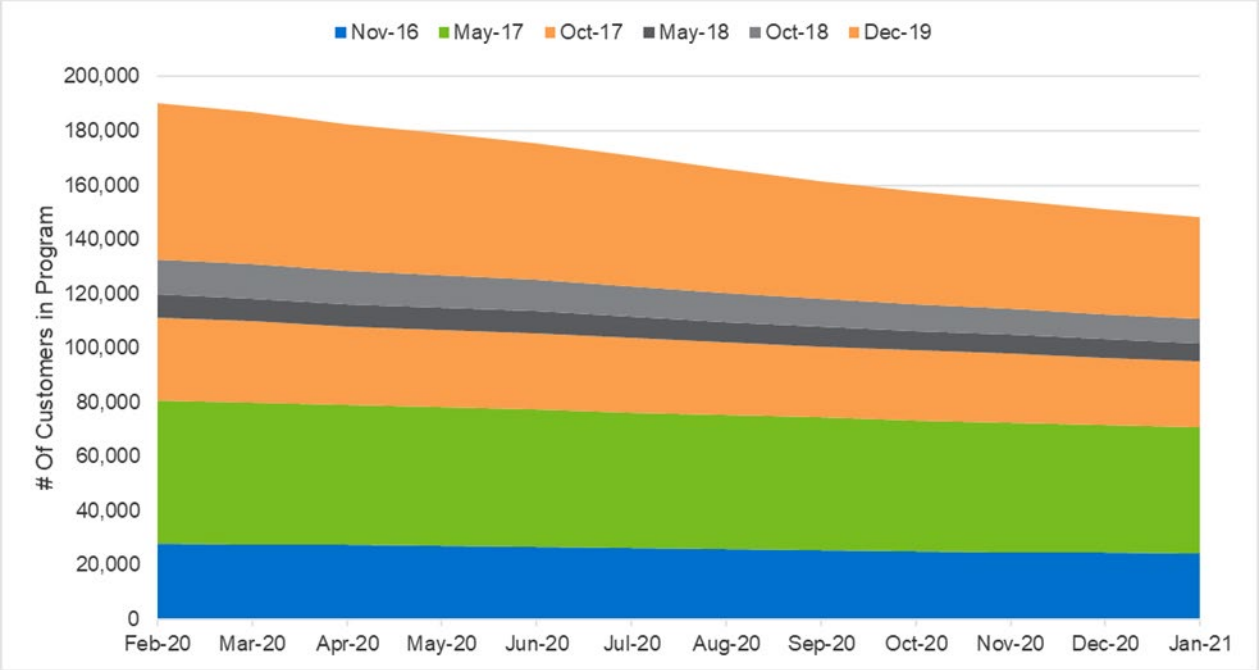


Table 3-6 presents summary information for each of the six cohorts included in Nexant's DEC MF analysis. On an annual basis, the pre-assignment usage is relatively balanced between groups for each of these cohorts, where the largest difference occurs in the first cohort ("November 2016").

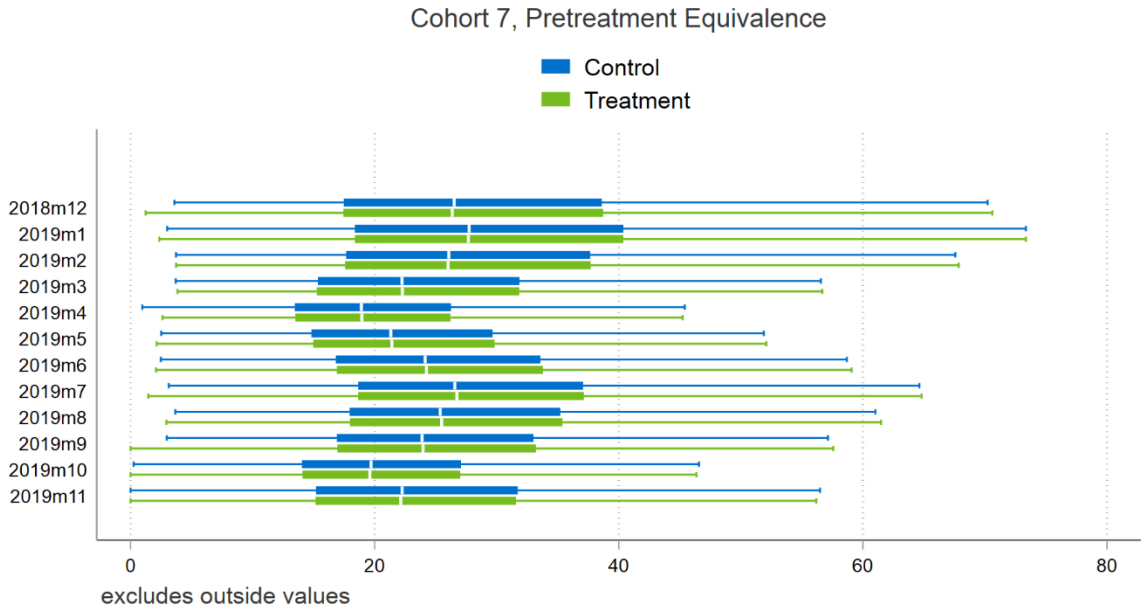
Table 3-6: DEC MF Cohort Summary Statistics

Cohort		Pretreatment Period		# Homes		Annual kWh in Pretreatment Period	
		Start	End	Control	Treatment	Control	Treatment
1	Nov-16	11/2015	10/2016	3,954	29,128	11,649	11,506
2	May-17	05/2016	04/2017	7,490	54,450	10,719	10,612
3	Oct-17	10/2016	09/2017	11,993	31,915	9,940	9,971
4	May-18	05/2017	04/2018	8,518	9,451	9,716	9,717
5	Oct-18	10/2017	09/2018	12,806	13,699	9,863	9,777
6	Dec-19	12/2018	11/2019	19,813	62,959	9,794	9,796

Figure 3-4 is a box-and-whisker plot of the average pre-treatment consumption for the treatment and control groups of DEC MF Cohort 7 ("December 2019"), the largest treatment cohort of the DEC MF MyHER program. The figure depicts the distribution of monthly average consumption from December 2018 to November 2019, 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 very similar, and the t-

tests reveal that most of the months did not have statistically significant differences between them.

Figure 3-4: DEC MF Difference in Average Pre-treatment Billed Consumption (kWh)



3.1.4.3 Duke Energy Progress Single Family

Considering the DEP program, the history of DEP SF cohort assignments is represented in Figure 3-5. The DEP SF customers started treatment with one very large cohort in December 2014. Some of the December 2014 control customers were later released to treatment in 2017. Subsequent DEP SF waves are much smaller than the first treatment wave.

Figure 3-5: History of Cohort Assignments for DEP SF MyHER Program

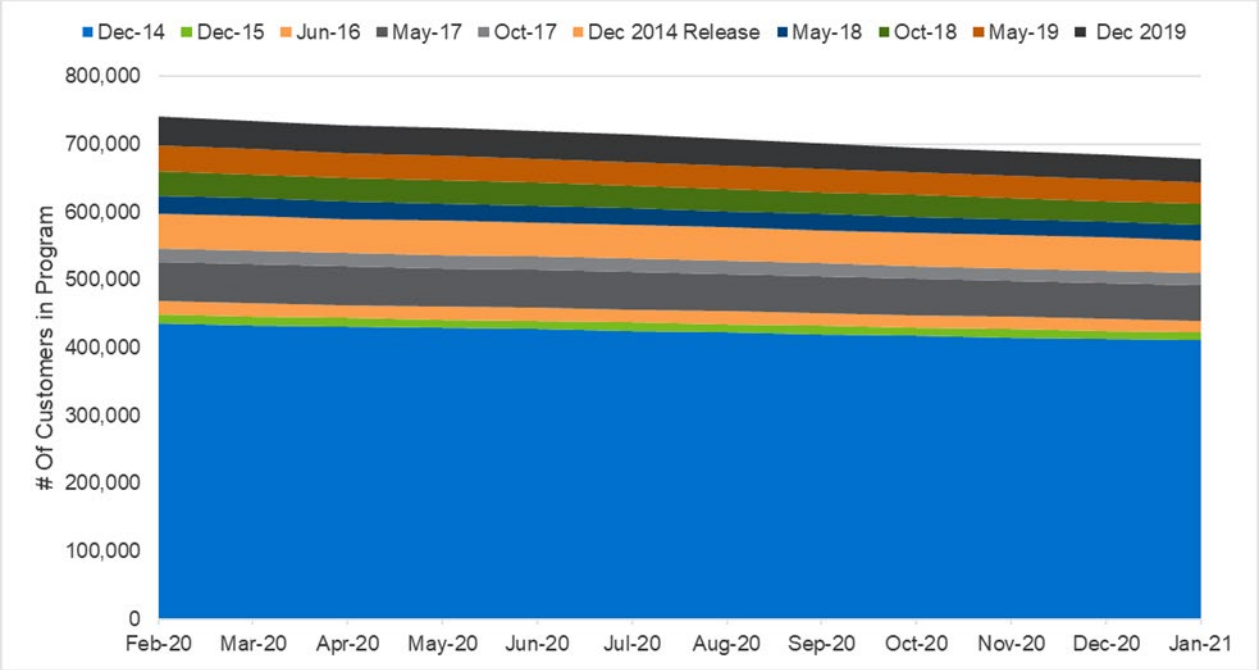


Table 3-7: presents summary information for each of the ten cohorts included in Nexant's analysis, comparing the average annual kWh usage of each cohort's treatment and control group for the 12 months prior to the beginning of assignment. Here as in DEC, on an annual basis, the pre-assignment usage is relatively balanced between groups for each of these cohorts, where the largest difference occurs in Cohort 5 ("October 2017").

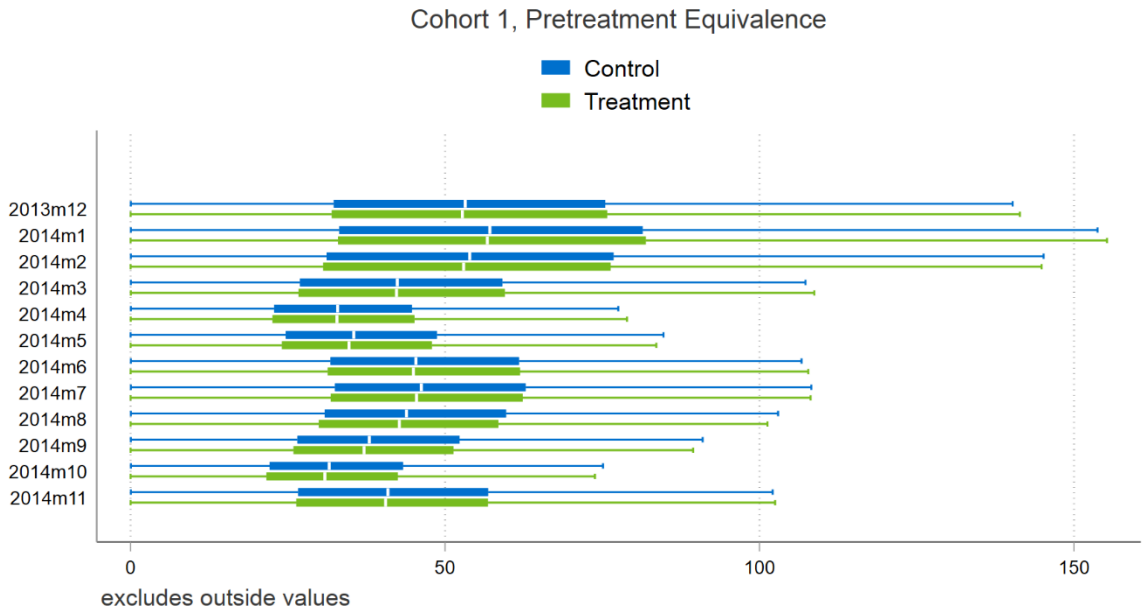
Table 3-7: DEP SF MyHER Cohort Statistics

Cohort		Pre-Period		# Homes		Annual kWh in Pre-Period	
		Start	End	Control	Treatment	Control	Treatment
1	Dec 2014	12/2013	11/2014	54,911	424,163	17,129	17,106
2	Dec 2015	12/2014	11/2015	4,348	13,112	15,091	14,960
3	Jun 2016	06/2015	05/2016	8,420	19,333	14,105	14,269
4	May 2017	05/2016	04/2017	4,291	58,014	15,529	15,523
5	Oct 2017	10/2016	09/2017	7,288	20,783	14,011	14,109
6	Dec 2014 Release	12/2013	11/2014	54,911	50,561	17,129	17,122
7	May 2018	05/2017	04/2018	3,886	26,121	14,321	14,479
8	Oct 2018	10/2017	09/2018	4,361	33,747	14,299	14,466
9	May 2019	05/2018	04/2019	4,941	37,836	14,817	14,797
10	Dec 2019	12/2018	11/2019	7,667	43,728	14,198	14,238

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 3-6 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, although the quality of the pretreatment equivalence is best in the more recent treatment cohorts.

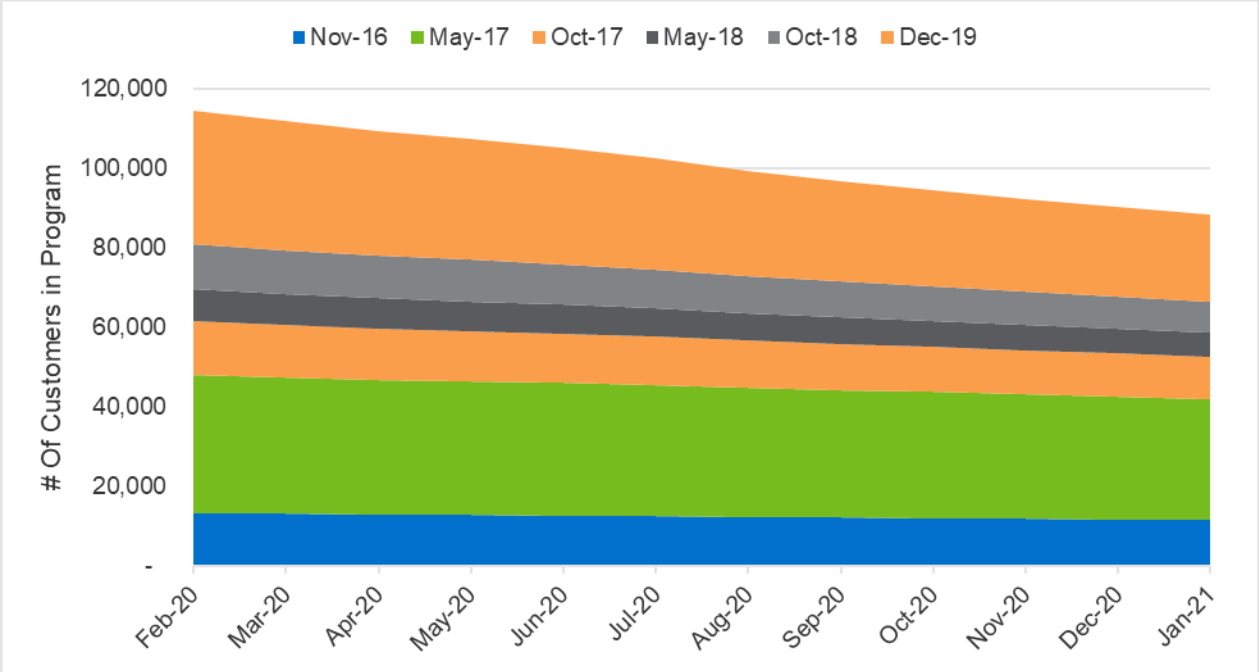
Figure 3-6: DEP SF Difference in Average Pre-treatment Billed Consumption (kWh)



3.1.4.4 Duke Energy Progress Multi-family

Figure 3-7 illustrates the number of DEP MF customers in each treatment cohort from February 2020 to January 2021. Treatment started with a small cohort launching in November 2016, followed by a larger cohort in May 2017. Similar to DEC MF, the DEP MF customers have higher attrition than the SF customers which is due to the fact that multi-family account turnover is usually higher than single family account turnover at most electric utilities.

Figure 3-7: History of Cohort Assignments for DEP MF Customers



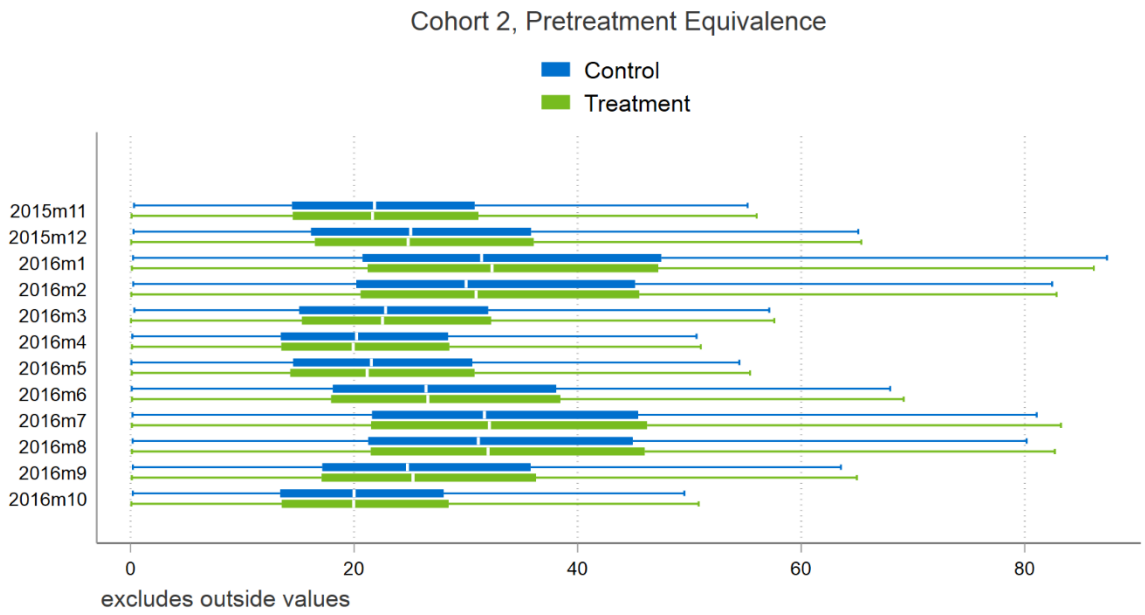
Summary statistics for DEP MF customers are presented in Table 3-8:. Cohort 2 ("May 2017") is the largest cohort and had the biggest difference in pre-treatment usage of about 170 kWh. Cohort 4 and Cohort 5 are much smaller than the previous cohorts, but they also had the smallest difference in pre-treatment electric usage.

Table 3-8: DEP MF MyHER Cohort Summary Statistics

Cohort		Pretreatment Period		# Homes		Annual kWh in Pretreatment Period	
		Start	End	Control	Treatment	Control	Treatment
1	Nov 2016	11/2015	10/2016	1,529	11,918	10,569	10,704
2	May 2017	05/2016	04/2017	4,194	30,751	10,637	10,467
3	Oct 2017	10/2016	09/2017	3,722	9,977	9,321	9,481
4	May 2018	05/2017	04/2018	3,782	4,458	9,759	9,662
5	Oct 2018	10/2017	09/2018	5,524	5,841	9,708	9,699
6	Dec 2019	12/2018	11/2019	16,520	17,830	9,526	9,506

Monthly pre-treatment equivalence for DEP MF Cohort 2, the largest cohort, is presented in Figure 3-8. As with other older cohorts, there are significant differences in electric usage between some of the months. While this was rectified with new assignment strategies in some of the newer cohorts, it is still something that must be addressed for the older cohorts that had a significant difference in electric usage between the treatment and control customers.

Figure 3-8: DEP MF 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

$$\mathrm{kWh_{ity}} = \mathrm{customer_i} * \beta_i + \sum_{t=1}^{12}\sum_{y=2009}^{2020} \mathrm{I_{ty}} * \beta_{ty} + \sum_{t=1}^{12}\sum_{y=2009}^{2020} \mathrm{I_{ty}} * \tau_{ty} * \mathrm{treatment_{ity}} + \varepsilon_{ity}$$

Table 3-9: provides additional information about the terms and coefficients in Equation 3-1.

Table 3-9: Fixed Effects Regression Model Definition of Terms

Variable	Definition
kWh_{ity}	Customer i's average daily energy usage in billing month t of year y.
$customer_i$	An indicator variable that equals one for customer i and zero otherwise. This variable models each customer's average energy use separately.
β_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.
β_{ty}	The coefficient on the billing period t, year y indicator variable.
$treatment_{ity}$	The treatment variable. Equal to one when the treatment is in effect for the treatment group. Zero otherwise. Always zero for the control group.
τ_{ty}	The estimated treatment effect in kWh per day per customer in billing month t of year y; the main parameter of interest.
ε_{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 are 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 3-10 illustrates the calculation of monthly impact estimates from the regression model coefficients for homes in the DEC SF 2012 - 2013 cohort (DEC SF Cohort 2). The monthly savings shown in Table 3-10 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 3-10: Impact Calculation Example – DEC SF Cohort 2

Month	Daily Treatment Coefficient (τ)	Monthly Impact (kWh)
Feb-20	1.4	43.7
Mar-20	1.0	30.1
Apr-20	1.0	30.6
May-20	0.9	28.9
Jun-20	0.5	15.5
Jul-20	0.3	9.7
Aug-20	0.4	12.0
Sep-20	0.2	7.5
Oct-20	1.1	33.7
Nov-20	1.2	37.5
Dec-20	1.3	38.8
Jan-21	1.6	47.7
12-month Total		**335.7**

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 for the single family and multi-family program segments.

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 may be 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, should it exist, 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 2018. This dataset included nearly 456,603 records of efficient measure installations by the MyHER treatment and control group and formed the basis of Nexant's dual participation analysis.

Table 3-11: and Table 3-12 show the distribution of participation and savings during the 12-month period February 2020 to January 2021 across DEC and DEP's residential portfolio, respectively.

Table 3-11: DEC SF and MF Total EE Program Participation among MyHER Participants

Program Name	Number of Records	Net MWh/year	Net kW/year
DE Residential EE Products & Services	142,910	28,351	3,467
DE Smart Saver Residential	139,857	104,899	18,704
Residential Energy Assessments	13,136	11,752	1,368
Total	**295,903**	**145,003**	**23,538**

Table 3-12: DEP SF and MF Total EE Program Participation among MyHER Participants

Program Name	Number of Records	Net MWh/year	Net kW/year
DEP Elec Wtzn pay per kwh prog Pilot	291	151	31
DEP Home Energy Improvement	15,345	4,707	1,331
DEP Neighborhood Energy Saver	246	192	26
DEP New Construction Program	19	0.4	0.4
DEP ResEE Multi-Family	14,72	279	30
DEP Residential Energy Assessment	8,072	11,069	1,306
DEP Single Family Water Measures	71,148	15,468	1,792
DEP Smart Saver Residential	17,729	10,309	776
Total	**114,322**	**42,176**	**5,292**

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 3-13: 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 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 3-13: Incremental EE Savings Calculation Example – DEC SF 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
Feb-20	0.38	0.39	0.01	3.0%	0.35
Mar-20	0.39	0.41	0.01	3.0%	0.36
Apr-20	0.41	0.42	0.01	2.7%	0.33
May-20	0.42	0.43	0.01	2.8%	0.35
Jun-20	0.42	0.44	0.02	4.1%	0.52
Jul-20	0.43	0.45	0.02	3.8%	0.50
Aug-20	0.44	0.46	0.02	3.8%	0.51
Sep-20	0.45	0.47	0.02	3.5%	0.49
Oct-20	0.46	0.47	0.02	3.6%	0.50
Nov-20	0.46	0.48	0.01	3.2%	0.46
Dec-20	0.47	0.48	0.02	3.4%	0.48
Jan-21	0.48	0.49	0.02	3.3%	0.47
12-month Total					**5.31**

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 3-14: and Table 3-15: show the number of homes that received each combination of messages for the DEC SF and MF customers, respectively. The same information is presented for DEP SF and MF customers in Table 3-16 and Table 3-17.

Table 3-14: DEC SF Promotional Messaging by Month

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
02/2020	Don't Sweat The Small Stuff	Dryer Best Practices	488
02/2020	Here's A Bright Idea! Free LED Bulbs	Don't Sweat The Small Stuff	156,536
02/2020	Ready For Your Free Contractor Referral?	Don't Sweat The Small Stuff	530,201
03/2020	Our Energy Pro Can Help You Save	Heavy And Light	143,996
03/2020	Save Energy. Save Money. Save Time. Shop Online!	Heavy And Light	355,950
03/2020	Saving $100* Is As Easy As Sun, Two, Three!	Heavy And Light	24,477
03/2020	Spend Money To Make Money	Heavy And Light	633,106
04/2020	Spring Into Savings With Free LEDs	Adjusting To Daylight	70,228
04/2020	Spring Into Savings With Free LEDs	Do You Have An Electric Water Heater?	3,734
04/2020	Turn Up To Save	Do You Have An Electric Water Heater?	29,395
04/2020	Turn Up To Save	Adjusting To Daylight	594,317
05/2020	Close In The Cool	Registers Free And Clear	592,463
05/2020	Close In The Cool	Discover Ways To Save On Your Bill	225,409
05/2020	Close In The Cool	Let LEDs Lower Your Cooling Bills	439
05/2020	Confirm Your Electric Water Heater!	Registers Free And Clear	13,225
05/2020	Confirm Your Electric Water Heater!	Discover Ways To Save On Your Bill	19,832
05/2020	Confirm Your Electric Water Heater!	Let LEDs Lower Your Cooling Bills	10
05/2020	Do You Have An Electric Water Heater?	Registers Free And Clear	84
05/2020	Do You Have An Electric Water Heater?	Discover Ways To Save On Your Bill	67
05/2020	Save Energy. Save Money. Save Time. Shop Online!	Discover Ways To Save On Your Bill	229,150
05/2020	Save Energy. Save Money. Save Time. Shop Online!	Registers Free And Clear	34,255
05/2020	Saving $100* Is As Easy As Sun, Two Three!	Discover Ways To Save On Your Bill	2,226
05/2020	Saving $100* Is As Easy As Sun, Two Three!	Registers Free And Clear	17,713
06/2020	Access Your Usage On Your Voice Assistant	Keep It On Cold	612
06/2020	Access Your Usage On Your Voice Assistant	Discover Ways To Save On Your Bill	813,181
06/2020	Access Your Usage On Your Voice Assistant	The Simplest Savings	376,251
07/2020	Close Out The Damp	Seal For The Summer!	957,823
07/2020	Our Energy Pro Can Help You Save	Seal For The Summer!	224,909
08/2020	Not Too Warm, Not Too Cold	Low With The Flow	583
08/2020	Ready For Your Free Contractor Referral?	Not Too Warm, Not Too Cold	1,163,736
08/2020	Your Support Inspires Future Innovation	Not Too Warm, Not Too Cold	5,355

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
09/2020	Take Small Steps To A Brighter Tomorrow	Cool It Down	345
09/2020	Take Small Steps To A Brighter Tomorrow	Do You Have An Electric Water Heater?	40
09/2020	Tap Into Your Energy Usage	Do You Have An Electric Water Heater?	77,675
09/2020	Tap Into Your Energy Usage	Cool It Down	652,295
10/2020	Free Home Energy Assessment	Back In Black Friday	218,613
10/2020	Lint Free And Loving It	Set It And Forget It	530
10/2020	Set It And Forget It	Back In Black Friday	925,904
11/2020	Ready For Your Free Contractor Referral?	Power-Free Holiday Decor	720,804
11/2020	Vacation Is Better If You Unplug	Power-Free Holiday Decor	502
12/2020	Free Home Energy Assessment	Winter Ways To Vent	217,058
12/2020	Tap Into Your Energy Usage	Winter Ways To Vent	913,405

Table 3-15: DEC MF MyHER Promotional Messaging by Month

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
02/2020	Don't Sweat The Small Stuff	Dryer Best Practices	125,345
02/2020	Here's A Bright Idea! Free LED Bulbs.	Don't Sweat The Small Stuff	13
02/2020	Ready For Your Free Contractor Referral?	Don't Sweat The Small Stuff	75
03/2020	Save Energy. Save Money. Save Time. Shop Online!	Heavy And Light	44
03/2020	Spend Money To Make Money	Heavy And Light	123,842
04/2020	Turn Up To Save	Adjusting To Daylight	120,979
05/2020	Close In The Cool	Discover Ways To Save On Your Bill	87,523
05/2020	Close In The Cool	Registers Free And Clear	66
05/2020	Close In The Cool	Let LEDs Lower Your Cooling Bills	83,036
05/2020	Confirm Your Electric Water Heater!	Let LEDs Lower Your Cooling Bills	1,178
05/2020	Confirm Your Electric Water Heater!	Discover Ways To Save On Your Bill	2,045
05/2020	Do You Have An Electric Water Heater?	Discover Ways To Save On Your Bill	15
05/2020	Save Energy. Save Money. Save Time. Shop Online!	Discover Ways To Save On Your Bill	30
06/2020	Access Your Usage On Your Voice Assistant	Keep It On Cold	27,348
06/2020	Access Your Usage On Your Voice Assistant	Discover Ways To Save On Your Bill	140,407
06/2020	Access Your Usage On Your Voice Assistant	The Simplest Savings	53
07/2020	Close Out The Damp	Seal For The Summer!	164,094
07/2020	Our Energy Pro Can Help You Save	Seal For The Summer!	16
08/2020	Not Too Warm, Not Too Cold	Low With The Flow	158,655
08/2020	Ready For Your Free Contractor Referral?	Not Too Warm, Not Too Cold	173
09/2020	Tap Into Your Energy Usage	Do You Have An Electric Water Heater?	15,160
09/2020	Tap Into Your Energy Usage	Cool It Down	91,162
10/2020	Free Home Energy Assessment	Back In Black Friday	15
10/2020	Lint Free And Loving It	Set It And Forget It	104,857
10/2020	Set It And Forget It	Back In Black Friday	154
11/2020	Ready For Your Free Contractor Referral?	Power-Free Holiday Décor	116

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
11/2020	Vacation Is Better If You Unplug	Power-Free Holiday Décor	100,808
12/2020	Free Home Energy Assessment	Winter Ways To Vent	16
12/2020	Tap Into Your Energy Usage	Winter Ways To Vent	146,548

Table 3-16: DEP SF MyHER Promotional Messaging by Month

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
02/2020	Don't Sweat The Small Stuff	Dryer Best Practices	165
02/2020	Ready For Your Free Contractor Referral?	Don't Sweat The Small Stuff	393,938
03/2020	Our Energy Pro Can Help You Save	Heavy And Light	316,151
03/2020	Save Energy. Save Money. Save Time. Shop Online!	Heavy And Light	153,949
03/2020	Saving $100* Is As Easy As Sun, Two, Three!	Heavy And Light	1,284
03/2020	Spend Money To Make Money	Heavy And Light	226,043
04/2020	Turn Up To Save	Do You Have An Electric Water Heater?	7,949
04/2020	Turn Up To Save	Adjusting To Daylight	395,313
05/2020	Close In The Cool.	Discover Ways To Save On Your Bill	131,813
05/2020	Close In The Cool.	Let LEDs Lower Your Cooling Bills	153
05/2020	Close In The Cool.	Registers Free And Clear	365,871
05/2020	Confirm Your Electric Water Heater!	Registers Free And Clear	3,033
05/2020	Confirm Your Electric Water Heater!	Discover Ways To Save On Your Bill	4,670
05/2020	Do You Have An Electric Water Heater?	Discover Ways To Save On Your Bill	15
05/2020	Do You Have An Electric Water Heater?	Registers Free And Clear	30
05/2020	Save Energy. Save Money. Save Time. Shop Online!	Registers Free And Clear	21,693
05/2020	Save Energy. Save Money. Save Time. Shop Online!	Discover Ways To Save On Your Bill	142,802
05/2020	Saving $100* Is As Easy As Sun, Two Three!	Registers Free And Clear	653
05/2020	Saving $100* Is As Easy As Sun, Two Three!	Discover Ways To Save On Your Bill	435
06/2020	Access Your Usage On Your Voice Assistant	The Simplest Savings	176,279
06/2020	Access Your Usage On Your Voice Assistant	Discover Ways To Save On Your Bill	543,796
06/2020	Access Your Usage On Your Voice Assistant	Keep It On Cold	196
07/2020	Close Out The Damp	Seal For The Summer!	210,521
07/2020	Our Energy Pro Can Help You Save	Seal For The Summer!	503,606
08/2020	Not Too Warm, Not Too Cold	Low With The Flow	196
08/2020	Ready For Your Free Contractor Referral?	Not Too Warm, Not Too Cold	706,077
08/2020	Your Support Inspires Future Innovation	Not Too Warm, Not Too Cold	3,615
09/2020	Take Small Steps To A Brighter Tomorrow	Do You Have An Electric Water Heater?	640
09/2020	Take Small Steps To A Brighter Tomorrow	Cool It Down	2,709
09/2020	Tap Into Your Energy Usage	Do You Have An Electric Water Heater?	33,461
09/2020	Tap Into Your Energy Usage	Cool It Down	389,519
10/2020	Free Home Energy Assessment	Back In Black Friday	446,665

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
10/2020	Lint Free And Loving It	Set It And Forget It	161
10/2020	Set It And Forget It	Back In Black Friday	182,849
11/2020	Ready For Your Free Contractor Referral?	Power-Free Holiday Decor	420,154
11/2020	Vacation Is Better If You Unplug	Power-Free Holiday Decor	160
12/2020	Free Home Energy Assessment	Winter Ways To Vent	472,490
12/2020	Tap Into Your Energy Usage	Winter Ways To Vent	210,173

Table 3-17: DEP MF MyHER Promotional Messaging by Month

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
02/2020	Don't Sweat The Small Stuff	Dryer Best Practices	44,427
02/2020	Ready For Your Free Contractor Referral?	Don't Sweat The Small Stuff	17
03/2020	Spend Money To Make Money	Heavy And Light	43,817
04/2020	Turn Up To Save	Adjusting To Daylight	43,325
05/2020	Close In The Cool	Let LEDs Lower Your Cooling Bills	35,728
05/2020	Close In The Cool	Registers Free And Clear	15
05/2020	Close In The Cool	Discover Ways To Save On Your Bill	31,939
05/2020	Confirm Your Electric Water Heater!	Discover Ways To Save On Your Bill	443
05/2020	Confirm Your Electric Water Heater!	Let LEDs Lower Your Cooling Bills	248
06/2020	Access Your Usage On Your Voice Assistant	The Simplest Savings	16
06/2020	Access Your Usage On Your Voice Assistant	Discover Ways To Save On Your Bill	58,636
06/2020	Access Your Usage On Your Voice Assistant	Keep It On Cold	9,412
07/2020	Close Out The Damp	Seal For The Summer!	66,813
08/2020	Not Too Warm, Not Too Cold	Low With The Flow	65,079
08/2020	Ready For Your Free Contractor Referral?	Not Too Warm, Not Too Cold	49
09/2020	Tap Into Your Energy Usage	Cool It Down	35,531
09/2020	Tap Into Your Energy Usage	Do You Have An Electric Water Heater?	3,498
10/2020	Lint Free And Loving It	Set It And Forget It	36,370
10/2020	Set It And Forget It	Back In Black Friday	44
11/2020	Ready For Your Free Contractor Referral?	Power-Free Holiday Décor	31
11/2020	Vacation Is Better If You Unplug	Power-Free Holiday Décor	37,031
12/2020	Tap Into Your Energy Usage	Winter Ways To Vent	59,701
01/2021	We're All In This Together	Cold Is Best For Your Disposal	35,487

3.2 Duke Energy Carolinas Impact Findings

3.2.1 Per-home kWh and Percent Impacts

Nexant estimates the average participating DEC SF MyHER home saved 260.5 kWh of electricity from February 2020 to January 2021. This represents a 1.83% reduction in total electricity consumption compared to the control group over the same period. The average DEC MF MyHER home saved 77.0 kWh of electricity from February 2020 to January 2021, which represents a 0.74% reduction in electricity consumption. These estimates reflect both 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 3-18: and Table 3-19: show the impact estimates in each bill month for the average home assigned to treatment in DEC MF and SF, 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 3-18: DEC SF MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment

Month	Treatment Homes Analyzed	DEC SF Participant Count	kWh impact in Assigned Homes	% Treated	kWh Impact in Treated Homes
Feb-20	1,240,618	1,211,859	27.8	98%	28.4
Mar-20	1,232,861	1,210,755	22.0	98%	22.4
Apr-20	1,223,328	1,203,318	20.8	98%	21.2
May-20	1,215,700	1,199,355	20.1	99%	20.4
Jun-20	1,208,469	1,193,259	16.9	99%	17.2
Jul-20	1,256,262	1,221,119	15.6	97%	16.1
Aug-20	1,244,968	1,223,132	16.1	98%	16.3
Sep-20	1,234,562	1,216,836	14.6	99%	14.9
Oct-20	1,224,792	1,211,764	21.6	99%	21.8
Nov-20	1,214,988	1,201,904	24.0	99%	24.3
Dec-20	1,205,209	1,191,807	28.4	99%	28.7
Jan-21	1,195,687	1,182,251	32.8	99%	33.1
12-month Total			**260.8**	**98%**	**264.8**

Table 3-19: DEC MF MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment

Month	Treatment Homes Analyzed	DEC MF Participant Count	kWh impact in Assigned Homes	% Treated	kWh Impact in Treated Homes
Feb-20	197,933	197,607	9.1	100%	9.1
Mar-20	194,281	194,057	7.0	100%	7.0
Apr-20	189,715	188,944	6.0	100%	6.0
May-20	186,317	185,155	6.6	99%	6.6
Jun-20	182,876	181,900	5.6	99%	5.6
Jul-20	177,982	177,346	4.9	100%	5.0
Aug-20	173,082	173,809	6.0	100%	6.0
Sep-20	168,480	169,085	5.6	100%	5.6
Oct-20	164,697	164,134	5.8	100%	5.8
Nov-20	161,448	159,810	6.8	99%	6.9
Dec-20	158,121	156,140	8.2	99%	8.3
Jan-21	155,138	152,839	7.9	99%	8.1
12-month Total			**79.5**	**100%**	**79.9**

An adjustment factor of 4.4 kWh per home for SF customers and 2.9 kWh per home for MF customers is applied to MyHER impact estimates in Table 3-20: 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 3-20: DEC 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 SF	February 2020 – January 2021	264.8	4.4	260.5	14,251	1.86%
DEC MF	February 2020 – January 2021	79.9	2.9	77.0	10,454	0.76%

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 February 2020 to January 2021, DEC SF MyHER participants conserved 313.5 GWh of electricity, while DEC MF MyHER participants conserved 13.5 GWh. The aggregate impacts presented in Table 3-21 and Table 3-22 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 3-21: DEC SF MyHER Aggregate Impacts

Month	DEC SF Participant Count	kWh Net Impact	GWh Net Impact
Feb-20	1,211,859	28.1	34.1
Mar-20	1,210,755	22.1	26.8
Apr-20	1,203,318	20.9	25.1
May-20	1,199,355	20.1	24.1
Jun-20	1,193,259	16.7	19.9
Jul-20	1,221,119	15.7	19.1
Aug-20	1,223,132	16.0	19.5
Sep-20	1,216,836	14.5	17.6
Oct-20	1,211,764	21.4	26.0
Nov-20	1,201,904	23.9	28.8
Dec-20	1,191,807	28.3	33.8
Jan-21	1,182,251	32.7	38.7
12-month Total		**260.5**	**313.5**

Table 3-22: DEC MF MyHER Aggregate Impacts

Month	DEC MF Participant Count	kWh Net Impact	GWh Net Impact
Feb-20	197,607	8.9	1.8
Mar-20	194,057	6.8	1.3
Apr-20	188,944	5.8	1.1
May-20	185,155	6.4	1.2
Jun-20	181,900	5.4	1.0
Jul-20	177,346	4.7	0.8
Aug-20	173,809	5.7	1.0
Sep-20	169,085	5.4	0.9
Oct-20	164,134	5.5	0.9
Nov-20	159,810	6.6	1.0
Dec-20	156,140	8.0	1.2
Jan-21	152,839	7.8	1.2
12-month Total		**77.0**	**13.5**

3.2.3 Precision of Findings

The margin of error of the per-home impact estimate is ± 22.7 kWh for DEC SF and ± 23.4 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 3-23: and Table 3-24:).

Table 3-23: 90% Confidence Intervals Associated with DEC SF MyHER Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	237.7	260.5	283.2
Percent Reduction	1.67%	1.83%	1.99%
Aggregate Impact (GWh)	286.1	313.5	340.9

Table 3-24: 90% Confidence Intervals Associated with DEC MF MyHER Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	53.6	77.0	100.4
Percent Reduction	0.51%	0.74%	0.96%
Aggregate Impact (GWh)	9.4	13.5	17.6

For DEC SF, the absolute precision of the result is ± 0.16% and the relative precision of ± 8.71% at the 90% confidence level. For DEC MF, the absolute precision of the result is ± 0.22% and the relative precision of ± 30.39% at the 90% confidence level.

3.2.4 Impact Estimates by Cohort

The per-home impact estimates shown in Table 3-18 and Table 3-19 reflect an unadjusted average impact across the thirteen cohorts of DEC SF MyHER customers analyzed and the six cohorts of DEC MF MyHER customers analyzed. The impact estimates for the individual cohorts varied across the study period. Table 3-25 and Table 3-26 show point estimates for each cohort during the period February 2020 to January 2021 for DEC SF and MF, respectively. Three released cohorts for DEC SF were added to treatment in October 2015 and began producing impacts in November 2015. The largest impacts for DEC SF customers came from cohort 2 (“2012-2013”) and cohort 8 (“2014-2015 Release”), these are both older cohorts, and continue the trend seen in the previous evaluation of mature cohorts producing some of the largest impacts in the study.

Table 3-25: DEC SF Unadjusted Monthly kWh Impact Estimates by Cohort

Month	Apr-10	2012-2013	2014-2015	Jun-16	May-17	Apr 2010 Release	2012-2013 Release	2014-2015 Release	Oct-17	May-18	Oct-18	May-19	Dec-19
Feb-20	15.5	43.7	33.1	15.6	6.4	8.3	20.1	36.5	-2.4	13.3	8.4	0.7	-0.4
Mar-20	17.4	30.1	28.9	17.1	6.7	11.9	17.4	32.3	10.4	11.4	7.9	2.1	0.8
Apr-20	17.3	30.6	22.2	17.0	7.8	10.9	16.3	27.5	15.8	12.1	9.2	4.5	1.2
May-20	23.1	28.9	17.1	17.3	13.0	10.6	16.6	27.3	23.9	12.4	8.3	11.8	5.8
Jun-20	22.7	15.5	16.9	16.3	19.9	8.0	20.3	32.0	36.1	14.4	15.2	17.8	9.4
Jul-20	21.2	9.7	16.6	15.1	22.9	10.7	24.9	36.3	42.9	17.7	14.5	22.2	8.1
Aug-20	29.8	12.0	14.0	12.2	23.7	12.8	24.5	39.0	42.8	22.8	11.6	24.1	9.7
Sep-20	22.9	7.5	22.7	10.6	15.8	13.7	21.5	35.3	28.5	16.8	7.8	16.6	7.8
Oct-20	19.1	33.7	19.4	13.4	5.2	12.5	15.3	28.5	15.0	9.3	4.7	14.2	6.4
Nov-20	20.5	37.5	22.9	18.5	7.3	18.8	14.8	28.1	7.5	12.5	4.4	10.7	7.8
Dec-20	15.7	38.8	35.3	21.4	18.9	26.5	19.1	34.1	0.3	16.3	6.0	7.6	3.4
Jan-21	14.6	47.7	38.5	22.2	21.6	21.9	20.3	33.8	-4.5	18.6	7.3	4.3	5.1
Total	**239.7**	**335.7**	**287.5**	**196.7**	**169.0**	**166.5**	**231.2**	**390.8**	**216.5**	**177.6**	**105.1**	**136.7**	**65.2**

As shown in Table 3-26, the largest impacts for DEC MF customers came from the three oldest cohorts ("November 2016", "May 2017", and "October 2017") with the largest impacts of 107 kWh coming from the May 2017 cohort. The newer cohorts have considerably lower impacts, which fits expectations in the previous DEC DEP MyHER reports where the Nexant team found impacts increased as cohorts matured.

Table 3-26: DEC MF Unadjusted Monthly kWh Impact Estimates by Cohort

Month	Nov-16	May-17	Oct-17	May-18	Oct-18	Dec-19
Feb-20	10.6	12.5	7.9	3.4	8.0	6.9
Mar-20	6.9	7.9	8.1	4.7	6.7	5.9
Apr-20	7.5	6.3	8.4	2.6	2.8	4.8
May-20	11.6	4.8	10.9	1.2	4.6	4.8
Jun-20	7.8	2.3	14.5	0.4	7.3	3.2
Jul-20	4.8	3.1	13.8	2.7	6.0	2.0
Aug-20	5.7	6.1	13.6	3.5	6.2	1.9
Sep-20	1.6	5.1	13.3	6.5	3.4	4.4
Oct-20	3.9	6.4	10.7	4.2	1.9	4.4
Nov-20	0.1	11.3	6.9	5.7	3.5	6.5
Dec-20	4.2	12.8	-0.1	3.9	8.5	11.0
Jan-21	6.5	10.6	-0.9	5.7	8.4	11.7
Total	**71.1**	**89.3**	**107.0**	**44.3**	**67.3**	**67.6**

Table 3-27: and Table 3-28: show the margin of error at the 90% confidence level for each cohort's annual impact estimate for DEC SF and MF, 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 3-27: DEC SF 90% Confidence Intervals Associated with Cohort Savings Estimates

Cohort	Margin of Error at 90% Confidence Level	Lower Bound (kWh)	Point Estimate (kWh)	Upper Bound (kWh)
Apr-10	211.8	27.9	239.7	451.4
2012-2013	79.9	255.9	335.7	415.6
2014-2015	84.5	202.9	287.5	372.0
Jun-16	119.8	76.9	196.7	316.5
May-17	160.4	8.7	169.0	329.4
Apr 2010 Release	182.2	-15.8	166.5	348.7
2012-2013 Release	91.2	140.1	231.2	322.4
2014-2015 Release	119.9	270.9	390.8	510.7
Oct-17	102.8	113.7	216.5	319.2
May-18	124.1	53.4	177.6	301.7
Oct-18	122.8	-17.7	105.1	228.0
May-19	142.9	-6.1	136.7	279.6
Dec-19	123.1	-57.9	65.2	188.3

Table 3-28: DEC MF 90% Confidence Intervals Associated with Cohort Savings Estimates

Cohort	Margin of Error at 90% Confidence Level	Lower Bound (kWh)	Point Estimate (kWh)	Upper Bound (kWh)
Nov-16	179.6	-108.4	71.1	250.7
May-17	117.3	-28.0	89.3	206.5
Oct-17	90.9	16.1	107.0	197.9
May-18	105.1	-60.8	44.3	149.5
Oct-18	90.1	-22.8	67.3	157.3
Dec-19	63.5	4.1	67.6	131.0

3.2.5 Seasonal Trends

There is a clear seasonal pattern to the DEC SF and MF MyHER savings profiles. SF and MF customers both consistently experience the greatest reductions in winter and the smallest, sometimes negative, reductions in summer. The blue bars in Figure 3-9 and Figure 3-10 show the average estimated monthly treatment effect for the program in each bill month from February 2020 to January 2021. The green series in Figure 3-9 and Figure 3-10 show the average control customer's load during the same time period.

Figure 3-9: DEC SF Average kWh Savings by Month

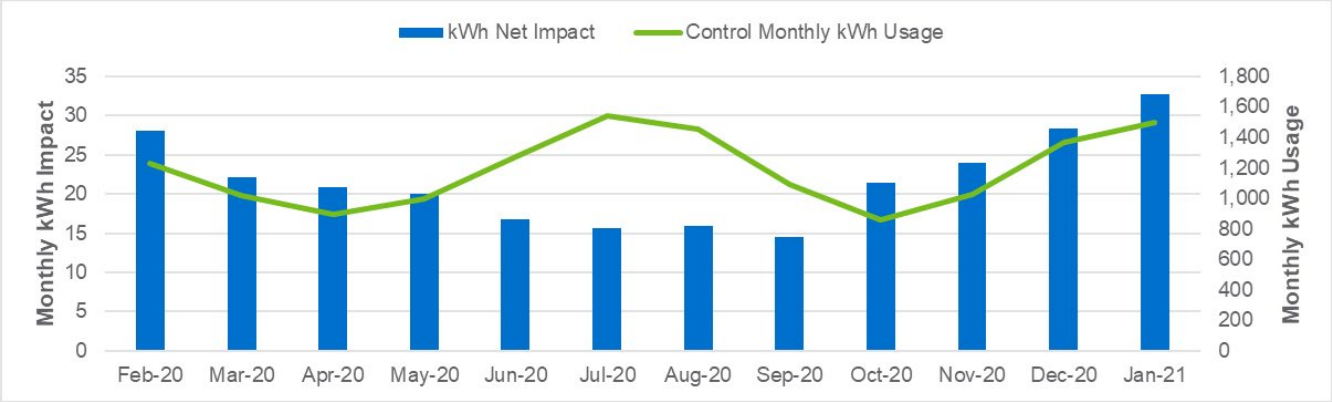
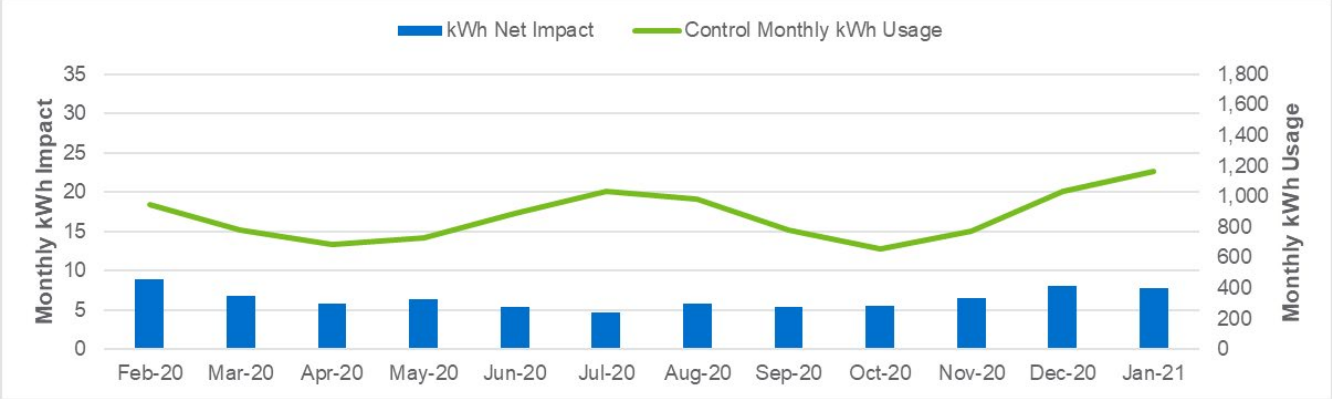


Figure 3-10: DEC MF Average kWh Savings by Month



Based on the observed savings trends, MyHER is realizing the greatest impacts in the winter. 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 3-29: presents the downward adjustment per home that was applied to impacts in order to avoid double-counting savings from February 2020 to January 2021. For DEC SF, the uplift was determined to be 4.35 kWh per home, or 5.3 GWh in aggregate. For DEC MF, the uplift was determined to be 2.93 kWh per home, or 0.5 GWh in aggregate.

Table 3-29: Monthly Adjustment for Overlapping Participation in Other EE Programs

Month	DEC SF Incremental kWh from Other EE Programs	DEC MF Incremental kWh from Other EE Programs
Feb-20	0.30	0.19
Mar-20	0.29	0.22
Apr-20	0.28	0.21
May-20	0.30	0.23
Jun-20	0.44	0.23
Jul-20	0.37	0.25
Aug-20	0.39	0.22
Sep-20	0.39	0.25
Oct-20	0.40	0.29
Nov-20	0.38	0.30
Dec-20	0.42	0.28
Jan-21	0.40	0.26
12-month Total	**4.35**	**2.93**

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 3-30 and Table 3-31 show the average daily energy savings attributable to tracked energy efficiency measures as of January 2021 by cohort and calculates an uplift percentage. In most of the cohorts the treatment group was more likely to have savings from DEC EE programs.

Table 3-30: DEC SF Uplift Percentage by Cohort

Cohort	Monthly Net kWh Savings from EE (Treatment Group)	Monthly Net kWh Savings from EE (Control Group)	Uplift Percentage
Dec 2014	7.7	7.5	1.1%
Dec 2015	7.6	7.2	3.4%
Jun 2016	7.8	7.7	2.5%
May 2017	7.6	7.0	7.5%
Oct 2017	8.0	8.2	1.6%
Dec 2014 Release	7.9	7.5	1.8%
May 2018	8.5	6.7	0.8%
Oct 2018	9.1	8.9	2.1%
May 2019	8.1	8.2	2.6%
Dec 2019	6.8	6.6	4.8%

Table 3-31: DEC MF Uplift Percentage by Cohort

Cohort	Monthly Net kWh Savings from EE (Treatment Group)	Monthly Net kWh Savings from EE (Control Group)	Uplift Percentage
Nov-16	13.7	12.5	9.6%
May-17	11.7	11.5	1.1%
Oct-17	13.7	13.6	0.7%
May-18	15.3	15.3	0.2%
Oct-18	16.0	15.3	4.4%
Dec-19	16.4	16.5	-0.4%

3.2.7 Peak Demand Impacts

Nexant estimated MyHER summer and winter demand savings using Duke Energy's DSMore load profile from 2020. The load profile data was provided to Nexant by Duke Energy for residential customers in DEC. Nexant used the peak demand definition defined by Duke Energy, which has a summer peak period of 4:00 PM to 5:00 PM on July weekdays and a winter peak period of 7:00 AM to 8:00 AM on January weekdays.

With regards to summer impacts: for single-family, Nexant applied the proportion of annual residential load in this hour to our annual MyHER impact savings estimate of 260.5 kWh; the result is an estimated MyHER residential peak demand savings of 0.048 kW. For multi-family, Nexant applied the proportion of annual residential load in this hour to our annual MyHER impact savings estimate of 77.0 kWh; the result is an estimated MyHER residential peak demand savings of 0.014 kW.

In the winter peak period, Nexant used the same method but applied the results to the proportion of annual usage during the January peak of hour ending 8:00 AM. For single family, Nexant estimated savings of 0.014 kW and for multi-family, Nexant estimated savings of 0.011 kW per customer during the winter peak hour. Demand impact results are presented in Table 3-32.

Table 3-32: DEC MyHER Summer and Winter Demand Impacts

Season	Segment	Participant Count	Per Home kW Savings	Aggregate MW
Summer	Single Family	1,205,613	0.0483	58.26
	Multi-family	175,069	0.0143	2.50
Winter	Single Family	1,205,613	0.0387	46.66
	Multi-family	175,069	0.0114	2.00

3.2.8 Duration of Exposure

Home energy report evaluations in North America consistently find a trend of increasing savings with length of treatment. For DEC SF, cohorts 1-9 have been exposed to treatment for longer than three years and provide 88% of aggregate savings, while comprising 79% of the

population. For DEC MF, cohorts 2-4[11] have been in the program for longer than three years and provide 67% of aggregate savings while comprising 59% of the population. A comparison of monthly impacts between the average customer and customers in the oldest cohorts are presented in Figure 3-11 and Figure 3-12.

Figure 3-11: DEC SF Comparison of Average Customer Savings to the Savings of the Older Program Participants

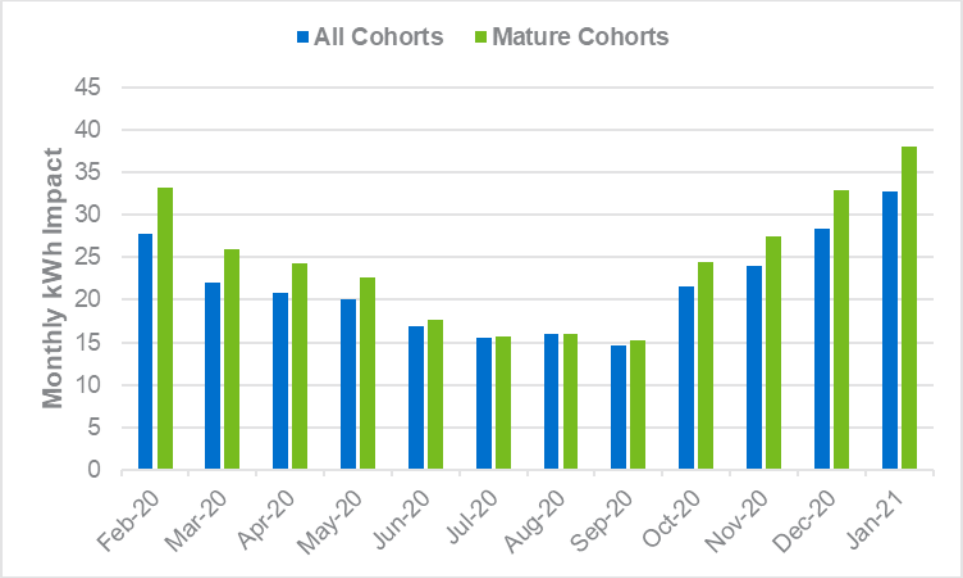
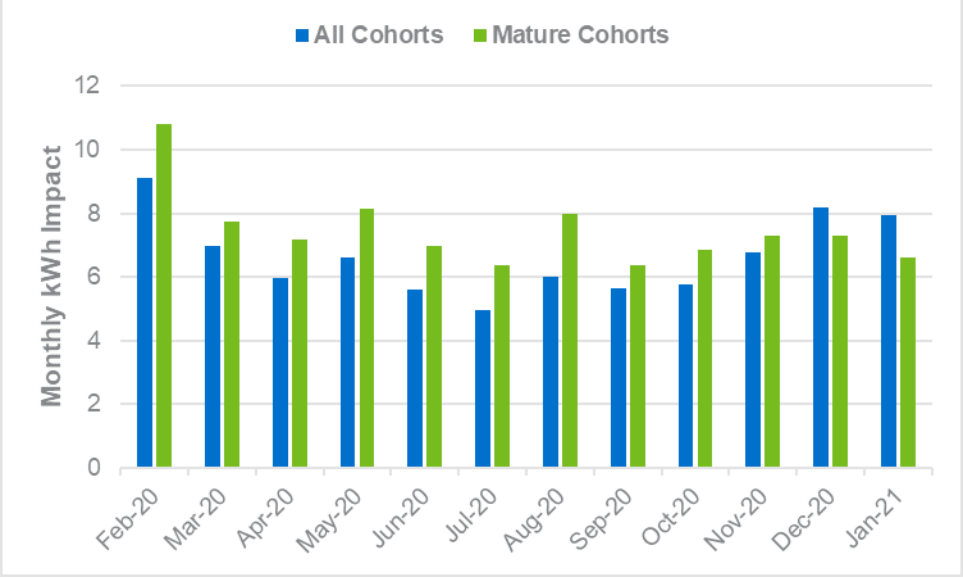


Figure 3-12: DEC MF Comparison of Average Customer Savings to the Savings of the Older Program Participants



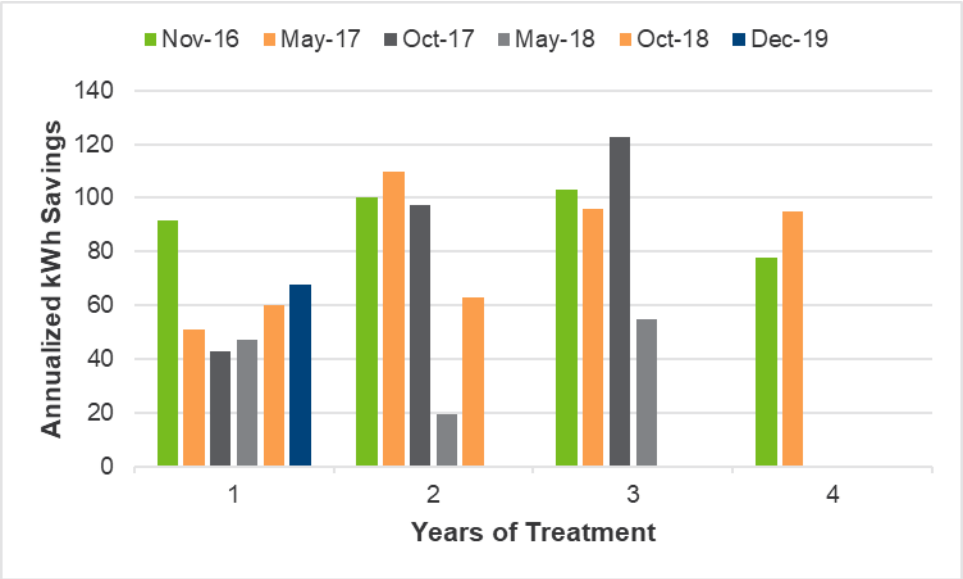
[11] Cohort 1 is a catch all for MF customers who were assigned before Nov 2016 and did not fit a cohort criteria, results for these customers were not presented as they do not have an even pre-treatment period.

Figure 3-13 displays the annual savings by the number of years a cohort has been in the program for DEC SF MyHER participants. 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 its treatment. It should be noted that there are few program implementations of home energy report programs with durations in excess of seven years and there is less information about what should be expected from implementations that are reaching a decade. 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 "April 2010" cohort's performance may be indicative of the existence of a point peak maturation after which mature impacts cannot be sustained. Two of the clearest trends in maturation are seen in the "2013-2013" cohort and the "2014-2015 Release" cohort, where impacts have been on a clear upwards trajectory for the extent of the program.

Figure 3-13: DEC SF Annual Savings by Duration of Exposure

Duration of exposure for DEC MF customers is displayed on Figure 3-14. Like the SF customers, the results are mixed as to the impact of maturation. The two 2018 cohorts show a clear increase in savings over their three year span in the analysis period, while the two oldest cohorts, "November 2016" and "May 2017", show steady impacts across the years. This evaluation is the first one to look at DEC MF MyHER impacts, so the impact of maturation will be revisited in the next DEC DEP evaluation as the cohorts mature to lengths seen in the SF customers.

Figure 3-14: DEC MF Annual Savings by Duration of Exposure



3.3 Duke Energy Progress Impact Findings

3.3.1 Per-home kWh and Percent Impacts

Nexant estimates the average participating DEP SF MyHER home saved 243.2 kWh of electricity from February 2020 to January 2021. This represents a 1.61% reduction in total electricity consumption compared to the control group over the same period. The average DEP MF MyHER home saved 64.1 kWh of electricity from February 2020 to January 2021, which represents a 0.64% 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 3-33 and Table 3-34 show the impact estimates in each bill month for the average home assigned to treatment in DEP MF and SF, 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 3-33: DEP SF MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment

Month	Treatment Homes Analyzed	DEP SF Participant Count	kWh impact in Assigned Homes	% Treated	kWh Impact in Treated Homes
Feb-20	740,536	725,283	24.4	98%	24.9
Mar-20	735,142	725,212	20.3	99%	20.6
Apr-20	728,397	719,344	15.1	99%	15.3
May-20	724,174	716,929	16.2	99%	16.4
Jun-20	720,002	714,581	19.0	99%	19.1
Jul-20	750,040	737,309	20.1	98%	20.4
Aug-20	742,628	738,331	21.3	99%	21.5
Sep-20	736,292	734,948	18.3	100%	18.3
Oct-20	729,724	731,763	14.7	100%	14.6
Nov-20	723,593	711,645	19.5	98%	19.8
Dec-20	717,862	705,104	25.8	98%	26.2
Jan-21	711,773	700,447	28.8	98%	29.3
12-month Total			**243.4**	**99%**	**246.4**

Table 3-34: DEP MF MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment

Month	Treatment Homes Analyzed	DEP MF Participant Count	kWh impact in Assigned Homes	% Treated	kWh Impact in Treated Homes
Feb-20	79,939	77,591	5.1	97%	5.3
Mar-20	78,360	76,233	6.7	97%	6.8
Apr-20	76,748	74,236	4.5	97%	4.7
May-20	75,535	72,746	2.9	96%	3.0
Jun-20	74,263	72,110	2.1	97%	2.2
Jul-20	72,580	70,702	3.3	97%	3.4
Aug-20	70,606	69,398	5.7	98%	5.8
Sep-20	69,096	67,637	5.6	98%	5.8
Oct-20	67,636	65,929	6.7	97%	6.9
Nov-20	66,307	64,486	6.1	97%	6.2
Dec-20	65,030	63,061	7.1	97%	7.4
Jan-21	63,741	61,710	7.5	97%	7.7
12-month Total			**63.3**	**100%**	**65.1**

An adjustment factor of 3.2 kWh per home for SF customers and 1.0 kWh per home for MF customers is applied to MyHER impact estimates in Table 3-35 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 3-35: DEP 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
DEP SF	February 2020 – January 2021	246.4	3.2	243.2	15,061	1.61%
DEP MF	February 2020 – January 2021	65.1	1.0	64.1	10,058	0.64%

3.3.2 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 February 2020 to January 2021, DEP SF MyHER participants conserved 175.2 GWh of electricity, while DEP MF MyHER participants conserved 4.4 GWh. The aggregate impacts presented in Table 3-36 and Table 3-37 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 3-36: DEP SF MyHER Aggregate Impacts

Month	DEP SF Participant Count	kWh Net Impact	GWh Net Impact
Feb-20	725,283	24.7	17.9
Mar-20	725,212	20.4	14.8
Apr-20	719,344	15.1	10.9
May-20	716,929	16.2	11.6
Jun-20	714,581	18.8	13.4
Jul-20	737,309	20.2	14.9
Aug-20	738,331	21.2	15.7
Sep-20	734,948	18.0	13.3
Oct-20	731,763	14.4	10.5
Nov-20	711,645	19.5	13.9
Dec-20	705,104	25.9	18.2
Jan-21	700,447	28.9	20.2
12-month Total		**243.2**	**175.2**

Table 3-37: DEP MF MyHER Aggregate Impacts

Month	DEP MF Participant Count	kWh Net Impact	GWh Net Impact
Feb-20	77,591	5.2	0.4
Mar-20	76,233	6.8	0.5
Apr-20	74,236	4.6	0.3
May-20	72,746	2.9	0.2
Jun-20	72,110	2.1	0.1
Jul-20	70,702	3.3	0.2
Aug-20	69,398	5.7	0.4
Sep-20	67,637	5.7	0.4
Oct-20	65,929	6.8	0.5
Nov-20	64,486	6.1	0.4
Dec-20	63,061	7.3	0.5
Jan-21	61,710	7.6	0.5
12-month Total		**64.1**	**4.4**

3.3.3 Precision of Findings

The margin of error of the per-home impact estimate is ± 24.0 kWh for DEP SF and ± 32.9 kWh for DEP MF 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 3-38 and Table 3-39).

Table 3-38: 90% Confidence Intervals Associated with DEP SF MyHER Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	219.2	243.2	267.2
Percent Reduction	1.46%	1.61%	1.77%
Aggregate Impact (GWh)	157.9	175.2	192.6

Table 3-39: 90% Confidence Intervals Associated with DEP MF MyHER Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	31.2	64.1	97.0
Percent Reduction	0.31%	0.64%	0.96%
Aggregate Impact (GWh)	2.1	4.4	6.7

For DEP SF, the absolute precision of the result is ± 0.16% and the relative precision of ± 9.87% at the 90% confidence level. For DEP MF, the absolute precision of the result is ± 0.32% and the relative precision of ± 51.33% at the 90% confidence level.

3.3.4 Impact Estimates by Cohort

The per-home impact estimates shown in Table 3-33 and Table 3-34 reflect an unadjusted average impact across the ten cohorts of DEP SF MyHER customers analyzed and the six cohorts of DEP MF MyHER customers analyzed. The impact estimates for the individual cohorts varied across the study period. Table 3-40 and Table 3-41 show point estimates for each cohort during the period February 2020 to January 2021 for DEC SF and MF, respectively. One release cohort for DEP was added to treatment in October 2015 and began producing impacts in November 2015. The largest DEP SF impacts are found in the first cohort (“December 2014”).

Table 3-40: DEP SF Unadjusted Monthly kWh Impact Estimates by Cohort

Month	Dec-14	Dec-15	Jun-16	May-17	Oct-17	Dec 2014 Release	May-18	Oct-18	May-19	Dec 2019
Feb-20	34.2	3.4	12.3	14.1	-20.6	24.0	17.7	2.8	4.2	12.8
Mar-20	26.5	3.9	21.9	9.9	2.1	18.5	19.7	5.5	8.1	10.2
Apr-20	18.0	2.3	25.9	3.9	22.3	13.9	25.9	11.1	-2.0	9.2
May-20	19.6	6.0	26.1	3.0	34.1	12.1	26.3	10.7	-1.5	7.6
Jun-20	22.8	7.8	23.8	8.2	37.8	11.5	27.4	10.5	3.5	9.8
Jul-20	24.6	7.6	21.0	8.9	37.5	11.2	27.5	13.5	4.3	8.2
Aug-20	26.5	4.3	20.1	13.9	36.2	11.3	23.1	8.6	7.3	9.5
Sep-20	21.9	1.6	18.0	15.6	31.7	11.3	24.5	11.2	3.9	4.7
Oct-20	17.2	-0.1	20.1	7.6	24.2	12.1	21.5	14.8	5.0	1.9
Nov-20	25.4	9.6	21.7	3.3	5.3	18.7	23.8	9.9	5.3	4.5
Dec-20	36.5	18.1	9.0	0.0	-15.5	24.1	24.0	7.3	10.3	5.9
Jan-21	39.8	14.4	11.0	6.6	-22.1	28.1	23.3	6.6	15.1	9.9
Total	**312.8**	**79.1**	**230.7**	**94.9**	**173.0**	**196.8**	**284.7**	**112.4**	**63.5**	**94.1**

Table 3-41: DEP MF Unadjusted Monthly kWh Impact Estimates by Cohort

Month	Nov-16	May-17	Oct-17	May-18	Oct-18	Dec-19
Feb-20	8.9	7.5	3.7	-4.1	7.3	0.6
Mar-20	14.9	6.1	7.1	5.0	5.8	2.3
Apr-20	15.5	2.0	5.7	4.6	5.3	0.4
May-20	8.0	0.4	6.4	9.6	1.1	0.7
Jun-20	0.0	3.1	6.9	11.5	-7.0	-0.2
Jul-20	-0.8	9.4	-0.4	14.5	-9.8	-2.1
Aug-20	5.0	11.1	1.0	15.0	-5.0	-0.8
Sep-20	8.2	7.4	6.2	12.4	-2.4	0.4
Oct-20	14.1	6.8	10.3	5.1	1.7	0.2
Nov-20	10.6	8.4	4.2	0.8	4.0	0.4
Dec-20	5.5	15.0	-2.0	-6.8	12.6	-1.4
Jan-21	1.6	13.6	2.1	-3.1	14.4	2.6
Total	**91.5**	**90.9**	**51.2**	**64.4**	**27.9**	**2.9**

Table 3-42 and Table 3-43 show the margin of error at the 90% confidence level for each cohort's annual impact estimate for DEP SF and MF, 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. This is especially relevant when looking at the DEP MF cohorts, which have the smallest customer counts in the MyHER program.

Table 3-42: DEP SF 90% Confidence Intervals Associated with Cohort Savings Estimates

Cohort	Margin of Error at 90% Confidence Level	Lower Bound (kWh)	Point Estimate (kWh)	Upper Bound (kWh)
Dec-14	60.6	252.2	312.8	373.4
Dec-15	216.5	-137.4	79.1	295.6
Jun-16	160.8	69.9	230.7	391.5
May-17	195.0	-100.0	94.9	289.9
Oct-17	168.4	4.6	173.0	341.4
Dec 2014 Release	82.3	114.5	196.8	279.2
May-18	185.6	99.1	284.7	470.3
Oct-18	171.0	-58.6	112.4	283.5
May-19	196.1	-132.6	63.5	259.6
Dec 2019	144.7	-50.7	94.1	238.8

Table 3-43: DEP MF 90% Confidence Intervals Associated with Cohort Savings Estimates

Cohort	Margin of Error at 90% Confidence Level	Lower Bound (kWh)	Point Estimate (kWh)	Upper Bound (kWh)
Nov-16	236.5	-145.0	91.5	328.1
May-17	155.0	-64.1	90.9	245.9
Oct-17	141.9	-90.7	51.2	193.0
May-18	153.5	-89.2	64.4	217.9
Oct-18	136.3	-108.4	27.9	164.2
Dec-19	80.2	-77.4	2.9	83.1

3.3.5 Seasonal Trends

There is a clear seasonal pattern to the DEP SF and MF MyHER savings profiles. SF and MF customers both consistently experience the greatest reductions in winter and the smallest, sometimes negative, reductions in summer. The blue bars in Figure 3-15 and Figure 3-16 show the average estimated monthly treatment effect for the program in each bill month from February 2020 to January 2021. The green series in Figure 3-15 and Figure 3-16 show the average control customer's load during the same time period. Annual electricity consumption for SF and MF customers is bimodal, with peaks in both summer and winter, and the results for DEP SF customers are also bimodal, unlike the DEC SF customers. DEP MF customers follow a different trend, with their highest impacts in the fall and winter months.

Figure 3-15: DEP SF Average kWh Savings by Month

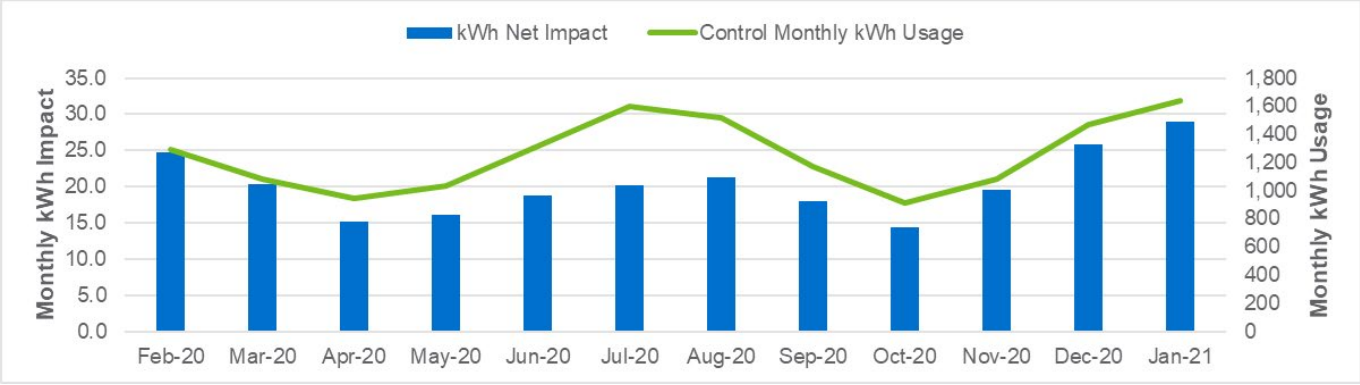
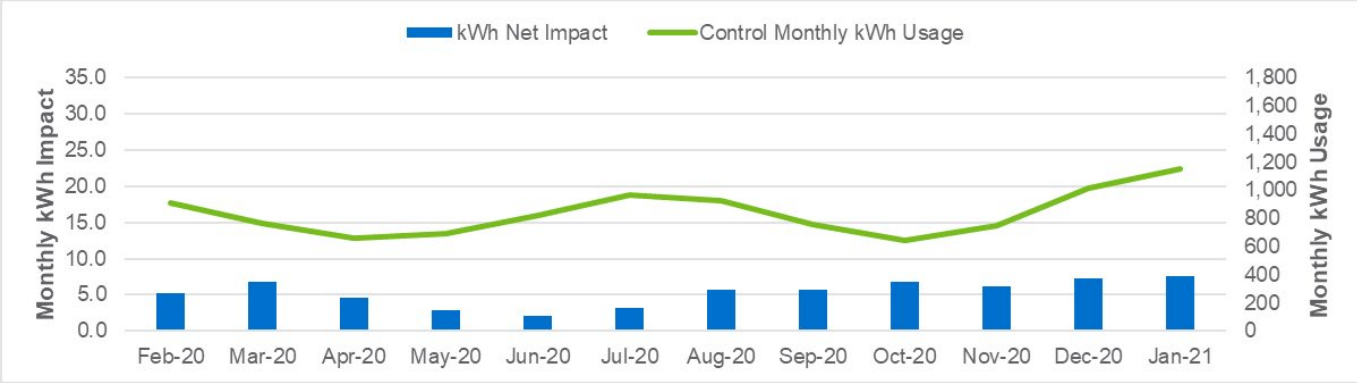


Figure 3-16: DEP MF Average kWh Savings by Month



Based on the observed savings trends among DEP MF and SF customers, MyHER is generally realizing the greatest impacts in the winter months, but DEP MyHER participants do relatively better in the summer months than the DEC MyHER participants.

3.3.6 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 3-44 presents the downward adjustment per home that was applied to impacts in order to avoid double-counting savings from February 2020 to January 2021. For DEP SF, the uplift was determined to be 3.19 kWh per home, or 2.31 GWh in aggregate. For DEP MF, the uplift was determined to be 1.00 kWh per home, or 0.07 GWh in aggregate.

Table 3-44: Monthly Adjustment for Overlapping Participation in Other EE Programs

Month	DEP SF Incremental kWh from Other EE Programs	DEP MF Incremental kWh from Other EE Programs
Feb-20	0.17	0.04
Mar-20	0.17	0.04
Apr-20	0.18	0.08
May-20	0.19	0.11
Jun-20	0.33	0.13
Jul-20	0.25	0.10
Aug-20	0.25	0.13
Sep-20	0.27	0.05
Oct-20	0.29	0.06
Nov-20	0.32	0.10
Dec-20	0.38	0.06
Jan-21	0.38	0.09
12-month Total	**3.19**	**1.00**

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

Table 3-45 and Table 3-46 show the average daily energy savings attributable to tracked energy efficiency measures as of January 2021 by cohort and calculates an uplift percentage. In all but two SF and one MF cohort the treatment group showed a higher propensity to adopt measures through Duke Energy programs than the control group.

Table 3-45: DEP SF Uplift Percentage by Cohort

Cohort	Monthly Net kWh Savings from EE (Treatment Group)	Monthly Net kWh Savings from EE (Control Group)	Uplift Percentage
Dec 2014	7.7	7.5	3.0%
Dec 2015	7.6	7.2	4.7%
Jun 2016	7.8	7.7	0.4%
May 2017	7.6	7.0	8.2%
Oct 2017	8.0	8.2	-2.5%
Dec 2014 Release	7.9	7.5	4.9%
May 2018	8.5	6.7	27.4%
Oct 2018	9.1	8.9	2.0%
May 2019	8.1	8.2	-1.1%
Dec 2019	6.8	6.6	2.4%

Table 3-46: DEP MF Uplift Percentage by Cohort

Cohort	Monthly Net kWh Savings from EE (Treatment Group)	Monthly Net kWh Savings from EE (Control Group)	Uplift Percentage
Nov-16	6.2	5.8	9%
May-17	4.5	4.5	0%
Oct-17	7.7	7.4	5%
May-18	7.9	6.6	21%
Oct-18	8.9	8.9	0%
Dec-19	7.4	8.0	-8%

3.3.7 Peak Demand Impacts

Nexant estimated MyHER summer and winter demand savings using Duke Energy's DSMore load profile from 2020. The load profile data was provided to Nexant by Duke Energy for residential customers in DEP. Nexant used the peak demand definition defined by Duke Energy, which has a summer peak period of 4:00 PM to 5:00 PM on July weekdays and a winter peak period of 7:00 AM to 8:00 AM on January weekdays.

With regards to summer impacts: for single-family, Nexant applied the proportion of annual residential load in this hour to our annual MyHER impact savings estimate of 243.2 kWh; the result is an estimated MyHER residential peak demand savings of 0.047 kW. For multi-family, Nexant applied the proportion of annual residential load in this hour to our annual MyHER impact savings estimate of 64.1 kWh; the result is an estimated MyHER residential peak demand savings of 0.012 kW.

In the winter peak period, Nexant used the same method but applied the results to the proportion of annual usage during the January peak of hour ending 8:00 AM. For single family, Nexant estimated savings of 0.043 kW and for multi-family, Nexant estimated savings of 0.011 kW per customer during the winter peak hour.

Table 3-47: DEP MyHER Summer and Winter Demand Impacts

Season	Segment	Participant Count	Per Home kW Savings	Aggregate MW
Summer	Single Family	721,741	0.0468	33.77
	Multi-family	69,653	0.0123	0.86
Winter	Single Family	721,741	0.0432	31.19
	Multi-family	69,653	0.0114	0.79

3.3.8 Duration of Exposure

Home energy report evaluations in North America consistently find a trend of increasing savings with length of treatment. For DEP SF, Cohorts 1-6 have been exposed to treatment for longer than three years and provide 87% of aggregate savings, while comprising 79% of the population. For DEP MF, Cohorts 2-4[12] have been in the program for longer than three years and provide 68% of aggregate savings while comprising 68% of the population. A comparison of monthly impacts between the average customer and customers in the oldest cohorts are presented in Figure 3-17 and Figure 3-18.

[12] Cohort 1 is a catchall cohort for MF customers who were assigned before Nov 2016 and did not fit a reasonable definition of a cohort.

Figure 3-17: DEP SF Comparison of Average Customer Savings to the Savings of the Older Program Participants

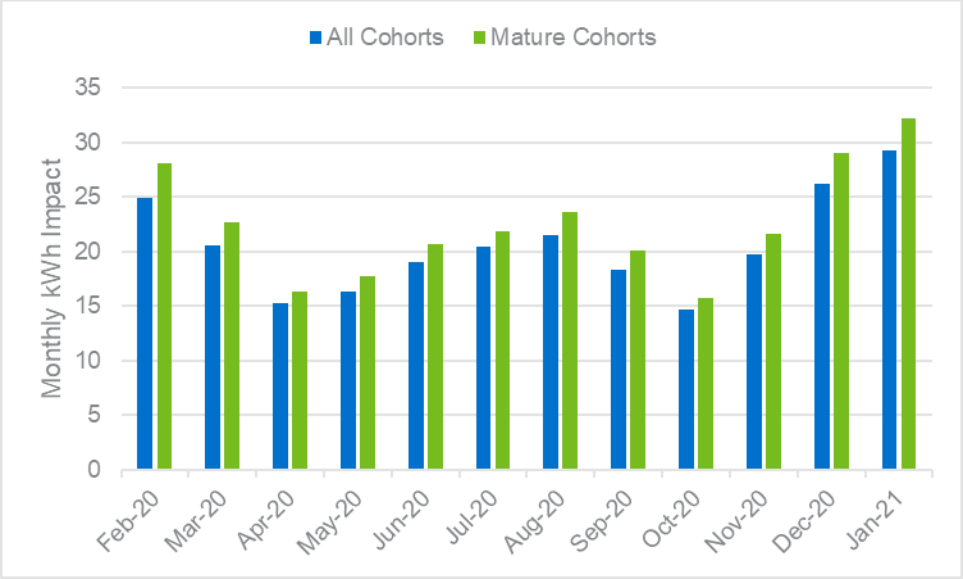


Figure 3-18: DEP MF Comparison of Average Customer Savings to the Savings of the Older Program Participants

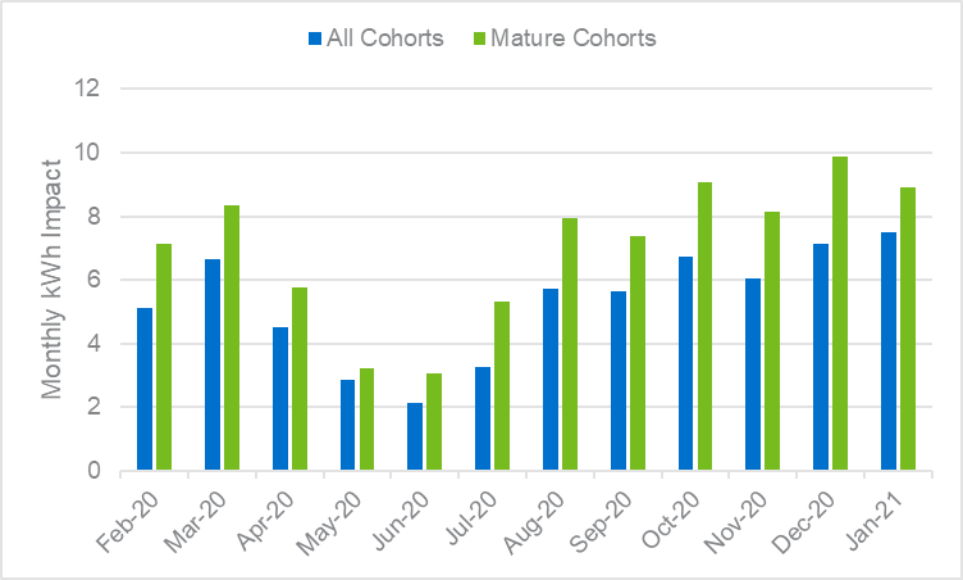


Figure 3-19 displays the annual savings for each year of treatment among the DEP SF MyHER cohorts. Like DEC SF, there is a general increase in savings across the first few years of the program, followed by a leveling out in some of the later years. This trend holds for some of the older cohorts who see continued increases in impacts before leveling out in year four or five. The same information for DEP MF customers is displayed in Figure 3-20, where the oldest cohorts see a large increase in savings between year three and year four. The other cohorts do not show a clear trend but are still in their infancy, results for MF customers will be revisited in future reports on the DEP MyHER program.

Figure 3-19: DEP SF Annual Savings by Duration of Exposure

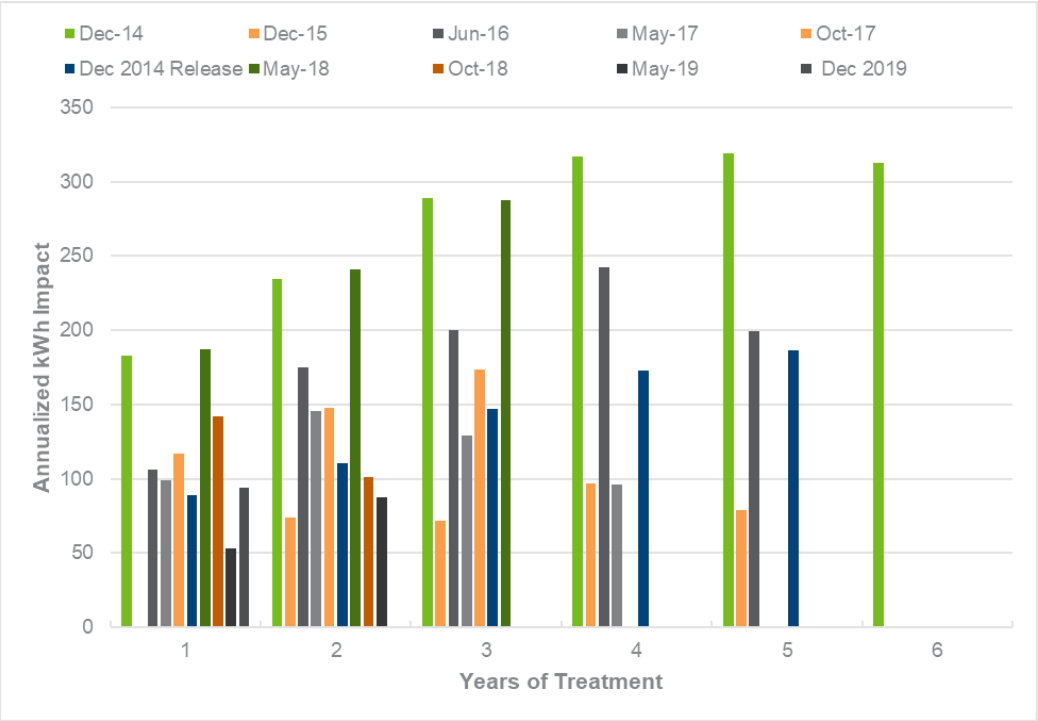
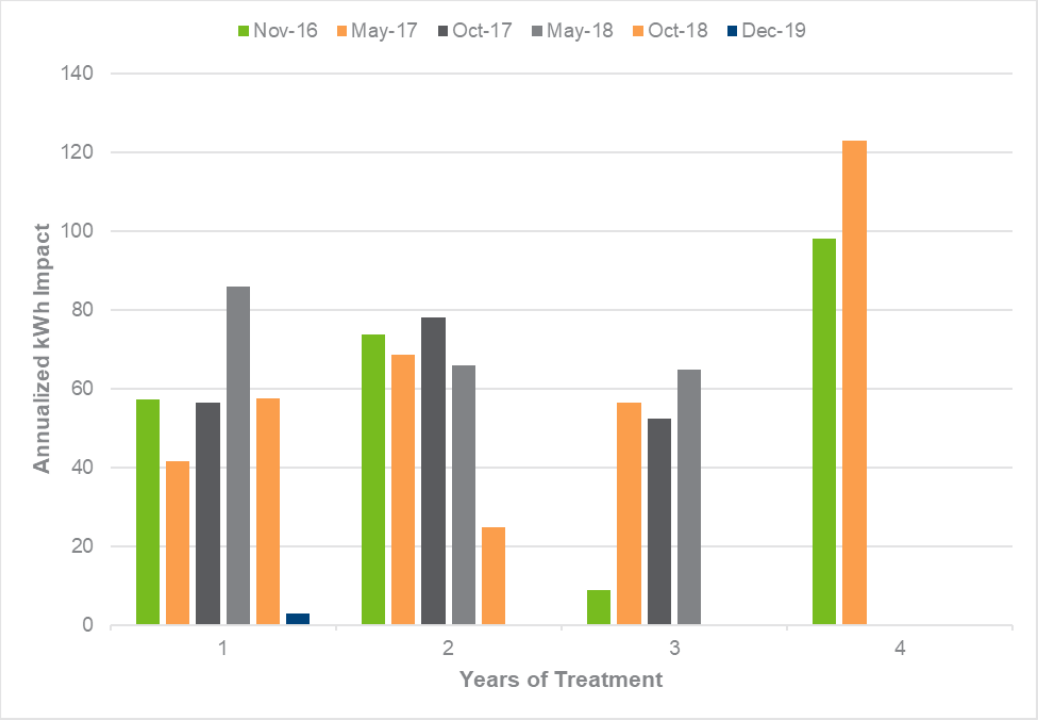


Figure 3-20: DEP MF Annual Savings by Duration of Exposure



3.1 DEC MyHER Interactive Portal

Nexant also evaluated the incremental energy savings generated by Duke Energy's online enhancement to the standard MyHER report, which has been available to Duke Energy MyHER treatment customers since 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).

3.1.1 Estimation Procedures for MyHER Interactive

A matched comparison group is an accepted 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 126,485 DEC SF and 15,202 DEC MF MyHER treatment customers signed up to use the portal. For DEC SF, 12.7% of Interactive users signed into the portal more than once, and 6.1% signed in more than twice between February 2020 and January 2021. For DEC MF, 14.7% of Interactive users signed into the portal more than once, and 6.6% signed in more than twice between February 2020 and January 2021. The average DEC SF interactive user logged in 0.8 times and the average DEC MF interactive user logged in to interactive 0.9 times – about 64% of registered users recorded no sessions logged in. Excluding customers that never logged in, single family Interactive users logged in on average 2.4 times, and multi-family users logged in on average 2 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 pre-treatment data. For DEC SF, 92,250 of the Interactive users (73%) had sufficient data available for the LFER analysis before their enrollment in MyHER. In the DEC MF segment, 13,690 Interactive users (90%) had sufficient data to be included in the LFER analysis. Figure 3-21 and Figure 3-22: DEC MF MyHER Interactive Portal Enrollment

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 February 2020 to January 2021 for DEC SF and MF, respectively.[13]

Figure 3-21: DEC SF MyHER Interactive Portal Enrollment

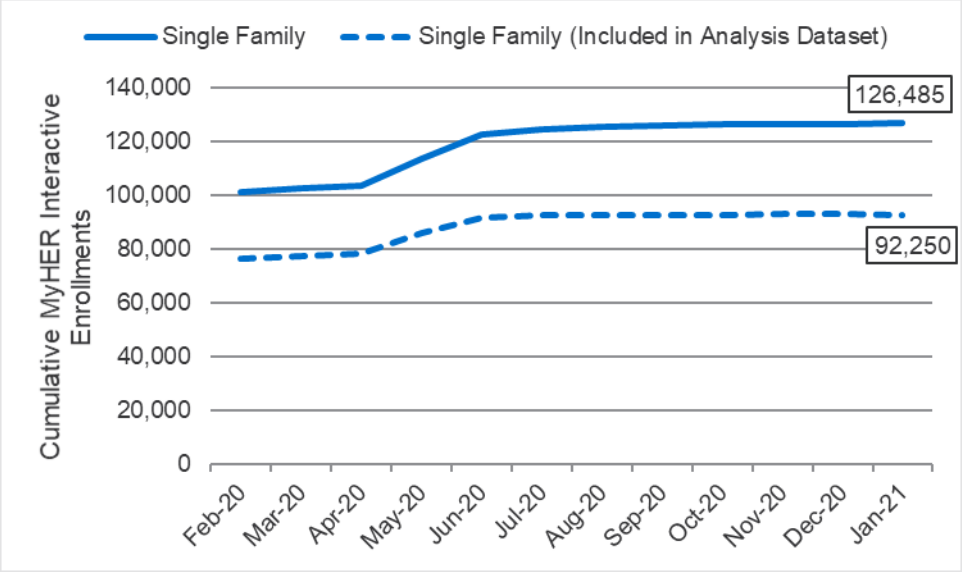
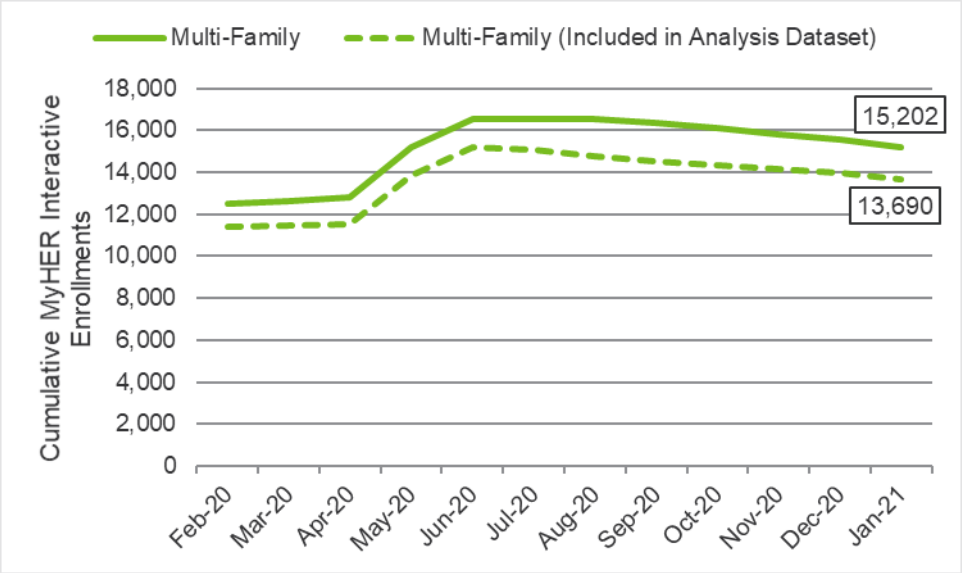


Figure 3-22: DEC MF MyHER Interactive Portal Enrollment

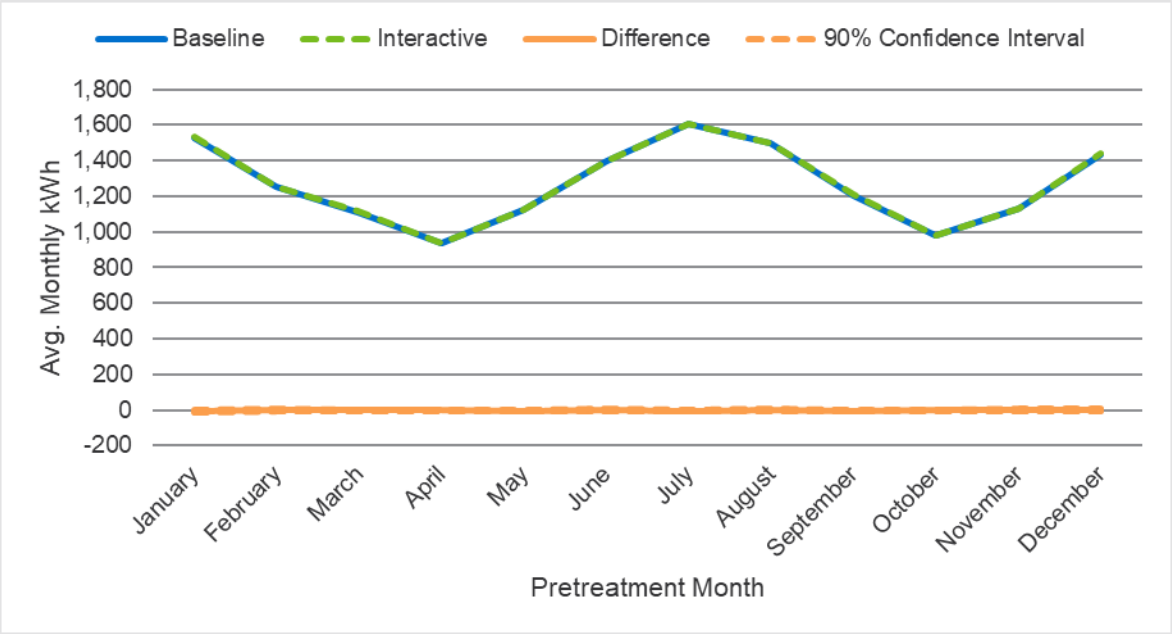


[13] A total of 26,443 interactive customers were excluded from analysis due to incomplete pretreatment data (missing 12 full months) ; the totals in Figure 3-21 and Figure 3-22: DEC MF MyHER Interactive Portal Enrollment

additionally exclude Interactive users who enrolled after the evaluation period ended, a total of 1,658 customers.

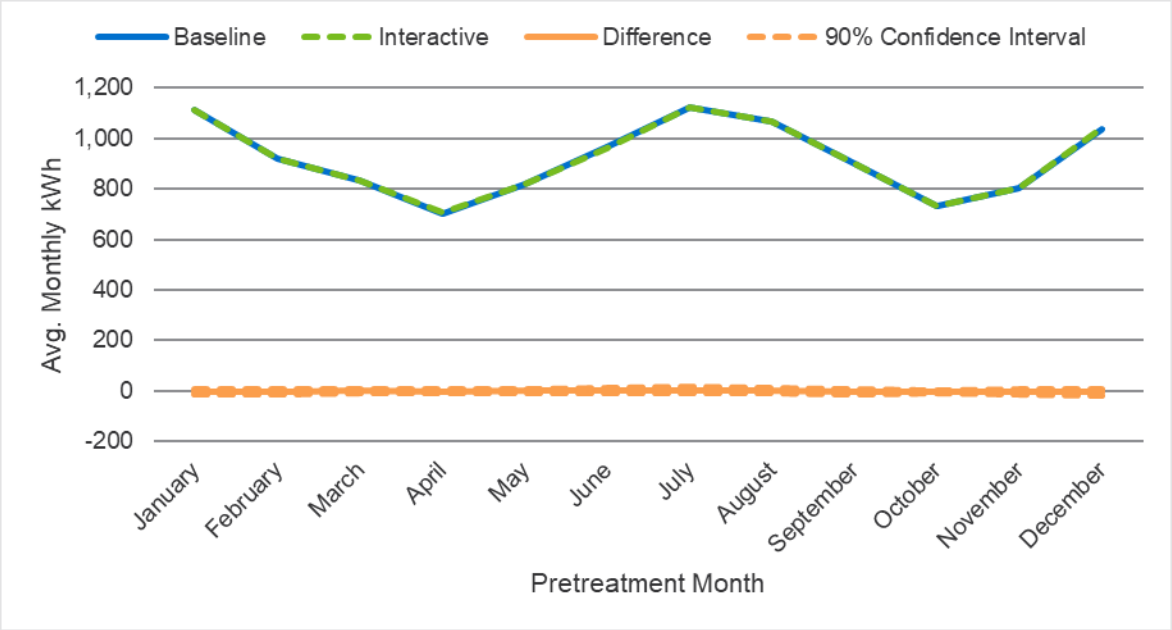
For DEC SF, the Interactive customers used in the estimation analysis were matched on pre-interactive usage based on their cohort and segment. Figure 3-23 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER customers that have not enrolled in Interactive for the DEC and had complete pretreatment data. 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 SF Interactive treatment group is -0.2%. The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in Section 3.1.5.

Figure 3-23: DEC SF MyHER Interactive Portal Customers and Matched Comparison Group Pretreatment Enrollment Periods



For DEC MF, the Interactive customers used in the estimation analysis were also matched on their pretreatment usage depending on their treatment cohort. Note that as in the primary MyHER impact analysis, customers in DEC MF Cohort 1 were removed from the analysis due to their being no consistent pre-treatment period across that group. Figure 3-24 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER that were not enrolled in Interactive and share the same treatment cohort. 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 -0.1% The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in Section 3.1.5.

Figure 3-24: DEC MF MyHER Interactive Portal Customers and Matched Comparison Group –Pre-Interactive Enrollment Periods



3.1.2 Results and Precision

For DEC SF, the average monthly impact across the 12-month period February 2020 to January 2021 was 0.9 kWh or 10.5 kWh annually per customer, representing the uplift in savings that MyHER Interactive produces over and above the savings produced by the paper MyHER, although this impact is not statistically significant at the 90% level of confidence. In aggregate, the DEC SF MyHER Interactive Portal would equal 0.92 GWh of annual savings, incremental to the MyHER reports, however, the treatment effect is not distinguishable from zero. These high-level findings are summarized in Table 3-48.

Table 3-48: 90% Confidence Intervals Associated with DEC SF MyHER Interactive Annual Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	-94.6	10.5	115.5
Percent Reduction	-0.64%	0.07%	0.79%
Aggregate Impact (GWh)	-8.33	0.92	10.18

On a month-to-month basis, energy impacts were statistically significant and positive during the months of February, March, and April and range from 0.7% to 1.1% or from 6 to 13 kWh on an absolute basis. There were also statistically significant increases in electric usage of about 0.5% during the summer from August to October.

Figure 3-25 illustrates 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 user sessions. During earlier years of the Interactive deployment, there was a correlation between statistically significant impacts and times of high Interactive usage, but there is currently no evidence of that relationship.

Figure 3-25: DEC SF MyHER Interactive Portal Energy Impacts

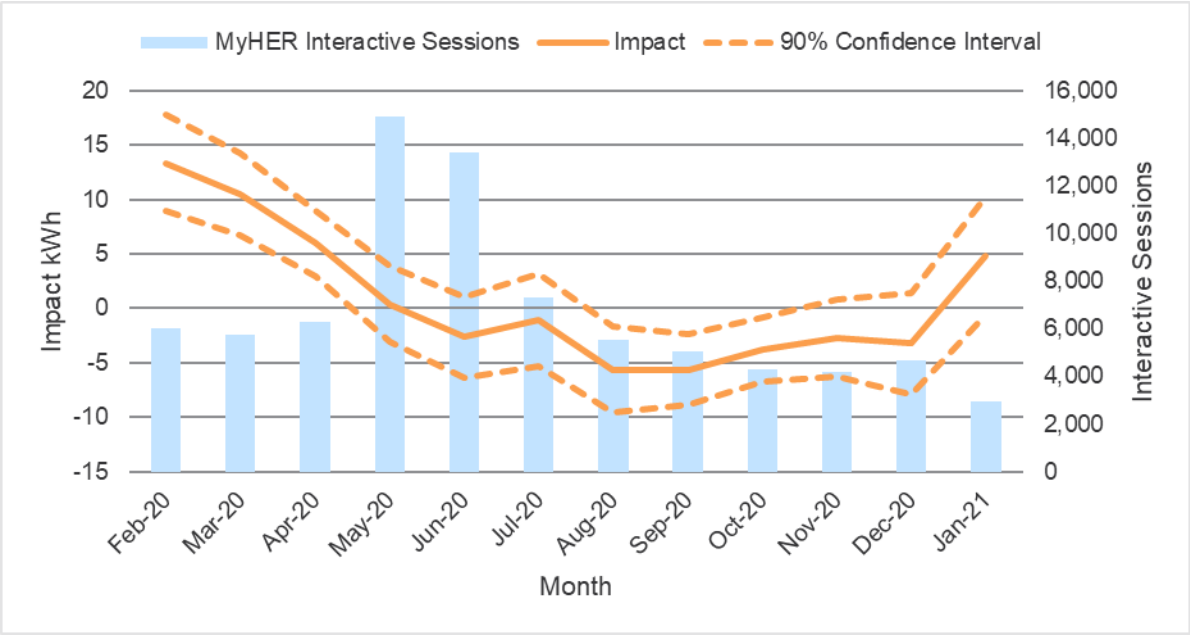


Table 3-49: provides impact model results for DEC SF, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence.

Table 3-49: DEC SF MyHER Interactive Monthly Energy Savings

Month	Number of Participants Analyzed	MyHER Interactive Signups	Monthly kWh			90% Conf. Interval		% Impact	
			Non-Participants	Participants	Impact				
Feb-20	76,284	5,998	1,194.0	1,180.6	13.4	8.9	17.8	1.1%	*
Mar-20	77,206	5,731	1,061.9	1,051.4	10.5	6.7	14.2	1.0%	*
Apr-20	78,147	6,264	911.5	905.5	6.0	2.9	9.0	0.7%	*
May-20	86,041	14,897	1,044.2	1,043.8	0.4	-3.0	3.9	0.04%	
Jun-20	91,610	13,405	1,298.9	1,301.5	-2.6	-6.4	1.1	-0.2%	
Jul-20	92,261	7,308	1,621.5	1,622.5	-1.0	-5.3	3.2	-0.1%	
Aug-20	92,531	5,550	1,525.0	1,530.6	-5.6	-9.6	-1.7	-0.4%	*
Sep-20	92,685	5,061	1,109.4	1,115.0	-5.6	-8.9	-2.4	-0.5%	*
Oct-20	92,685	4,283	898.6	902.4	-3.8	-6.8	-0.8	-0.4%	*
Nov-20	92,728	4,193	1,027.1	1,029.8	-2.7	-6.3	0.9	-0.3%	
Dec-20	92,864	4,672	1,419.7	1,422.9	-3.2	-7.9	1.5	-0.2%	
Jan-21	92,250	2,955	1,553.7	1,548.8	4.8	-0.6	10.3	0.3%	
Average	**88,108**	**6,693**	**1,222.1**	**1,221.3**	**0.9**	**-7.9**	**9.6**	**0.1%**	

For DEC MF (Table 3-50), the average monthly impact across the 12-month period February 2020 to January 2021 was 1.2 kWh, or 14.6 kWh annually, 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. The aggregate annual impact for DEC MF interactive customers is estimated to be 0.20 GWh, which is also not statistically significant at the 90% confidence level.

Table 3-50: 90% Confidence Intervals Associated with DEC MF MyHER Interactive Annual Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	-123.9	14.6	153.0
Percent Reduction	-1.11%	0.13%	1.38%
Aggregate Impact (GWh)	-1.69	0.20	2.09

On a month-to-month basis, energy impacts were statistically significant only during January, February, and December, with impacts ranging from 8.8 kWh to 12.1 kWh

Figure 3-26 illustrates 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 sessions.

Figure 3-26: DEC MF MyHER Interactive Portal Energy Impacts

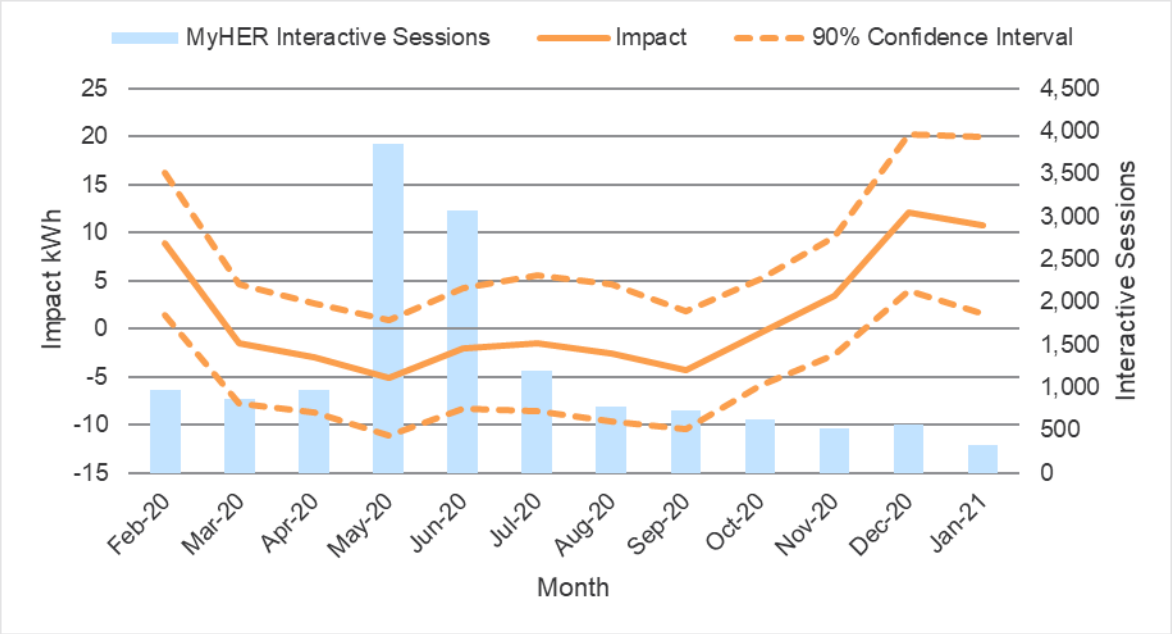


Table 3-51 provides impact model results for DEC MF, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence.

Table 3-51: DEC MF MyHER Interactive Monthly Energy Savings

Month	Number of Participants Analyzed	MyHER Interactive Signups	Monthly kWh			90% Conf. Interval		% Impact	
			Non-Participants	Participants	Impact				
Feb-20	11,426	971	933.5	924.6	8.8	1.4	16.3	0.9%	*
Mar-20	11,483	865	829.3	830.9	-1.6	-7.8	4.7	-0.2%	
Apr-20	11,510	969	716.1	719.1	-3.0	-8.7	2.7	-0.4%	
May-20	13,841	3,853	795.9	801.0	-5.1	-11.1	0.8	-0.6%	
Jun-20	15,184	3,070	943.3	945.4	-2.1	-8.3	4.2	-0.2%	
Jul-20	15,050	1,187	1,139.3	1,140.8	-1.5	-8.6	5.6	-0.1%	
Aug-20	14,775	776	1,092.2	1,094.8	-2.5	-9.7	4.6	-0.2%	
Sep-20	14,517	727	831.8	836.1	-4.3	-10.5	1.8	-0.5%	
Oct-20	14,322	620	713.9	714.3	-0.4	-5.9	5.2	-0.1%	
Nov-20	14,153	523	804.4	801.0	3.4	-2.7	9.5	0.4%	
Dec-20	13,950	571	1,103.2	1,091.1	12.1	4.0	20.3	1.1%	*
Jan-21	13,690	331	1,225.0	1,214.3	10.7	1.5	20.0	0.9%	*
Average	**13,658**	**1,205**	**927.3**	**926.1**	**1.2**	**-10.3**	**12.8**	**0.1%**	

Nexant concludes that the DEC SF MyHER Interactive portal succeeded in generating additional statistically significant savings during some of the winter months in the time frame from February 2020 to January 2021 while observing some significant increases in usage during

the summer months. The DEC MF MyHER Interactive portal only achieved additional statistically significant savings for three winter months during the evaluation period.

3.2 DEP MyHER Interactive Portal

Nexant also evaluated the incremental energy savings generated by Duke Energy's enhancement to the standard MyHER report, which has been available to MyHER treatment customers since 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 additionally provides 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).

3.2.1 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. At the end of the evaluation period, 69,473 DEP SF and 4,896 DEP MF treatment customers were signed up to use the portal. For DEP SF, 13.3% of Interactive users signed into the portal more than once, and 6.5% signed in more than twice between February 2020 and January 2021. For DEP MF, 15.0% of Interactive users signed into the portal more than once, and 6.8% signed in more than twice between February 2020 and January 2021. The average DEP SF interactive user logged in 0.8 times and the average DEP MF interactive user logged in to interactive 0.94 times – about 65% of registered users recorded no sessions logged in. Excluding customers that never logged in, single family Interactive users logged in on average 2.5 times, and multi-family users logged in on average 2.2 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 pre-treatment data. For DEP SF, 60,519 of the Interactive users (87%) had sufficient

data available for the LFER analysis before their enrollment in MyHER. In the DEP MF segment, 4,705 Interactive users (96%) had sufficient data to be included in the LFER analysis. Figure 3-27 and Figure 3-28 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 February 2020 to January 2021 for DEP SF and MF, respectively.[14]

Figure 3-27: DEP SF MyHER Interactive Portal Enrollment

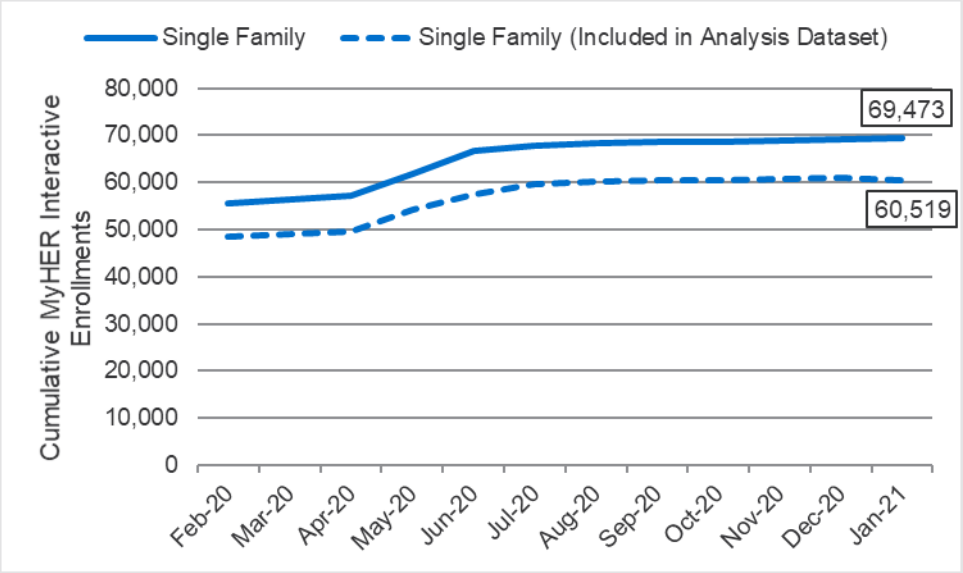
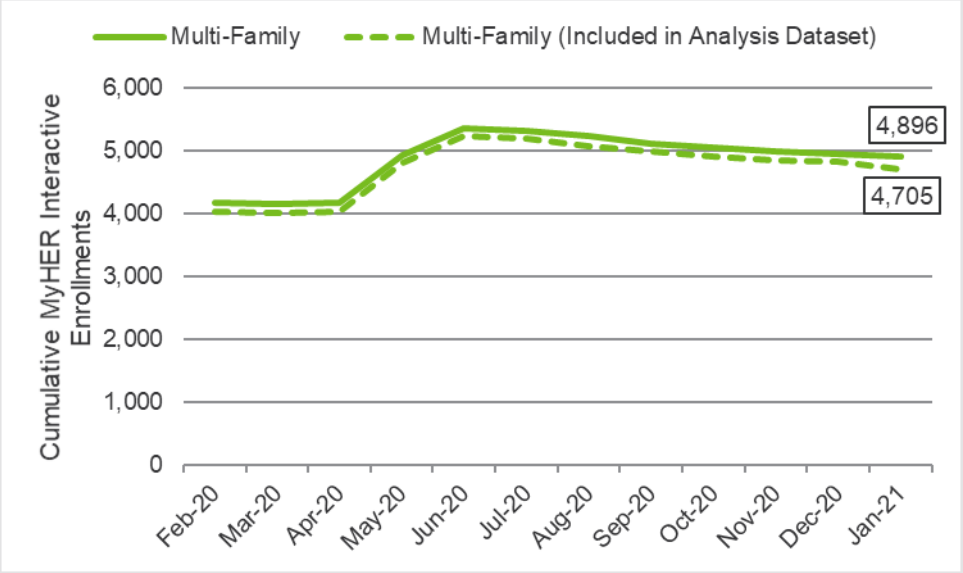


Figure 3-28: DEP MF MyHER Interactive Portal Enrollment

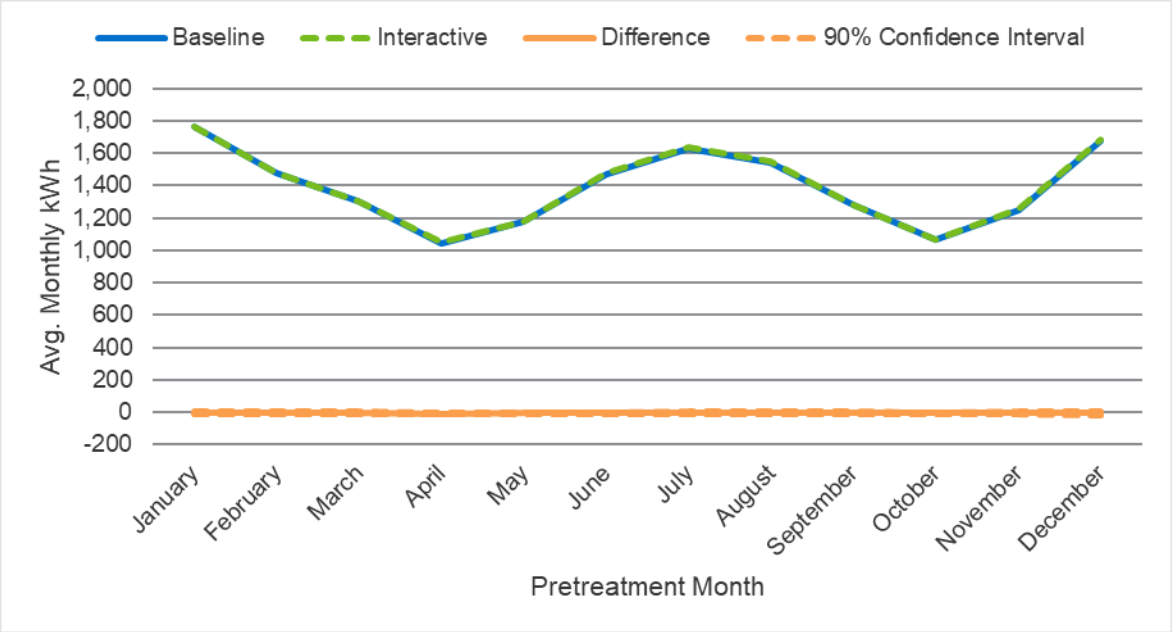


For DEP SF, the Interactive customers used in the estimation analysis were matched on pre-treatment usage based on their cohort and segment. Figure 3-29 presents the pre-treatment

[14] A total of 7,534 interactive customers were excluded from analysis due to incomplete pretreatment data; the totals in Figure 3-27 and Figure 3-28 additionally exclude Interactive users who enrolled after the evaluation period ended, a total of 1,107 customers.

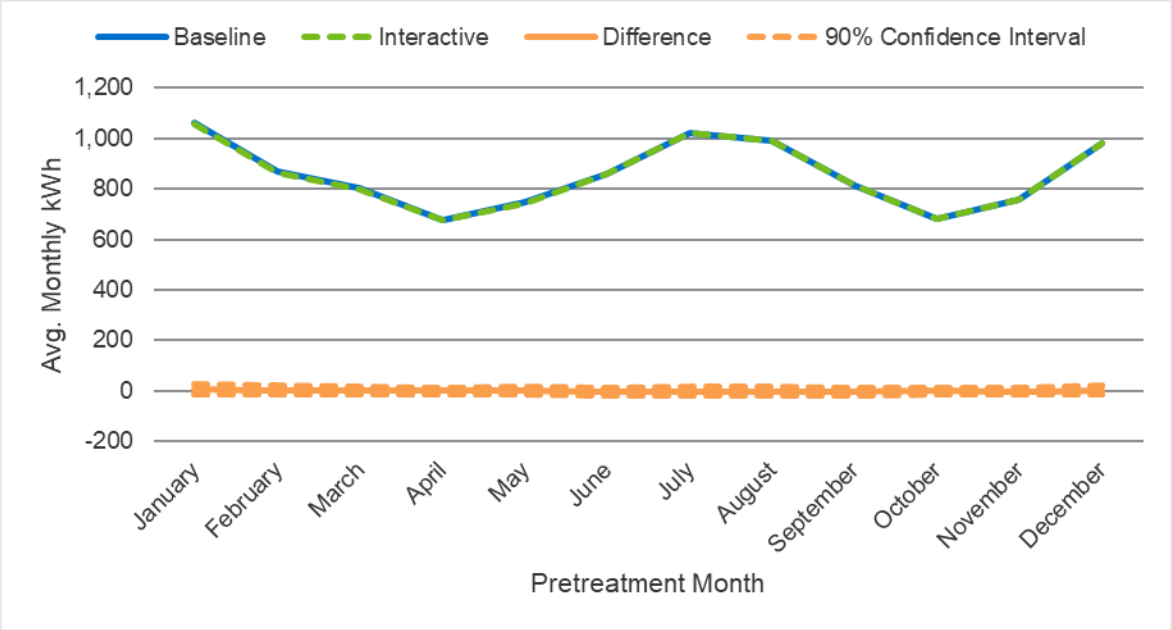
consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER customers that have not enrolled in Interactive and had usage data through January 2021. The matching approach generates two groups with nearly identical consumption patterns over the time period prior to customers' enrollment in MyHER Interactive. On average, the difference in monthly usage between the matched control group and the DEP SF Interactive treatment group is -0.4%. The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in Section 3.1.5.

Figure 3-29: DEP SF MyHER Interactive Portal Customers and Matched Comparison Group - Pre-Interactive Enrollment Periods



For DEP MF, the Interactive customers used in the estimation analysis were also matched on their pre-treatment usage depending on their treatment cohort. Note that customers in DEP MF Cohort 1 were removed from the analysis due to their being no consistent pre-treatment period across the group. Figure 3-30 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER that were not enrolled in interactive and share the same treatment cohort. 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 0.1% The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in Section 3.1.5.

Figure 3-30: DEP MF MyHER Interactive Portal Customers and Matched Comparison Group - Pre-Interactive Enrollment Periods



3.2.2 Results and Precision

For DEP SF, the average monthly impact across the 12-month period February 2020 to January 2021 was -5.4 kWh or -64.9 kWh annually per customer, representing the uplift in savings that MyHER Interactive produces over and above the savings produced by the paper MyHER, although this impact is not statistically significant at the 90% level of confidence. In aggregate, the DEP SF MyHER Interactive Portal resulted in -3.61 GWh of annual savings, incremental to the MyHER reports, but these savings are not differentiable from zero. These high-level findings are summarized in Table 3-52.

Table 3-52: 90% Confidence Intervals Associated with DEP MyHER Interactive Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	-191.8	-64.9	62.0
Percent Reduction	-1.24%	-0.42%	0.40%
Aggregate Impact (GWh)	-10.67	-3.61	3.45

On a month-to-month basis, there were statistically significant impacts in the months of February and March, ranging from 0.6% to 1.1%, with absolute impacts ranging from 7 to 13 kWh. There were statistically significant increases in electricity from May to November ranging from -0.5% to -1.5%, or -6 to -15 kWh.

Figure 3-31 illustrates 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 user sessions. During earlier years of the Interactive deployment, there was a correlation between statistically significant impacts and times of high Interactive usage, but there is currently no evidence of that relationship.

Figure 3-31: DEP SF MyHER Interactive Portal Energy Impacts

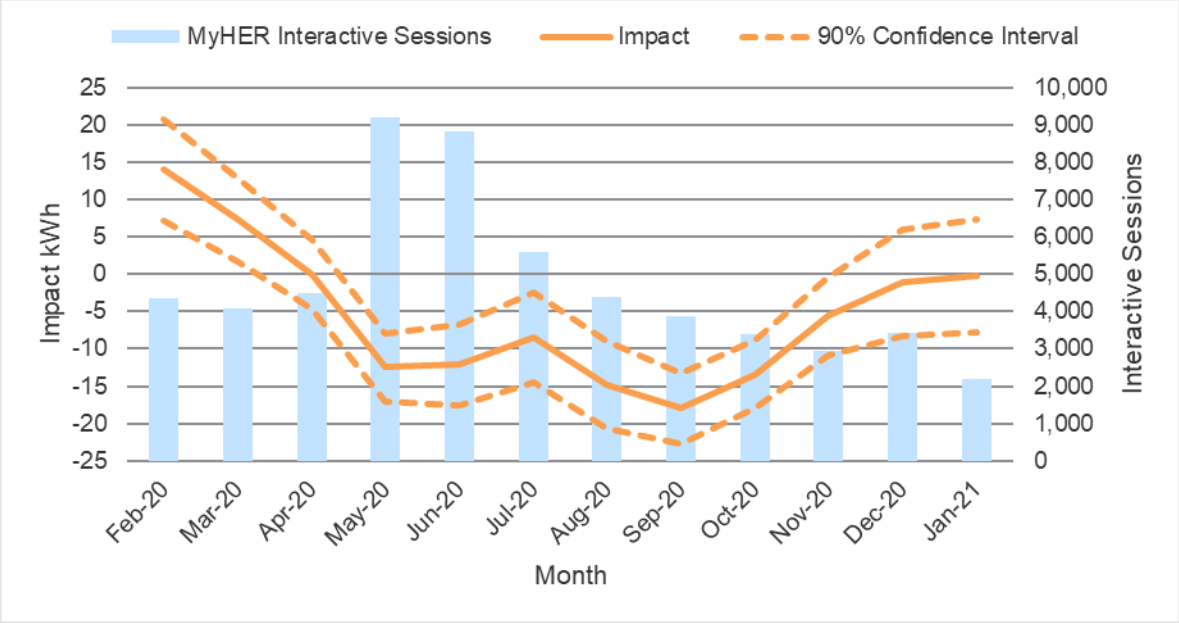


Table 3-53 provides impact model results for DEP SF, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence.

Table 3-53: DEP SF MyHER Interactive Monthly Energy Savings

Month	Number of Participants Analyzed	MyHER Interactive Signups	Daily kWh			90% Conf. Interval		% Impact	
			Non-Participants	Participants	Impact				
Feb-20	48,512	4,364	1,247.0	1,233.1	13.9	7.2	20.7	1.1%	*
Mar-20	49,055	4,070	1,126.0	1,118.8	7.3	1.7	12.8	0.6%	*
Apr-20	49,646	4,482	961.3	961.3	0.0	-4.6	4.6	0.0%	
May-20	54,164	9,181	1,077.3	1,089.8	-12.4	-17.0	-7.9	-1.2%	*
Jun-20	57,457	8,830	1,336.4	1,348.5	-12.1	-17.6	-6.7	-0.9%	*
Jul-20	58,137	5,597	1,674.9	1,683.3	-8.5	-14.5	-2.5	-0.5%	*
Aug-20	58,343	4,381	1,588.9	1,603.6	-14.8	-20.6	-9.0	-0.9%	*
Sep-20	58,462	3,864	1,178.5	1,196.5	-18.0	-22.7	-13.3	-1.5%	*
Oct-20	58,421	3,400	956.6	970.1	-13.4	-18.0	-8.9	-1.4%	*
Nov-20	58,461	2,960	1,087.5	1,093.1	-5.6	-10.9	-0.4	-0.5%	*
Dec-20	58,748	3,418	1,517.0	1,518.1	-1.1	-8.3	6.0	-0.1%	
Jan-21	58,258	2,184	1,683.1	1,683.2	-0.2	-7.7	7.4	0.0%	
Average	**55,639**	**4,728**	**1,286.2**	**1,291.6**	**-5.4**	**-16.0**	**5.2**	**-0.4%**	

For DEP MF, the average monthly impact across the 12-month period February 2020 to January 2021 was -8.0 kWh, or -95.7 kWh annually 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. The aggregate impact for DEP MF interactive customers was estimated to be -0.45 GWh, which was also not statistically significant at the 90% confidence level.

Table 3-54: 90% Confidence Intervals Associated with DEP MF MyHER Interactive Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	-276.8	-95.7	85.3
Percent Reduction	-2.75%	-0.95%	0.85%
Aggregate Impact (GWh)	-1.30	-0.45	0.40

On a month-to-month basis, there were statistically significant increases in electricity usage by Interactive customers in the months of May, June, and October, with impacts in usage ranging from -22 kWh to -31 kWh.

Figure 3-32 illustrates 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 user sessions.

Figure 3-32: DEP MF MyHER Interactive Portal Energy Impacts

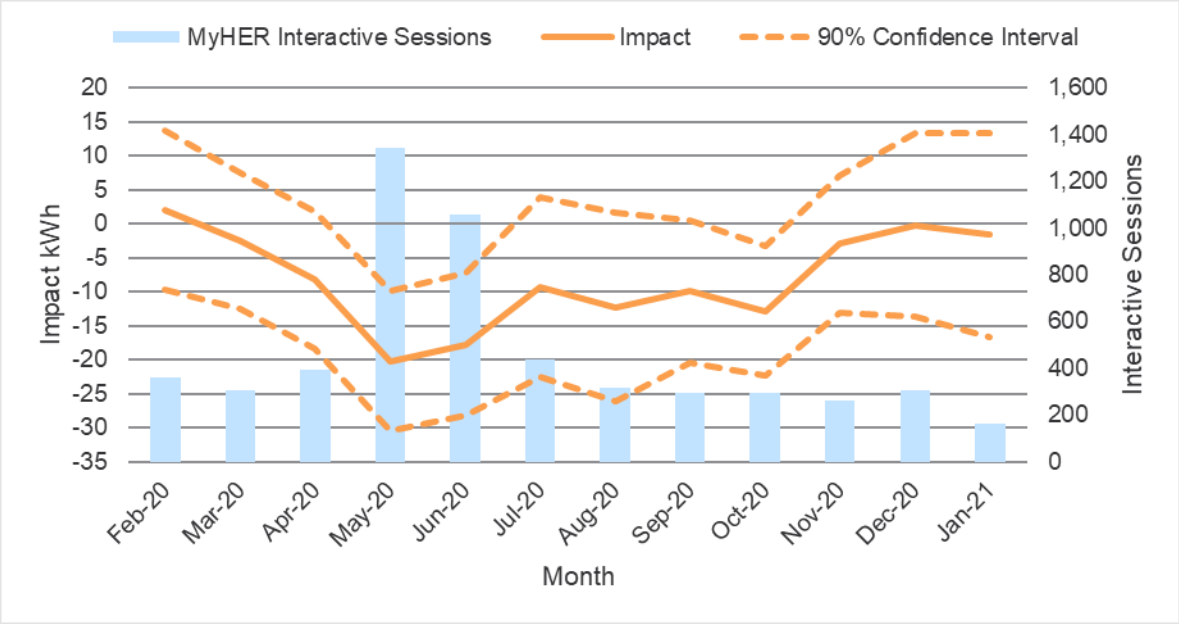


Table 3-55 provides impact model results for DEP MF, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence.

Table 3-55: DEP MF MyHER Interactive Monthly Energy Savings

Month	Number of Participants Analyzed	MyHER Interactive Signups	Daily kWh			90% Conf. Interval		% Impact	
			Non-Participants	Participants	Impact				
Feb-20	4,018	358	846.5	844.5	2.1	-9.7	13.8	0.2%	
Mar-20	4,007	305	762.4	765.0	-2.5	-12.5	7.4	-0.3%	
Apr-20	4,022	393	650.0	658.2	-8.2	-18.3	1.9	-1.3%	
May-20	4,796	1,346	704.4	724.6	-20.2	-30.5	-9.9	-2.9%	*
Jun-20	5,226	1,056	823.9	841.7	-17.8	-28.2	-7.3	-2.2%	*
Jul-20	5,178	437	1,001.6	1,010.8	-9.3	-22.6	4.0	-0.9%	
Aug-20	5,064	319	961.5	973.8	-12.3	-26.1	1.6	-1.3%	
Sep-20	4,976	295	758.6	768.6	-10.0	-20.5	0.5	-1.3%	
Oct-20	4,905	295	661.7	674.5	-12.8	-22.4	-3.2	-1.9%	*
Nov-20	4,843	262	746.2	749.2	-3.0	-13.1	7.1	-0.4%	
Dec-20	4,824	303	1,018.2	1,018.4	-0.2	-13.7	13.4	0.0%	
Jan-21	4,705	163	1,140.1	1,141.7	-1.6	-16.6	13.3	-0.1%	
Average	**4,714**	**461**	**839.6**	**847.6**	**-8.0**	**-23.1**	**7.1**	**-1.0%**	

Nexant concludes that the DEP SF MyHER Interactive portal did succeed in generating additional statistically significant savings during some of the winter months in the time frame

from February 2020 to January 2021 while observing some significant increases in usage during the summer months. The DEP MF MyHER Interactive portal did not achieve any statistically significant savings and had significant increases in usage during three of the months in the time period.

4 Process Evaluation

This section presents the results of process evaluation activities including in-depth interviews with Duke Energy 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 staff and surveys of a random sample of both single family and multi-family households selected to receive MyHER reports as well as surveys of a random sample of control group households (both multi-family and single family).

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 where they could complete it. After two weeks, customers who did not respond to the web survey received another mailing, this time containing a paper copy of the survey and a return postage-paid envelope for them to complete the survey by mail. Survey recipients also had the option of calling a toll-free telephone number to complete it by telephone.

Two different instruments were used in the survey deployment. A primary instrument was used to survey random samples of treatment and control customers, selected from both the single

family and multi-family program populations. An additional random sample of treatment customers (selected from both the single family and multi-family program populations) received a different instrument with a battery of questions that only pertains to treatment customers (such as satisfaction with MyHER report features, recall of MyHER receipt, etc.). This treatment-only survey instrument was developed in order to prevent the primary instrument from getting too lengthy.

Table 4-1 shows that 305 DEC single family treatment customers (137 treatment only, and 168 primary treatment) and 171 DEC single family control customers completed the survey, totaling 476 responses for this group. In addition, 154 DEC multi-family treatment (87 treatment only, and 67 primary treatment) and 88 DEC multi-family control customers completed the survey, for a total of 242. In total, 718 DEC customers completed the survey.

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	Up to 3	2	Not Applicable	Not Applicable
Treatment group households; Treatment only instrument	Mixed-mode; mail, web, and phone	≈ 1.1 M	68	137	90/10	90/7.0
Treatment group households; Primary instrument	Mixed-mode; mail, web, and phone		68	168	90/10	90/6.3
Control group households; Primary instrument	Mixed-mode; mail, web, and phone	≈ 160,000	68	171	90/10	90/6.3
Total Single Family Survey Responses				**476**		
Treatment group households; Treatment only instrument	Mixed-mode; mail, web, and phone	≈ 65,000	68	87	90/10	90/8.8
Treatment group households; Primary instrument	Mixed-mode; mail, web, and phone		68	67	90/10	90/10.0
Control group households; Primary instrument	Mixed-mode; mail, web, and phone	≈ 20,000	68	88	90/10	90/8.8
Total Multi-family Survey Responses				**242**		
Total Responses				**718**		

Table 4-2 shows that 327 DEP single family treatment customers (169 treatment only, and 158 primary treatment) and 181 DEP single family control customers completed the survey, totaling

508 responses for this group. In addition, 185 DEP multi-family treatment (86 treatment only, and 99 primary treatment) and 88 DEP multi-family control customers completed the survey, for a total of 273. In total, 781 DEP customers completed the survey.

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	Up to 3	2	Not Applicable	Not Applicable
Treatment group households; Treatment only instrument	Mixed-mode; mail, web, and phone	≈ 725,000	68	169	90/10	90/6.3
Treatment group households; Primary instrument	Mixed-mode; mail, web, and phone		68	158	90/10	90/6.5
Control group households; Primary instrument	Mixed-mode; mail, web, and phone	≈ 155,000	68	181	90/10	90/6.1
Total Single Family Survey Responses				**508**		
Treatment group households; Treatment only instrument	Mixed-mode; mail, web, and phone	≈ 80,000	68	86	90/10	90/8.9
Treatment group households; Primary instrument	Mixed-mode; mail, web, and phone		68	99	90/10	90/8.3
Control group households; Primary instrument	Mixed-mode; mail, web, and phone	≈ 35,000	68	88	90/10	90/8.8
Total Multi-family Survey Responses				**273**		
Total Responses				**781**		

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, but not with Uplight since their engagement with Duke Energy as the MyHER implementer was concluding. 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 DEC and DEP customers, as well as to understand any developments in program delivery.

4.1.1.2 Household Surveys

Both treatment and control groups of single family and multi-family customers 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 sample.

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

- 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 908 letters to randomly selected residential customers in the treatment group and 908 letters to the randomly selected residential customers in the control group for the primary survey. We also mailed 908 letters to the treatment customers for the treatment-only survey. Of the total 2,724 customers each of these groups, 1,206 letters were mailed to multi-family customers, and 1,518 were mailed to single family customers.

The survey was completed by a total of 476 single family households and 242 multi-family households, representing an overall single family response rate of 31% and a multi-family response rate of 20%.

Among all completed surveys, 305 were completed by treatment households and 171 were completed by control households in the single family segment. About half (59% of the treatment group and 57% of the control group) of the surveys completed by single family customers were completed online. For multi-family customer surveys, 154 were completed by treatment households and 88 were completed by control households. Seventy-one percent of the treatment group and 69% 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	
Single Family	Count	Percent	Count	Percent
Completes by Mode				
Web-based Survey	179	59%	98	57%
Mail/Paper Survey	116	38%	69	40%
Inbound Phone Survey	10	3%	4	2%
Total Single Family Completes	**305**	**100%**	**171**	**100%**
Mode	**Treatment**		**Control**	
Multi-family	Count	Percent	Count	Percent
Completes by Mode				
Web-based Survey	110	71%	61	69%
Mail/Paper Survey	41	27%	25	28%
Inbound Phone Survey	3	2%	2	2%
Total Multi-family Completes	**154**	**100%**	**88**	**100%**
TOTAL	**459**		**259**	

Survey Disposition - DEP

We mailed 906 letters to randomly selected residential customers in the treatment group and 906 letters to the randomly selected residential customers in the control group for the primary survey. We also mailed 906 letters to the treatment customers for the treatment-only survey. Of the total 2,718 customers in each of these groups, 1,203 letters were mailed to multi-family customers, and 1,515 were mailed to single family customers.

The survey was completed by a total of 508 single family households and 273 multi-family households, representing an overall single family response rate of 34% and a multi-family response rate of 23%.

Among all completed surveys, 327 were completed by treatment households and 181 were completed by control households in the single family segment. More than half (60% of the treatment group and 61% of the control group) of the surveys completed by single family customers were completed online. For multi-family customer surveys, 185 were completed by treatment households and 88 were completed by control households. Sixty-six percent of the

treatment group and 64% of the control group of the surveys were completed online. Table 4-4 summarizes the treatment and control group survey dispositions in DEP.

Table 4-4: Survey Disposition - DEP

Mode	Treatment		Control	
Single Family	Count	Percent	Count	Percent
Completes by Mode				
Web-based Survey	197	60%	110	61%
Mail/Paper Survey	124	38%	70	39%
Inbound Phone Survey	6	2%	1	1%
Total Single Family Completes	**327**	**100%**	**181**	**100%**
Mode	**Treatment**		**Control**	
Multi-family	Count	Percent	Count	Percent
Completes by Mode				
Web-based Survey	123	66%	56	64%
Mail/Paper Survey	57	31%	25	28%
Inbound Phone Survey	5	3%	7	8%
Total Multi-family Completes	**185**	**100%**	**88**	**100%**
TOTAL	**512**		**269**	

4.2 Findings

This section presents the findings from in-depth interviews with Duke Energy program staff and the results of the customer surveys.

4.2.1 Program Processes and Operations

As in other Duke Energy jurisdictions, MyHER at DEC and DEP is managed primarily through a core team of three Duke Energy staff members: a Program Manager in charge of the day-to-day operations of the MyHER program, a Marketing Manager that is responsible for report content, 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 Uplight, Duke Energy's program implementer under contract during this evaluation period, MyHER is supported by dedicated program team members as well as shared support including a Home Energy Report Product Manager, Operations Manager (who oversees Operations Analysts and Quality Assurance Engineers), an Engineering Manager and software engineers, and an Account Manager responsible for ensuring that the Duke Energy MyHER products meet expectations for quality, timing, and customer satisfaction. Uplight staff track the number of reports sent, the quality of the reports, and the timing of when reports are mailed. Uplight's primary key performance indicators (KPIs) include in-home dates for each batch of reports sent, the percentage of eligible treatment customers actually treated, as well as report appearance

and data accuracy. Customers that are eligible to receive a MyHER report are those who: have been billed for electric service in 11 of past 13 months and are billed for at least 150 kWh of monthly electricity consumption. Customers that meet these eligibility criteria are randomly assigned treatment and control status in twice-annual treatment assignment batches.

MyHER is Duke Energy's flagship behavioral energy efficiency program. Its primary goals are to achieve energy savings, increase customer satisfaction with Duke Energy, and cross-promote enrollment into Duke Energy's demand response and energy efficiency programs. Duke Energy program staff described continuous coordination with Uplight 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 that exists between bills.

In addition to home energy reports, the MyHER program at Duke Energy also produces content for the MyHER Interactive portal, introduced to the program in 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 customers in active energy management, additional efficiency upgrades, and conservation behavior.

Customers enrolled in MyHER that have also installed the Duke Energy mobile application (app) on their mobile devices (e.g., tablets and mobile phones) can also view the information found on their MyHERs in the app.[15] MyHER content is available via a link found on the app's home screen. MyHER's home comparison charts, comparison group information, and usage disaggregation are all available through the Duke Energy app.

Program operations for the management and production of the content on all of these channels are conducted with a customer-focused orientation where the commitment to producing a high-quality product is ongoing and consistently pursued by Uplight and Duke Energy staff each month of the year.

4.2.1.1 MyHER Production

During the time period under study by this evaluation, MyHERs were mailed out to DEC and DEP single family customers on paper through the U.S. Postal service eight times a year, and 12 times a year by email to customers that have provided Duke Energy with their email address. DEC and DEP multi-family customers receive six reports a year by mail, and those who have provided their email address receive four reports a year by mail and 12 reports per year by email. During the eight Single Family U.S. Mail treatment months, paper reports are generated

[15] The Duke Energy app is available to every DEC and DEP residential customer (not just customers that receive MyHERs) that provides customers with a mobile-optimized web interface that they can use to manage their Duke Energy account, pay their bills, track billed electric usage, report outages, and view special offers.

twice per week, a cadence that is designed to facilitate meeting one of Uplight's key performance indicators: Once the batch of MyHERs is approved by Duke Energy, that it arrives at the print house within twelve days, and to the customer soon after, 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 less often, as described in the above paragraph.[16] In the case of the Single Family segment, starting in late 2019, Duke Energy began sending only six paper reports a year to new enrollees, so as to make the program more cost-effective while maintaining energy savings and demand impacts.

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, Uplight's HOMERS (Home Energy Reporting Service) system downloads billing data nightly, five times a week (Tuesday through Saturday) and readies the data for quality control (QC). This is an improvement on Uplight's legacy (pre-HOMERS) system which required QC to be run only when batches were being readied for report production. The ability to run multiple iterations of QC protocols allows Uplight to detect, analyze, and act on any emergent issues on a daily basis.

In addition to this functionality, HOMERS is designed as a platform that unites the data management and report production processes, and provides Duke Energy with the ability to review report data and proofs in real time.

Duke Energy program management interviewees have reported that HOMERS' launch fulfilled expectations regarding the production of reports for multiple billing cycles at once, improving the production process most notably by eliminating what were referred to as "Batch 1" problems. This class of QC exceptions stemmed from the relatively large number of reports produced for the first cycle of the month using Uplight's legacy system. With HOMERS, data transfers to Duke Energy now contain much smaller and consistent batch sizes— "Batch 1" sizes have roughly been cut in half, and batches throughout the month are relatively consistent, though dependent on the availability of billing data from Duke Energy, which tends to be the most voluminous at the beginning of the month.

Upon nightly delivery to Uplight, each account's data is passed through an overnight QC process, and a report is generated under a "rendered" status. Rendered reports are then submitted to a more complex QC framework, where data is validated and text sizing and spacing checks are carried out. Once this is complete, HOMERS produces a report detailing the results of the QC process, and this is reviewed by Uplight operations analysts and engineers each morning to assess the need for further QC reviews. These reviews include further data validation, including usage disaggregation, as well as visual checks that assure charts, text, and

[16] Duke Energy will cease delivery of paper MyHER reports, and only send email reports, if the customer requests them to do so.

general report presentment is correct. The reports with no flagged concerns are assigned a “QC pass” status, and those with which errors are found at any stage of the review process are assigned a “QC fail” status and reviewed by Uplight staff to assess whether or not the error can be addressed in the current cycle to allow for a quality HER to be produced.

Twice a week, Uplight gathers reports in “QC pass” status, and a flat file containing all the data from these reports is sent to Duke Energy for an independent quality control check by their Senior Data Analyst. These data checks have been increasingly carried out on an automated basis, though manual checks on these data are still part of the protocol. While under review, reports are changed to “QC pending” status. In addition to this data, drafts of every report are available (in HTML and PDF formats) for download and subject to visual QC checks by Duke Energy.

Approved reports are then assigned back to “QC pass” status, Uplight sends the PDFs to the print house, and the print house generates a final proof for Duke Energy approval. Finally, after the proof is approved, the print house prints and mails all the reports, Uplight emails eHERs on the specified day, and then commences the process of reporting the printing, mailing, and emailing to Duke Energy.

This production chain moves quickly: once Uplight generates a batch of reports, the time elapsed until transfer to the print house is generally three to four 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 print house 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 requires dedicated effort to achieve.

Prior MyHER process evaluations in this and other Duke Energy jurisdictions where MyHER is also implemented have found that this fast-moving process has seen improvements over time through the adoption of various changes: recently, these have been best characterized by the adoption of HOMERS, getting free-form text (FFT) content designed, approved and ready to incorporate into reports ahead of time, and an increased attention to continuously improving QC processes at Uplight. These changes have delivered reductions in both report in-home times, as well as the number of problems found during report batch quality control checks, though Uplight has the most difficulty with accommodating last-minute requests from Duke Energy.

4.2.1.2 Quality Control

As summarized above, embedded in the early days of the MyHER production cycle is a quality control process that ensures 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 received 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 Uplight's governance sessions with Duke Energy. This visibility has typically resulted in issue resolution on a going-forward basis.

Duke Energy program staff report that the incidence of significant production problems was dramatically reduced since Uplight implemented quality control automation. Uplight's automated quality control process is described as follows, recalling that customer data is transferred to Uplight daily:

- Uplight pulls Duke Energy billing data into an Amazon Redshift database and prepares the data for presentment in the HERs. The HERs are then generated and rendered;
- A series of SQL queries against the data presented in the HERS then runs. This process delivers output into the Amazon Simple Storage Solutions (S3) environment that reports on the results of the checks and indicates any reports with errors. Reports with errors are then postfiltered;
- Reports that pass the SQL checks are then visually checked by Uplight staff 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.

Prior evaluations of MyHER revealed that some program processes could benefit from improved quality control performance. Duke Energy program management interviewees reported that while the implementation of HOMERS and the continued refinement and automation of QC protocols have reduced errors significantly, errors on reports do occasionally pass through to them.

Continuous improvements to 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 over-leveraged component of program operations). As such, outcomes of both Uplight and Duke Energy's QC processes are monitored to detect emergent opportunities or needs to tune report production operations.

Continuous program improvement has also been facilitated by Duke Energy and Uplight collaborative activities. Duke Energy and Uplight 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 Uplight. Uplight's internal HER Improvement Team serves to ensure progress is made on the product request list. This team meets quarterly to reassess the feasibility of each of

the list's items and reprioritize these items, as needed, based on the priorities Duke Energy has expressed in collaborative meetings.

4.2.1.3 MyHER Components

MyHER reports include several key elements that are customized for each customer each month: bar charts, tips, trend charts, and messages. Duke Energy and Uplight 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 initially 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 believes that 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.

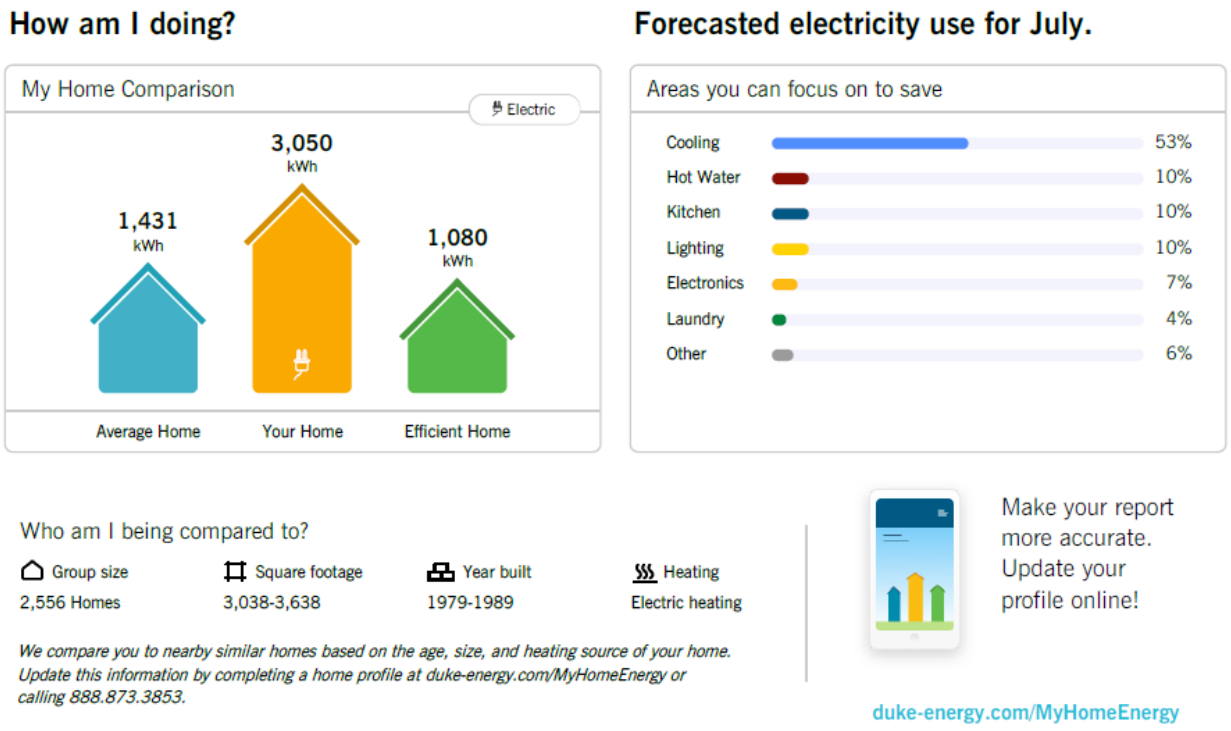
To the right of the vertical bar chart is a horizontal bar chart that illustrates Uplight's forecast for the customer's home's electricity usage in the next month, disaggregated by end use type. This chart is intended to provide actionable insights to each customer as to where they might direct their energy savings efforts to make the greatest impact in their energy usage in the month ahead. Uplight 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.

In 2019, Uplight employed EV (electric vehicle) detection models using AMI data in order to ascertain which customers had these vehicles, and thus improve the disaggregation prediction for those customers. Similarly, an email campaign was conducted for customers who reported

that they have pools, but had not specified how it was heated. These customers were encouraged to report pool heating type on the MyHER Interactive portal.

Generally, Duke Energy and Uplight continue to encourage customers to visit the Interactive portal where they can further customize or correct information about their homes that impact the accuracy of the disaggregated usage forecasts.

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



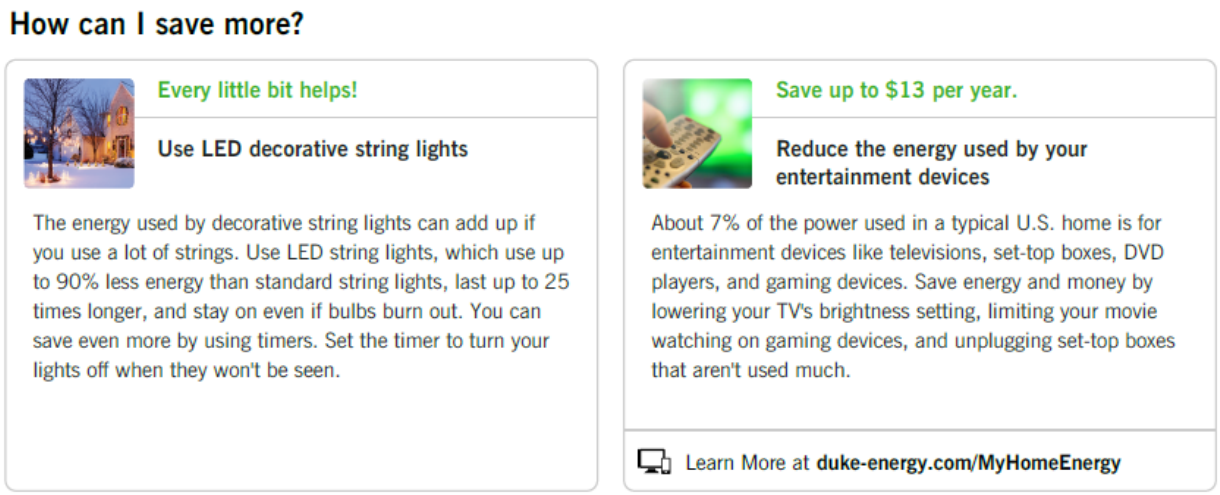
In addition to the comparison graph, each MyHER includes a set of customized action tips under the heading “How can I save more?”. These tips are designed to provide information relevant to homes with similar characteristics, as presented in the box accompanying the comparison graph. These tips often 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 Uplight’s “Ask the Expert” technical writer continued to add to them over time. The large library has enabled the program to avoid any repeats to customers over long 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 Uplight for each tip action for reasonableness. In addition, tips that would lead to annual customer savings of less than $5 will omit their savings

figure, as it is possible that such a low amount may actually dissuade customers from participating in the action.

Duke Energy and Uplight identified an opportunity for improving action tips and developed additional targeting algorithms for tip display. Some tips are now “smart” in that they are linked to Uplight’s building model that disaggregates energy use in the home, as seen in Figure 4-2, and will calculate potential savings based on the home’s characteristics. However, not all of the actions and tips 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. In 2019, the size of the tips library increased by about 50%, with about half of the newest tips enhanced as smart tips.

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



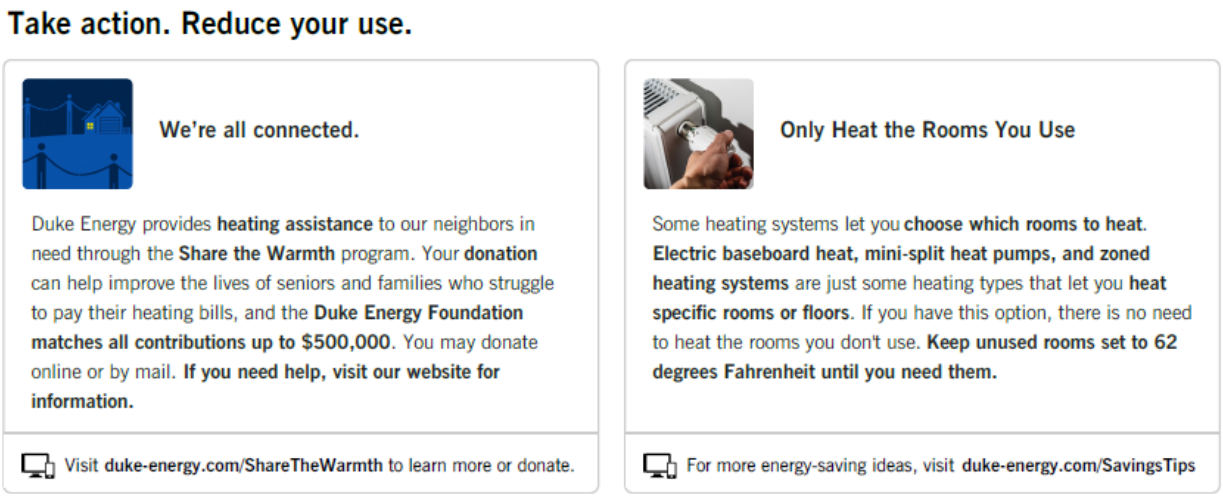
The back page of the MyHER reports includes a trend chart that displays how the recipient’s home compares to average and efficient homes with respect to energy usage over a year (Figure 4-3). This trend chart can help customers identify certain months where their usage increased relative to the efficient 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 (Figure 4-4). 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 priority 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) or behavioral suggestions. These promotions have led to significant program participation, especially for those programs that offer free energy savings products (LED programs) or low-cost enrollment (GoGreen program).

Figure 4-4: MyHER Free-form Text Modules

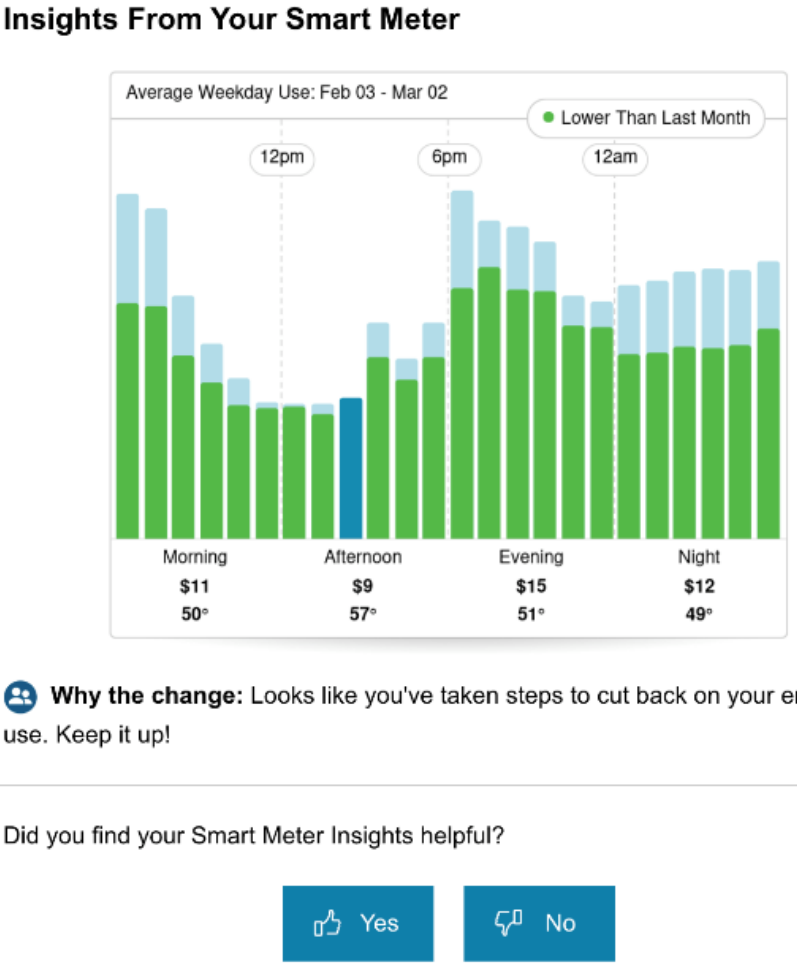


Establishing an FFT calendar early in each year and attempting to avoid last-minute changes to the messages each month has been challenging to implement. In the past, last-minute FFT changes were common due to changes during the course of the year to Duke Energy program promotions and incentive levels. 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 has historically been relatively resource-intensive with a lengthy revision-review-approval process with numerous stakeholders accompanying most changes to FFT messages. However, in 2019 this process was prioritized and planning strategies were implemented to prepare FFT messaging weeks, and often months, in advance to prevent the likelihood of disruption in the report production process due to last minute changes.

In addition, as part of Uplight's Program Manager (formerly Uplight 360) tool, an FFT-specific tool, called Content Manager was launched in 2019. Content Manager allows Duke Energy to directly produce FFT content and design the customer groups the messages are intended for.

Uplight also piloted an AMI usage chart for customers that receive eHERs (Figure 4-5). This chart displays hourly usage data, breaks it into segments, and shows the customer how much money they spend on electricity usage for the average weekday in each time period compared to the prior month.

Figure 4-5: Hourly Customer AMI Usage Chart



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. The rigorous quality control efforts described earlier have kept quality-related issues from ever reaching customers. Duke Energy reports to Nexant that, generally, 1% of MyHER customers contact Duke Energy annually. Nexant finds that 0.24% of MyHER participants opted-out of the program during the period January 2020 to December 2020.

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 portal where the customers' account number is auto-populated. Program staff revamped the content and graphics of the email campaign in 2018.

In addition, Uplight and Duke Energy prioritized increasing MyHER Interactive enrollments in 2019, with relative success. An awareness campaign that included two sweepstakes was conducted that resulted in an increase in Interactive enrollment from about 100,000 to almost 250,000 across all Duke Energy jurisdictions.

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 on Interactive content are made on an individual customer basis. The bulk of quality control for Interactive is carried out by Uplight.

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 responses to survey questions asked of both treatment and control households of single family and multi-family households in DEC and compares the response patterns of each. In addition, comparative analyses between single family and multi-family customers are included where pertinent. Statistically significant differences between treatment and control households, and between single family and multi-family households, are noted when they occur.

Duke Energy Customer Satisfaction

Both single family and multi-family treatment and control groups' overall satisfaction with Duke Energy are high. For single family, 82% 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. For

multi-family, 94% 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). This difference is statistically significant at the 90% level of confidence.

Respondents were asked if they “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree”, or “strongly agree” that Duke Energy provides excellent customer service, respects its customers, and provides service at a reasonable cost. Single family control households are more likely to “agree” or “strongly agree” on these three aspects than treatment customers. None of these differences are statistically significant at the 90% level of confidence (Figure 4-6). Multi-family households reported similar levels of agreement with these statements (Figure 4-7).

Figure 4-6: Satisfaction with Various Aspects of Customer Service – Single Family Top-2 Box Scores (1-5 Scale)

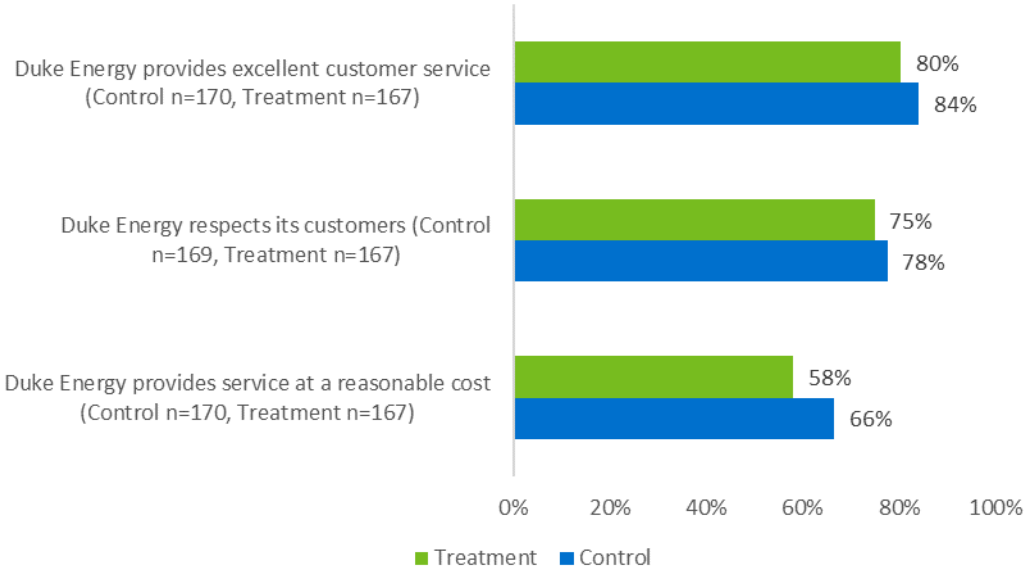
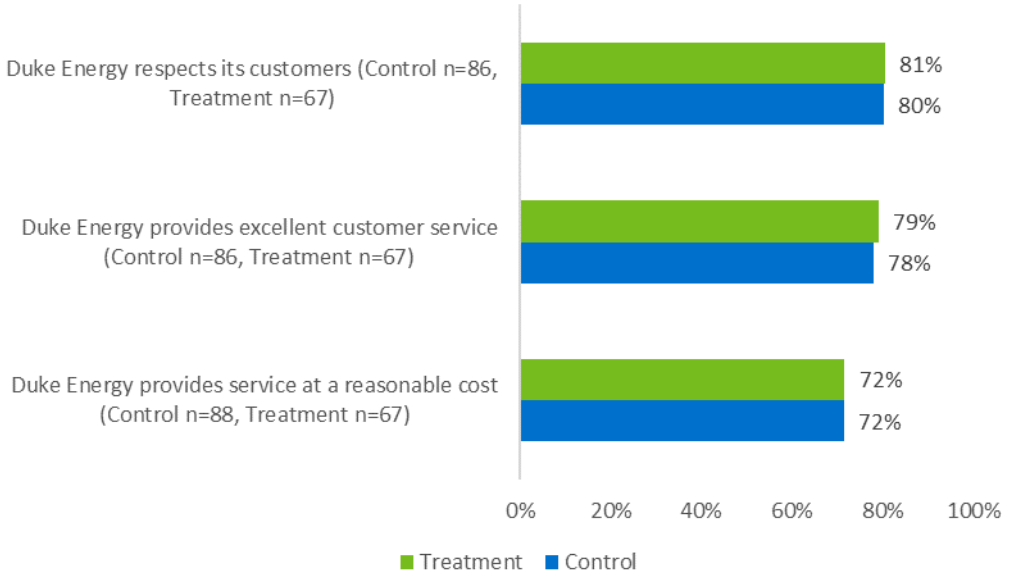


Figure 4-7: Satisfaction with Various Aspects of Customer Service – Multi-family Top-2 Box Scores (1-5 Scale)



Using a five point scale, “very dissatisfied”, “dissatisfied”, “neither dissatisfied nor satisfied”, “somewhat satisfied”, and “very satisfied”, single family treatment customers are more likely to report that they are either “somewhat satisfied” or “very satisfied” with the information available about Duke Energy’s energy efficiency programs, Duke Energy’s commitment to promoting energy efficiency and the wise use of electricity, and the information Duke Energy provides to help customers save on energy bills than control customers (Figure 4-8). However, as above, none of these differences are statistically significant at the 90% level of confidence. A new question on customer’s overall satisfaction with Duke Energy’s response to COVID-19, to help its customers dealing with financial hardship, was asked to both single family treatment and control groups. The two groups report similar levels of satisfaction. Similar patterns between single and multi-family (Figure 4-9) respondents as well as between treatment and control customers are seen for these measures of customer satisfaction. One difference to note is that significantly more multi-family respondents are satisfied with Duke Energy’s response to COVID-19 to assist customers than are single family respondents (82% and 73% for treatment and control multifamily customers and 62% and 63% for treatment and control single-family customers).

Figure 4-8: Satisfaction with Energy Efficiency Offerings and Information – Single Family Top-2 Box Scores (1-5 Scale)

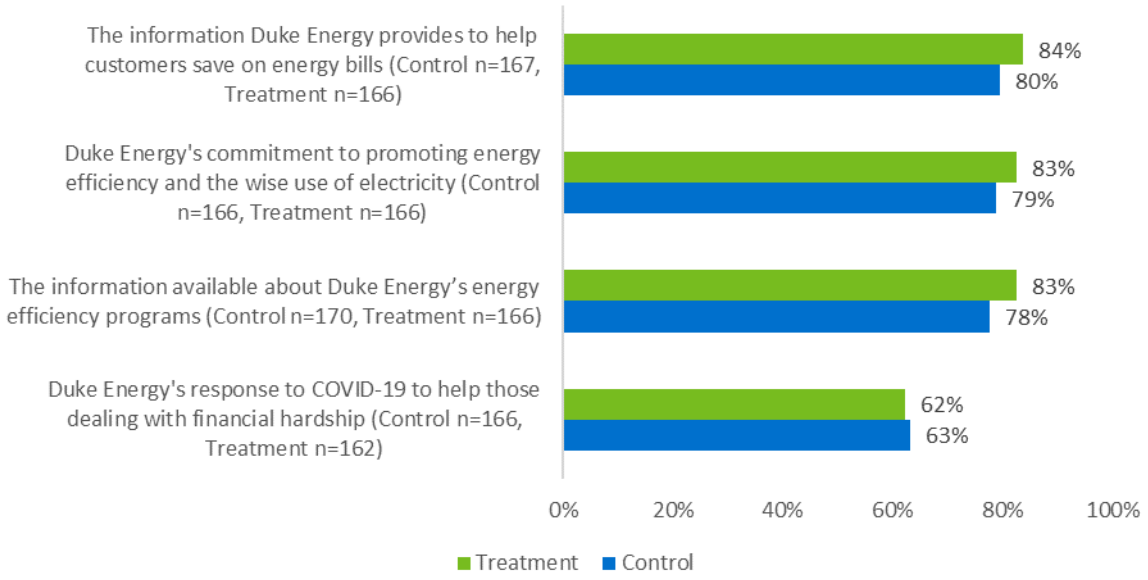
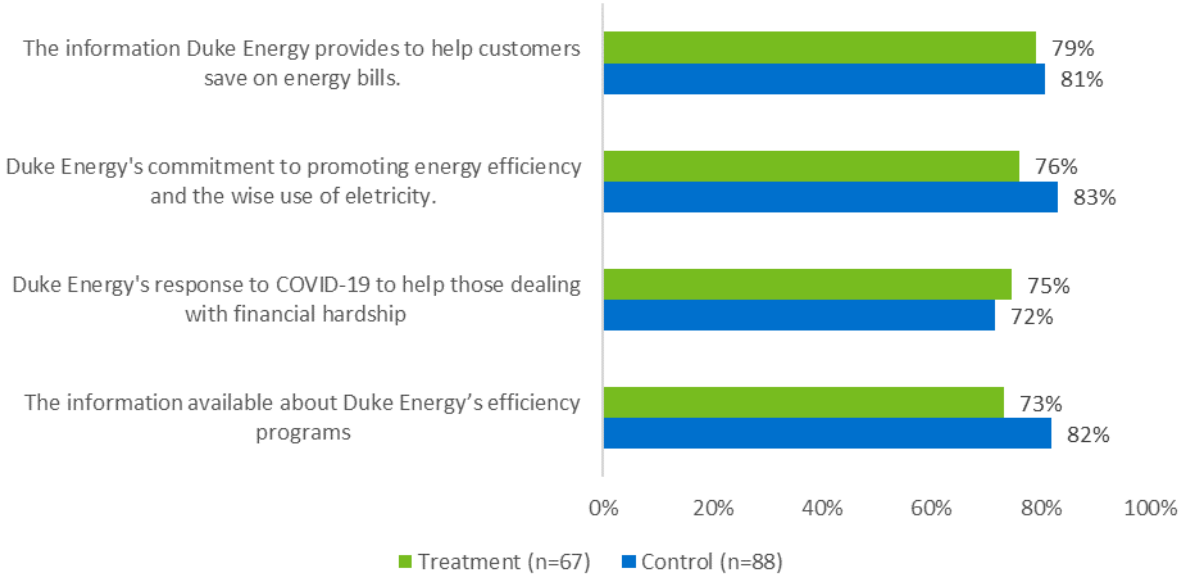


Figure 4-9: Satisfaction with Energy Efficiency Offerings and Information – Multi-family Top-2 Box Scores (1-5 Scale)



Engagement with Duke Energy's Website

Both treatment and control 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 a significant difference on using online accounts to pay bills between multi-family treatment and control groups. Table 4-5 shows that 30% of single family treatment group and 33% of control group, and 21% of multi-

family treatment group and 20% of control group reported they had never logged in to their Duke Energy accounts. Among those that had logged in, the most reported purpose was to pay their bill for both single family and multi-family respondents.

Table 4-5: Use of Duke Energy Online Account

Online Account Activity	Single Family		Multi-family	
	Treatment Group	Control Group	Treatment Group	Control Group
	(n=168)	(n=171)	(n=67)	(n=88)
Never logged in	30%	33%	21%	20%
Pay my bill	40%	39%	51%*	66%*
Look for energy efficiency opportunities or ideas	14%	13%	19%	19%

*statistically significant, p=0.057

As shown in Figure 4-10, single family treatment and control group households report similarly 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. Multi-Family control group households are 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 than treatment group households (Figure 4-11). Relatively small percentages of both groups in single and multi-family report regular usage of the website for purposes other than bill payment.

Figure 4-10: Assessing Duke Energy Website for Other Information – Single Family

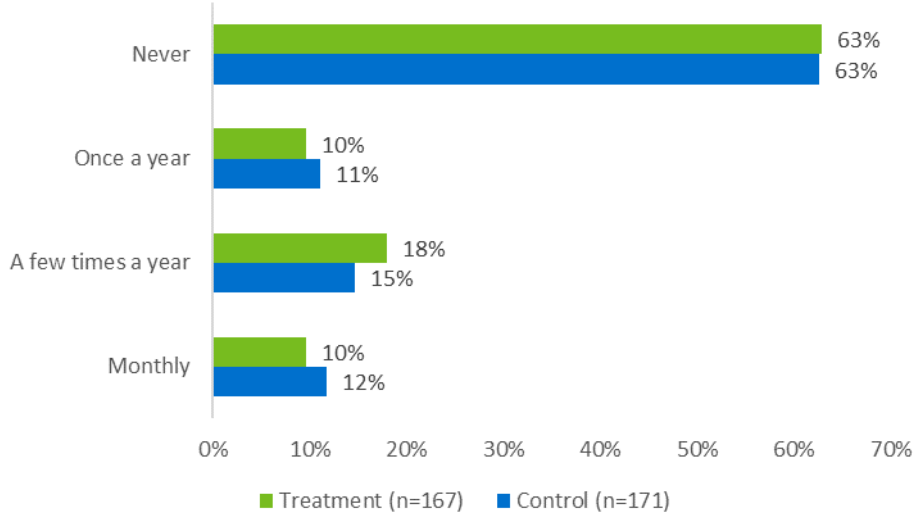
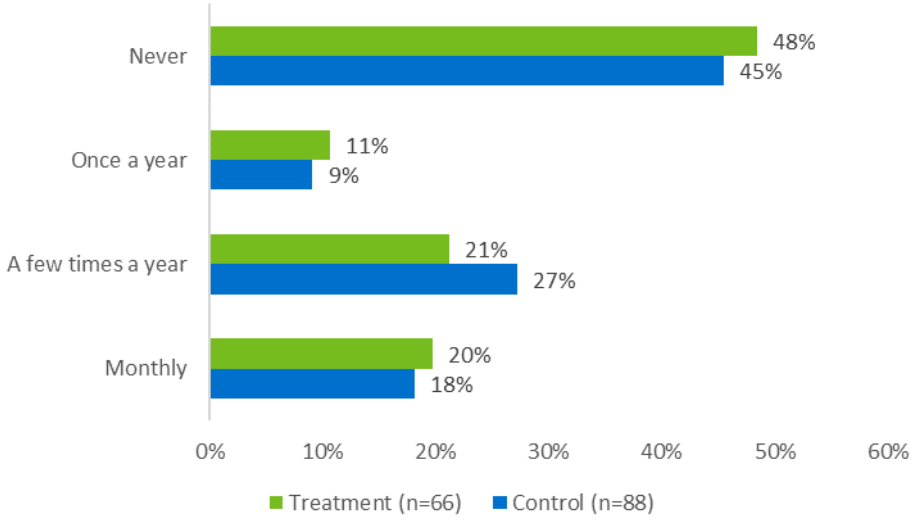


Figure 4-11: Assessing Duke Energy Website for Other Information – Multi-family



Forty-one percent of single family control group customers and 35% of treatment group customers reported they would be likely to check the Duke Energy website for information before purchasing major household equipment, while 46% of multi-family control group customers and 38% of treatment group customers reported so. The portion of respondents rating their likelihood a "7" or higher on an 11-point scale of likelihood is plotted in Figure 4-12 and Figure 4-13.

Figure 4-12: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment – Single Family Split Top-4 Box Scores (0-10 Scale)

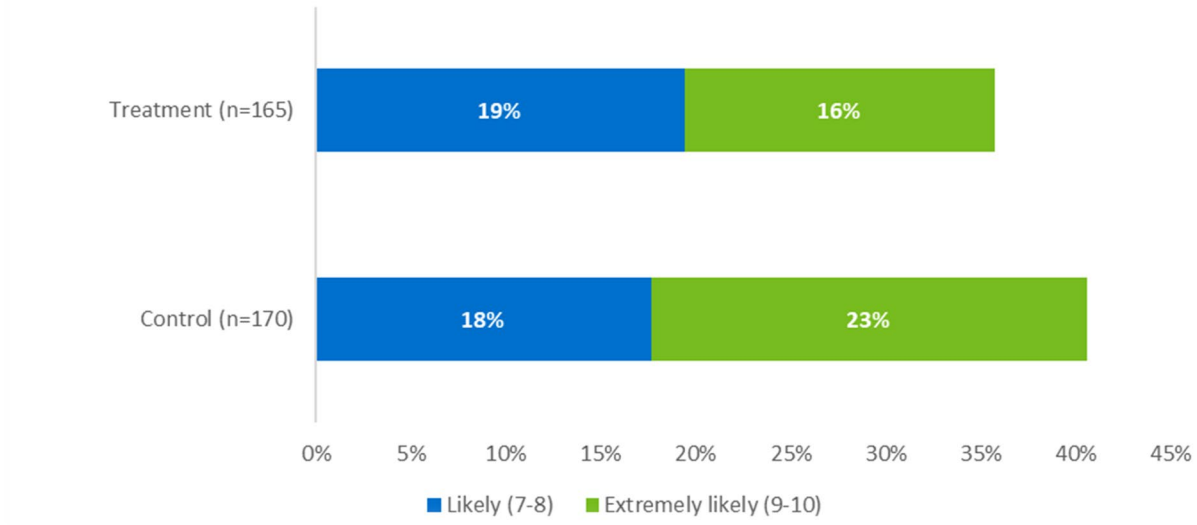
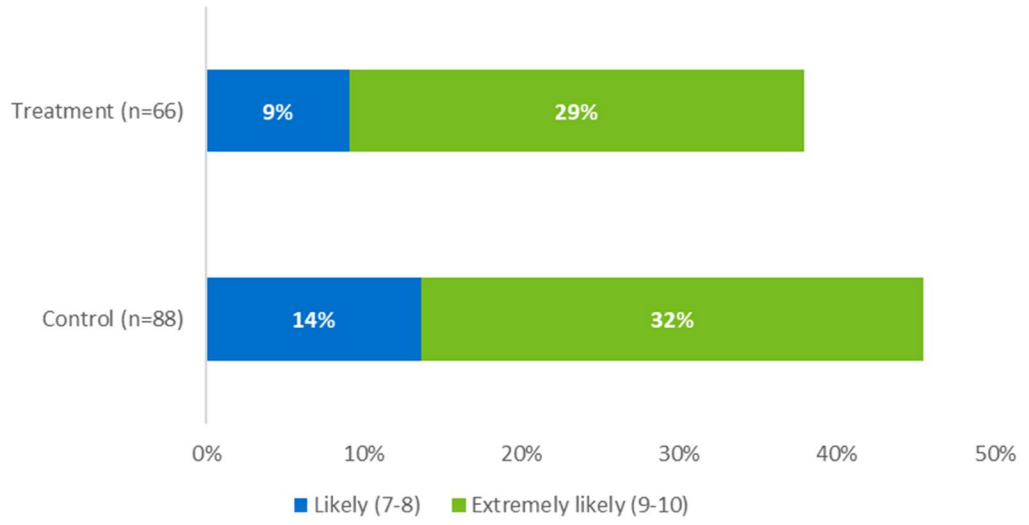


Figure 4-13: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment – Multi-family Split Top-4 Box Scores (0-10 Scale)

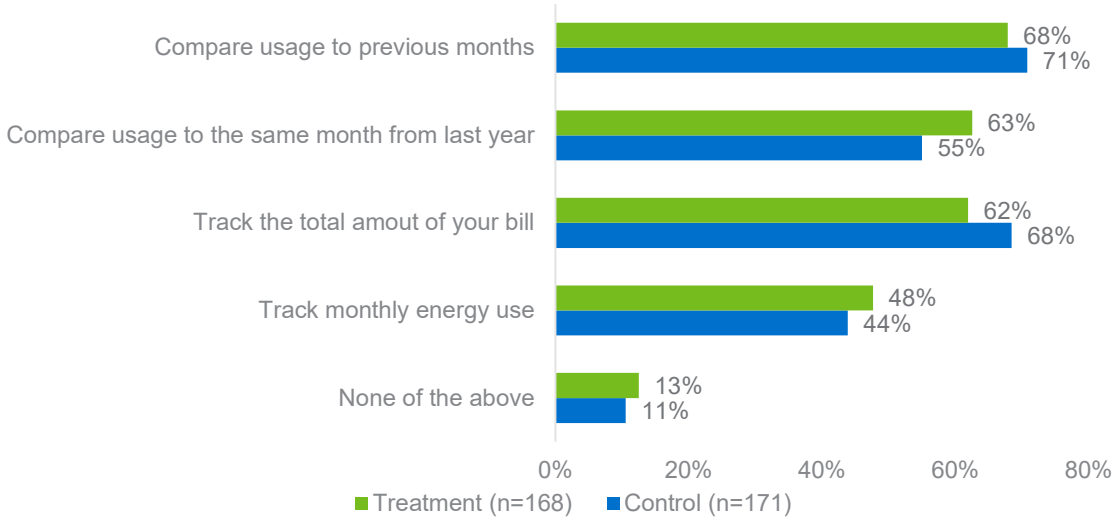


Customers' Reported Levels of Monitoring Energy Use and Energy Saving Behaviors

Single family treatment and control customers report tracking information (bills and usage) related to their household's energy usage in the following ways (Figure 4-14):

- Sixty-two percent of the treatment customers and 68% of the control customers reported tracking the total amount of the bill. The difference is not statistically significant at the 90% level of confidence.
- About two-thirds of respondents compared usage to previous months. The difference between treatment and control groups is not statistically significant.
- More than half of respondents compared usage to the same month from last year. The difference in responses here between treatment and control groups is not statistically significant at the 90% level of confidence.

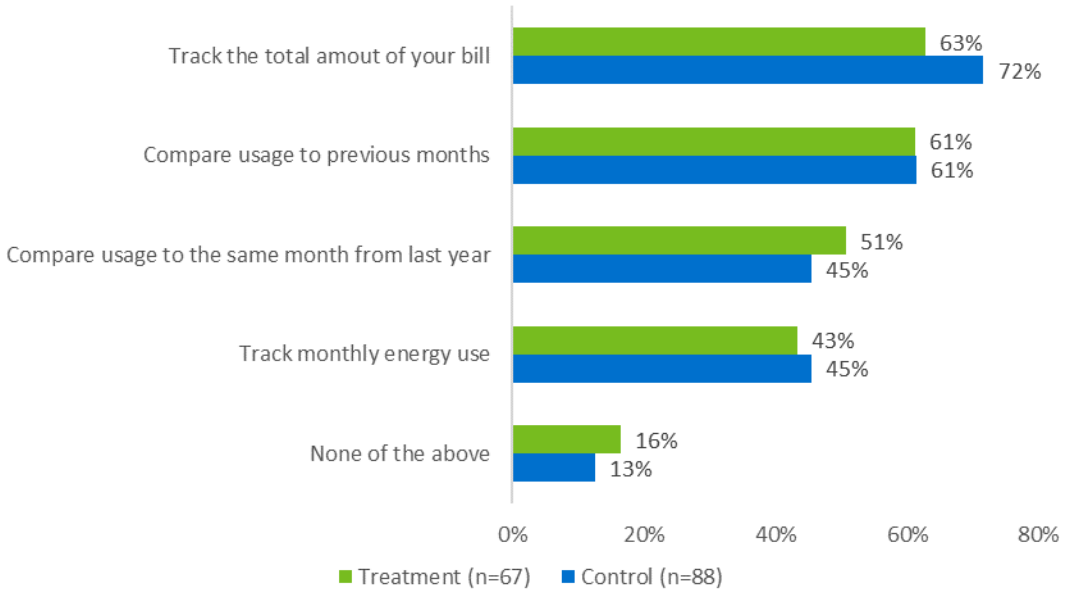
Figure 4-14: "Which of the Following Do You Do with Regard to Your Household's Energy Use?" – Single Family



Multi-family treatment and control customers report tracking information (bills and usage) related to their household's energy usage in the following ways (Figure 4-15):

- Sixty-three percent of the treatment customers and 72% 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-one percent of treatment and control respondents, respectively, compared usage to previous months.
- Fifty-one percent of treatment respondents and 45% of control respondents compared usage to the same month from last year. The difference in responses here between treatment and control groups is not statistically significant at the 90% level of confidence.

Figure 4-15: "Which of the Following Do You Do with Regard to Your Household's Energy Use?" – Multi-family



An area of significant interest in this evaluation is the identification of energy-saving behaviors that MyHERs move treatment customers to undertake. These behaviors, if they result in energy savings attributed to the reports, would be over and above what the treatment households would have done without having read or seen their MyHERs. The customer survey included a battery of questions inquiring as to whether the respondent's household has undertaken energy-savings actions. The responses to these questions are compared between the treatment and control respondents, and any statistically significant uplift in the reported behaviors undertaken can be concluded to be due to the MyHERs and may also be inferred as a driver of energy savings attributed to the program. A screening question is used to ensure that respondents answering the questions about specific behaviors only see those questions if they state that they have undertaken any energy savings actions or made energy efficiency improvements at all in the past year.[17]

For both single family and multi-family treatment and control groups, respectively, respondents reported similar levels of taking actions to save energy, as shown in Figure 4-16 and Figure 4-17. Across the nine specific behaviors and actions described by the survey, none show that treatment respondents are significantly more likely to take action to save energy than control respondents. The most cited behavior for both single family and multi-family respondents is turning off lights in unused indoor or outdoor areas, with 93-95% of single family respondents reporting taking that action and 99-100% of multi-family respondents reporting that they take the action. The least-cited action is turning down the water heater temperature – where 30-43% of

[17] Single family treatment and control customers report similar likelihood of having undertaken any behaviors to reduce household energy use or having made energy efficiency improvements to their home (66% to 67%). This is also true for treatment and control multi-family respondents (64% to 59%).

single family respondents reporting that they did that and 34-45% of the multi-family respondents reporting the same.

There are two energy-savings behaviors for which significantly more single-family control customers are reporting undertaking than treatment customers, both of which are related to conserving on water heating. The MyHER reports do not usually touch on water heating end-uses and it may be that MyHER treatment customers are taking actions that displace their interest or efforts to conserve water heating energy use.

While none of these behaviors show an uplift that can be ascribed to MyHER, that does not mean that energy savings are not coming from these behaviors. What these findings mean is that there is no evidence that MyHER has introduced new behaviors to treatment customers that they were not doing at all previously. It's quite possible that MyHER energy savings, at least in part, come from customers turning off lights in unused areas of the home – because they are doing that more than they would otherwise. The current survey instrument used by this evaluation cannot detect that change. Surveys or interviews can be designed to collect information on those more subtle differences in energy savings behaviors in the home, however they would be considerably more complicated and more expensive to field. Fewer customers would be willing to complete such a survey and non-response bias would be of greater concern. Non-response bias could be potentially overcome with completion incentives, but that would also increase the evaluation budget. Duke Energy is aware of the limitations of the customer research agenda and accepts the current resolution of the tradeoff between depth of findings, reliability of findings, and evaluation cost.

Figure 4-16: Reported Energy Savings Behaviors – Single Family

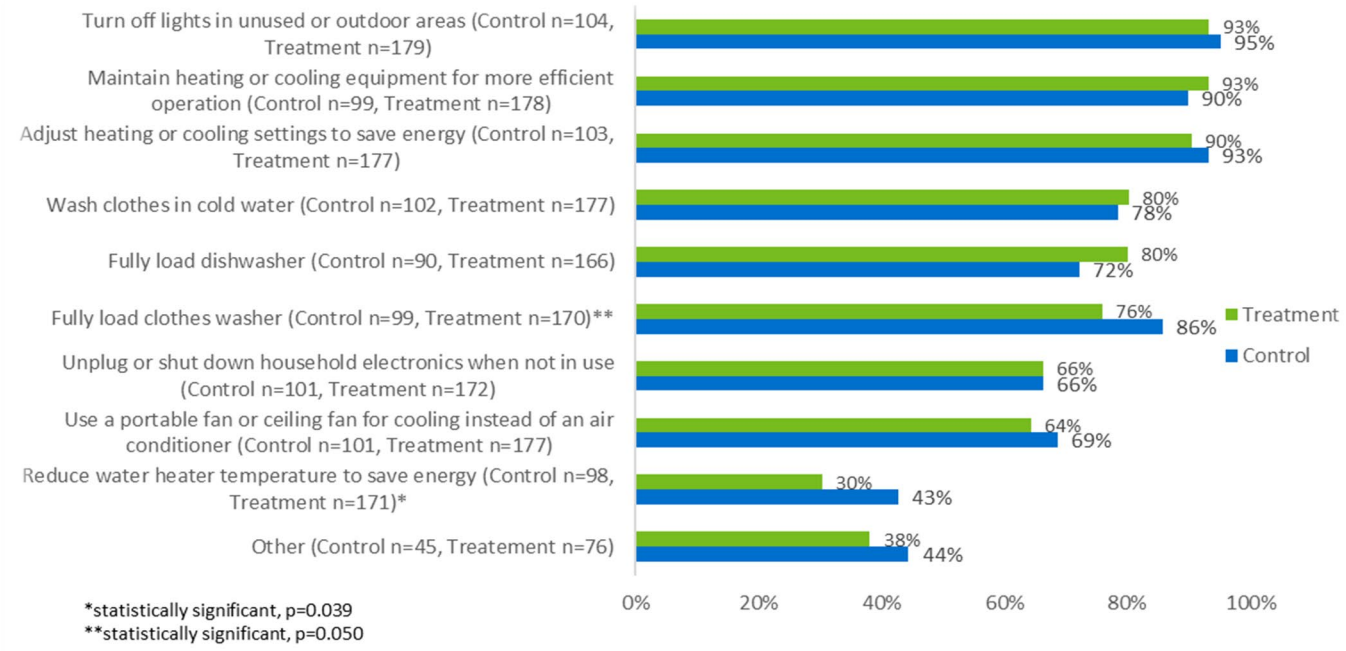
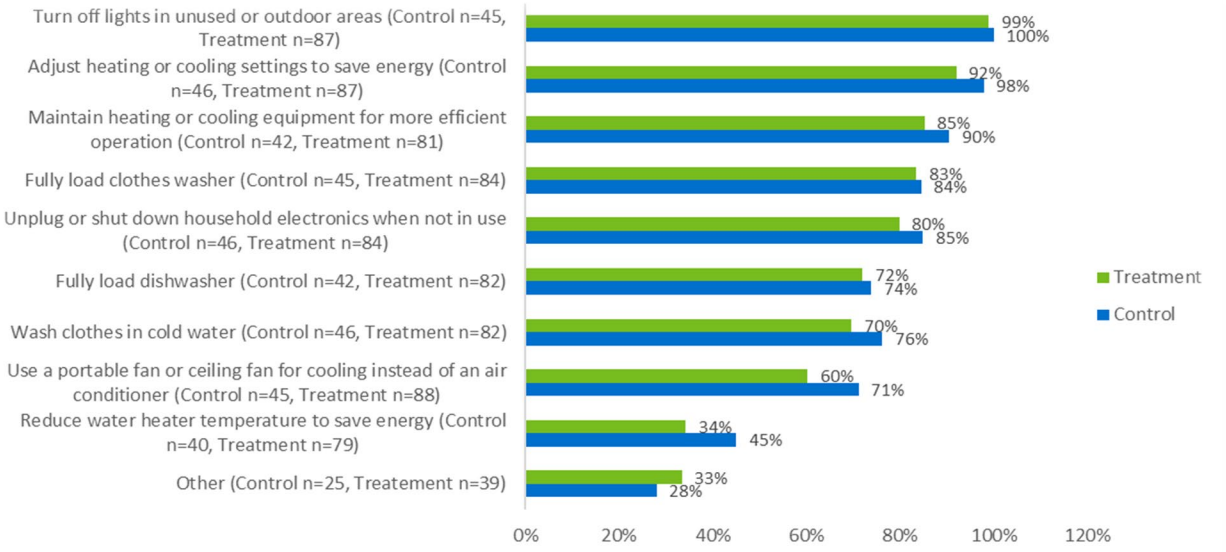


Figure 4-17: Reported Energy Savings Behaviors – Multi-family



Nexant compared the reported behaviors of single family treatment customers to those of multi-family treatment customers. Here we do see measurable differences between behaviors taken by single family customers and multi-family customers. Not surprisingly, single family treatment customers are significantly more likely to report that they “Maintain heating or cooling equipment for more efficient operation” and “Wash clothes in cold water” than multi-family treatment customers, as shown in Figure 4-18. These differences are likely due to the fact that maintenance in multi-family housing is often completed by property management companies. Additionally, the saturation of air conditioning is lower in multi-family housing units as compared to single family. Multi-family treatment customers are significantly more likely to “Turn off lights in unused or outdoor areas” and “Unplug or shut down household electronics when not in use” than single family treatment customers.

Forty-eight single family respondents (treatment and control customers in total) reported other energy savings actions. Nexant categorized these actions and the results are shown in Figure 4-19. The two most reported actions, mentioned by 15 respondents, respectively, pertain to lighting, such as switching to LED bulbs, and upgrading insulation and home sealing.

Figure 4-18: Reported Energy Savings Behaviors Single Family Treatment vs. Multi-family Treatment

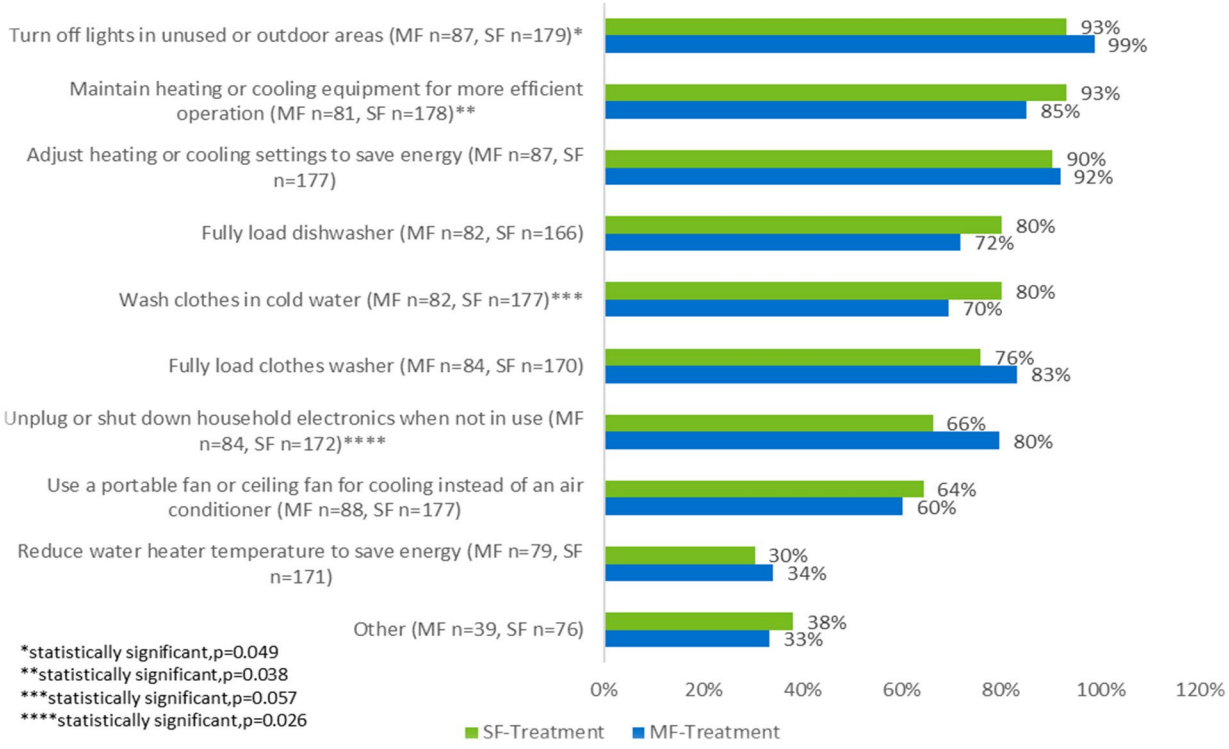
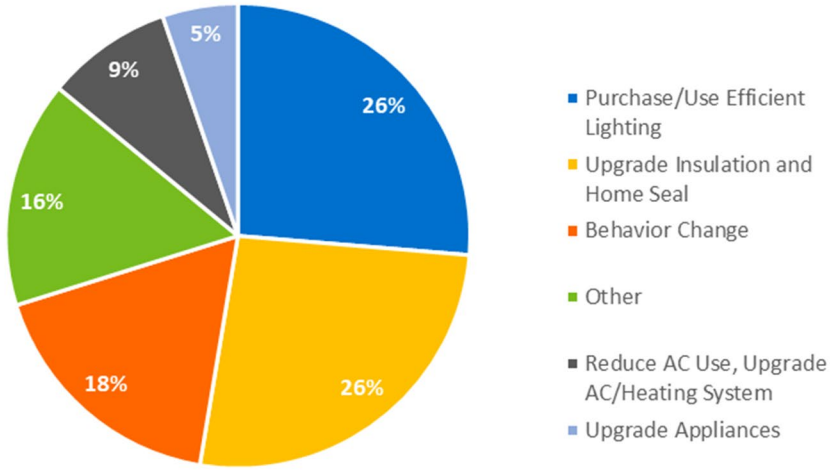


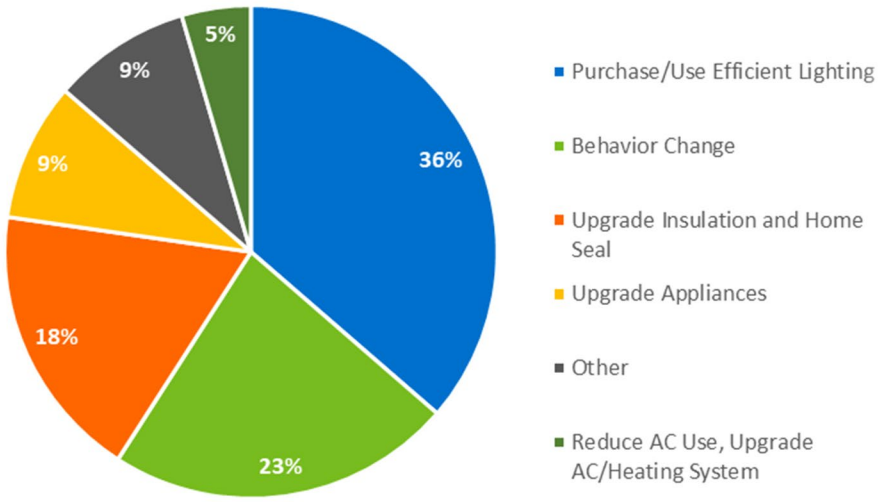
Figure 4-19: Distribution of "Other" Energy Savings Behaviors – Single Family (treatment and control n=48)



Twenty multi-family respondents (treatment and control customers in total) reported other

energy savings actions. Nexant categorized these actions and the results are shown in Figure 4-20. The most reported action, mentioned by eight respondents, pertains to lighting, such as switching to LED bulbs.

Figure 4-20: Distribution of "Other" Energy Savings Behaviors – Multi-family (treatment and control n=20)



Both single family and multi-family customers were further asked a question about COVID-19's effects on their household's ability to take energy savings actions. Sixteen percent of single family control customers and 10% of treatment customers reported that the likelihood of COVID-19 pandemic increasing their ability to take energy savings actions a "7" or higher on an 11-point scale of likelihood, while 23% of multi-family control customers and 22% of treatment customers reported so. None of these differences in responses between treatment and control customers are statistically significant.

Reported Energy Efficiency Improvements

With respect to improvements and investments that customers might make after reading or seeing their MyHER reports, we have a similar finding to that of the behavior-related actions discussed above. Respondents were provided with a list of energy efficiency improvements and were asked if they had done each in the past year. In all cases, treatment group is not significantly more likely to report energy efficiency upgrades than control group – across both single family and multi-family respondents. Single family control group respondents are significantly more likely to report replacing windows or doors with more energy-efficient types than treatment group respondents. Significantly more multi-family control group respondents reported caulking or weatherstripping (windows or doors) and installing energy-efficient water heater than treatment group respondents (Table 4-6). On the one hand, this may be considered an unsavory result since the initial hypothesis is that MyHERs are likely to motivate customers

to make upgrades like caulking and weatherstripping, or replacing windows and doors. However, this result may also indicate MyHER's success at educating customers about the power of inexpensive purchases and simple behavior changes in managing their electricity bills. Without that education from MyHERs, the control customers may have been more receptive to advertising for new water heaters, or caulking and weatherstripping. This is an interesting possibility and subtle enough that further insights would likely require focus groups, telephone interviews, or a follow up survey.

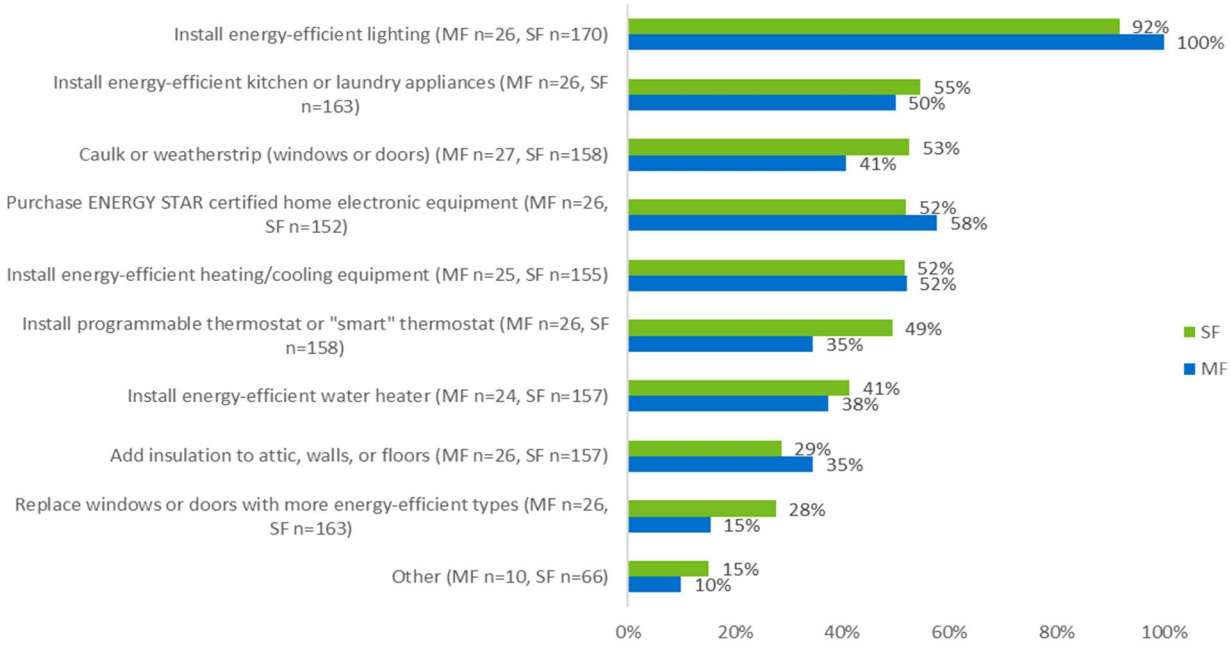
Table 4-6: Customers Indicating They Had Made Each Energy Efficiency Upgrade

Upgrade	Single Family		Multi-family	
	Treatment	Control	Treatment	Control
Install energy-efficient lighting	92% (n=179)	89% (n=104)	88% (n=80)	91% (n=44)
Install energy-efficient kitchen or laundry appliances	53% (n=171)	60% (n=97)	44% (n=75)	52% (n=42)
Purchase ENERGY STAR certified home electronic equipment	51% (n=160)	56% (n=91)	44% (n=73)	49% (n=39)
Caulk or weatherstrip (windows or doors)	51% (n=166)	50% (n=102)	38% (n=72)**	55% (n=42)**
Install energy-efficient heating/cooling equipment	51% (n=164)	51% (n=97)	37% (n=67)	48% (n=40)
Install programmable thermostat or "smart" thermostat	49% (n=166)	47% (n=100)	29% (n=79)	21% (n=43)
Install energy-efficient water heater	42% (n=166)	44% (n=95)	25% (n=68)***	45% (n=40)***
Replace windows or doors with more energy-efficient types	28% (n=172)*	42% (n=103)*	12% (n=74)	24% (n=42)
Add insulation to attic, walls, or floors	28% (n=166)	34% (n=100)	20% (n=70)	30% (n=40)

*statistically significant p=0.018
**statistically significant p=0.073
***statistically significant p=0.032

As discussed above with behavioral actions, single family treatment respondents were significantly more likely to report they had undertaken upgrades than multi-family treatment respondents on installing energy-efficient heating/cooling equipment, installing energy-efficient water heaters, replacing windows or doors with more energy-efficient types, caulking or weatherstripping (windows or doors), and installing programmable thermostat or "smart" thermostat in the survey. To control for the fact that the likelihood of renters would make these upgrades is very low, we considered the multi-family treatment responses in comparison to single family treatment responses with renters removed. When renters were removed from the analysis, five of these upgrades still emerged as higher for single family treatment respondents, as seen in Figure 4-21. None of the differences are statistically significant.

Figure 4-21: Customers Indicating They Had Made Each Energy Efficiency Upgrade Treatment Homeowners Only – Single Family vs. Multi-family



To examine broader patterns within participant responses to the behavior and upgrade questions, these questions were combined into behavior vs. upgrade categories and were also combined into end-use categories. First, as shown in Table 4-7, treatment respondents and control respondents reported very similar levels of engagement in energy efficiency behaviors and improvements generally, and also undertook a similar average number of energy efficiency behaviors across the two household types.

Table 4-7: Percent of Households That Have Undertaken Energy Efficiency Actions

Behaviors/Improvements	Single Family		Multi-family	
	Treatment	Control	Treatment	Control
Energy Efficiency Behaviors	100% (n=183)	100% (n=106)	100% (n=88)	100% (n=47)
Average Number of Behaviors	6.6	6.7	6.6	7.0
Energy Efficiency Improvements	97% (n=181)	96% (n=105)	92% (n=84)	96% (n=46)
Average Number of Improvements	4.2	4.5	3	3.8

Additionally, Table 4-8 shows the proportion of respondents that had undertaken at least one behavior or upgrade in each end use category. For those categories that have multiple behaviors or upgrades within it, these are broken out on their own for analysis. In the category “Water Heating Behaviors/Upgrades”, for example, four behaviors relevant to water heating are combined in a subcategory “Water Heating Behaviors” are broken out. Upgrades are not broken out here in that way because there is only one upgrade (“Install energy-efficient water heater”)

associated with the parent category, and the proportion of respondents undertaking this upgrade is presented in Table 4-6, above. Similarly, for "Lighting Behaviors/Upgrades", there was only one upgrade and behavior, so these are not broken out. Lastly, there was only one behavior associated with the "Electronics and Appliances Behaviors/Upgrades" category ("Unplug or shut down household electronics when not in use"), so it was omitted as well. Multi-family control group members were significantly more likely to have undertaken sealing and insulation upgrades than treatment group members.

Table 4-8: Percent of Households That Had Undertaken Energy Efficiency Behaviors or Upgrades, by End Use Category

Behaviors/Improvements	Single-family		Multi-family	
	Treatment Group	Control Group	Treatment Group	Control Group
Water Heating Behaviors/Upgrades (5)	96% (n=182)	98% (n=106)	95% (n=87)	98% (n=47)
Water Heating Behaviors (4)	96% (n=182)	99% (n=105)	94% (n=87)	98% (n=47)
Space Heating Behaviors/Upgrades (5)	99% (n=183)	97% (n=106)	99% (n=88)	100% (n=47)
Space Heating Behaviors (3)	99% (n=183)	98% (n=105)	99% (n=88)	100% (n=47)
Space Heating Upgrades (2)	66% (n=173)	66% (n=103)	46% (n=81)	49% (n=43)
Lighting Behaviors/Upgrades (2)	98% (n=183)	99% (n=106)	99% (n=87)	100% (n=47)
Electronics and Appliances Behaviors/Upgrades (3)	87% (n=182)	85% (n=106)	86% (n=87)	93% (n=46)
Electronics and Appliances Upgrades (2)	65% (n=173)	69% (n=100)	55% (n=80)	63% (n=43)
Sealing and Insulation Upgrades (3)	65% (n=174)	66% (n=103)	43% (n=75)	59%* (n=44)

*statistically significant, p=0.084

Both single family and multi-family customers were further asked a question about COVID-19's effects on their households' ability to make energy efficiency improvements. Twelve percent of single family control customers and 9% of treatment customers reported that the likelihood of COVID-19 pandemic increasing their ability to make energy efficiency improvements a "7" or higher on a 0-10 point scale of likelihood, while 21% of multi-family control customers and 24% of treatment customers reported so. None of these differences in responses between treatment and control customers are statistically significant.

Customer Motivation and Awareness

Single family control and treatment groups report similar levels of motivation for saving energy. Eighty-five percent of control customers indicated that knowing they are using energy wisely is "important" or "extremely important" (rated 7 or higher on a 0-10 point scale), compared to 81% of treatment customers. This difference is not statistically significant (Figure 4-22). The same is true for multi-family. Eighty-one percent of control customers indicated that knowing they are using energy wisely is "important" or "extremely important", compared to 82% of treatment customers. This difference is not statistically significant (Figure 4-23).

Figure 4-22: "How Important Is It for You to Know if Your Household is Using Energy Wisely?"– Single Family Split Top-4 Box Scores (0-10 Scale)

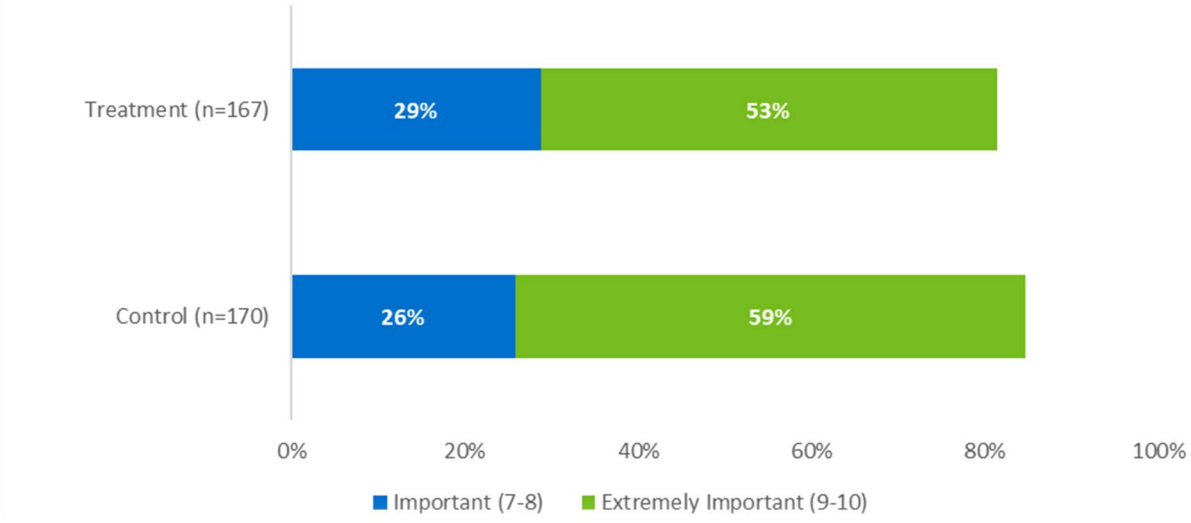
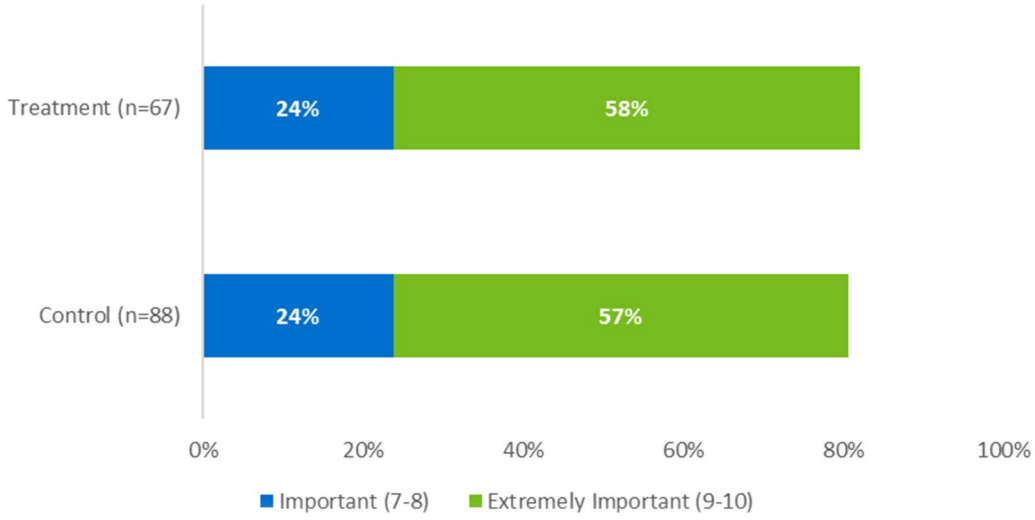


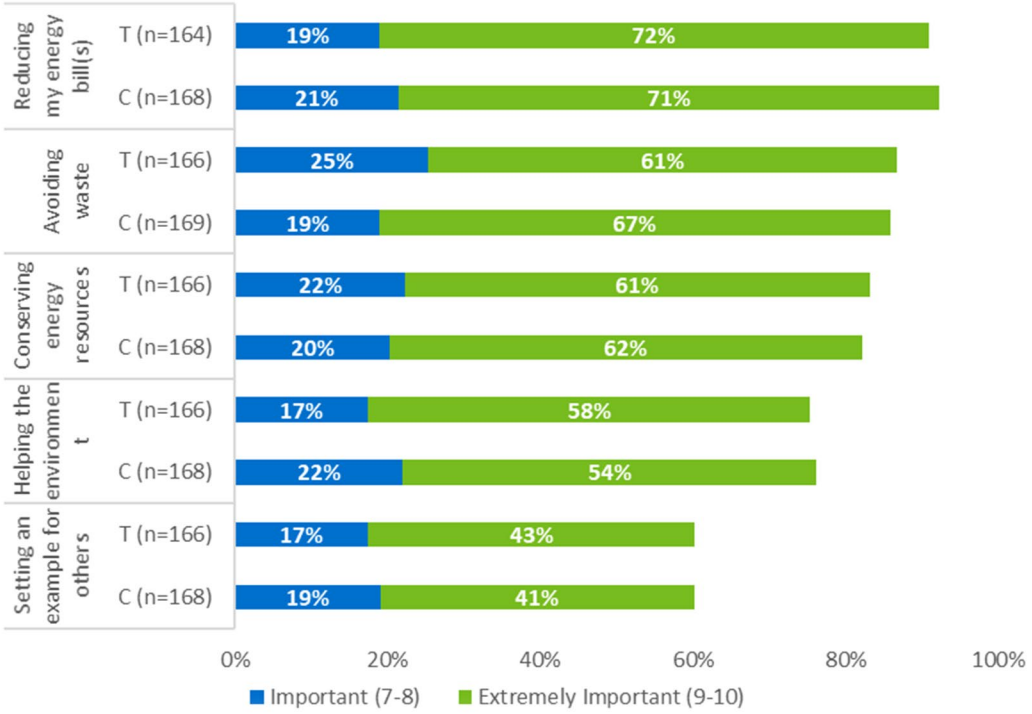
Figure 4-23: "How Important Is It for You to Know if Your Household is Using Energy Wisely?" – Multi-family Split Top-4 Box Scores (0-10 Scale)



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 treatment and control groups is saving money on their energy bills. For single family, 91% of treatment respondents and 92% of control respondents reported that saving money on their energy bills was "important" or "extremely important" (rated 7 or higher on a 0-10 point scale). Eighty-six percent of treatment respondents and 86% of control respondents indicated that "avoiding waste" was "important" or "extremely important" to them. Eighty-three percent of treatment customers and 82% of control customers reported that "conserving energy resources" was "important" or "extremely important". Seventy-five percent of treatment customers and 76% of

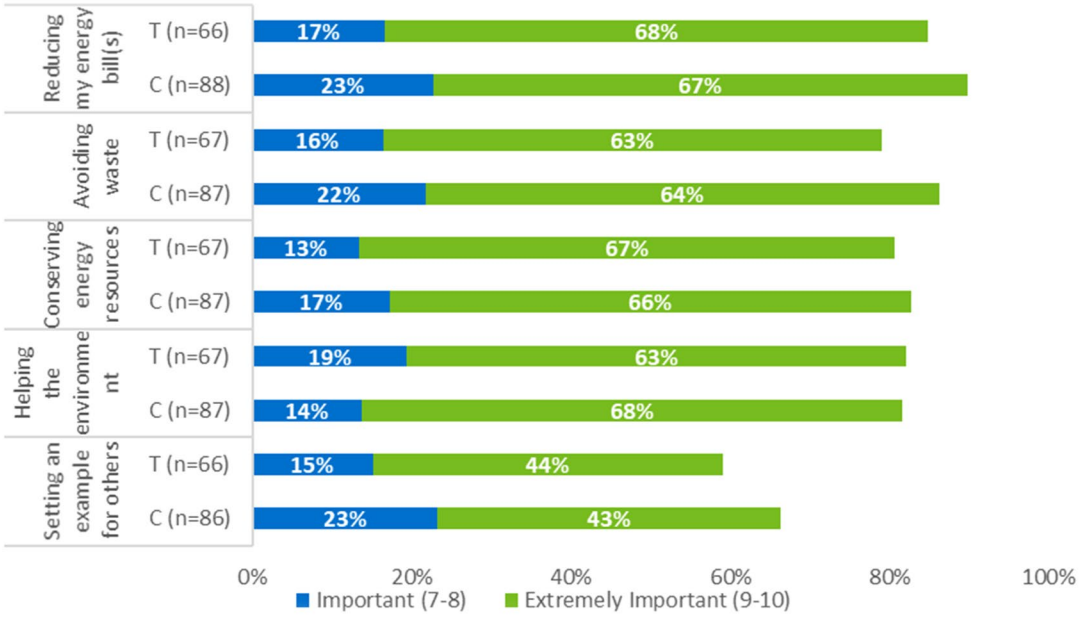
control customers reported that “helping the environment” was “important” or “extremely important”. None of the differences between treatment and control groups are statistically significant. Figure 4-24 contains the frequency of responses to this question, shown as a percentage for both treatment and control groups.

Figure 4-24: “Please Indicate How Important Each Statement Is to You” – Single Family Split Top-4 Box Scores (0-10 Scale)



For multi-family, 85% of treatment respondents and 90% of control respondents reported that saving money on their energy bills was “important” or “extremely important” (rated 7 or higher on a 0-10 point scale). Seventy-nine percent of treatment customers and 86% of control customers reported that “avoiding waste” was “important” or “extremely important”. Eighty percent of treatment respondents and 83% of control respondents indicated that “conserving energy resources” was “important” or “extremely important” to them. Eighty-two percent of treatment customers and control customers, respectively, reported that “helping the environment” was “important” or “extremely important”. None of the differences are statistically significant at the 90% level of confidence. Figure 4-25 contains the frequency of responses to this question, shown as a percentage for both treatment and control groups.

Figure 4-25: "Please Indicate How Important Each Statement Is to You" – Multi-family Split Top-4 Box Scores (0-10 Scale)



As indicated by Figure 4-26 and Figure 4-27, among single family treatment customers, 71% of treatment group customers rated their knowledge regarding ways to save energy in the home at least seven on a 0-10 point scale (indicating they were "knowledgeable" or "extremely knowledgeable"), while 61% of control group customers rated themselves this way. The difference between treatment and control customers is statistically significant at the 90% level of confidence. Among multi-family customers, 62% of treatment respondents and 63% of control respondents rated themselves seven or higher on this scale. The difference is not statistically significant at the 90% level of confidence.

Figure 4-26: "How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?" – Single Family Split Top-4 Box Scores (0-10 Scale)

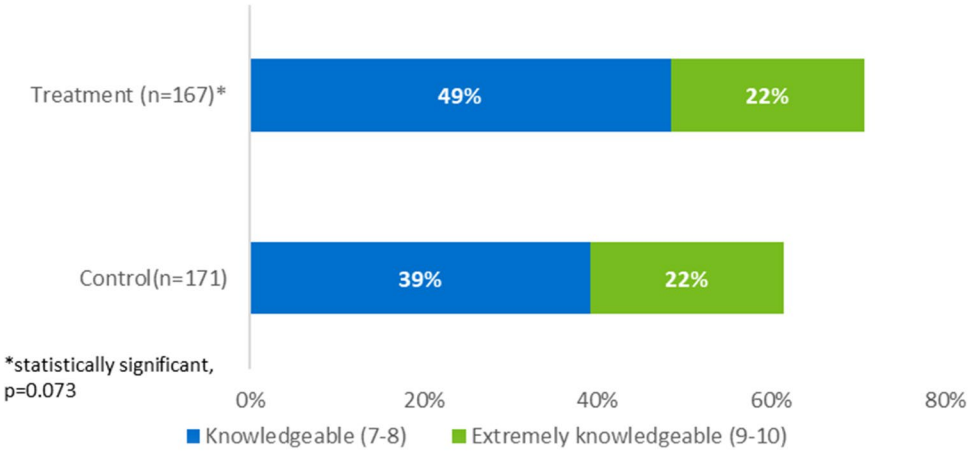
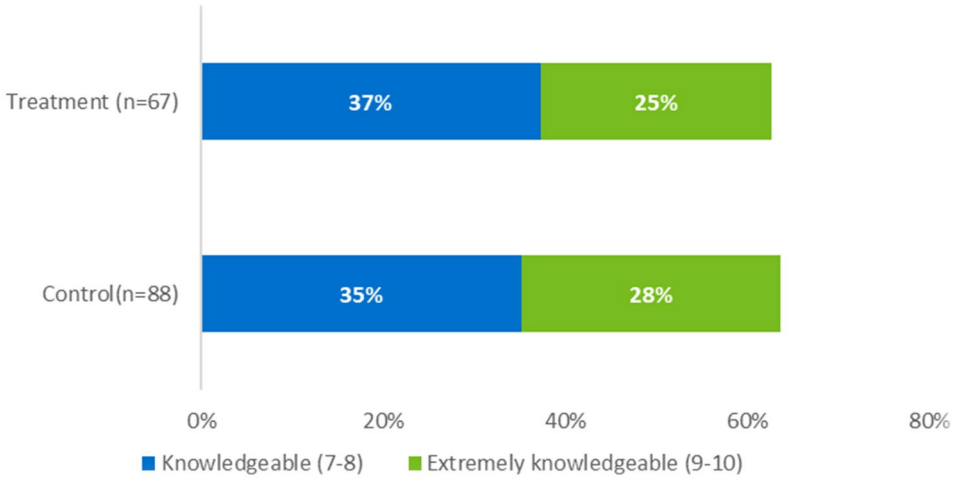


Figure 4-27: "How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?"– Multi-family Split Top-4 Box Scores (0-10 Scale)



Respondents that took the treatment-only survey were asked how useful each MyHER feature was to their homes. A similar question was asked of primary survey respondents, but rephrased to ask them how useful they might expect that information to be. Table 4-9 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 for both sets of respondents who answered "7" or above on a scale from 0-10.

This table shows that among single family customers, control customers were significantly more likely to think that "Tips to help you save money and energy" and "Information about services and offers from Duke Energy" might be useful, than treatment customers actually thought they were. Among multi-family customers, 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 it was. These findings suggest that there may be an opportunity to improve the presentment of this information in MyHERs, about Duke Energy's services and offerings.

Table 4-9: Actual Usefulness versus Hypothetical Usefulness of HER Features
Top-4 Box Scores (0-10 Scale)

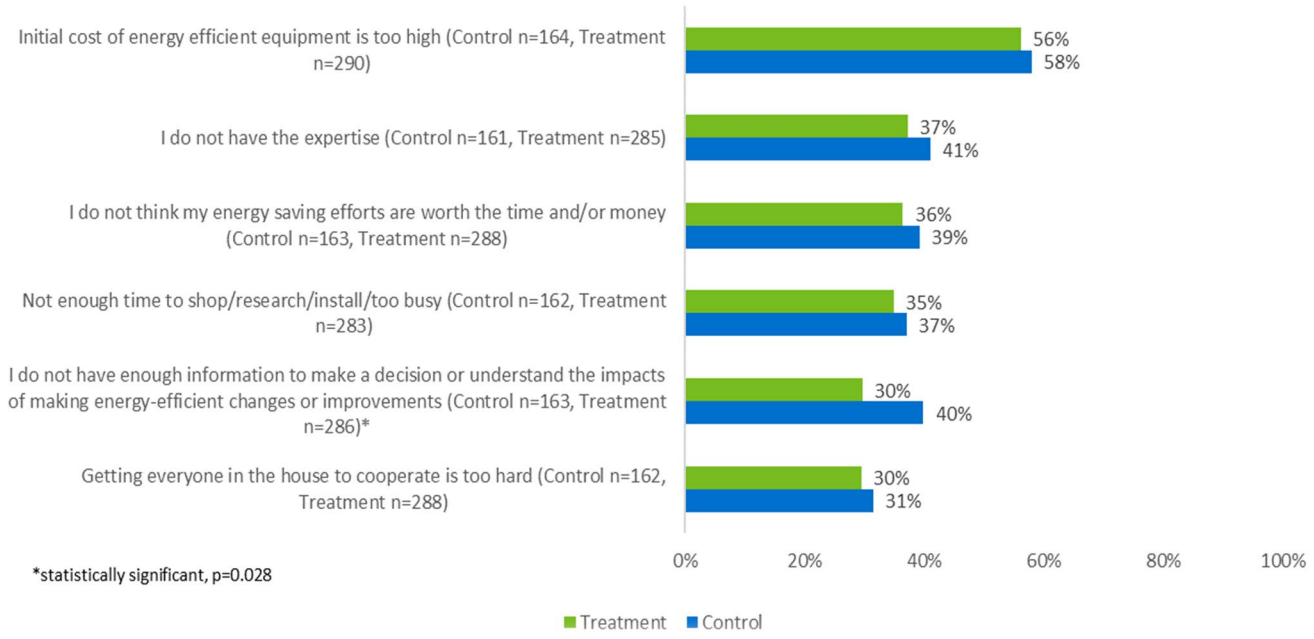
HER Feature	Single Family		Multi-family	
	Control	Treatment Only	Control	Treatment Only
Graphs that display your home's energy use over time	67% (n=160)*	80% (n=114)*	67% (n=86)	71% (n=66)
Energy use associated with specific household items and areas	67% (n=160)	57% (n=115)	58% (n=86)****	73% (n=66)****
Tips to help you save money and energy	75% (n=165)**	54% (n=115)**	73% (n=86)	66% (n=65)
Customized suggestions for your home	56% (n=162)	53% (n=113)	56% (n=85)	57% (n=65)
Information about services and offers from Duke Energy	65% (n=164)***	50% (n=114)***	68% (n=87)*****	48% (n=66)*****
Comparison to similar homes	52% (n=160)	44% (n=115)	58% (n=85)	51% (n=65)

*statistically significant, p=0.018
**statistically significant, p=0.000
***statistically significant, p=0.015
****statistically significant, p=0.063
*****statistically significant, p=0.010

Barriers to Customers Undertaking Energy Savings Actions

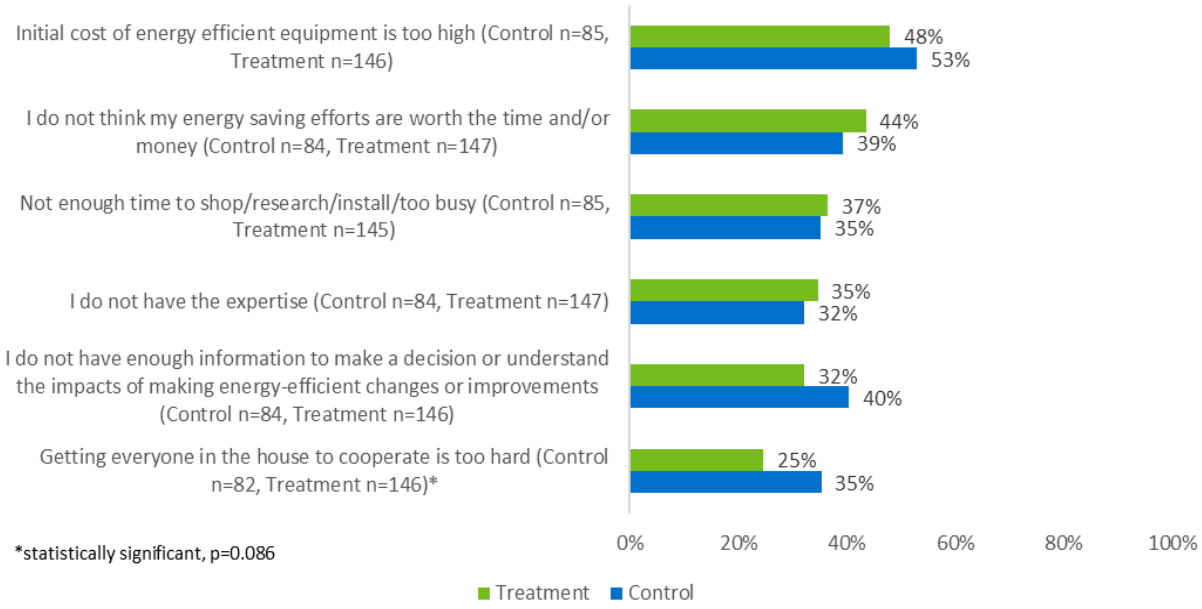
When asked the reasons why customers might not be able to save as much ~~as~~ energy as they would like, statistically different response patterns between treatment and control customers were found, as shown in Figure 4-28 and Figure 4-29. On a scale of 0-10, where 0 represents "not at all important" and 10 is "extremely important", forty percent of single family control respondents reported "I do not have enough information to make a decision or understand the impacts of making energy-efficient changes or improvements" as a barrier and 30% of treatment respondents did so as well (rated this importance as 7 or higher). The difference is statistically significant at the 90% level of confidence. For multi-family, 25% of treatment respondents and 35% of control respondents reported "Getting everyone in the house to cooperate is too hard" as a barrier. The difference is statistically significant at the 90% level of confidence. When single family and multi-family treatment group responses ~~to these questions~~ were compared, roughly half of multi-family respondents and single family respondents reported "Initial cost of energy efficient equipment is too high" as a barrier. The difference between single family and multi-family respondents is statistically significant at 90% level of confidence.

Figure 4-28: Barriers to Customers Undertaking Energy Savings Actions – Single Family Top-4 Box Scores (0-10 Scale)



*statistically significant, p=0.028

Figure 4-29: Barriers to Customers Undertaking Energy Savings Actions – Multi-family Top-4 Box Scores (0-10 Scale)



*statistically significant, p=0.086

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 25% (179 of 718, treatment and control customers in total) offered suggestions, including 26 who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned in 62 of the remaining 168 responses with suggestions, reflected a desire for more energy savings programs, more energy savings information, and more incentives:

- "*More options for low-cost LED bulbs. Rebates/coupons for energy efficient appliances/HVAC, fans*"
- "*Send LED light bulbs"*
- *"Offer suggestions on how to save on energy consumption"*
- *"Offer E.E. light bulbs more often. Reduce rates for low income households."*
- "*Give more energy efficient items."*

Other comments centered on other suggestions, such as reducing prices/providing senior discounts and better communication. Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-10.

Table 4-10: Responses to Solicitation for Suggestions to Duke Energy for Improving Service Offerings

Suggestion	Single Family			Multi-family		
	Count	Percent of Respondents Mentioning (n=120)	Percent of Total Mentions (n=130)	Count	Percent of Respondents Mentioning (n=59)	Percent of Total Mentions (n=65)
Increase program offerings, incentives, or information	40	33%	31%	22	37%	34%
Appreciate current offers	20	17%	15%	7	12%	11%
Voiced frustration with Duke Energy	18	15%	14%	2	3%	3%
Reduce Price/provide senior discounts	16	13%	12%	11	19%	17%
Provide more detailed info in MyHER	15	13%	12%	8	14%	12%
Better Communication/More Emails/More mails/In-person communication	11	9%	8%	2	3%	3%
Miscellaneous	8	7%	6%	11	19%	17%
Reduce Power Outages	1	1%	1%	1	2%	2%
Improve website/app	1	1%	1%	1	2%	2%

4.2.2.2 Treatment Households: Experience and Satisfaction with MyHER

A very large majority of the single family treatment only household respondents, 95%, (124 of 131), and the multi-family treatment only household respondents, 95%, (77 of 81) 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 4-30 and Figure 4-31). Given Duke Energy's protocols for report delivery, respondents who receive paper HERs would receive eight reports (single family respondents) and up to six reports (multi-family respondents) in this time period, and those who receive eHERs would have received 12. Fifty percent (59 of 118) of single family customers responded that they received 12 home energy reports in the past 12 months. Twenty-nine percent (20 of 70) of multi-family customers responded that they received 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. We note the response pattern for single family respondents is significantly different than that of multi-family respondents.

Figure 4-30: Reported Number of MyHERs Received "In the past 12 months" (n=118) Single Family

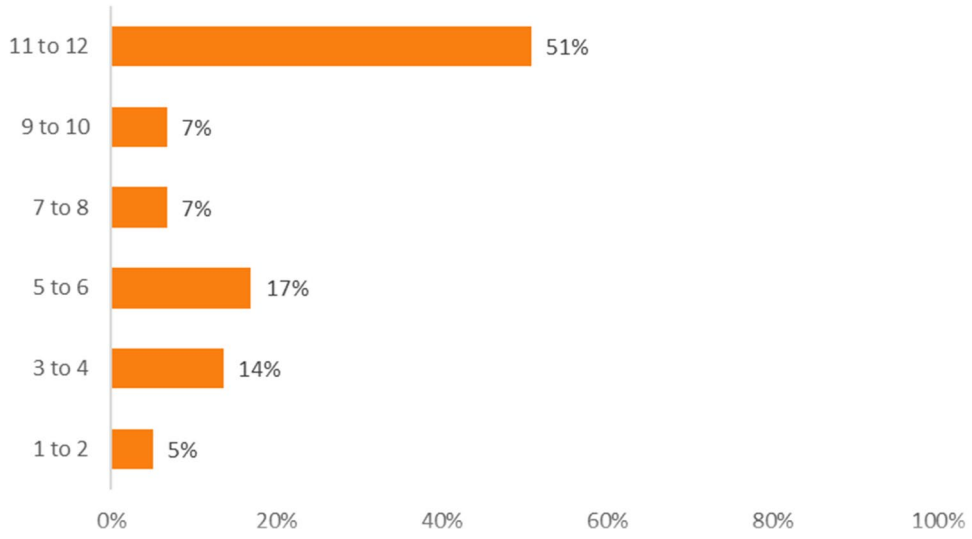
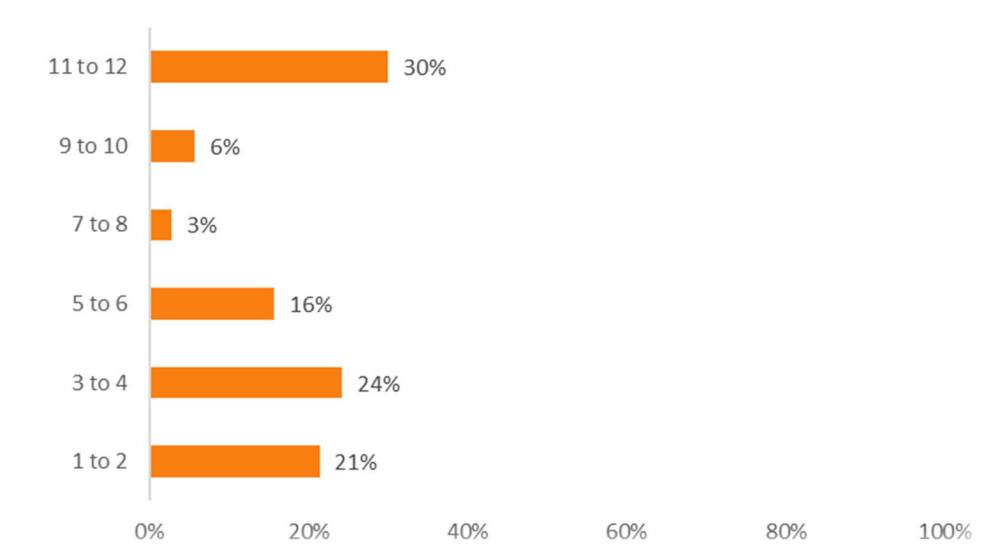


Figure 4-31: Reported Number of MyHERs Received "In the past 12 months" (n=70) Multi-family



Survey respondents indicated high interest in the MyHER reports. As shown in Figure 4-32 and Figure 4-33, when asked how often they read the reports, 98% of single family respondents indicated they "always" or "sometimes" read the reports, and 94% of multi-family respondents indicated they "always" or "sometimes" read them.

Figure 4-32: How Often Customers Report Reading the MyHER (n=117) – Single Family

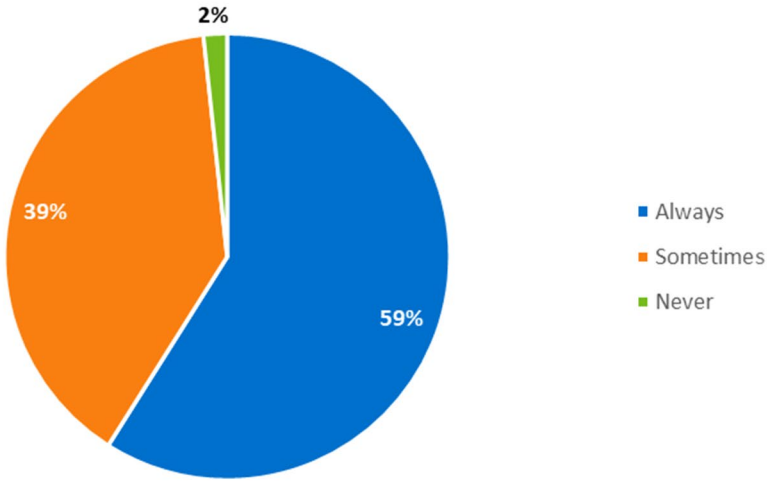
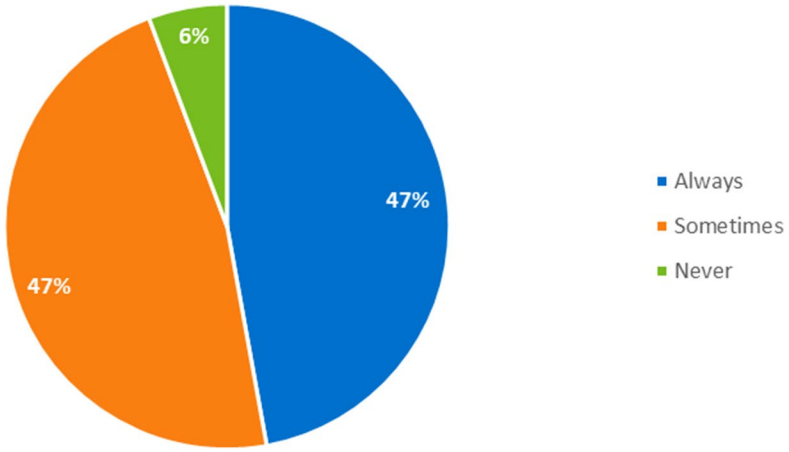


Figure 4-33: How Often Customers Report Reading the MyHER (n=70) – Multi-family



Fifty-nine percent (77 of 113) of single family respondents that provided a rating reported being "somewhat" or "very" satisfied with the information contained in the reports (Figure 4-34). Seventy-two percent (46 of 64) of multi-family respondents that provided a rating reported being "somewhat" or "very" satisfied with the information contained in the reports (Figure 4-35). The survey asked a further question to the respondents of why they said so: 8 of the satisfied single family respondents and 4 of the satisfied multi-family respondents provided reasons. Among customers who gave the highest satisfaction ratings, the most common comments on the MyHERs described the reports as "helpful."

Figure 4-34: Satisfaction with the Information in MyHER Reports (n=113) – Single Family

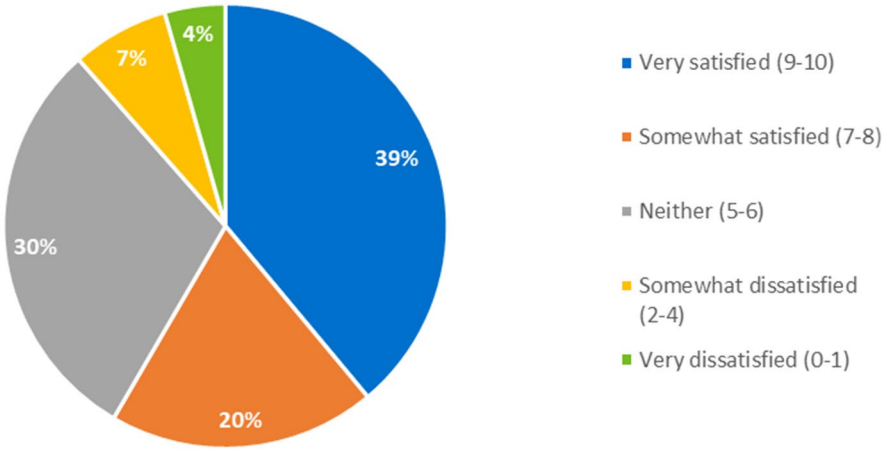
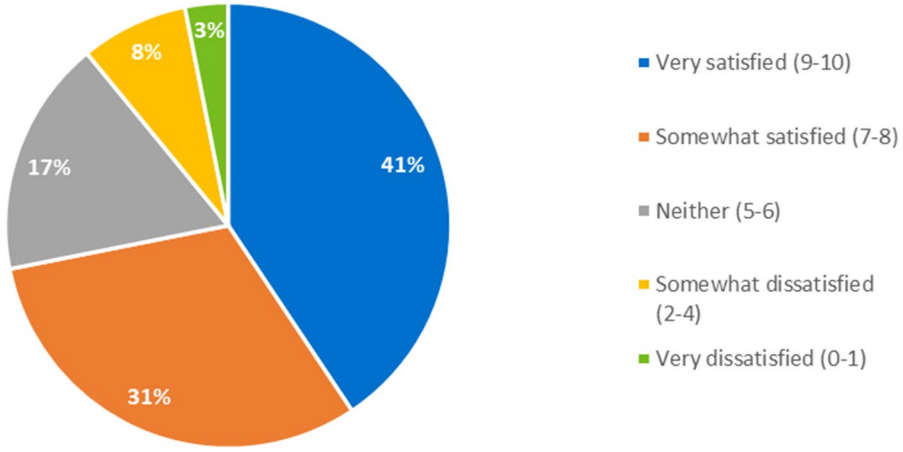


Figure 4-35: Satisfaction with the Information in MyHER Reports (n=64) – Multi-family

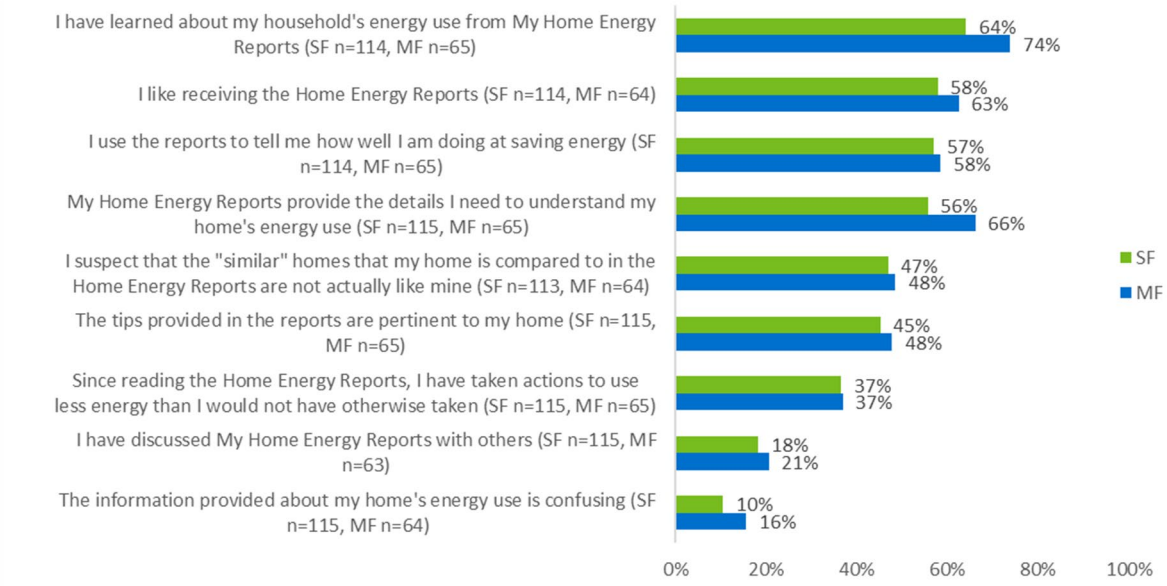


When asked to rate their agreement with a series of statements about MyHERs on a scale of 0 to 10, recipients largely agreed that the reports helped them understand their home's energy use, with 64% of single family respondents and 74% of multi-family respondents rating their agreement a seven or higher on a 0-10 point scale.

Fifty-eight percent of single family respondents and 63% of multi-family respondents agreed that they like receiving the home energy reports; this difference is not statistically significant at the 90% level of confidence.

More than half (56% of single family respondents and 66% of multi-family respondents) agreed that the reports provided the details they needed to understand their home's energy usage. The difference here between single family and multi-family respondents is not statistically significant. 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 (10% of single family respondents and 16% of multi-family respondents) agreed with the statement that the information provided is confusing; the difference is not statistically significant at the 90% level of confidence (Figure 4-36).

Figure 4-36: Level of Agreement with Statements about MyHER Top-4 Box Scores (0-10 Scale)



The survey provided an open-ended question (to customers that reported reading at least one report in the past year) to elicit suggestions for improvements to the MyHER reports. About 41% (47 of 115) of single family respondents and 26% (17 of 66) of multi-family respondents offered suggestions, including 7 single family respondents and 5 multi-family respondents who offered comments to express gratitude and appreciation of the reports only. Among those providing a response to the question, the most common response, mentioned by 17 of the 40 single family respondents with suggestions and 6 of the 12 multi-family respondents 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 how to reduce energy consumption information:

- "*Specific Instructions on how to reduce energy consumption in the highest used category would be most useful*"
- *"Provide better more realistic tips about how I can decrease my bill"*
- "*Give improvement suggestions on each report that we could implement and save energy*"

Other comments centered on unique circumstances, such as providing relevant information for people who live in an apartment (three multi-family respondents mentioned these circumstances):

- "*I live in an apartment and I was doing all of the suggestions before I received the report. I would like suggestions on things I can control in my apartment*"

- *"I live in an apartment and some of the suggestions don't apply to me…"*

Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-11.

Table 4-11: Suggestions for HER Improvement (Multiple Responses Allowed)

Suggestion/Comment	Single Family			Multi-family		
	Count	Percent of Respondents Mentioning (n=47)	Percent of Total Mentions (n=51)	Count	Percent of Respondents Mentioning (n=17)	Percent of Total Mentions (n=20)
Provide more specific information or details	17	36%	33%	6	35%	30%
Don't believe comparison/accuracy	12	26%	24%	1	6%	5%
Appreciate the Home Energy Report	7	15%	14%	5	29%	25%
Format/Frequency	7	15%	14%	2	12%	10%
Unique circumstances	3	6%	6%	4	24%	20%
Other	1	2%	2%	0	0%	0%
Don't see value/dislike	2	4%	4%	2	12%	10%
Expressed frustration	2	4%	4%	0	0%	0%

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

- Only 31% (35 of 112) of single family treatment customers and 52% (34 of 65) of multi-family treatment customers are aware of MyHER Interactive. The difference between single family and multi-family respondents is statistically significant at the 90% level of confidence;
- Among aware customers, 91% of single family respondents and multi-family respondents, respectively, reported that they had not signed up to use MyHER Interactive; and
- When these respondents were asked why they haven't signed up to use MyHER Interactive, among the respondents who gave the answers, 29% of single family respondents and 27% of multi-family respondents reported that they were not interested in it, 21% of single family respondents and 14% of the multi-family respondents said they were too busy, 14% of single family respondents and 27% of multi-family respondents reported that they did not know about it, and 18% of multi-family respondents reported that they did not use computer.

Evidence of MyHER Effects

As noted above, while formal statistical testing found some differences among treatment and control group households for individual questions, Nexant 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.

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 51 questions;
- Note any item for which the treatment group outperformed the control group:
    - Single family: The treatment group outperformed the control group in 26 questions, or 51% of the total questions;
    - Multi-family: The treatment group outperformed the control group in 14 questions, or 27% of the total questions; and
- Calculate the probability that the difference in response patterns is due to chance, rather than an underlying difference in populations – 61% in the case of single family. Since this probability is much greater than 10%, we cannot reject the null hypothesis that the number of positive responses should be equal for treatment and control customers at the 90% level of confidence.

In comparing the response patterns between the treatment and control groups, 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. What we see in the survey data overall is the proportion of questions indicating a positive MyHER effect very near 50% in the case of single family program participants. In fact, the proportion of questions where treatment customers showed a positive MyHER effect was a little higher than 50%, however not statistically different from 50% at the 90% level of confidence.

The survey data reveal that there are specific areas where MyHER has relatively stronger and weaker positive effects. These areas of strong and weak performance are different for single family and multi-family participants, as shown in Table 4-12 and Table 4-13. In the case of single family customers, receiving the MyHER is associated with lower customer motivation, engagement and awareness of energy efficiency, lower customer-reported energy savings behaviors, and lower satisfaction with Duke Energy. These results may indicate that opportunities exist for Duke Energy to leverage the reports and website as a vehicle for delivering different or new information and opportunities to MyHER recipients that would increase their satisfaction with Duke Energy overall. On the other hand, single family MyHER recipients had a more positive view in these surveys on Duke Energy's energy efficiency offerings and customer engagement with Duke Energy website, and they reported experiencing fewer barriers to take energy savings actions.

Unlike single family customers, in the case of multi-family customers, MyHER recipients reported higher satisfaction with Duke Energy than non-recipients. Multi-family MyHER recipients reported a similar level of experiencing barriers to take energy savings actions relative to non-recipients. Multi-family MyHER survey responses also indicated lower satisfaction on Duke Energy's energy efficiency offerings and lower customer engagement with Duke Energy website.

When considering all possible areas of enhancement that the MyHERs can have on customer attitudes and actions related to satisfaction and energy savings behaviors, we observe areas of relative strength and weakness that differ between single family and multi-family customers. This result further illustrates that the messaging and approach taken in the reports delivered to multi-family customers may differ from that used in the single family reports.

Table 4-12: Survey Response Pattern Index – Single Family

Question Category	Count of Ques. where T better than C	Number of Ques. in Topic Area	Portion of Ques. where T better than C
Duke Energy's Public Stance on Energy Efficiency	3	4	75%
Customer Engagement with Duke Energy Website	3	5	60%
Customer's Reported Energy-saving Behaviors	3	11	27%
Customer's Reported Energy Efficiency Improvements Made	5	10	50%
Customer Motivation, Engagement and Awareness of Energy Efficiency	5	11	45%
Barriers of Customer Not Undertaking Energy Savings Actions	6	6	100%
Customer Satisfaction with Duke Energy	1	4	25%
Total	**26**	**51**	**51%**

Table 4-13: Survey Response Pattern Index – Multi-family

Question Category	Count of Ques. where T better than C	Number of Ques. in Topic Area	Portion of Ques. where T better than C
Duke Energy's Public Stance on Energy Efficiency	1	4	25%
Customer Engagement with Duke Energy Website	1	5	20%
Customer's Reported Energy-saving Behaviors	2	11	18%
Customer's Reported Energy Efficiency Improvements Made	2	10	20%
Customer Motivation, Engagement and Awareness of Energy Efficiency	2	11	18%
Barriers of Customer Not Undertaking Energy Savings Actions	3	6	50%
Customer Satisfaction with Duke Energy	3	4	75%
Total	**14**	**51**	**27%**

Respondent Demographics

Nearly all single family respondents—93% of treatment group customers and 90% of control group customers—own their residence. Among multi-family respondents, 69% of treatment group customers and 68% of control group customers rent their residence. More than half of households surveyed have two or fewer residents for both single family and multi-family. For single family households, about 15% of treatment households and 17% of control households have four or more residents. For multi-family households, about 18% of treatment households and 14% 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 for both single family and multi-family (Figure 4-37 and Figure 4-38).

Figure 4-37: "In What Year Was Your Home Built?" – Single Family

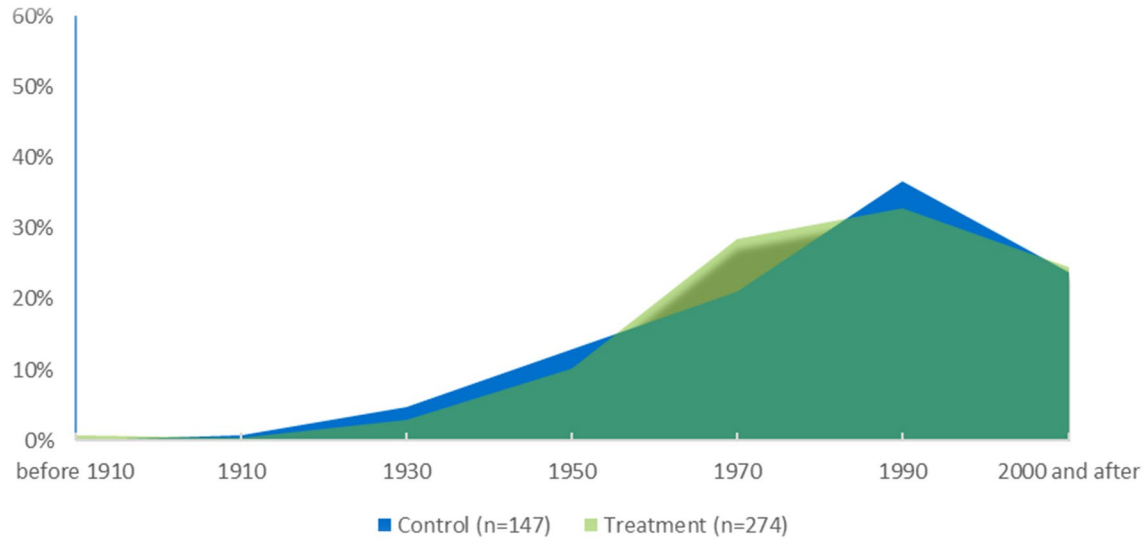


Figure 4-38: "In What Year Was Your Home Built?" – Multi-family

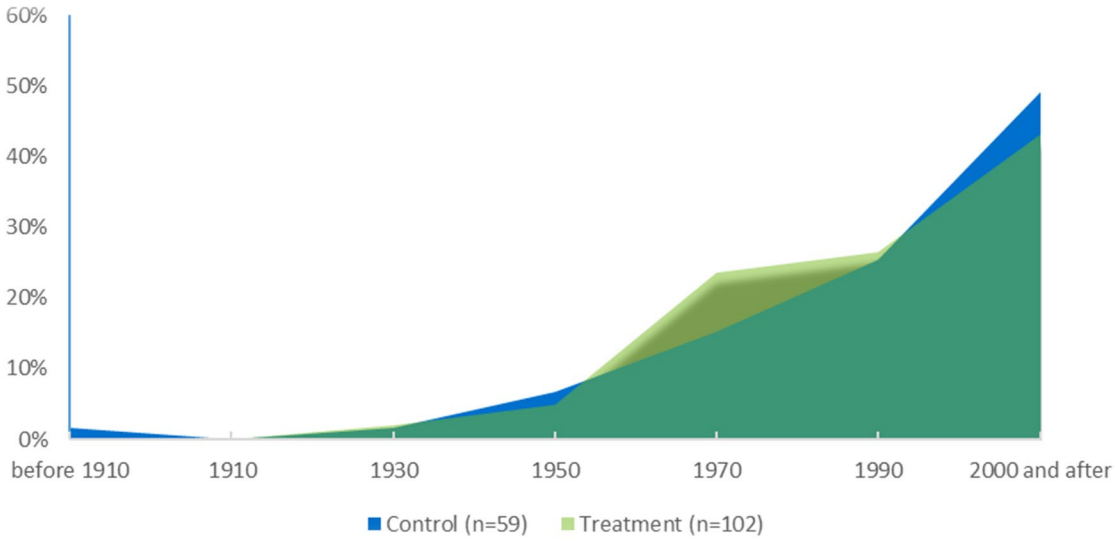


Figure 4-39 shows distribution of home square footage is similar between control and treatment group customers among single family households. The average square footage above ground is 2,055 for control households and 2,087 for treatment households, and the difference is not statistically significant. Figure 4-40 shows distribution of home square footage of control and treatment group customers among multi-family households. The average square footage above ground is 1,776 for control households and 1,419 for treatment households, and this difference is statistically significant at the 90% level of confidence. However, when the outliers in the 5,000-9,999 square feet bin are excluded, the differences in mean square footages are no longer statistically significant.

Figure 4-39: How many square feet is above ground living space? – Single Family

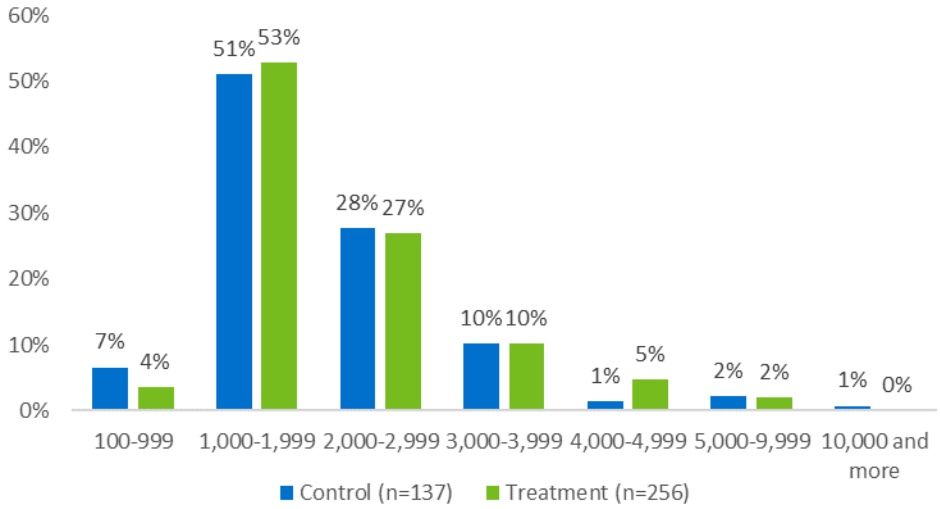
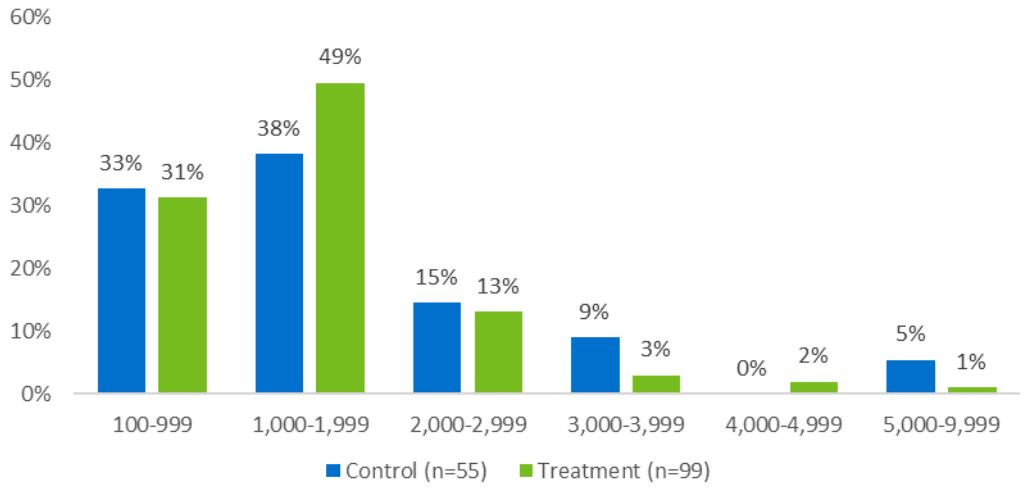


Figure 4-40: How many square feet is above ground living space? – Multi-family



The average age for single family respondents is 63 for control customers and 64 for treatment customers. For multi-family respondents it is 52 for control customers and 51 for treatment customers. The lowest age category (Younger than 25) is often underrepresented in survey studies, given that many members of that population are difficult to draw to participate in surveys. This common underrepresentation is true in this survey study, as well (see Table 4-14).

Table 4-14: Respondent Age Relative to RECS or American Housing Survey

Age	Single Family			Multi-family		
	Control Group (n=156)	Treatment Group (n=274)	EIA RECS Data_South Atlantic Census Division[18]	Control Group (n=83)	Treatment Group (n=140)	American Housing Survey[19]
Younger than 25	1%	0%	6%	0%	0%	10%
25-34	3%	3%	14%	19%	18%	30%
35-44	12%	9%	15%	25%	25%	23%
45-54	11%	12%	20%	5%	17%	19%
55-64	26%	21%	20%	23%	16%	9%
65 and over	47%	54%	26%	28%	24%	9%

Figure 4-41 shows the primary heating fuel type used in single family control and treatment households. More than half of treatment (53%) and control (53%) customers use electricity in

[18] 2015 Residential Energy Consumption Survey (RECS). https://www.eia.gov/consumption/residential/data/2015/hc/php/hc9.8.php

[19] American Housing Survey, 2011 Charlotte - Household Demographics - All Occupied Units, Charlotte-Gastonia-Rock Hill, NC-SC MSA (1993 OMB definition), Tenure Filter: Renter, https://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html?s_areas=16740&s_year=2011&s_tablename=TABLE8A&s_bygroup1=1&s_bygroup2=1&s_filtergroup1=3&s_filtergroup2=1

their households for heating. Forty percent of treatment customers and 38% of control customers use natural gas for heating. The difference is not statistically significant.

Figure 4-41: Primary Heating Fuel in Households – Single Family

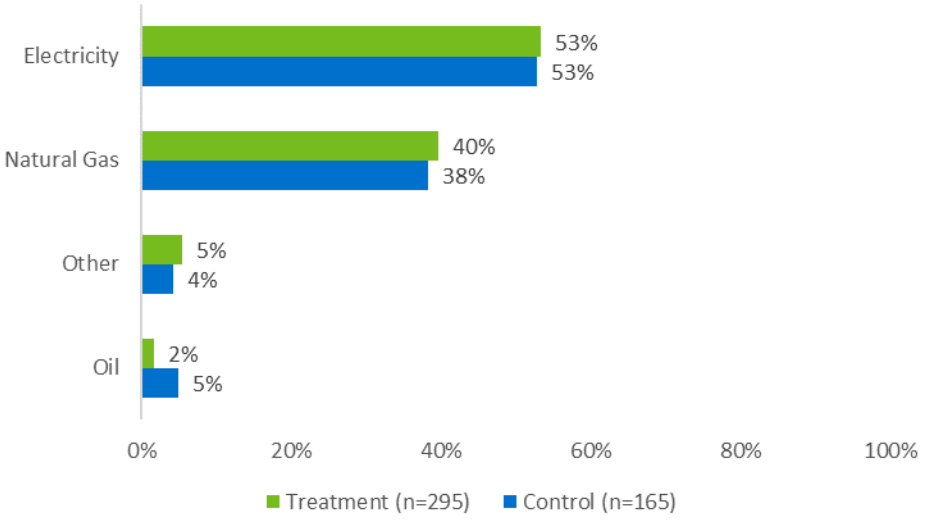


Figure 4-42 shows the primary heating fuel type used in multi-family control and treatment households. More than half of treatment (80%) and control (78%) customers use electricity in their households for heating. Sixteen percent of treatment customers and 19% of control customers use natural gas for heating. These differences are not statistically significant.

Figure 4-42: Primary Heating Fuel in Households – Multi-family

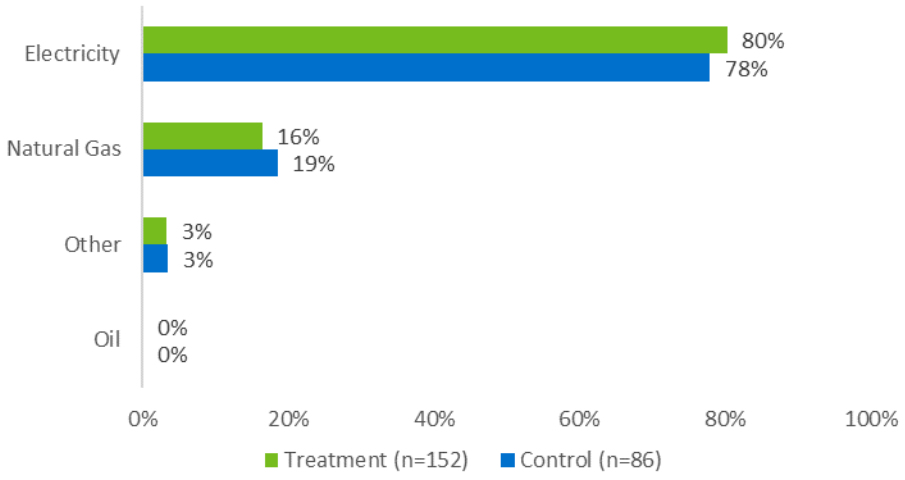


Table 4-15 shows the distribution of total annual household income in single family and multi-family households. Fifteen percent of single family treatment customers and 24% of control customers reported their household income between $50,000 and $ 75,000 in 2020. For the

multi-family households, 15% of treatment and 16% of control customers reported their 2020 household income in this income bracket.

Table 4-15: 2020 Total Annual Household Income

2020 Annual Income	Single Family		Multi-family	
	Control (n=144)	Treatment (n=247)	Control (n=81)	Treatment (n=138)
Under $15,000	10%	7%	15%	17%
$15,000 to under $25,000	9%	11%	11%	12%
$25,000 to under $35,000	6%	7%	7%	12%
$35,000 to under $50,000	17%	16%	26%	21%
$50,000 to under $75,000	24%	15%	16%	15%
$75,000 to under $100,000	9%	14%	10%	10%
$100,000 to under $150,000	18%	15%	10%	6%
$150,000 to under $200,000	4%	9%	2%	1%
$200,000 or more	3%	7%	2%	7%

4.2.3 Customer Surveys – DEP

As was the case for DEC, the DEP 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.

4.2.3.1 Comparing Treatment and Control Responses - DEP

This section presents the results of responses to survey questions asked of both treatment and control households of single family and multi-family households in DEP, and compares the response patterns of each, respectively. In addition, comparative analyses between single family and multi-family customers are included where pertinent. Statistically significant differences between treatment and control households, and between single family and multi-family households, are noted when they occur.

Duke Energy Customer Satisfaction

Both single family and multi-family treatment and control groups' overall satisfaction with Duke Energy are high. For single family, 81% 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. For multi-family, 79% of treatment customers and 89% 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). This difference is statistically significant at the 90% level of confidence.

Respondents were asked if they “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree”, or “strongly agree” that Duke Energy provides excellent customer service, respects its customers, and provides service at a reasonable cost. Single family treatment households are more likely to “agree” or “strongly agree” that Duke Energy respects its customers and Duke Energy provides service at a reasonable cost than control households, but none of the differences are statistically significant at the 90% level of confidence (Figure 4-43). Multi-family treatment households are more likely to report that Duke Energy respects its customers, than control households. The difference is not statistically significant (Figure 4-44).

Figure 4-43: Satisfaction with Various Aspects of Customer Service – Single Family Top-2 Box Scores (1-5 Scale)

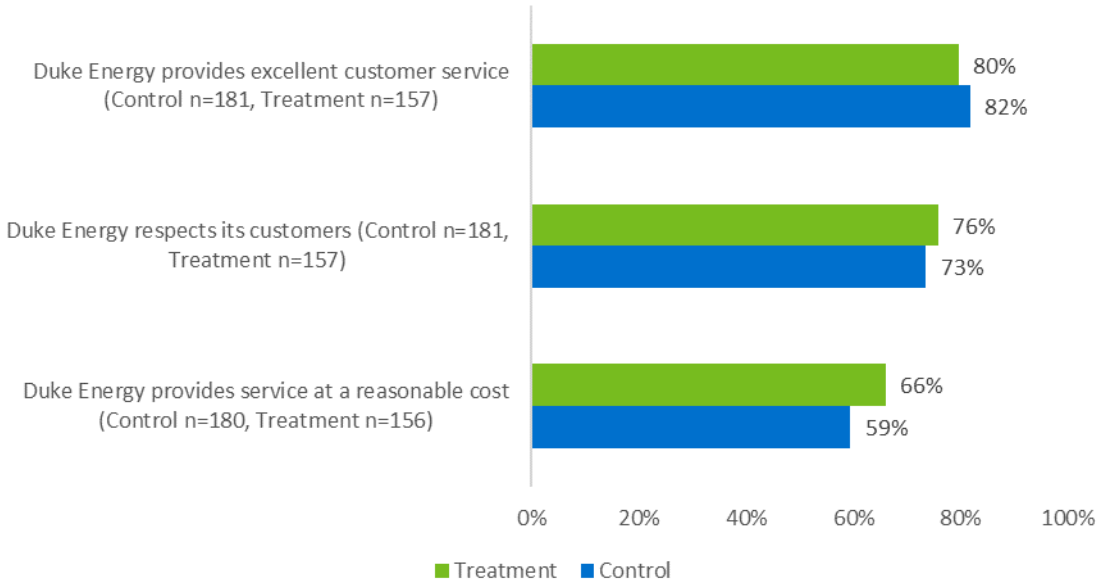
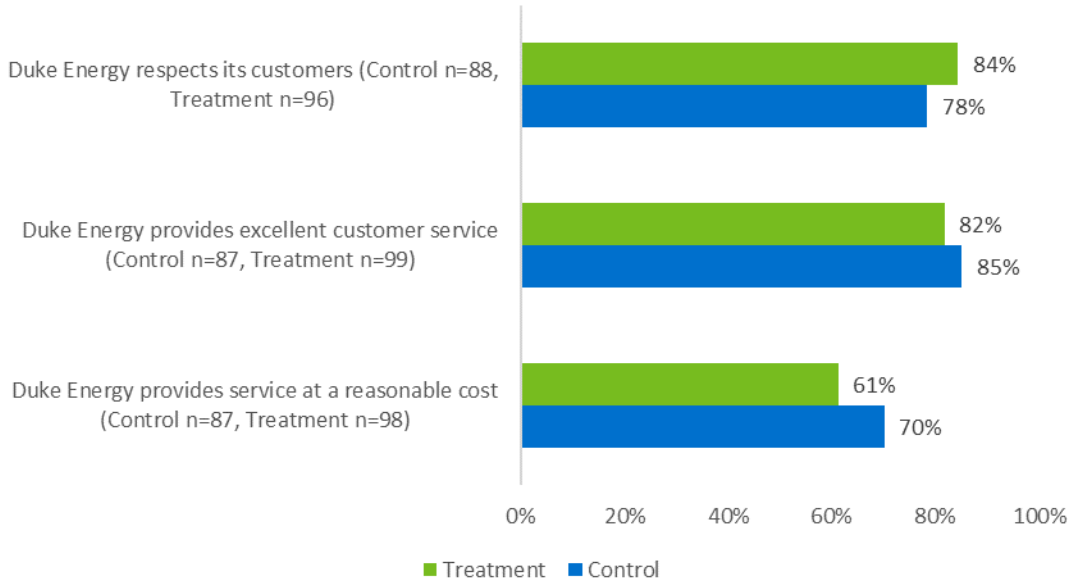


Figure 4-44: Satisfaction with Various Aspects of Customer Service – Multi-family Top-2 Box Scores (1-5 Scale)



Using a five point scale, “very dissatisfied”, “dissatisfied”, “neither dissatisfied nor satisfied”, “somewhat satisfied”, and “very satisfied”, single family treatment customers are more likely to report that they are either “somewhat satisfied” or “very satisfied” with Duke Energy’s commitment to promoting energy efficiency and the wise use of electricity, and the information available about Duke Energy’s energy efficiency programs than control customers (Figure 4-45). These differences are not statistically significant at the 90% level of confidence. MyHER has not measurably changed single family customer satisfaction with Duke Energy’s promotion of energy efficiency at DEP. Multi-family control customers are significantly more likely to report higher level of satisfaction with the Information Duke Energy provides to help customers save on energy bills than treatment customers (Figure 4-46). Like single-family, MyHER has not measurably changed multi-family customer satisfaction with Duke Energy’s promotion of EE.

Figure 4-45: Satisfaction with Energy Efficiency Offerings and Information – Single Family Top-2 Box Scores (1-5 Scale)

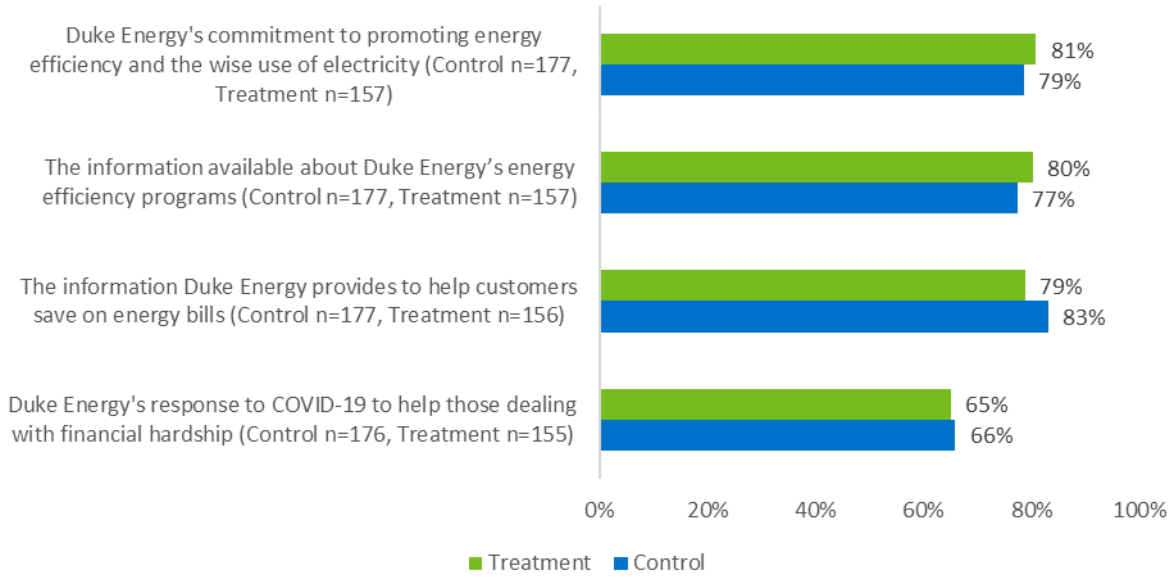
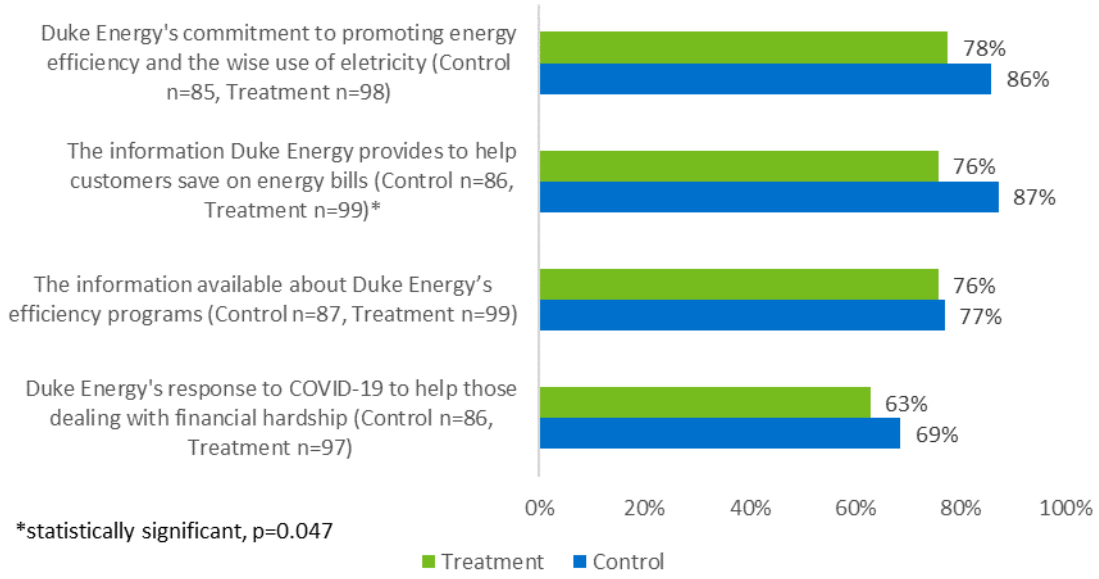


Figure 4-46: Satisfaction with Energy Efficiency Offerings and Information – Multi-family Top-2 Box Scores (1-5 Scale)



Engagement with Duke Energy's Website

Both treatment and control 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 a similar level of using online accounts between treatment and control customers for both single and multi-family groups. Table 4-16 shows that 30% of single family treatment group and 37% of the control

group, and 25% of multi-family treatment group and 25% of control group, reported they had never logged in to their Duke Energy accounts. Among those that had logged in, the most reported purpose was to pay their bill for both single family and multi-family respondents.

Table 4-16: Use of Duke Energy Online Account

Online Account Activity	Single Family		Multi-family	
	Treatment Group (n=158)	Control Group (n=181)	Treatment Group (n=99)	Control Group (n=88)
Never logged in	30%	37%	25%	25%
Pay my bill	37%	33%	56%	50%
Look for energy efficiency opportunities or ideas	15%	10%	24%	15%

As shown in Figure 4-47, single family treatment and control group households report similar levels of accessing the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make their home more energy efficient. This is also the case for multi-family control and treatment group households (Figure 4-48). Relatively small percentages of both groups in single and multi-family reported regular usage of the website for purposes other than bill payment.

Figure 4-47: Assessing Duke Energy Website for Other Information – Single Family

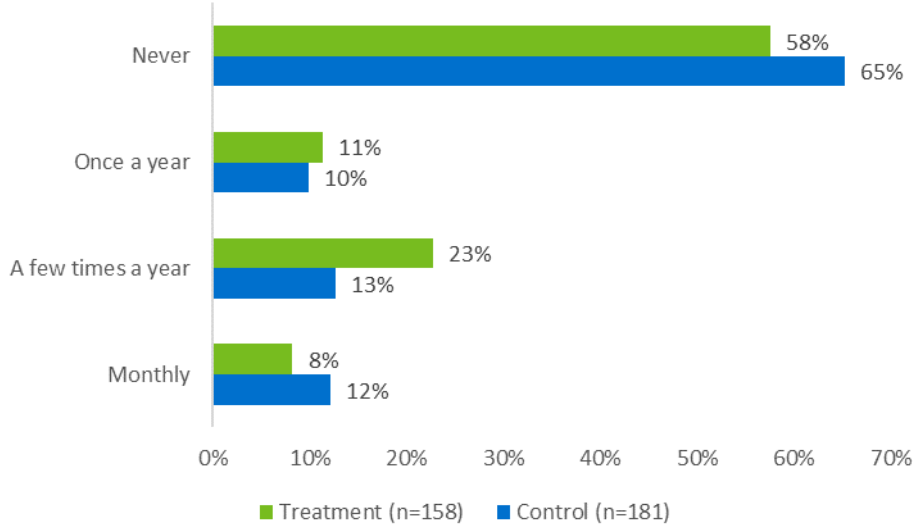
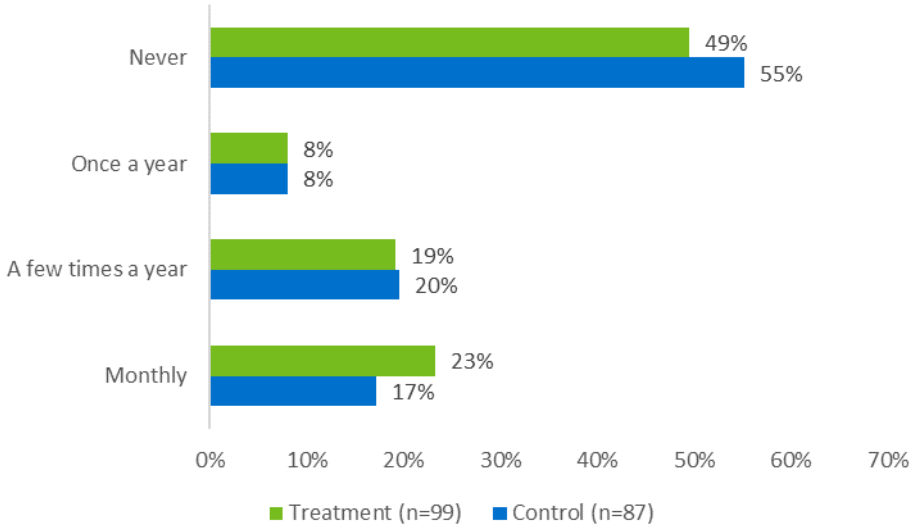


Figure 4-48: Assessing Duke Energy Website for Other Information – Multi-family



Thirty-five percent of single family control group customers and 33% of treatment group customers reported they would be likely to check the Duke Energy website for information before purchasing major household equipment, while 52% of multi-family control group customers and 51% of treatment group customers reported so. The portion of respondents rating their likelihood a "7" or higher on an 11-point scale of likelihood is plotted in Figure 4-49 and Figure 4-50.

Figure 4-49: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment – Single Family – Split Top-4 Box Scores (0-10 Scale)

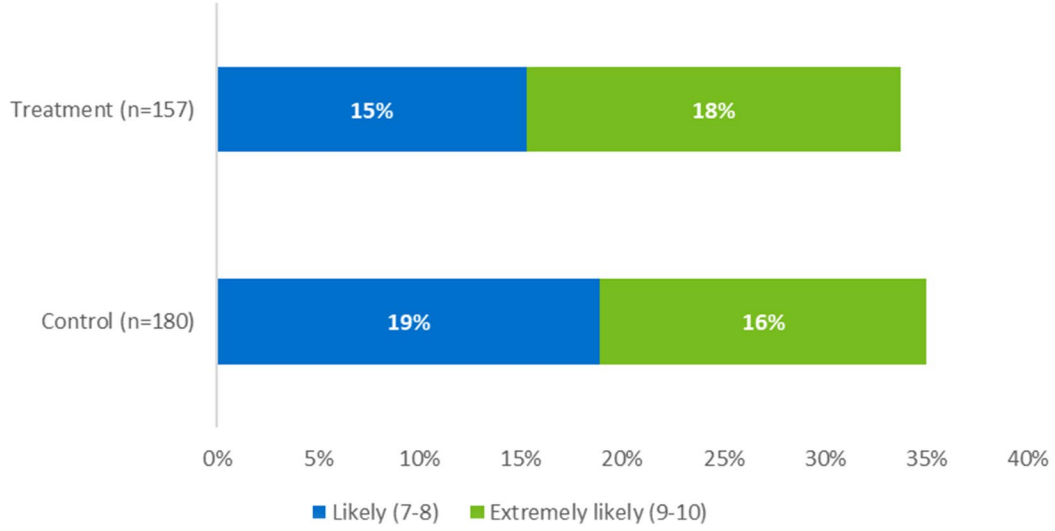
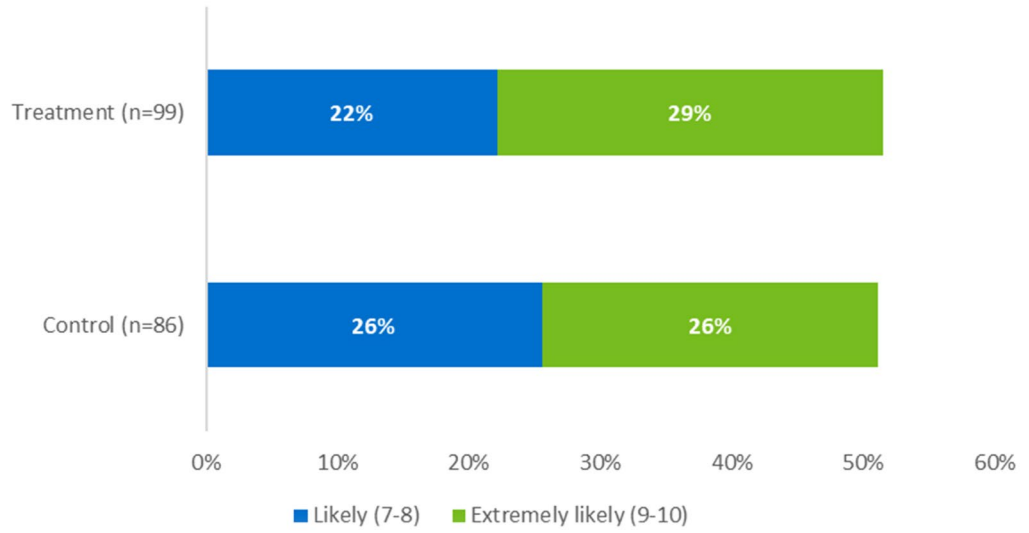


Figure 4-50: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment – Multi-family – Split Top-4 Box Scores (0-10 Scale)

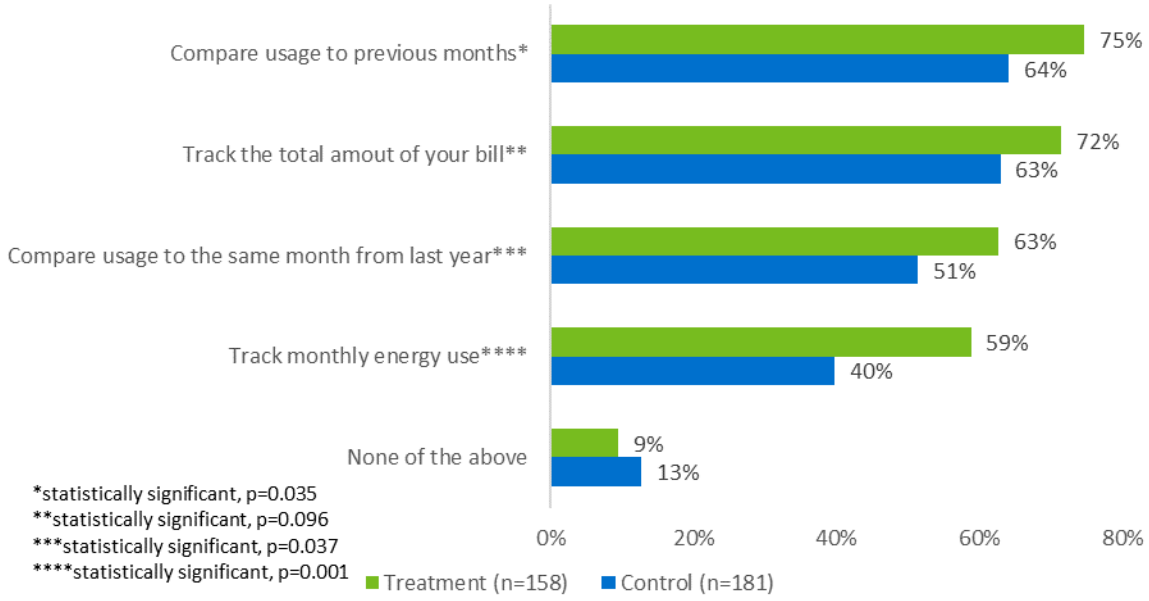


Customers' Reported Levels of Monitoring Energy Use and Energy Saving Behaviors

Single family treatment and control customers track information (bills and usage) related to their household's energy usage in the following ways (Figure 4-51):

- Seventy-five percent of the treatment customers and 64% of the control customers reported comparing usage to previous months. The difference is statistically significant at the 90% level of confidence.
- Seventy-two percent of the treatment respondents and 63% of the control respondents tracked the total amount of the bill. The difference between the treatment and control groups is statistically significant at the 90% level of confidence.
- More than half of respondents compare usage to the same month from last year, and the difference in responses here between treatment and control groups is statistically significant at the 90% level of confidence.
- Fifty-nine percent of treatment customers and 40% of control customers tracked their monthly energy use. The difference between treatment and control groups is statistically significant at the 90% level of confidence.

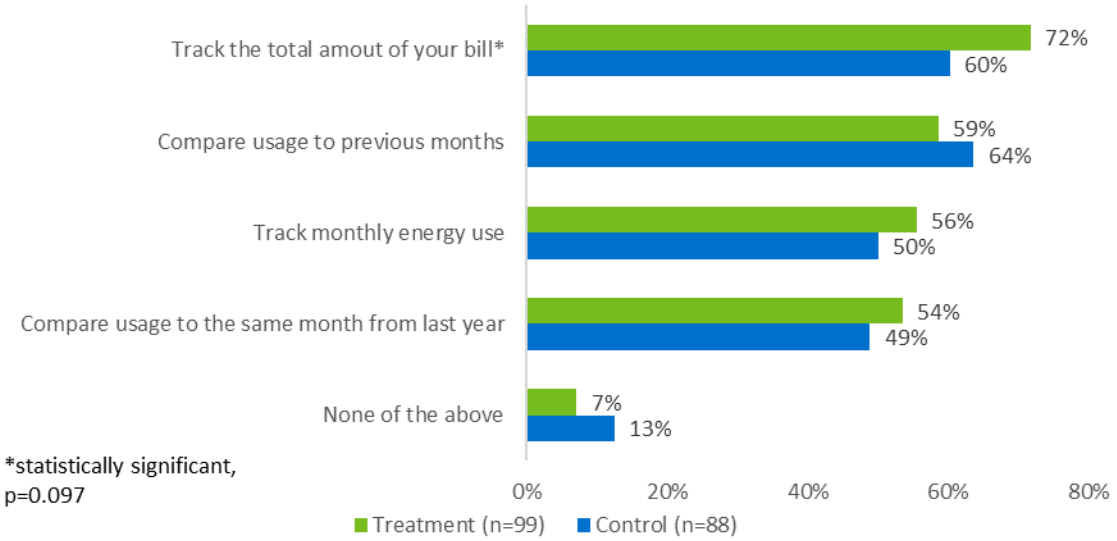
Figure 4-51: "Which of the Following Do You Do with Regard to Your Household's Energy Use?" – Single Family



Multi-family treatment and control customers track information (bills and usage) related to their household's energy usage in the following ways (Figure 4-52):

- Seventy-two percent of the treatment customers and 60% of the control customers reported tracking the total amount of the bill. The difference is statistically significant at the 90% level of confidence.
- More than half of respondents tracked monthly energy use. The difference in responses between the treatment and control groups is not statistically significant.
- Fifty-four percent of treatment respondents and 49% of control respondents compare usage to the same month from last year, and the difference in responses here between treatment and control groups is not statistically significant at the 90% level of confidence.

Figure 4-52: "Which of the Following Do You Do with Regard to Your Household's Energy Use?" – Multi-family



An area of significant interest in this evaluation is the identification of energy-saving behaviors that MyHERs move treatment customers to undertake. These behaviors, if they result in energy savings attributed to the reports, would be over and above what the treatment households would have done without having read or seen their MyHERs. The customer survey included a battery of questions inquiring as to whether the respondent's household has undertaken energy-savings actions. The responses to these questions are compared between the treatment and control respondents, and any statistically significant uplift in the reported behaviors undertaken can be concluded to be due to the MyHERs and may also be inferred as a driver of energy savings attributed to the program. A screening question is used to ensure that respondents answering the questions about specific behaviors only see those questions if they state that they have undertaken any energy savings actions or made energy efficiency improvements at all in the past year.[20]

For both single family and multi-family treatment and control groups, respectively, respondents reported similar levels of taking actions to save energy, as shown in Figure 4-53 and Figure 4-54. Across the nine specific behaviors and actions described by the survey, none show that treatment respondents are significantly more likely to take action to save energy than control respondents. The most cited behavior for single family is turning off lights in unused indoor or outdoor areas, with 95-98% of single family respondents reporting taking that action; the most two commonly cited behaviors for multi-family are turning off lights in unused indoor or outdoor areas and adjusting heating or cooling settings to save energy, with 95-98% of multi-family respondents reporting that they take that action, respectively. The least cited action for both

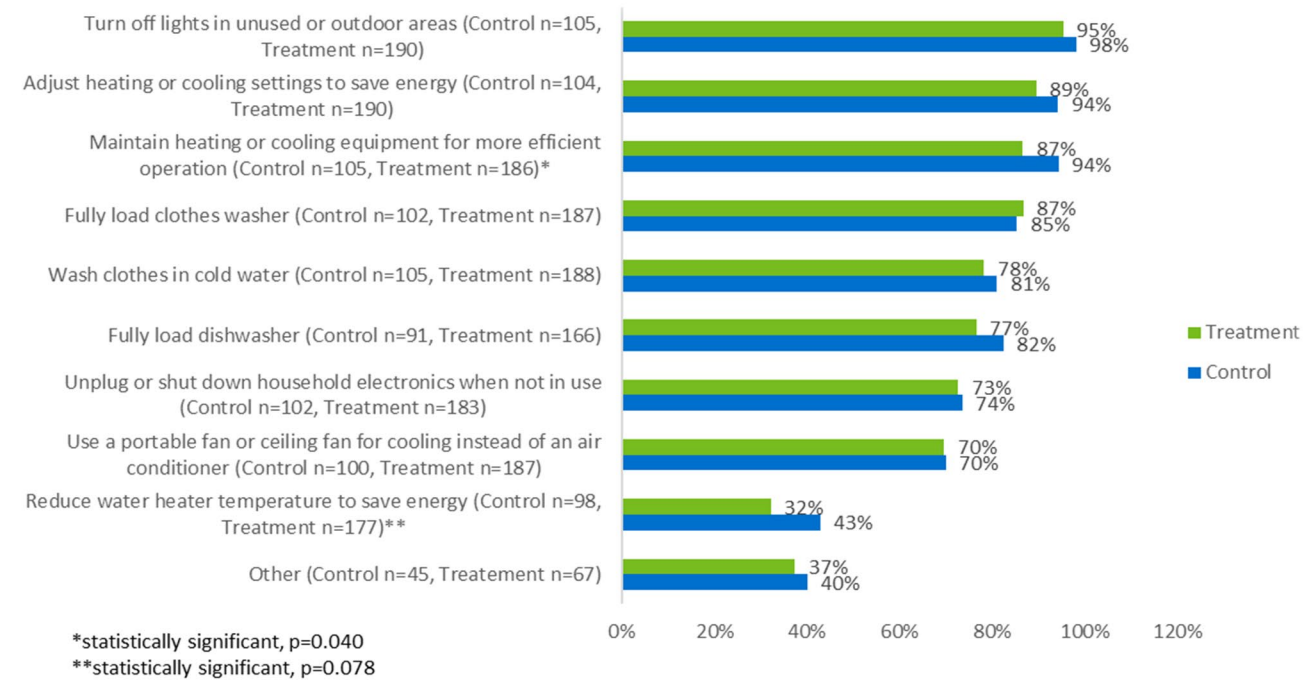
[20] Single family treatment and control customers report similar likelihood of having undertaken any behaviors to reduce household energy use or having made energy efficiency improvements to their home (65% to 66%). This is also true for treatment and control multi-family respondents (66% to 56%).

single and multi-family is turning down the water heater temperature, with 32-43% of single family respondents reporting that they did that and 33-38% of the multi-family respondents reporting the same.

There are two energy-savings behaviors for which significantly more single-family control customers are reporting undertaking than treatment customers, one of which is related to conserving on water heating. This is a similar finding in the DEC evaluation. The MyHER reports do not usually touch on water heating end-uses and it may be that MyHER treatment customers are taking actions that displace their interest or efforts to conserve water heating energy use.

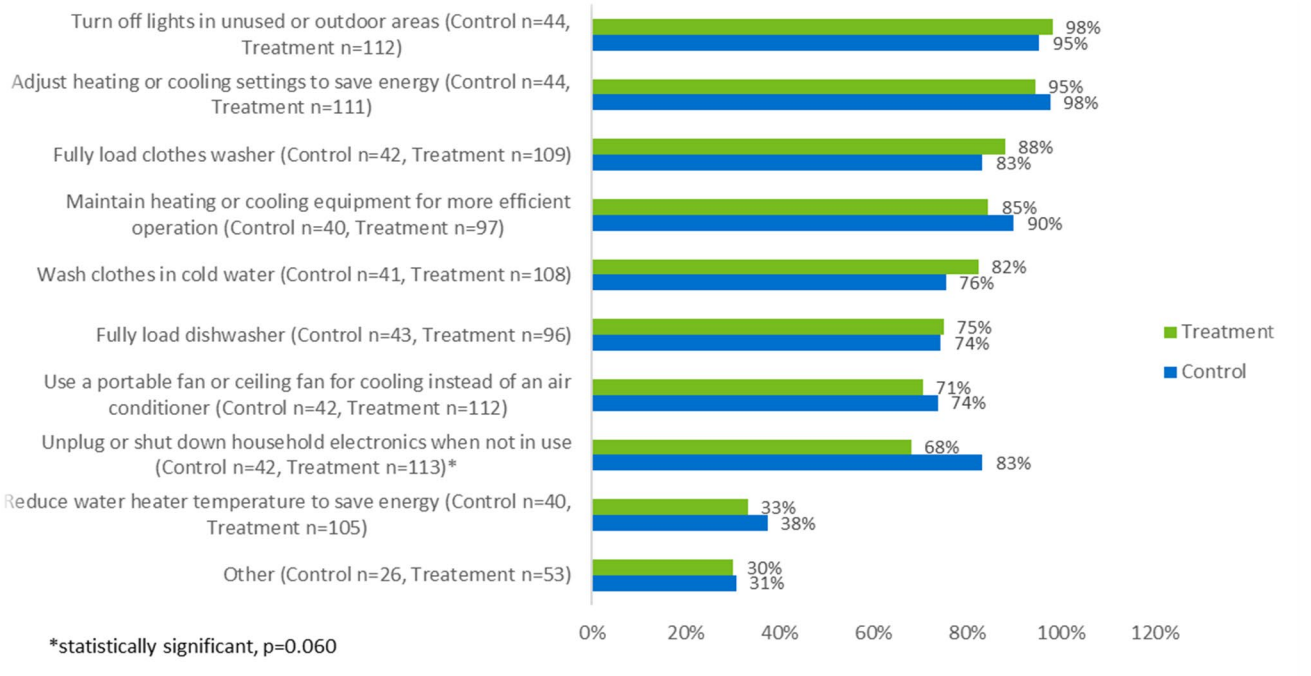
While none of these behaviors show an uplift that can be ascribed to MyHER, that does not mean that energy savings are not coming from these behaviors. What these findings mean is that there is no evidence that MyHER has introduced new behaviors to treatment customers that they were not doing at all previously. It's quite possible that MyHER energy savings, at least in part, come from customers turning off lights in unused areas of the home – because they're doing that more than they would otherwise. The current survey instrument used by this evaluation cannot detect that change. Surveys or interviews can be designed to collect information on those more subtle differences in energy savings behaviors in the home, however they would be considerably more complicated and more expensive to field. Fewer customers would be willing to complete such a survey and non-response bias would be of greater concern. Non-response bias could be potentially overcome with completion incentives, but that would also increase the evaluation budget. Duke Energy is aware of the limitations of the customer research agenda and accepts the current resolution of the tradeoff between depth of findings, reliability of findings, and evaluation cost.

Figure 4-53: Reported Energy Savings Behaviors – Single Family



*statistically significant, p=0.040
**statistically significant, p=0.078

Figure 4-54: Reported Energy Savings Behaviors – Multi-family



*statistically significant, p=0.060

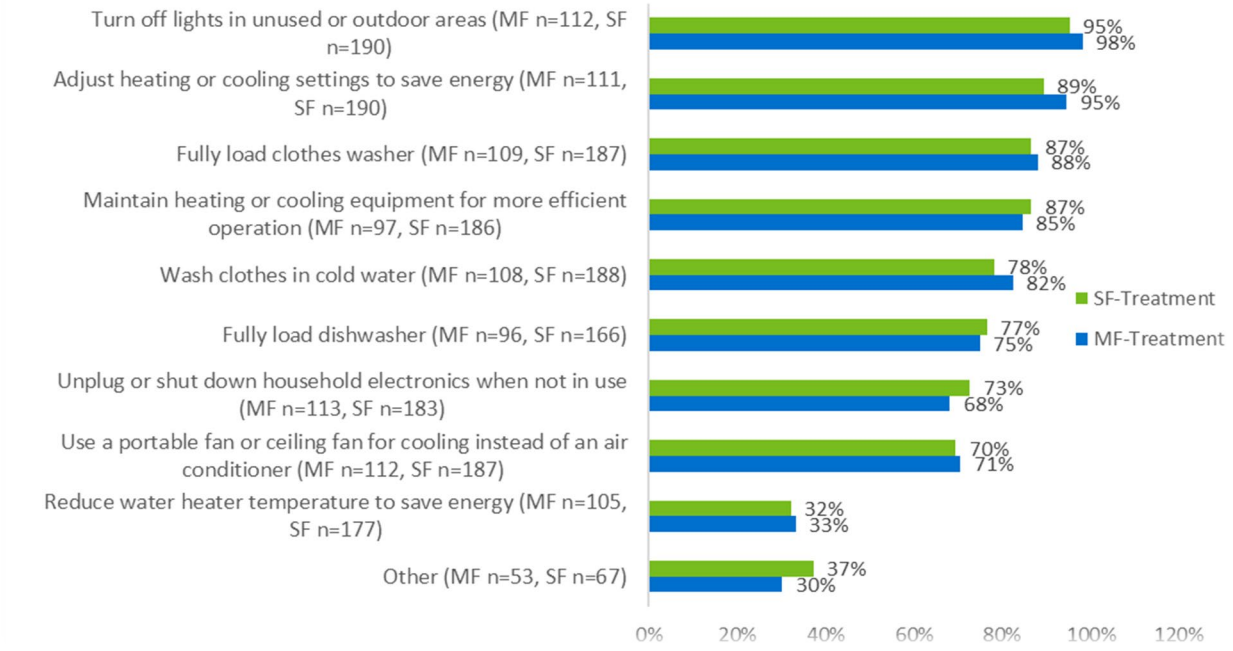
Nexant compared the reported behaviors of single family treatment customers to those of multi-family treatment customers. Here we do see differences between behaviors taken by single

family customers and multi-family customers, however the differences on responses between single family treatment customers and multi-family treatment customers are not statistically significant. It is useful to consider the differences directionally:

- Single family treatment customers are more likely to report that they "Maintain heating or cooling equipment for more efficient operation", "Fully load dishwasher", and "Unplug or shut down household electronics when not in use" than multi-family treatment customers, as shown in Figure 4-55. Some of these differences are likely due to the fact that maintenance in multi-family housing is often completed by property management companies, or are less likely to have dishwashers.

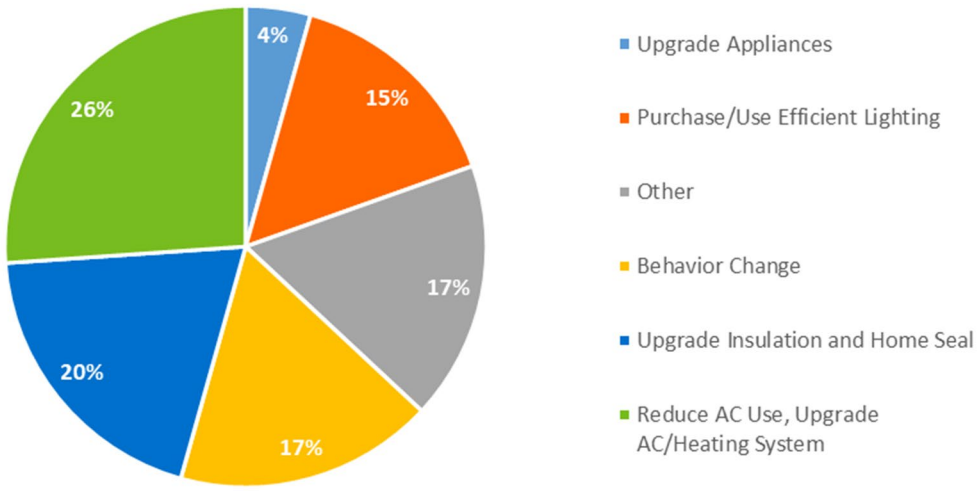
- Multi-family treatment customers are more likely to "Turn off lights in unused or outdoor areas", "Use a portable fan or ceiling fan for cooling instead of an air conditioner", "Reduce water heater temperature to save energy", "Wash clothes in cold water", "Fully load clothes washer", and "Adjust heating or cooling setting to save energy" than single family treatment customers.

Figure 4-55: Reported Energy Savings Behaviors
Single Family Treatment vs. Multi-family Treatment



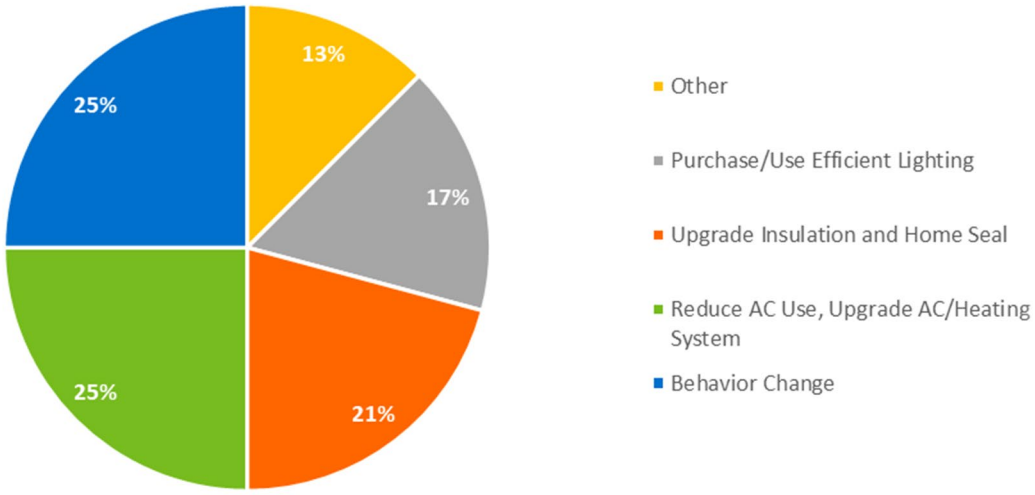
Forty-three single family respondents (treatment and control customers in total) reported "other" energy savings actions and wrote in their action(s). Nexant categorized these actions and the results are shown in Figure 4-56. The most reported action, mentioned by 12 respondents, pertains to air conditioning/heating system, such as replacing the HVAC system.

Figure 4-56: Distribution of Other Energy Savings Behaviors – Single Family (Treatment and Control n=43)



Twenty-four multi-family respondents (treatment and control customers in total) also reported "other" energy savings actions. Nexant categorized these actions and the results are shown in Figure 4-57. The most two commonly reported actions, pertain to the air conditioning/heating system (mentioned by 6 respondents, such as reducing operation of air conditioner), and behavior changes (mentioned by 6 respondents, such as washing clothes at night).

Figure 4-57: Distribution of Other Energy Savings Behaviors – Multi-family (Treatment and Control n=24)



Both single family and multi-family customers were further asked a question about COVID-19's effects on their households' ability to take energy savings actions. Sixteen percent of single family control customers and 20% of treatment customers reported that the likelihood of COVID-19 pandemic increasing their ability to take energy savings actions a "7" or higher on an 11-point scale of likelihood, while 25% of multi-family control customers and 21% of treatment customers reported so. None of these differences in responses between treatment and control customers are statistically significant.

Reported Energy Efficiency Improvements

With respect to improvements and investments that customers might make after reading or seeing their MyHER reports, we have a similar finding to that of the behavior-related actions discussed above. Respondents were provided with a list of energy efficiency improvements and were asked if they had done each in the past year. In all but one case, there are no statistically significant differences between the incidence of reporting energy efficiency upgrades between the treatment and control groups – across both single family and multi-family respondents. The one exception is that in multi-family group, significantly more control group respondents reported replacing windows or doors with more energy-efficient types than treatment group respondents (Table 4-17). As noted in the DEC reporting section above, this type of result may be indicative of MyHER's success at educating customers about the power of inexpensive purchases and behavior changes in managing their electricity bills. Without that education from MyHERs, the control customers may have been more receptive to advertising for new windows or doors.

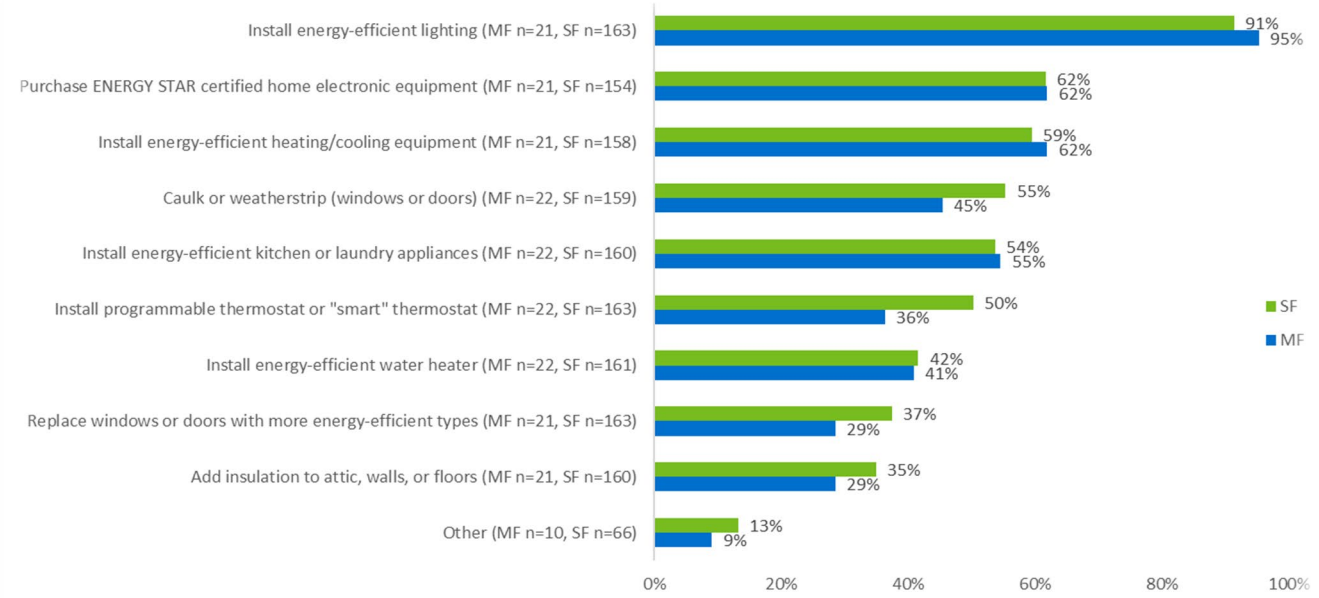
Table 4-17: Customers Indicating They Had Made Each Energy Efficiency Upgrade

Upgrade	Single Family		Multi-family	
	Treatment	Control	Treatment	Control
Install energy-efficient lighting	90% (n=184)	89% (n=106)	86% (n=103)	83% (n=40)
Install energy-efficient kitchen or laundry appliances	53% (n=182)	58% (n=97)	32% (n=102)	42% (n=36)
Purchase ENERGY STAR certified home electronic equipment	58% (n=173)	56% (n=89)	33% (n=96)	47% (n=36)
Caulk or weatherstrip (windows or doors)	53% (n=181)	54% (n=100)	38% (n=97)	39% (n=36)
Install energy-efficient heating/cooling equipment	54% (n=178)	46% (n=96)	30% (n=93)	31% (n=35)
Install programmable thermostat or "smart" thermostat	47% (n=182)	45% (n=98)	32% (n=100)	35% (n=37)
Install energy-efficient water heater	38% (n=180)	41% (n=99)	27% (n=95)	37% (n=38)
Replace windows or doors with more energy-efficient types	37% (n=183)	44% (n=100)	14% (n=97)*	29% (n=35)*
Add insulation to attic, walls, or floors	34% (n=180)	34% (n=99)	17% (n=89)	9% (n=33)

*statistically significant p=0.063

As discussed above with behavioral actions, while the differences are not significantly different at the 90% level of confidence, single family treatment respondents were more likely to report they had undertaken upgrades or made investments than multi-family treatment respondents on installing energy-efficient kitchen or laundry appliances, purchasing ENERGY STAR certified home electronic equipment, caulking or weatherstripping (windows or doors), installing energy-efficient heating/cooling equipment, installing programmable thermostat or “smart” thermostat, installing energy-efficient water heater, replacing windows or doors with more energy-efficient types, and adding insulation to attic, walks, or floors in the survey. To control for the fact that the likelihood of renters would make these upgrades is very low, we considered the multi-family treatment responses in comparison to single family treatment responses with renters removed. When renters were removed from the analysis, five of these upgrades still emerged as higher for single family treatment respondents, as seen in Figure 4-58.

Figure 4-58: Customers Indicating They Had Made Each Energy Efficiency Upgrade Treatment Homeowners Only – Single Family vs. Multi-family



To examine broader patterns within participant responses to the behavior and upgrade questions, these questions were combined into behavior vs. upgrade categories and were also combined into end-use categories. First, as shown in Table 4-18, treatment respondents and control respondents reported very similar levels of engaging in energy efficiency behaviors and improvements generally. Single family control group respondents reported significantly higher average number of energy efficiency behaviors then single family treatment group customers. This result may indicate that the MyHER treatment is encouraging customers to focus their energy saving behaviors, that are more effective, at reducing energy consumption.

Table 4-18: Percent of Households That Have Undertaken Energy Efficiency Actions

Behaviors/Improvements	Single-family		Multi-family	
	Treatment	Control	Treatment	Control
Energy Efficiency Behaviors	100% (n=195)	100% (n=106)	100% (n=113)	100% (n=44)
Average Number of Behaviors	6.6*	7.1*	6.7	7.0
Energy Efficiency Improvements	97% (n=192)	96% (n=106)	92% (n=110)	95% (n=41)
Average Number of Improvements	4.4	4.4	2.9	3.2

*statistically significant, p=0.012

Additionally, Table 4-19 shows the proportion of respondents that had undertaken at least one behavior or upgrade in each end use category. For those categories that have multiple behaviors or upgrades within it, these are broken out on their own for analysis. In the category “Water Heating Behaviors/Upgrades”, for example, four behaviors relevant to water heating are combined in a subcategory “Water Heating Behaviors” are broken out. Upgrades are not broken

out here in that way because there is only one upgrade ("Install energy-efficient water heater") associated with the parent category, and the proportion of respondents undertaking this upgrade is presented in Table 4-17 above. Similarly, for "Lighting Behaviors/Upgrades", there was only one upgrade and behavior, so these are not broken out. Lastly, there was only one behavior associated with the "Electronics and Appliances Behaviors/Upgrades" category ("Unplug or shut down household electronics when not in use"), so it was omitted as well. Multi-family control group members were significantly more likely to have undertaken electronics and appliances behaviors/upgrades than treatment group members.

Table 4-19: Percent of Households That Had Undertaken Energy Efficiency Behaviors or Upgrades, by End Use Category

Behaviors/Improvements	Single-family		Multi-family	
	Treatment Group	Control Group	Treatment Group	Control Group
Water Heating Behaviors/Upgrades (5)	98% (n=195)	100% (n=106)	98% (n=112)	95% (n=44)
Water Heating Behaviors (4)	99% (n=193)	100% (n=106)	98% (n=112)	95% (n=44)
Space Heating Behaviors/Upgrades (5)	97% (n=194)	99% (n=106)	99% (n=113)	100% (n=44)
Space Heating Behaviors (3)	98% (n=192)	99% (n=106)	99% (n=113)	100% (n=44)
Space Heating Upgrades (2)	63% (n=186)	64% (n=100)	46% (n=103)	49% (n=39)
Lighting Behaviors/Upgrades (2)	97% (n=194)	99% (n=106)	98% (n=113)	98% (n=44)
Electronics and Appliances Behaviors/Upgrades (3)	88% (n=191)	90% (n=105)	81% (n=113)*	91% (n=43)*
Electronics and Appliances Upgrades (2)	69% (n=186)	69% (n=99)	41% (n=104)	54% (n=37)
Sealing and Insulation Upgrades (3)	66% (n=189)	71% (n=103)	44% (n=106)	47% (n=38)

*statistically significant, p=0.073

Both single family and multi-family customers were further asked a question about COVID-19's effects on their households' ability to make energy efficiency improvements. Thirteen percent of single family control customers and 17% of treatment customers reported that the likelihood of COVID-19 pandemic increasing their ability to make energy efficiency improvements a "7" or higher on a 0-10 point scale of likelihood, while 16% of multi-family control customers and 9% of treatment customers reported so. None of these differences in responses between treatment and control customers are statistically significant.

Customer Motivation and Awareness

Single family control and treatment groups reported similar levels of motivation for saving energy. Seventy-six percent of control customers indicated that knowing they are using energy wisely is "important" or "extremely important" (rated 7 or higher on a 0-10 point scale), compared to 79% of treatment customers. This difference is not statistically significant (Figure 4-59). The same is true for multi-family. Eighty-four percent of control customers indicated that knowing they are using energy wisely is "important" or "extremely important", compared to 83% of treatment customers. This difference is not statistically significant (Figure 4-60).

Figure 4-59: "How Important Is It for You to Know if Your Household is Using Energy Wisely?"– Single Family Split Top-4 Box Scores (0-10 Scale)

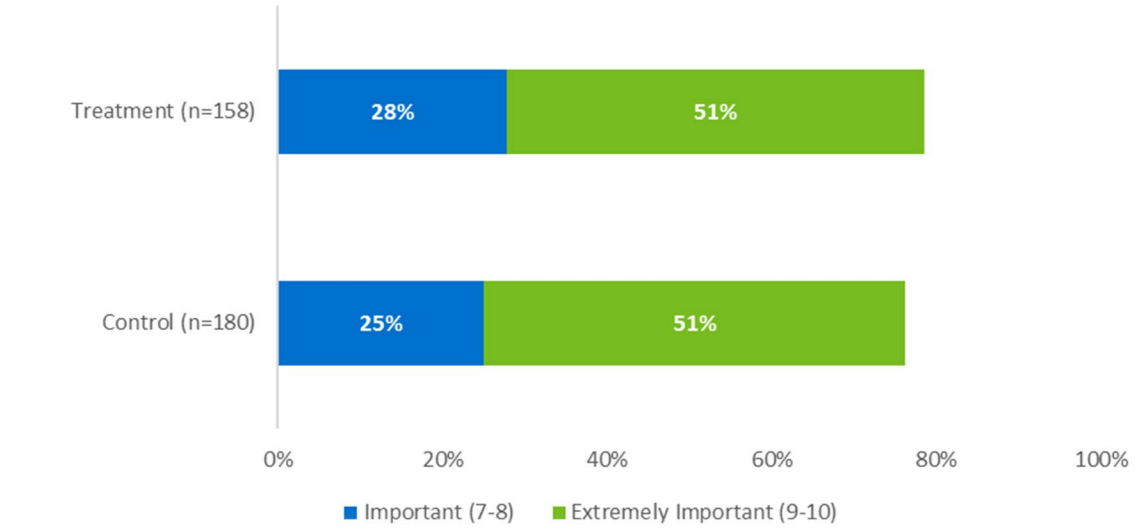
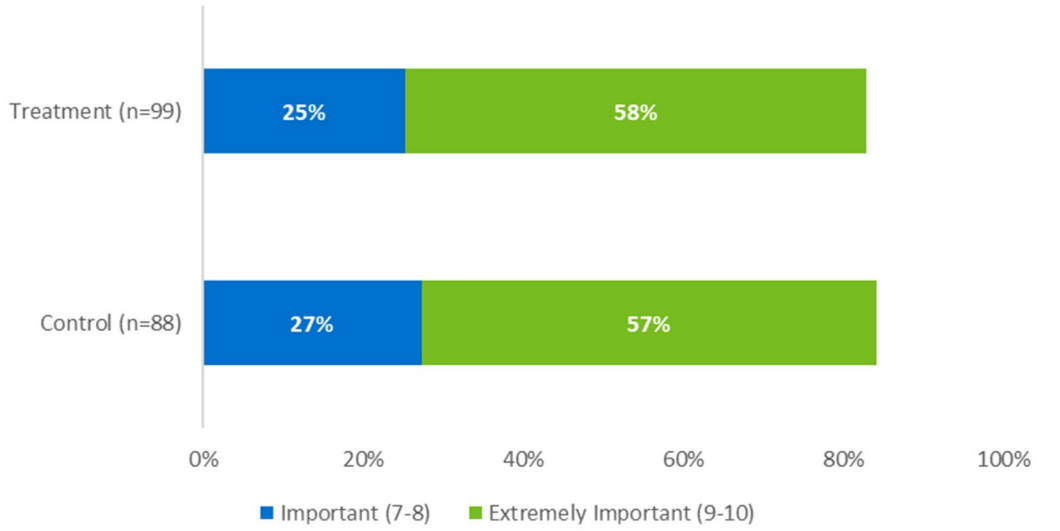


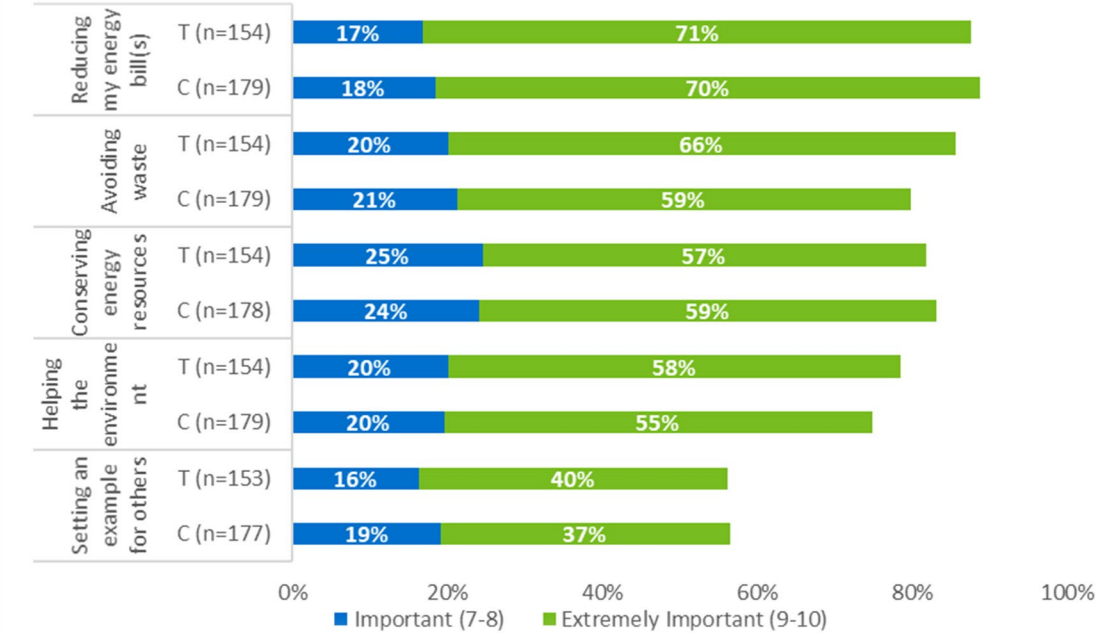
Figure 4-60: "How Important Is It for You to Know if Your Household is Using Energy Wisely?" – Multi-family Split Top-4 Box Scores (0-10 Scale)



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 treatment and control groups is saving money on their energy bills. For single family, 88% of treatment respondents and 88% of control respondents reported that saving money on their energy bills was "important" or "extremely important" (rated 7 or higher on a 0-10 point scale). Eighty-six percent of treatment respondents and 80% of control respondents indicated that "avoiding waste" was "important" or "extremely important" to them. Eighty-two percent of treatment customers and 83% of control customers reported that "conserving energy resources" was "important" or "extremely important". Seventy-eight percent of treatment customers and 75% of

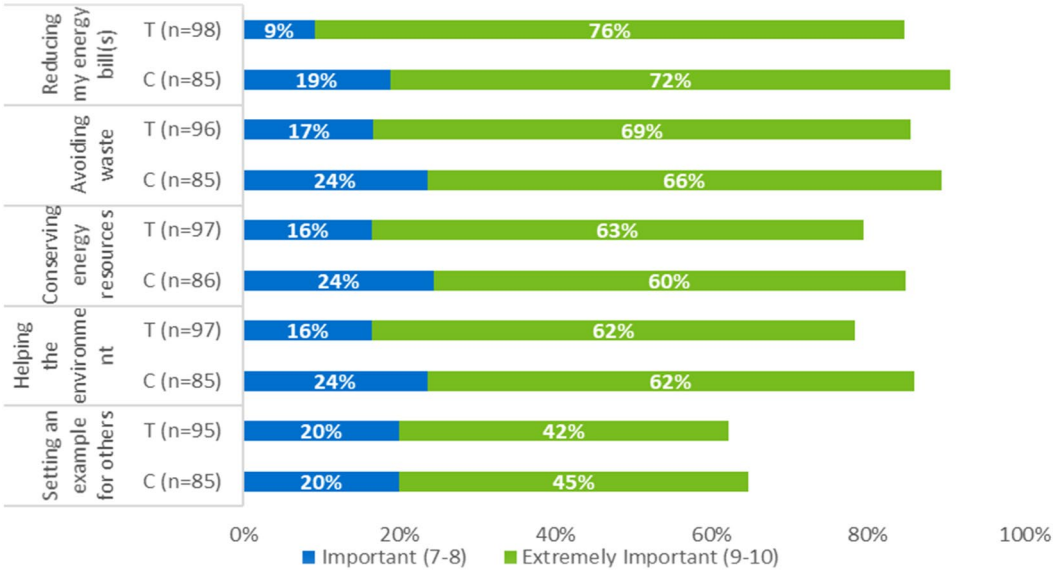
control customers reported that “helping the environment” was “important” or “extremely important”. None of the differences between treatment and control groups are statistically significant. Figure 4-61 contains the frequency of responses to this question, shown as a percentage for both treatment and control groups.

Figure 4-61: “Please Indicate How Important Each Statement Is to You” – Single Family Split Top-4 Box Scores (0-10 Scale)



For multi-family, 85% of treatment respondents and 91% of control respondents reported that saving money on their energy bills was “important” or “extremely important” (rated 7 or higher on a 0-10 point scale). Eighty-six percent of treatment customers and 90% of control customers reported that “avoiding waste” was “important” or “extremely important”. Seventy-eight percent of treatment respondents and 86% of control respondents indicated that “helping the environment” was “important” or “extremely important” to them. Seventy-nine percent of treatment customers and 84% of control customers reported that “conserving energy resources” was “important” or “extremely important”. None of the differences are statistically significant at the 90% level of confidence. Figure 4-62 contains the frequency of responses to this question, shown as a percentage for both treatment and control groups.

Figure 4-62: "Please Indicate How Important Each Statement Is to You" – Multi-family Split Top-4 Box Scores (0-10 Scale)



As indicated by Figure 4-63 and Figure 4-64, among single family treatment customers, 70% of treatment group customers rated their knowledge regarding ways to save energy in the home at least seven on a 0-10 point scale (indicating they were "knowledgeable" or "extremely knowledgeable"), while 61% of control group customers rated themselves this way. The difference between treatment and control customers is statistically significant at the 90% level of confidence. Among multi-family customers, 63% of treatment respondents and 78% of control respondents rated themselves seven or higher on this scale. The difference is statistically significant at the 90% level of confidence.

Figure 4-63: "How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?" – Single Family Split Top-4 Box Scores (0-10 Scale)

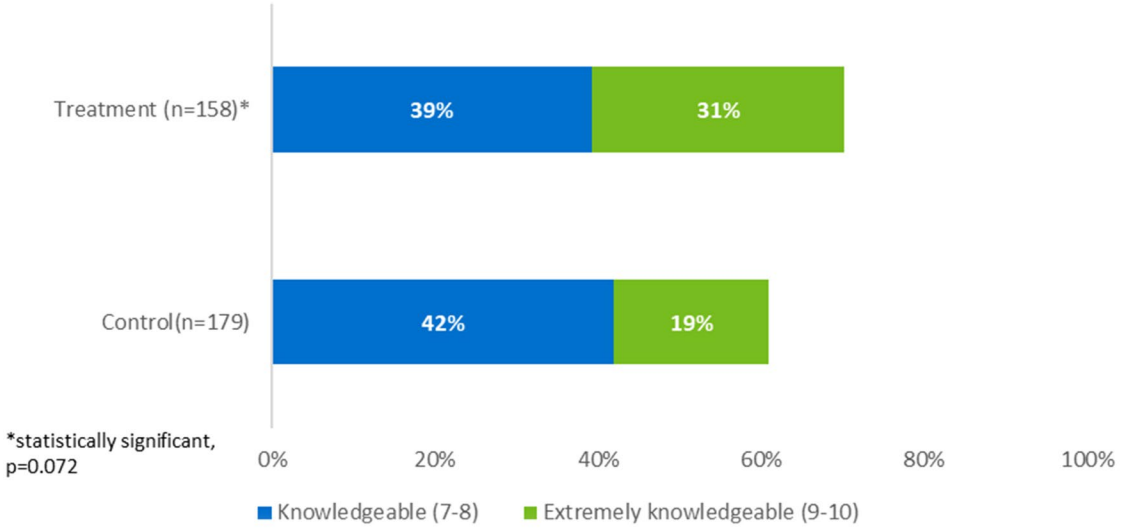
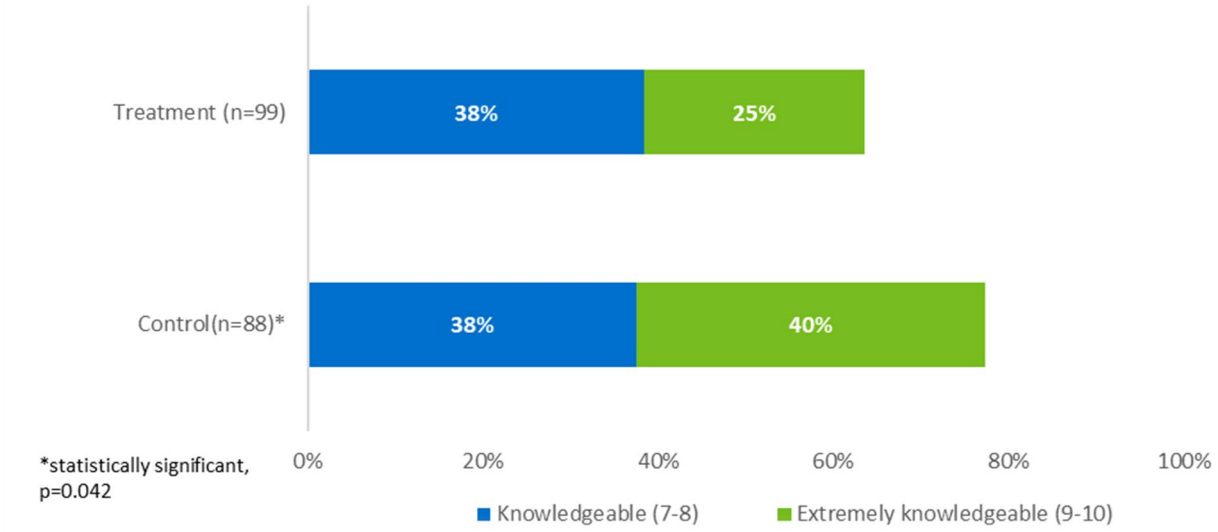


Figure 4-64: "How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?"– Multi-family Split Top-4 Box Scores (0-10 Scale)



Respondents that took the treatment-only survey were asked how useful each MyHER feature was to their homes. A similar question was asked of primary survey respondents, but rephrased to ask them how useful they might expect that information to be. Table 4-20 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 for both sets of respondents who answered "7" or above on a scale from 0-10. This table shows that among single family customers, control customers were significantly more likely to think that "Tips to help you save money and energy" and "Comparison to similar homes"

might be useful than treatment customers actually thought they were. These findings suggest that there is an opportunity to improve the presentment of this information to better meet customers' expectations.

Table 4-20: Actual Usefulness versus Hypothetical Usefulness of HER Features
Top-4 Box Scores (0-10 Scale)

HER Feature	Single-family		Multi-family	
	Control	Treatment Only	Control	Treatment Only
Graphs that display your home's energy use over time	64% (n=174)	67% (n=135)	73% (n=83)	76% (n=59)
Energy use associated with specific household items and areas	55% (n=171)	50% (n=132)	69% (n=84)	68% (n=59)
Tips to help you save money and energy	59% (n=176)*	47% (n=133)*	73% (n=83)	68% (n=59)
Customized suggestions for your home	52% (n=174)	45% (n=132)	54% (n=81)	61% (n=59)
Information about services and offers from Duke Energy	51% (n=173)	44% (n=135)	60% (n=84)	58% (n=59)
Comparison to similar homes	51% (n=173)**	38% (n=134)**	57% (n=82)	53% (n=59)

*statistically significant, p=0.038
**statistically significant, p=0.020

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, statistically different response patterns between single family control and treatment customers were found, as shown in Figure 4-65. On a scale of 0-10, where 0 represents "not at all important" and 10 is "extremely important", 41% of single family control respondents reported "I do not think my energy saving efforts are worth the time and/or money" as a barrier and 33% of treatment respondents did so as well (rated this importance as 7 or higher). The difference is statistically significant at the 90% level of confidence. For multi-family (Figure 4-66), 47% of treatment respondents and 50% of control respondents reported "Initial cost of energy efficient equipment is too high". The difference is not statistically significant at the 90% level of confidence.

When single family and multi-family responses to these questions were compared, 36% of single family respondents and 44% of multi-family respondents reported "I do not think my energy saving efforts are worth the time and/or money" as a barrier. The difference between single family and multi-family respondents is statistically significant at 90% level of confidence.

Figure 4-65: Barriers to Customers Undertaking Energy Savings Actions – Single Family Top-4 Box Scores (0-10 Scale)

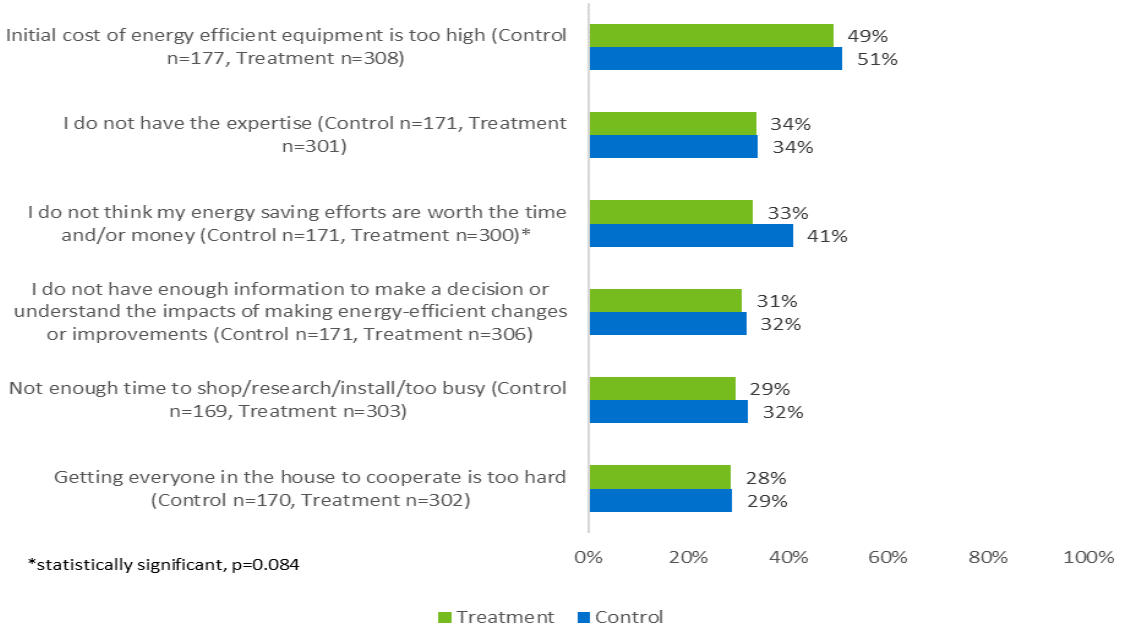
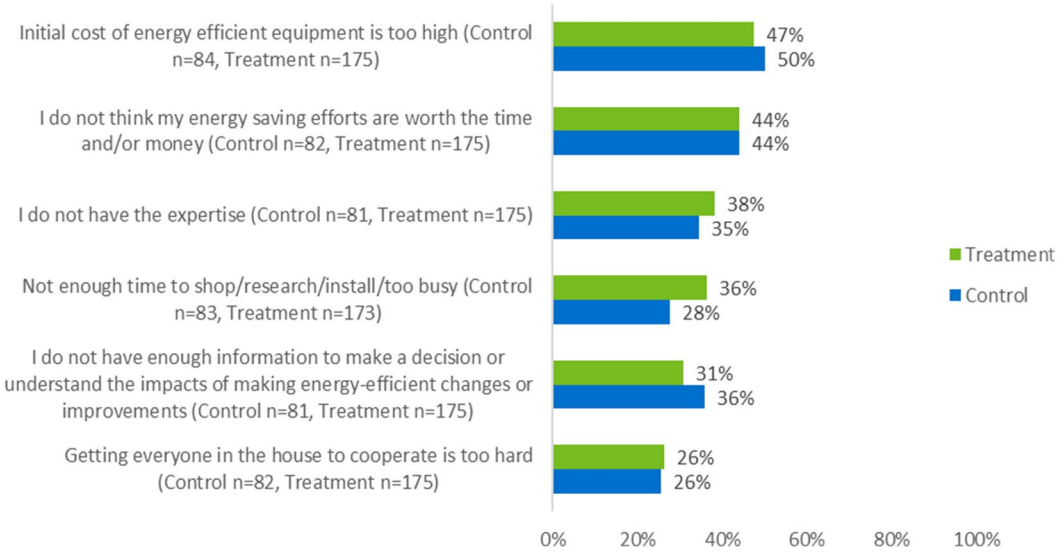


Figure 4-66: Barriers to Customers Undertaking Energy Savings Actions – Multi-family Top-4 Box Scores (0-10 Scale)



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 19% (148 of 781, treatment and control customers in total) offered suggestions, including 26 who offered only

appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned in 38 of the remaining 127 responses with suggestions, reflected a desire for more energy savings programs, more energy savings information, and more incentives:

- "*Give me more information on how to save energy…*"
- "*Incentives for customers who do try to save energy and keep their energy bills lower."*
- *"Provide free replacement light bulbs."*
- *"More rebate incentives."*
- "*More energy saving ideas for apartments."*

Other comments centered on other suggestions, such as reducing prices/providing senior and disability discounts, and better communication. Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-21.

Table 4-21: Responses to Solicitation for Suggestions to Duke Energy for Improving Service Offerings

Suggestion	Single Family			Multi-family		
	Count	Percent of Respondents Mentioning (n=104)	Percent of Total Mentions (n=107)	Count	Percent of Respondents Mentioning (n=44)	Percent of Total Mentions (n=46)
Increase program offerings, incentives, or information	24	23%	22%	14	32%	30%
Reduce price/provide senior and disability discounts	24	23%	22%	9	20%	20%
Appreciate current offers	18	17%	17%	9	20%	20%
Miscellaneous	12	12%	11%	8	18%	17%
Voiced frustration with Duke Energy	11	11%	10%	5	11%	11%
Better communication/more emails/more mails/in-person communication	9	9%	8%	1	2%	2%
Provide more detailed info in MyHER	6	6%	6%	0	0%	0%
Reduce power outages	3	3%	3%	0	0%	0%

4.2.3.2 Treatment Households: Experience and Satisfaction with MyHER

A very large majority of the single family treatment only household respondents, 95%, (158 of 166), and the multi-family treatment only household respondents, 85%, (69 of 81) 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” (respondents who receive paper HERs would receive eight reports (single family respondents) and up to six reports (multi-family respondents) in this time period, and those who receive eHERs would have received 12. Forty-five percent (65 of 146) of single family customers responded that they received 12 home energy reports in the past 12 months. Twenty percent (12 of 60) of multi-family customers responded that they received 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. We note the response pattern for single family respondents is significantly different than that of multi-family respondents.

Figure 4-67 and Figure 4-68). Given Duke Energy’s protocols for report delivery, respondents who receive paper HERs would receive eight reports (single family respondents) and up to six reports (multi-family respondents) in this time period, and those who receive eHERs would have received 12. Forty-five percent (65 of 146) of single family customers responded that they received 12 home energy reports in the past 12 months. Twenty percent (12 of 60) of multi-family customers responded that they received 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. We note the response pattern for single family respondents is significantly different than that of multi-family respondents.

Figure 4-67: Reported Number of MyHERs Received "In the past 12 months" (n=146) – Single Family

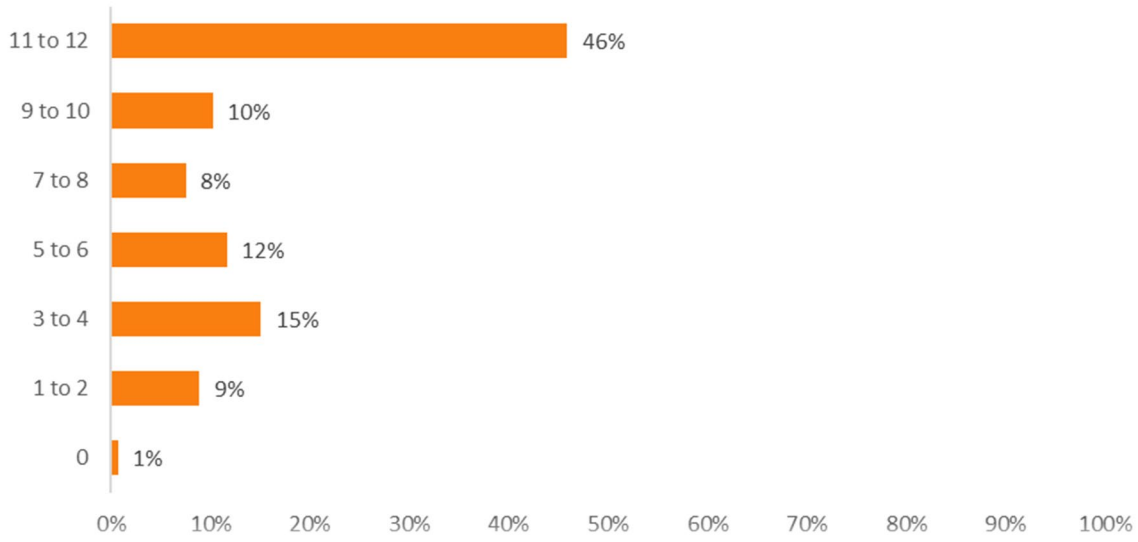
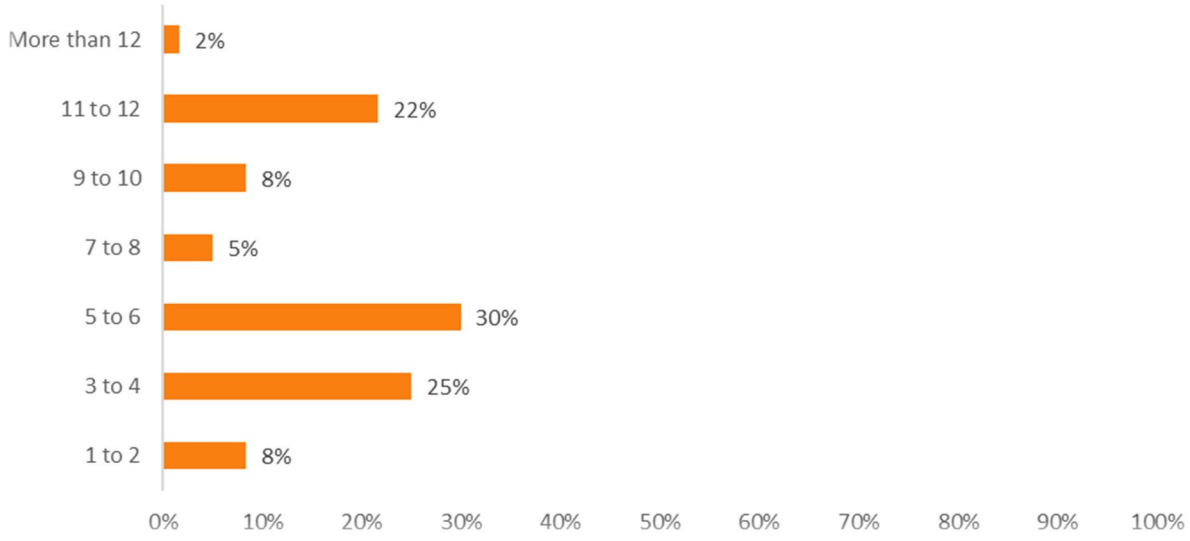


Figure 4-68: Reported Number of MyHERs Received "In the past 12 months" (n=60) – Multi-family



Survey respondents indicated high interest in the MyHER reports. As shown in Figure 4-69 and Figure 4-70, when asked how often they read the reports, 95% of single family respondents indicated they "always" or "sometimes" read the reports, and 98% of multi-family respondents indicated they "always" or "sometimes" read them.

Figure 4-69: How Often Customers Report Reading the MyHER (n=144) – Single Family

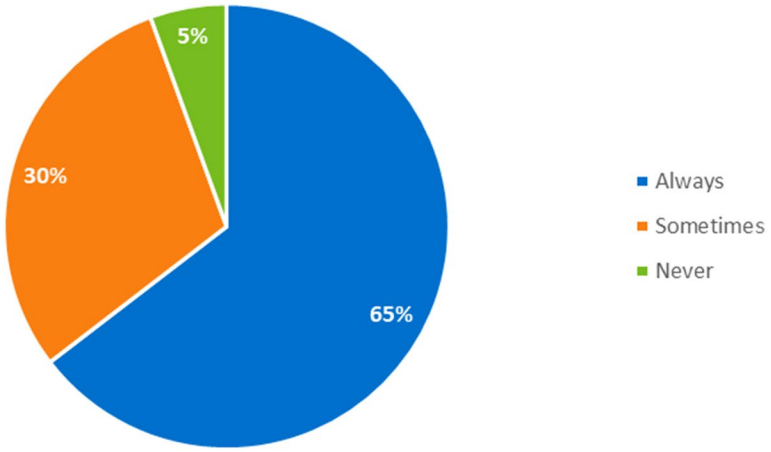
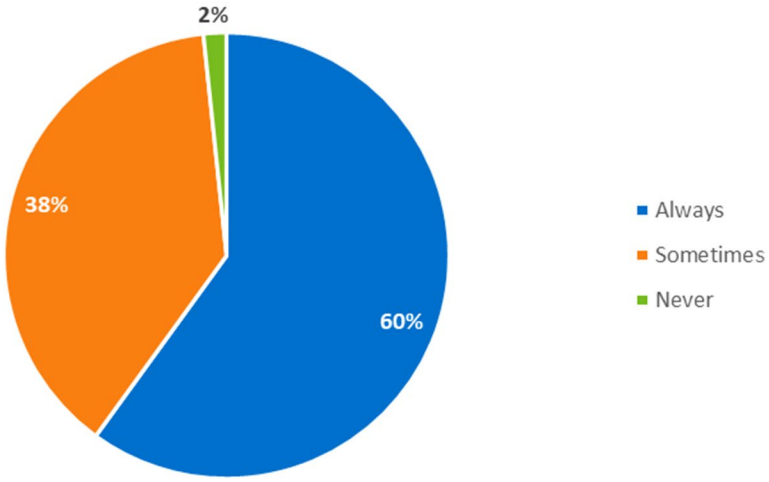


Figure 4-70: How Often Customers Report Reading the MyHER (n=60) – Multi-family



Sixty-three percent (85 of 134) of single family respondents that provided a rating reported being “somewhat” or “very” satisfied with the information contained in the reports (Figure 4-71). Seventy-three percent (43 of 59) of multi-family respondents that provided a rating reported being “somewhat” or “very” satisfied with the information contained in the reports (Figure 4-72). The survey asked a further question to the respondents of why they said so: 10 of the satisfied single family respondents and 6 of the satisfied multi-family respondents provided reasons. Among customers who gave the highest satisfaction ratings, the most common comments on the MyHERs described the reports as “helpful.”

Figure 4-71: Satisfaction with the Information in MyHER Reports (n=134) – Single Family

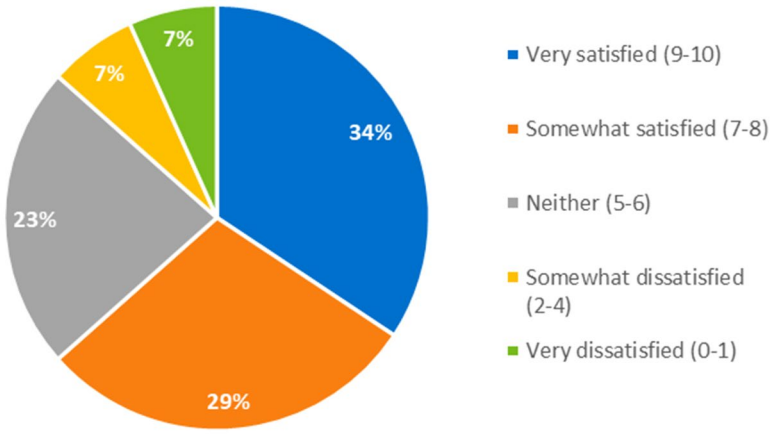
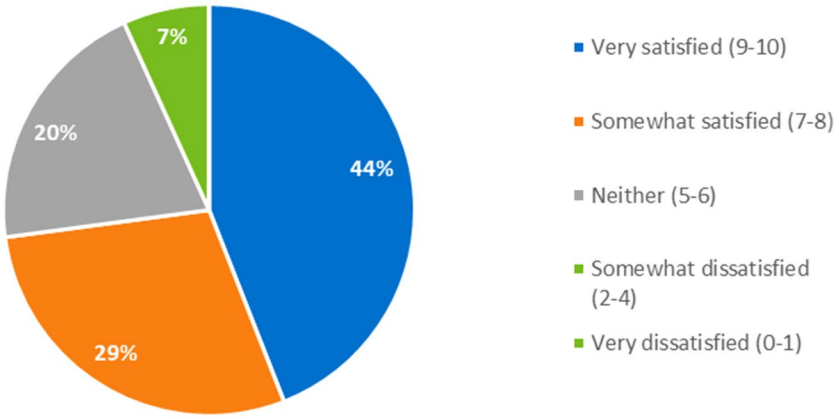


Figure 4-72: Satisfaction with the Information in MyHER Reports (n=59) – Multi-family



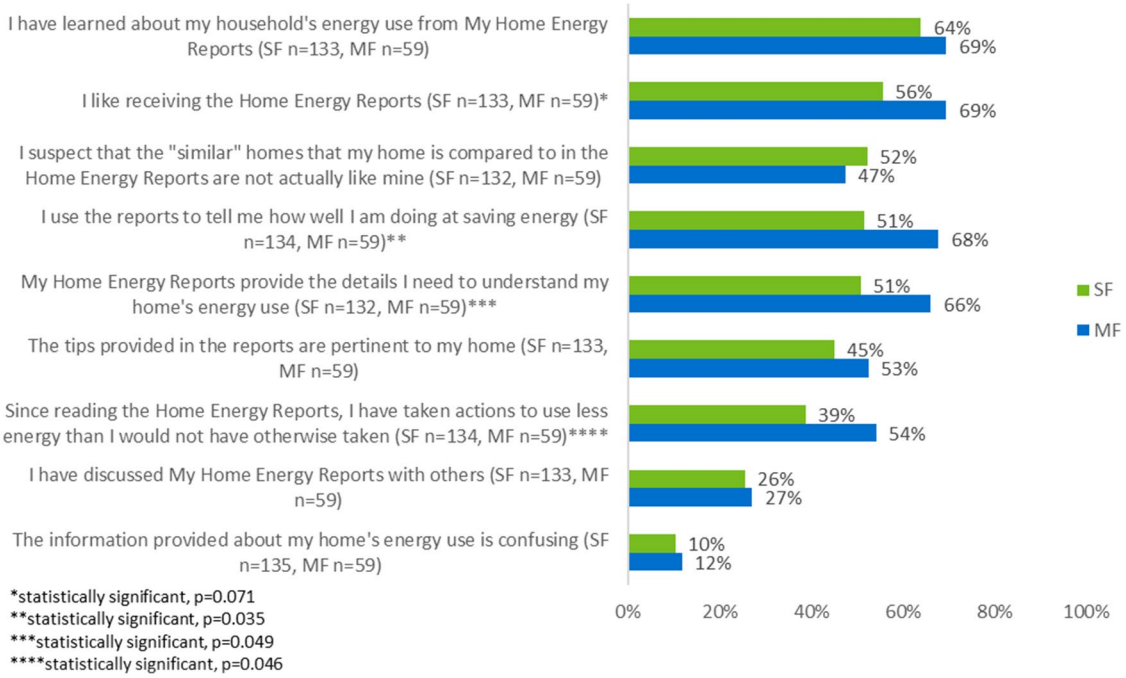
When asked to rate their agreement with a series of statements about MyHERs on a scale of 0 to 10, recipients largely agreed that the reports helped them understand their home's energy use, with 64% of single family respondents and 69% of multi-family respondents rating their agreement a seven or higher on a 0-10 point scale. The difference of responses between single family customers and multi-family customers is not statistically significant.

Fifty-six percent of single family respondents and 69% of multi-family respondents agreed that they like receiving the home energy reports; this difference is statistically significant at the 90% level of confidence.

More than half (51% of single family respondents and 68% of multi-family respondents) agreed that the reports provided the information of how well they were doing at saving

energy. Fifty-one percent of single family respondents and 66% of multi-family respondents agreed that the reports provided the detailed information they needed to understand home energy use. These differences between single family and multi-family respondents are statistically significant. Respondents provided weaker agreement to statements about whether they have taken actions to use less energy than they would not have since reading MyHERs (39% of single family respondents and 54% of multi-family respondents). The difference is statistically significant at the 90% level of confidence. A relatively small percentage (10% of single family respondents and 12% of multi-family respondents) agreed with the statement that the information provided is confusing. The difference is not statistically significant at the 90% level of confidence (Figure 4-73).

Figure 4-73: Level of Agreement with Statements about MyHER Top-4 Box Scores (0-10 Scale)



The survey provided an open-ended question (to customers that reported reading at least one report in the past year) to elicit suggestions for improvements to the MyHER reports. About 32% (44 of 136) of single family respondents and 39% (23 of 59) of multi-family respondents offered suggestions, including 10 single family respondents and 4 multi-family respondents who offered comments to express gratitude and appreciation of the reports only. Among those providing a response to the question, the most common response mentioned by 15 of the 34 single family respondents 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 how to reduce energy consumption information:

- "*More suggestions on utilizing Solar Power and credible sources of obtaining solar.*"
- "*Could the report explain how Duke Energy knows how much electricity is used in laundry, cooling, heating, etc.…"*
- *"Show influence on cost per square foot…"*

The most common response mentioned by 14 of the 19 multi-family respondents with suggestions questioned the comparison/accuracy of the report, such as:

- "*Make sure all factors are current with the household.*"
- "*Well, what's strange to me is there are categories for laundry (washer and dryer) usage and a few others I can't recall that don't even apply to us. We don't HAVE a washer or dryer so that's confusing to me."*

Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-22.

Table 4-22: Suggestions for MyHER Improvement (Multiple Responses Allowed)

Suggestion/Comment	Single Family			Multi-family		
	Count	Percent of Respondents Mentioning (n=44)	Percent of Total Mentions (n=46)	Count	Percent of Respondents Mentioning (n=23)	Percent of Total Mentions (n=25)
Provide more specific information or details	15	34%	33%	3	13%	12%
Don't believe comparison/accuracy	11	25%	24%	14	61%	56%
Appreciate the Home Energy Report	10	23%	22%	4	17%	16%
Change production (mail, paper, format)	4	9%	9%	1	4%	4%
Don't see value/dislike	4	9%	9%	0	0%	0%
Unique circumstances	2	5%	4%	3	13%	12%

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

- Only 38% (51 of 133) of single family treatment customers and 38% (22 of 58) of multi-family treatment customers are aware of MyHER Interactive;
- Among aware customers, 94% of single family respondents and 82% of multi-family respondents reported that they had not signed up to use MyHER Interactive. The difference is not statistically significant at the 90% level of confidence; and
- When these respondents were asked why they haven't signed up to use MyHER Interactive, among the respondents who gave the answers, 32% of single family

respondents and 18% of multi-family respondents reported that they were not interested in it, 19% of single family respondents and 9% of the multi-family respondents said they were too busy, and 10% of single family respondents and 36% of multi-family respondents reported that they did not know about it. Ten percent of single family respondents and 9% of multi-family respondents reported they did not have a computer, and 10% of single family respondents said they did not use computer.

Evidence of MyHER Effects

As noted above, while formal statistical testing found some differences among treatment and control group households for individual questions, Nexant 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.

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 51 questions;
- Note any item for which the treatment group outperformed the control group:
    - Single family: The treatment group outperformed the control group in 29 questions, or 57% of the total questions;
    - Multi-family: The treatment group outperformed the control group in 20 questions, or 39% of the total questions; and
- Calculate the probability that the difference in response patterns is due to chance, rather than an underlying difference in populations – 87% in the case of single family. Since this probability is much greater than 10%, we cannot reject the null hypothesis that the number of positive responses should be equal for treatment and control customers at the 90% level of confidence.

In comparing the response patterns between the treatment and control groups, 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. What we see in the survey data overall is the proportion of questions indicating a positive MyHER effect near 50% in the case of single family program participants. In fact, the proportion of questions where treatment customers showed a positive MyHER effect was a little higher than 50%, however not statistically different from 50% at the 90% level of confidence.

The survey data reveal that there are specific areas where MyHER has a relatively stronger and poorer positive effect. These areas of strong and weak performance are different for single family and multi-family participants, as shown in Table 4-23 and Table 4-24. In the case of

single family customers, receiving the MyHER is associated with lower customer reported energy savings behaviors. This result may indicate that opportunities exist for Duke Energy to leverage the reports and website as a vehicle for delivering different or new information and opportunities to MyHER recipients that would increase their overall energy efficiency behaviors taken. On the other hand, single family MyHER recipients had a more positive view in these surveys on customer engagement with Duke Energy website, customer motivation, engagement and awareness of energy efficiency, customer satisfaction with Duke Energy, and they reported experiencing fewer barriers to take energy savings actions.

Same as the single family customers, multi-family customers MyHER recipients reported

experiencing fewer barriers to taking energy savings actions than non-recipients and higher customer engagement with Duke Energy website. Unlike single family customers, multi-family MyHER survey responses also indicated lower satisfaction on Duke Energy's energy efficiency offerings and customer motivation, engagement and awareness of energy efficiency, and lower level of customer satisfaction with Duke Energy.

When considering all possible areas of enhancement that the MyHERs can have on customer attitudes and actions related to satisfaction and energy savings behaviors, we observe areas of relative strength and weakness that differ between single family and multi-family customers. This result further illustrates that the messaging and approach taken in the reports delivered to multi-family customers may differ from that used in the single family reports in order to optimize the desired effects of increasing satisfaction and energy savings actions across both customer groups.

Table 4-23: Survey Response Pattern Index – Single Family

Question Category	Count of Ques. where T better than C	Number of Ques. in Topic Area	Portion of Ques. where T better than C
Duke Energy's Public Stance on Energy Efficiency	2	4	50%
Customer Engagement with Duke Energy Website	4	5	80%
Customer's Reported Energy-saving Behaviors	1	11	9%
Customer's Reported Energy Efficiency Improvements Made	5	10	50%
Customer Motivation, Engagement and Awareness of Energy Efficiency	8	11	73%
Barriers of Customer Not Undertaking Energy Savings Actions	6	6	100%
Customer Satisfaction with Duke Energy	3	4	75%
Total	**29**	**51**	**57%**

Table 4-24: Survey Response Pattern Index – Multi-family

Question Category	Count of Ques. where T better than C	Number of Ques. in Topic Area	Portion of Ques. where T better than C
Duke Energy's Public Stance on Energy Efficiency	0	4	0%
Customer Engagement with Duke Energy Website	4	5	80%
Customer's Reported Energy-saving Behaviors	5	11	45%
Customer's Reported Energy Efficiency Improvements Made	3	10	30%
Customer Motivation, Engagement and Awareness of Energy Efficiency	3	11	27%
Barriers of Customer Not Undertaking Energy Savings Actions	4	6	67%
Customer Satisfaction with Duke Energy	1	4	25%
Total	**20**	**51**	**39%**

Respondent Demographics

Nearly all single family respondents—88% of treatment group customers and 90% of control group customers—own their residence. Among multi-family respondents, 81% of treatment group customers and 76% of control group customers rent their residence. More than half of households surveyed have two or fewer residents for both single family and multi-family. For single family households, about 13% of treatment households and 14% of control households have four or more residents. For multi-family households, about 7% of treatment households and 14% 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 for both single family and multi-family (Figure 4-74 and Figure 4-75).

Figure 4-74: "In What Year Was Your Home Built?" – Single Family

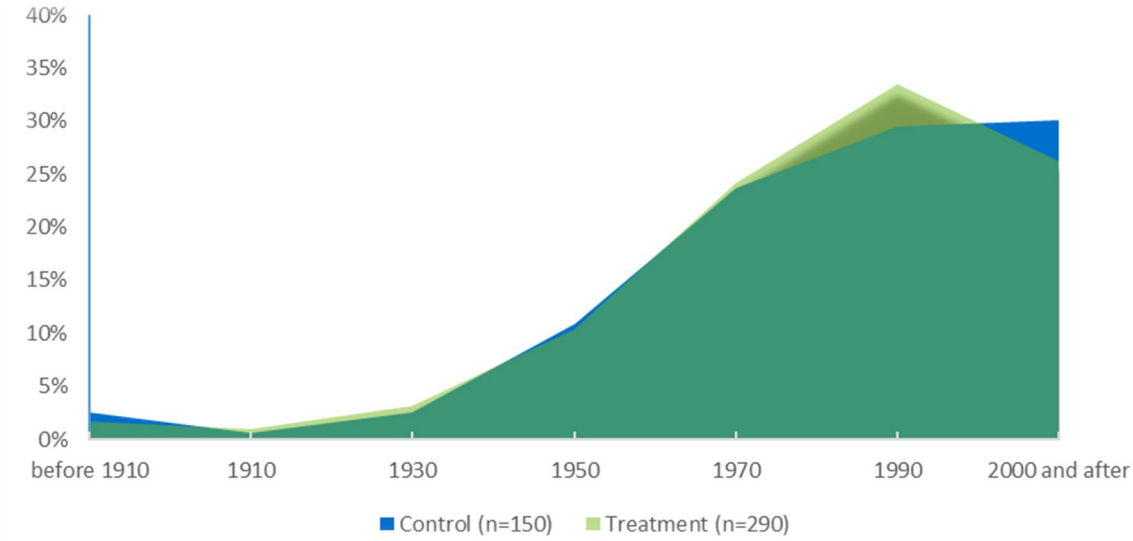


Figure 4-75: "In What Year Was Your Home Built?" – Multi-family

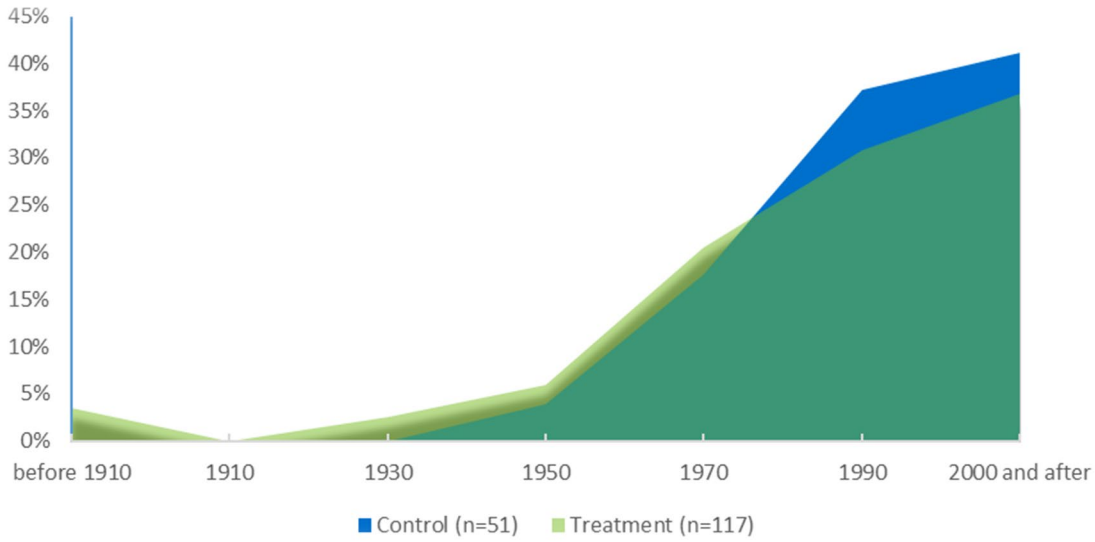


Figure 4-76 shows distribution of home square footage is similar between control and treatment group customers among single family households. The average square footage above ground is 2,152 for control households and 2,103 for treatment households, and the difference is not statistically significant. Figure 4-77 shows distribution of home square footage of control and treatment group customers among multi-family households. The average square footage above ground is 1,342 for control households and 1,323 for treatment households, and the difference is not statistically significant at the 90% level of confidence.

Figure 4-76: How many square feet is above ground living space? – Single Family

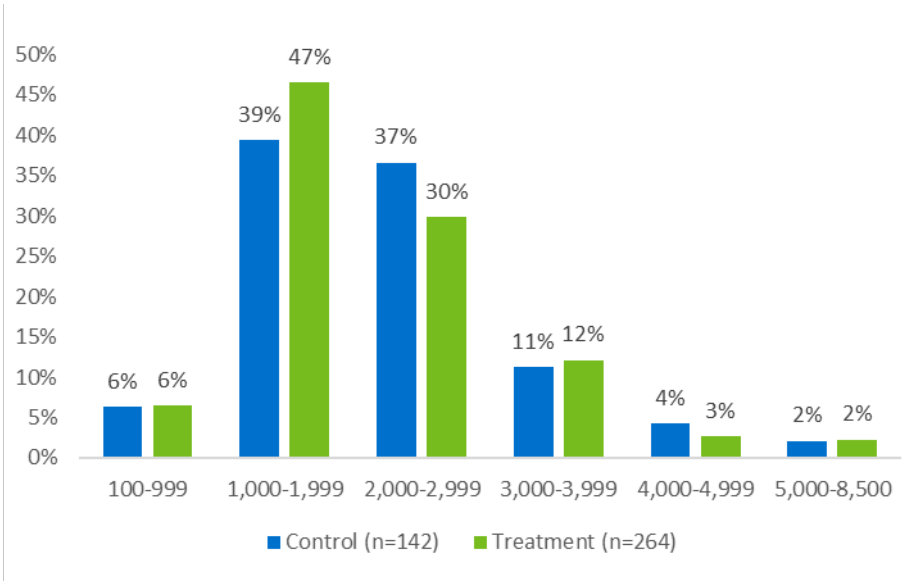
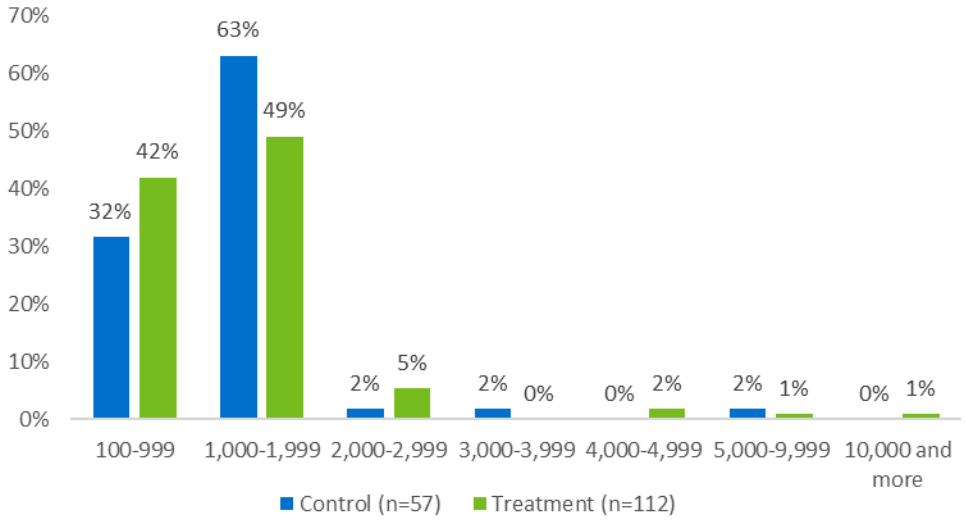


Figure 4-77: How many square feet is above ground living space? – Multi-family



The average age for single family respondents is 63 for control customers and 64 for treatment customers. For multi-family respondents it is 55 for control customers and 53 for treatment customers. The lowest age category (Younger than 25) is often underrepresented in survey studies, given that many members of that population would not participate in surveys. This common underrepresentation is true in this survey study, as well (see Table 4-25).

Table 4-25: Respondent Age Relative to RECS or American Housing Survey

Age	Single Family			Multi-family		
	Control Group (n=156)	Treatment Group (n=302)	EIA RECS Data South Atlantic Census Division[21]	Control Group (n=82)	Treatment Group (n=173)	American Housing Survey[22]
Younger than 25	0%	0%	6%	0%	1%	10%
25-34	5%	3%	14%	15%	23%	30%
35-44	7%	7%	15%	17%	14%	23%
45-54	15%	15%	20%	15%	13%	19%
55-64	23%	23%	20%	18%	14%	9%
65 and over	50%	52%	26%	35%	35%	9%

Figure 4-78 shows the primary heating fuel type used in single family control and treatment households. More than half of treatment (69%) and control (64%) customers use electricity in their households for heating. Twenty-two percent of treatment customers and 27% of control customers use natural gas for heating. These differences are not statistically significant.

Figure 4-78: Primary Heating Fuel in Households – Single Family

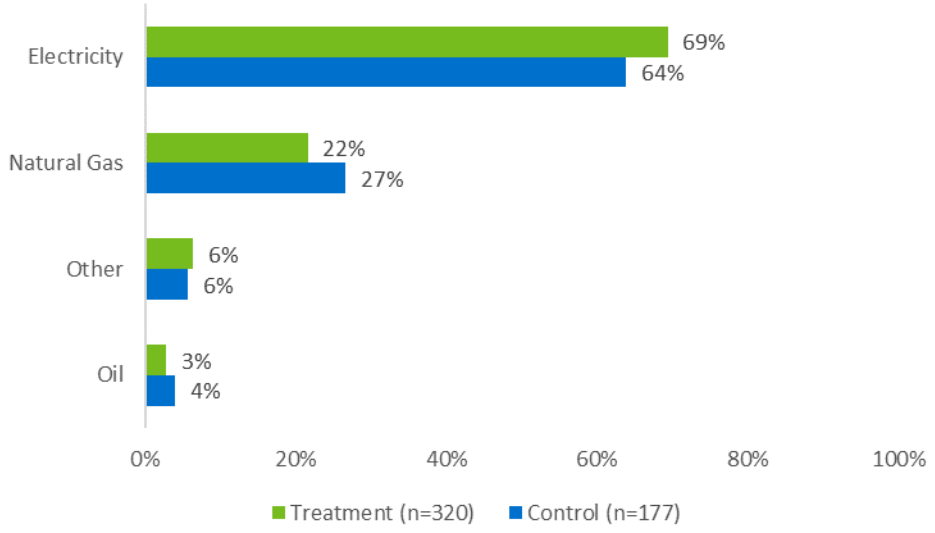


Figure 4-79 shows the primary heating fuel type used in multi-family control and treatment households. More than half of treatment (89%) and control (87%) customers use electricity in

[21] 2015 Residential Energy Consumption Survey (RECS). https://www.eia.gov/consumption/residential/data/2015/hc/php/hc9.8.php

[22] American Housing Survey, 2011 Charlotte - Household Demographics - All Occupied Units, Charlotte-Gastonia-Rock Hill, NC-SC MSA (1993 OMB definition) Tenure Filter: Renter, https://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html?s_areas=16740&s_year=2011&s_tablename=TABLE8A&s_bygroup1=1&s_bygroup2=1&s_filtergroup1=3&s_filtergroup2=1"

their households for heating. The difference is not statistically significant. Ten percent of treatment customers and control customers, respectively, use natural gas for heating.

Figure 4-79: Primary Heating Fuel in Households – Multi-family

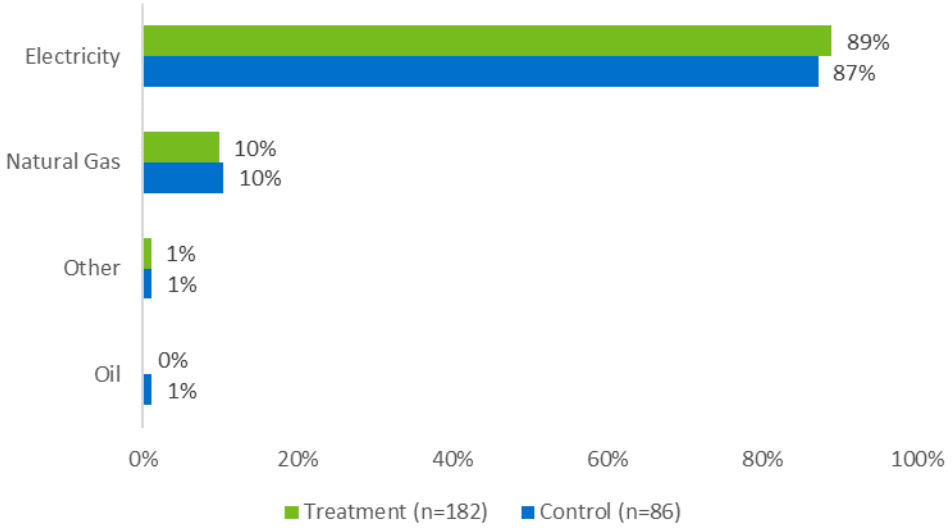


Table 4-26 shows the distribution of total annual household income in single family and multi-family households. Seventeen percent of single family treatment and control customers, respectively, reported their household income between $50,000 and $75,000 in 2020. For the multi-family households, 16% of treatment customers and 18% of control customers reported their household income in this bracket in 2020.

Table 4-26: 2020 Total Annual Household Income

2020 Annual Income	Single Family		Multi-family	
	Control (n=146)	Treatment (n=270)	Control (n=77)	Treatment (n=167)
Under $15,000	14%	13%	16%	20%
$15,000 to under $25,000	11%	10%	14%	14%
$25,000 to under $35,000	8%	10%	16%	9%
$35,000 to under $50,000	10%	12%	19%	19%
$50,000 to under $75,000	17%	17%	18%	16%
$75,000 to under $100,000	14%	10%	5%	11%
$100,000 to under $150,000	11%	16%	6%	4%
$150,000 to under $200,000	9%	6%	1%	5%
$200,000 or more	7%	5%	4%	2%

4.3 Summary of Process Evaluation Findings

In-depth interviews with Duke Energy MyHER program staff reveal that the DEC and DEP MyHER program has benefited throughout the life of the Uplight program implementation from a number of enhancements to the program and improvements in process and program management, and continues to operate effectively. A reduced number of six (from eight) paper reports are now sent to new enrollees that also receive eHERs in an effort to optimize treatment effects and program cost-effectiveness. In addition, efforts to increase enrollment for the MyHER Interactive online portal continues. In 2020, enrollment increased by nearly 30,000 customers in DEC and about 15,000 customers in DEP. The MyHER user experience is expected to be further enhanced in the future as the rollout of AMI meters recently completed in DEC and DEP and the strategic leveraging of this data continues to evolve in terms of report modeling and data presentation.

From the back office perspective, Uplight, Duke Energy's MyHER program provider, implemented a primary process improvement. Uplight launched HOMERS (Home Energy Reporting Service), which is a report management software platform that provides structure for Uplight's MyHER data management, quality control, and report production processes, while offering Duke Energy interactive management tools as well. Importantly, this shift to HOMERS has helped decrease QC errors at Uplight, and resulted in smaller and more predictable report batch sizes when reports are transferred to Duke Energy twice a week for QC purposes. In addition, the migration has reduced the amount of time reports take to get to customers. Not only did this reduction help Uplight meet their 12 day delivery SLA, customers get the report earlier in the month while their patterns of energy use from the previous month are fresher in their minds which should motivate behavioral change more effectively.

Additionally, Uplight has continued to make progress on updating the "action tips" section of the report to "smart actions", by increasing the number of these tips that are linked to the comparison housing model. In 2019, Uplight added 23 of these tips to the existing library of tips and overall have increased the size of this library by 50%. These "tips" were the latest feature to be added to the MyHER portion of the Duke Energy app, joining the home comparison chart, cohort information, and usage disaggregation.

Duke Energy and Uplight continued to collaborate for success through joint weekly status meetings, monthly operations meetings, and quarterly governance meetings for the duration of the implementation contract. 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. Uplight used an internal HER Improvement team to address the items on the list. Since the prior evaluation, Uplight has improved their performance in product quality, which is rigorously monitored by Duke Energy staff.

In general, the strong emphasis on the development of procedures and strategies to prevent problems in the MyHER production process that began in earnest in 2018 at both Uplight and

Duke Energy helped streamline the transition to the HOMERS platform that otherwise may have resulted in a more problematic and error-prone report production process and a less successful program overall.

Survey Findings – Single-family - DEC

Surveys of the single family treatment and control customers show that, among treatment group households:

- 95% recalled receiving at least one MyHER and 98% of those indicated that they "always" or "sometimes" read the reports.
- 58% reported being "very" or "somewhat" satisfied with the information provided by MyHERs.
- MyHER recipients are more likely to be satisfied with the three aspects of customer service provided by Duke Energy than non-recipients, but difference is not statistically significant.
- MyHER single family recipients are not more likely to undertake energy-saving behaviors or upgrades than non-recipients, however it is possible they do the same energy-savings behaviors with greater frequency or intensity of effort.
- Only 31% of MyHER recipients are aware of MyHER Interactive, and only 9% of the aware recipients reported that they had signed up to use it. When asked why they haven't signed up to use MyHER Interactive, 29% of respondents reported that they were not interested in it, 21% reported that they were too busy, and 14% then stated that they did not know about it.
- More than half, 64%, of respondents strongly agree with the statement "I have learned about my household's energy use from My Home Energy Reports". Very few (10%) strongly agree with the idea that the energy usage information presented by the reports is confusing.
- The most useful feature of the reports, as rated by treatment customer respondents, is the graphs that illustrate the home's energy usage over time.
- More than half (59%) of the respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently requested more specific or detailed information in their MyHERs or questioned the accuracy of the neighborhood comparisons.

Survey Findings – Multi-family – DEC

Surveys of the multi-family treatment and control customers show that, among treatment group households:

- 95% recalled receiving at least one MyHER and 94% of those indicated that they "always" or "sometimes" read the reports.
- 72% reported being "very" or "somewhat" satisfied with the information provided by MyHERs.
- MyHER recipients are more likely to be satisfied with Duke Energy's response to COVID-19 to help those dealing with financial hardship than non-recipients, but the difference is not statistically significant.

- MyHER multi-family recipients are not more likely to undertake energy-saving behaviors or upgrades than non-recipients, but as mentioned above, it is possible they undertake the behaviors with greater frequency or intensity.
- Only 52% of MyHER recipients are aware of MyHER Interactive, and only 9% of the aware recipients reported that they had signed up to use it. When those who hadn't signed up for MyHER Interactive were asked why, 27% reported that they were not interested in it, 27% of respondents then reported that they did not know about it, 18% of respondents reported that they were having technological issues or did not use computers, and another 14% reported that they were too busy.
- More than half of multi-family MyHER recipients, 74%, agree with the statement: “I have learned about my household's energy use from My Home Energy Reports”. A minority but notable proportion of respondents, 16%, strongly agree with the idea that the energy usage information presented by the reports is confusing.
- The most useful feature of the reports, as rated by treatment customer respondents, is the energy use associated with specific household items and areas.
- A majority (74%) 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.

Survey Findings – Single-family and Multi-family Comparison – DEC

- Both SF and MF treatment customers have about the same level of satisfaction (as measured by top-2 of 10 box scores) – MyHER did not result in a measurable uplift in satisfaction with Duke Energy during this evaluation period.
- More MF customers report being satisfied with MyHER than SF (72% vs. 58%).
- More multi-family MyHER recipients (66%) than single family MyHER recipients (56%) reported that My Home Energy Report provided the details they needed to understand their energy use, but the difference is not statistically significant.
- Multi-family customers are significantly more likely to agree that Duke Energy provides service at a reasonable cost than single family customers (72% vs. 62%).
- Multi-family treatment customers are more likely to report “Energy use associated with specific household items or areas is useful than single family treatment customers. The difference is statistically significant at the 90% level of confidence.
- Single family treatment customers were significantly more likely to have undertaken five EE upgrades than multi-family treatment customers, and this difference appears to be driven by homeownership - Single family homeowners from this group were also more likely to undertake five energy efficient upgrades than multi-family homeowners, but the differences are not statistically significant in that case.
- There is a significant differential between satisfaction among treatment customers and interest in control customers in “information about services and offers from Duke Energy”, indicating that the MyHERs could look to improve satisfaction or acceptance of this report feature. This finding holds for both SF and MF customers.

Survey Findings – Single-family – DEP

Surveys of the single family treatment and control customers show that, among treatment group households:

- 95% recalled receiving at least one MyHER and 94% of those indicated that they "always" or "sometimes" read the reports.
- 63% reported being "very" or "somewhat" satisfied with the information provided by MyHERs.
- MyHER recipients are more likely to be satisfied with Duke Energy's commitment to promoting energy efficiency and the wise use of electricity, and the information available about Duke Energy's efficiency programs than non-recipients, but these differences are not statistically significant.
- MyHER single family recipients are not more likely to undertake energy-saving behaviors than non-recipients, but may undertake these actions more often.
- Only 38% of MyHER recipients are aware of MyHER Interactive, and only 6% of the aware recipients reported that they had signed up to use it. When asked why they haven't signed up to use MyHER Interactive, 32% of respondents reported that they were not interested in it, 19% reported that they were having technological issues or they did not use computers, 19% reported that they were too busy, and 10% then stated that they did not know about it.
- More than half, 64%, of respondents strongly agree with the statement "I have learned about my household's energy use from My Home Energy Reports". Few (10%) 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.
- Most (68%) respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently requested more specific or detailed information in their MyHERs, and questioned the accuracy of the comparison.

Survey Findings – Multi-family – DEP

Surveys of the multi-family treatment and control customers show that, among treatment group households:

- 85% recalled receiving at least one MyHER and 98% of those indicated that they "always" or "sometimes" read the reports.
- 73% reported being "very" or "somewhat" satisfied with the information provided by MyHERs.
- MyHER recipients are not more likely to be satisfied with various aspects of Duke Energy customer service than non-recipients.
- MyHER multi-family recipients are not more likely to undertake energy-saving behaviors than non-recipients, but they could be undertaking those same behaviors with greater consistency or intensity.
- Only 38% of MyHER recipients are aware of MyHER Interactive, and only 18% of the aware recipients reported that they had signed up to use it. When those who hadn't signed up for MyHER Interactive were asked why, 36% reported that they actually did

not know about it, 18% reported that they were not interested in it, and 9% reported that they were too busy.

- More than half of multi-family MyHER recipients, 69%, agree with the statement: “I like receiving the Home Energy Reports”. A minority (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.
- More than half (61%) of respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently questioned the accuracy of the comparison homes.

Survey Findings – Single-family and Multi-family Comparison – DEP

- As in DEC, both SF and MF DEP treatment customers have about the same level of satisfaction (as measured by top-2 of 10 box scores) – MyHER did not result in a measurable uplift in satisfaction with Duke Energy during this evaluation period.
- Significantly more multi-family MyHER recipients (69%) than single family MyHER recipients (56%) like receiving the Home Energy Reports.
- Significantly more multi-family MyHER recipients (68%) than single family MyHER recipients (51%) report using the MyHERs to tell them how well they are doing at saving energy.
- Significantly more multi-family MyHER recipients (66%) than single family MyHER recipients (51%) report “My Home Energy Reports provide the details I need to understand my home's energy use”.
- Significantly more multi-family MyHER recipients (54%) than single family MyHER recipients (39%) report “Since reading the Home Energy Reports, I have taken actions to use less energy than I would not have otherwise taken”.
- Multi-family customers are more likely to agree that Duke Energy provides excellent customer service than single family customers (83% vs. 81%). The difference is not statistically significant.
- Single family treatment customers were significantly more likely to have undertaken almost all EE upgrades than multi-family treatment customers. Homeownership is an important factor - single family homeowners from this group were more likely to undertake five energy efficient upgrades than multi-family homeowners, but the differences are not statistically significant.
- There is a significant differential between satisfaction among treatment customers and interest in control customers in “comparisons to similar homes” and “tips to help you save money and energy”, indicating that the MyHERs could look to improve satisfaction or acceptance of these report features. This finding holds for SF customers only.

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 increasing uptake in other Duke Energy efficiency programs. The MyHER program is at full deployment among Duke Energy Carolinas and Progress single-family home customers, and now multi-family home customers as well, 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 313.5 GWh at Duke Energy Carolinas among single family program participants and 13.5 GWh among multi-family program participants. At Duke Energy Progress, single family participants saved 175.2 GWh due to the MyHER reports and multi-family participants saved 4.4 GWh. The confidence and relative precision of the estimates is 90% confidence and 8.7% and 30.4%, respectively, for DEC single family and multi-family. At DEP, the relative precisions are 9.9% and 51.3%, respectively, at the same level of confidence. These impact estimates account for the fact that MyHER increases uptake of other Duke Energy programs; 4.4 and 2.9 kWh has been subtracted from the average single family and multi-family DEC household program impact to account for the MyHER uplift in other programs. At DEP, 3.2 kWh and 1.0 kWh, respectively, were subtracted from the after single family and multi-family DEP household program impact for the same reason. Without such corrections, those savings would be double counted by Duke Energy.

Nexant does not find statistically significant (at the 90% level of confidence) incremental impacts that can be attributed to some MyHER treatment customers enrollment in Interactive for either DEC or DEP during this evaluation period.

5.2 Process Findings

MyHER is one of Duke Energy's most important residential DSM programs in terms of delivered energy savings in the Carolinas jurisdictions. Program operations are data-intensive – managing and processing the large volumes of data required to generate the monthly reports and support the program delivery schedule is the primary focus of program activities. Duke Energy and its implementation contractor, Uplight, have successfully managed this process and have provided DEC and DEP customers valuable information for managing home energy consumption.

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

DEC MyHER single family participants have been found, in this evaluation's customer surveys, to display higher levels of satisfaction with how Duke Energy provides excellent customer service than multi-family participants, while multi-family participants find the energy use associated with specific household items and areas significantly more useful than control customers think they might be. Overall, 58% of DEC single family and 72% of DEC multi-family recipients are very or somewhat satisfied with the information in the HERs. In addition, single family respondents were significantly more likely to report initial cost of energy efficient equipment is too high as a barrier to energy-saving actions than multi-family.

DEP MyHER single family participants have been found, in this evaluation's customer surveys, to display higher levels of satisfaction with how Duke Energy respects its customers and provides service at a reasonable cost than control customers, while multi-family participants find the graphs that display home energy use and customized suggestions for their homes more useful than control customers think they might be. Overall, 63% of DEP single family and 73% of DEP multi-family recipients are very or somewhat satisfied with the information in the HERs. In addition, multi-family respondents were significantly more likely to report "I do not think my energy saving efforts are worth the time and/or money" as a barrier to energy-saving actions than single family

5.3 Program Recommendations

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 Duke Energy should always 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 single family accounts to MyHER treatment and control groups 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.

- **Consider using larger control groups for the multi-family program.** This is the first evaluation in the DEC and DEP service territories and Nexant finds that the 90% confidence bands around the impact estimates for multi-family are very wide. This may improve over time as the first multi-family cohorts mature, but the opportunity for maturation may be less than for single family due to the more frequent account turnover among multi-family customers; maturation also may not include less variability in impacts so Duke Energy should consider larger control groups for this program segment.
- **Build on previous successes of Interactive awareness campaigns.** The process evaluation finds that current awareness of Interactive among MyHER participants has slightly increased for single family customers since the last evaluation (DEC: 28% to 31%, DEP: 35% to 38%), but is still somewhat low.
- **Leveraging AMI data and producing content.** In 2019, this data was presented in a pilot project to a small number of eHER recipients in the form of hourly weekday usage graphs. In addition, this data was leveraged to improve the housing model to improve disaggregation modeling. Considering that AMI meters deployment has reached nearly 100% in the DEC and DEP jurisdiction, and the presentation of this data offers older cohorts novel content, Duke Energy should continue to cost-effectively leverage AMI data.
- **Work to improve satisfaction.** Compared to the previous evaluation on satisfaction with information in the reports dropped (DEC single family: from 87% to 58%; DEP single family: from 80% to 63%). In addition, single family and multi-family control customers' expectations regarding the usefulness of some features of HERs tend to be significantly higher than treatment customers' ratings of their actual usefulness, indicating an opportunity to improve these features and align customers' expectations with reality.
- **Tune in to relevant energy-saving behaviors of multi-family customers.** While multi-family customers report high levels of engagement and interest in HERs, their reported energy investments are lower than those of single family customers, even for multi-family homeowners. While some of these differences are attributable to differing equipment saturation levels between the two segments, these disparities do indicate a need to understand more fully the energy-relevant behaviors, and barriers to energy saving behavior, of multi-family customers so as to make HERs more useful to customers in this segment.
- **Work to inspire trust in report accuracy.** While Uplight has continued work to improve the model used for building comparison home groups, including refining customers' accounts who have pools and electric vehicles, in open-ended responses to questions regarding suggested improvements to the reports, 24% of DEC single family and DEP single family survey comments, respectively, and 56% of DEP multi-family survey comments reported concerns about the accuracy and applicability of the reports to their home.

- **Target Interactive customers' summertime usage as an opportunity to increase annual Interactive savings.** Currently, Interactive customers are showing statistically significant uplifts in savings, over and above the savings attributable to the report. However, on an annual basis, those savings are eroded by significant increases in energy use in the summertime. MyHER should leverage opportunities to remind Interactive users not to backslide with energy savings behaviors in the summer.

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