ILLUME

PROJECT:

Bring Your Own Thermostat Pilot

Evaluation Report

PROJECT SPONSOR:

Georgia Power Company

ACKNOWLEDGMENTS

ILLUME Advising, LLC is a forward-thinking consulting company at the rare intersection of insight and execution. Founded in 2013, the company has quickly grown to include a deep bench of quantitative and qualitative research experts. ILLUME uses cutting edge research strategies to help build a resilient energy future to enrich lives, improve global health, and ensure a more secure and sustainable future.

For this effort, we would like to acknowledge, first and foremost, Nikita Trivedi, Jeff Smith, and Eric Arnold. We would also like to acknowledge the Bring Your Own Thermostat Pilot program manager, Audrey Ewen, and the ILLUME team members Shannon Kahl, Jes Rivas, and Eileen Hannigan.

PREPARED FOR:

Georgia Power Company

PREPARED BY:

ILLUME Advising LLC
440 Science Drive, Suite 220
Madison, WI 53711

CONTACT:

Eileen Hannigan
Executive in Charge, ILLUME Advising LLC
eileeen@illumeadvising.com
608.561.8396

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SUMMARY

INTRODUCTION

In 2018, Georgia Power launched the Bring your Own Thermostat (BYOT) Pilot to assess the magnitude of demand impacts and energy savings from a thermostat-based demand response (DR) program. The pilot tested DR events in both summer and winter using Nest's Rush Hour Rewards program.

Georgia Power contracted with Illume Advising, LLC (henceforth, "ILLUME", "we" or "our team") to provide evaluation, measurement, and verification (EM&V) of the pilot. ILLUME also evaluated program processes and gathered customer feedback on experiences and satisfaction with the pilot. We present our findings from the evaluation in this report.

PILOT OBJECTIVES & APPROACH

Georgia Power engaged approximately 1,318[1] residential customers to participate in its BYOT Pilot program to assess the demand impacts and energy savings from nine DR events — four in summer and five in winter — using Nest Learning Thermostat and Nest Thermostat E, sold through the Georgia Power Marketplace.

The objectives of the BYOT Pilot program evaluation are to (1) gauge customer understanding and awareness of DR events, (2) identify actions taken and barriers to action during these events, (3) explore how DR events affect satisfaction with Georgia Power overall, and (4) evaluate the impact of the BYOT pilot on demand reductions and energy consumption.

EVALUATION APPROACH

The BYOT Pilot evaluation included a range of data collection and evaluation activities, summarized in Table 1. We provide the details of each activity in Section 2.2 Evaluation Activities.

[1] The final participant list Georgia Power provided to ILLUME on 8/21/2018 included 1,320 unique residential premises, 1,318 unique customers and 1,314 unique email addresses.

TABLE 1. SUMMARY OF EVALUATION ACTIVITIES

TASK	DESCRIPTION
Interviews	• Interviewed the pilot program manager
Surveys	• Surveyed participants after six of the nine DR events, between one and three days after each event
Impact Analysis	• Estimated demand reduction and energy savings for each DR event • Checked for cross-participation in other Georgia Power programs, to reduce double-counted savings • Reviewed number, frequency, and timing of opt-outs

FINDINGS AND RECOMMENDATIONS

Key Finding #1. The BYOT Pilot achieved an average demand reduction between 0.83 and 0.91 kW per event per household for the summer DR events and an average demand reduction between 0.68 and 1.16 kW per event per household for winter events. Four of the five winter events had smaller reductions than any of the summer events. The winter events also had more variability in reductions. Aggregate demand reductions across all BYOT participants ranged from 1,032 kW to 1,124 kW for summer events. Aggregate demand reductions for the winter events ranged from 826 kW to 1,409 kW.

Key Finding #2. Across all participants the pilot achieved energy savings between 1,849 and 2,085 kWh per event day for the summer DR events while winter energy impacts ranged from an increase in usage by 462 kWh to a savings of 3,681 kWh across all participants per event day. While energy use increased in the pre-and post-event phases, these increases did not offset the reductions during the event phase, resulting in energy savings on eight out of nine event days.

Key Finding #3. Respondents were highly satisfied with Georgia Power and the Rush Hour Rewards program. Across the DR events, survey respondents gave Georgia Power a mean satisfaction rating of 4.5 on a 1-to-5 scale, where 1 means *not at all satisfied* and 5 means *completely satisfied*. Survey respondents gave the Rush Hour Rewards program a similar mean satisfaction rating of 4.4 on the same 1 to 5 scale. The majority of respondents who were less than *completely satisfied* with the program (rating of 4 or lower) cited reasons unrelated to the program such as high bills and power outages. Fewer respondents expressed concerns about the effects of the program on their home, a lack of understanding of the program, or issues with their Nest thermostat.

Key Finding #4. Respondents were satisfied with all aspects of Rush Hour Rewards program. Respondents rated various program components on a 1-to-5 scale, where 1 means *not at all satisfied* and 5 means *completely satisfied*. While respondents were satisfied with all aspects of the program, they were more satisfied with some aspects than others. Participants gave the lower ratings to the enrollment process (mean 4.1) and the report provided after an event (mean ranging from 3.9 to 4.2) and higher mean ratings to how Nest adjusts their thermostat, ease of overriding events, and the amount of notice before an event.

> ***Recommendation:*** *Use satisfaction with current program components to inform future program design. For instance, consider components of the current program that received lower satisfaction (relative to other program components) such as the enrollment process and the post-event report as possible areas for*

modification, while maintaining the ease of opting out, amount of notice prior to events, and how thermostat is adjusted that received higher ratings.

Key Finding #5. Satisfaction with Georgia Power and the Rush Hour Rewards program remains high across DR events and is slightly higher for winter events, suggesting that consecutive seasons of DR events do not negatively affect satisfaction. Across the DR events, mean satisfaction ratings for both Georgia Power and the program remained high, between 4.3 to 4.5 and 4.2 to 4.4 respectively, on a 1-to-5 scale, where 1 means *not at all satisfied* and 5 means *completely satisfied*. The mean satisfaction ratings for both Georgia Power and the program captured after the winter events were slightly higher than responses collected after the summer events, suggesting either that winter participation correlates to higher satisfaction and/or that prolonged program participation does not negatively impact satisfaction. Participants also reported higher satisfaction with the number of DR events, ease of overriding events, and with the post-event report on the winter surveys compared to the summer surveys.

Key Finding #6. Nearly all (95%) of survey respondents would participate in the program if Georgia Power offered it again. In the last three surveys we fielded, we asked respondents if they would enroll in the Rush Hour Rewards program if Georgia Power offers it again in the future, and 95% of respondents indicated they would.[2]

Recommendation: *Target pilot participants with a special offer to enroll in a future DR program.*

Key Finding #7. The rates at which respondents reported disruption to routines, negative effects, or discomfort as a result of the DR events remained consistently low across events and seasons. Across all events, only between 5% to 7% of respondents noted a negative effect as a result of the adjustments to their thermostat. Specifically, between 9% to 15% of respondents noted discomfort with the temperature being too hot in the summer or too cold in the winter. Very few participants (between 3% and 6% for each event) noted disruption to routines including cooking and cleaning when returning home (during summer events), getting ready for work in the morning (during winter events), sleep, and activities involving children (i.e. sleeping babies).

Recommendation: *When recruiting new participants in this program, consider including pilot participant testimonials to highlight the fact that the program is relatively low impact and that when issues arise, it is easy to override an event.*

Key Finding #8. Participants opted out of DR events at higher rates during winter than summer, however, across seasons, opt-outs typically occurred with less than an hour left of the three-hour event. On average, 12% of participants opted-out of winter events and 4% opted out of summer events. The ILLUME team found that unique devices generally did not opt out of multiple events during this pilot, meaning the same participants did not repeatedly override events. Our review of existing research suggests there are a few reasons beyond discomfort for opting out of an event, and that opt-outs often occur when there is not much time remaining in an event[3]. Survey respondents were also more likely to be home during the winter events than summer, which could explain the lower completion rate in winter.

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[2] 590 respondents took at least one of the winter surveys.

[3] Navigant Consulting and ILLUME Advising, "Understanding the Role of Weather in Air Conditioning Use Behavior and Demand Response Program Participation (BEH 2)," 2018.

Recommendation: *Consider scheduling shorter (two-hour) DR events when three-hour DR events are not necessary to meet demand reduction needs.*

Recommendation: *Include information about the event length in event notifications, if possible. If thermostat functionality allows, inform participants about the amount of time remaining in the event by displaying, "Are you sure? You only have (amount of time) left."*

Recommendation: *When considering DR providers, ensure communication with customers informs them of how to override an event and that confirmation occurs before automatically overriding an event when a customer changes the temperature in the inefficient direction to ensure customers understand they are overriding the DR event.*

Recommendation: *If opt-out rates increase in a future program, consider conducting research targeting participants who opted out of events to understand why they opted out and what they would need to remain in the event.*

Key Finding #9. While respondents were satisfied with the program and Georgia Power overall, several customer comments indicate possible customer misperceptions. Several survey respondents made comments indicating a lack of understanding of some program details, concerns that the program could affect heating/cooling equipment negatively, and frustration in not knowing when to expect the bill credit. Additionally, 32% of respondents were motivated to enroll in the program to save money on energy bills, which does not always happen as a result of DR events outside of time-of-use or peak pricing rate designs. Notably, a small number of comments also indicated potential issues with events adjusting thermostats for natural gas furnaces or adjusting the temperature more than a few degrees. Even if the DR events did not cause these issues, the participants believe that they did.

Recommendation: *Use more frequent communication to alleviate participant concerns and frustrations. Consider sending short emails after the first summer event, first winter event, and when bill credits are awarded. The emails could provide an opportunity to thank participants, congratulate them on completing their first summer or winter event, remind them of how to opt-out of an event, and alert them when their bill credit has been made. The emails could also encourage customers to call or email the program with any questions or concerns they have regarding the program.*

Recommendation: *Consider ways to obtain frequent feedback from participants in order to identify any potential issues early. Embed survey questions in post-event emails to gather information on the customer experience with events.*

Key Finding #10. Survey respondents were least satisfied with the amount of the bill credit compared to other program components, with only 27% indicating they were *completely satisfied* and 28% indicating they were *moderately satisfied* with the amount of the bill credit. Among the various program components for which satisfaction was measured, the bill credit received the fewest *completely satisfie*d ratings. While not a major source of dissatisfaction, some respondents (n=6) were confused about when to expect the bill credit and two respondents said the amount of the bill credit affected their satisfaction with Georgia Power overall.

Recommendation: *Notify participants when bill credits are made to their account. Use this opportunity to thank them for their participation and to remind them of other program details as noted in Finding No. 9.*

Recommendation: *Consider different incentive structures and payment schedules. Additional bill credits provided at the end of the heating season and the end of the cooling season, for example, could offer additional opportunities for program communications with customers as noted in Finding No. 9.*

Key Finding #11. There is a subset of participants highly likely to take additional energy-saving actions during DR events. Between 62% and 76% of longitudinal respondents reported taking at least one additional action across the six survey events and between 45% and 60% reported taking two or more actions. These actions included: adjusting the thermostat temperature in the efficient direction; shutting of the HVAC system or pool equipment; avoiding doing laundry, dishes, or cooking; or turning off lights, office equipment, or entertainment systems.

> ***Recommendation:*** *Consider providing additional messaging throughout program communications encouraging additional actions participants can take to reduce energy use or monthly bills.*

Key Finding #12. Data limitations constrained the types of analysis the team could perform and may have affected the impacts detected by the analysis. The interval meter data available for this analysis contained integer values in hourly intervals which can obscure changes in energy demand and use because residential customers frequently use less than 1 kWh per hour. Additionally, we were unable to link the Nest thermostat data to the Georgia Power interval meter data to provide additional context for understanding impact results because of a restriction in the Nest contract that did not allow Nest to provide a common identifier to ILLUME.

> ***Recommendation:*** *Provide a common identifier to enable linking device data to interval meter data in a future program.*

> ***Recommendation:*** *Provide decimal reads in 15-minute intervals to better detect program impacts for future program participants.*

1. PILOT OVERVIEW

1.1 PILOT DESIGN

IMPLEMENTATION

The Georgia Power BYOT Pilot used Nest's Rush Hour Rewards to implement its DR program. Georgia Power called a total of nine DR events throughout the summer of 2018 and winter of 2018–2019 wherein Nest ran its Rush Hour Rewards algorithm to curtail air conditioning consumption for participants[4]. The DR events were held on:

- August 16 from 3 p.m. to 6 p.m.;
- August 21 from 3 p.m. to 6 p.m.;
- September 5 from 4 p.m. to 7 p.m.;
- September 13 from 3 p.m. to 6 p.m.;
- November 28 from 6 a.m. to 9 a.m.;
- December 6 from 7 a.m. to 10 a.m.;
- January 10 from 6 a.m. to 9 a.m.;
- January 15 from 7 a.m. to 10 a.m.; and
- January 30 from 6 a.m. to 9 a.m.

Participants received a $25 bill credit for signing up for the program and another $25 bill credit after the first year of participation.

RECRUITMENT

Georgia Power initially targeted 3,000–5,000 participants for its BYOT Pilot. To be eligible for this pilot, customers had to have an active account with Georgia Power, central air conditioning, electric heat and either a Nest Learning thermostat or a Nest Thermostat E.

Georgia Power recruited participants in two waves. For the first recruitment wave, Nest selected 20,000 customers using a randomized list of zip codes provided by the ILLUME team. Using the data Nest has on their customers (including thermostat type, home type, heating system type and zip code), Nest attempted to identify eligible customers moving across these zip codes until they reached the target size of 20,000 customers. After Georgia Power confirmed their active account status, Nest sent a co-branded recruitment email to 20,000 eligible customers on June 28, 2018. For the second recruitment wave, Nest sent a co-branded recruitment email to all customers with central air conditioning and winter heating connected to a Nest thermostat.

[4] The Nest algorithm is proprietary, it uses custom data from each thermostat to adjust thermostat settings during each DR event. It will pre-cool in the summer and pre-heat in the winter, then adjust the setting not to exceed two degrees difference from the customer's original set point.

Recruitment emails explained to customers that they could get paid up to $50 to use less energy during peak hours, or "energy rush hours", when everyone else is using more energy. The email included links for more information and enrollment. Interested customers viewed the offer and then confirmed their device, provided system details, and completed their application to enroll in the program. Nest notified ineligible customers by email.

The program fell short of its recruitment goals and proceeded with 1,318 participants in August 2018. Nest attributed this to equipment eligibility requirements and the incentive amount ($50), which was slightly lower than its recommendation of offering a $75 incentive paid in three installments: $25 when enrolling, $25 after the cooling season, and $25 after the heating season.

DESIGN

After a customer enrolled, Nest sent a confirmation email that thanked them for signing up for the Rush Hour Rewards program and provided additional detail about what to expect in terms of number of events (no more than 15 each summer and each winter and no more than three in one week), event length (maximum four hours), and event window (between 7 a.m. and 10 a.m. in the winter and between 2 p.m. and 7 p.m. in the summer).[5] Nest also explained in the email that they may 'tweak temperatures' before and during an energy rush hour to ensure comfort and that if at any time the participant does not like the temperature, they can change it.

According to Nest documentation[6], Nest notifies participants of energy rush hours prior to each event through the mobile app and on the Nest device — the night before for morning events and at least an hour before afternoon events. During pre-cooling or pre-heating, the Nest app and thermostat display a gold gear and the words "Pre-Cooling" or "Pre-Heating."

During the event, the thermostat and Nest app display the gold gear with a Nest leaf inside and the words *Energy Rush Hour.* If the user changes the temperature, the Nest app and thermostat display the message, "Energy demand is high. If you change the temperature, you'll leave this Rush Hour" to confirm the user wishes to stop participating in the event. After the event, participants can access information about the event through the mobile app or an email report.

TIMELINE

The BYOT Pilot officially ran from August 2018 to April 2019 and held nine DR events between August 16, 2018, and January 30, 2019, as noted previously.

[5] Note that actual event durations and time varied slightly from the language included in the recruitment emails.

[6] https://nest.com/support/article/What-happens-during-a-Summer-or-Winter-Rush-Hour

2. EVALUATION OBJECTIVES AND APPROACH

This section summarizes the objectives and activities conducted for the evaluation of the BYOT Pilot.

2.1 RESEARCH QUESTIONS

The evaluation team developed a list of key research questions with input from Georgia Power and Public Service Commission staff. The team conducted evaluation activities to address the following research questions.

IMPACT QUESTIONS

1. What are the demand and energy impacts of the demand response events? Are the impacts different on different days, times of day, or seasons? This includes impacts before, during, and after the event.
2. Are the demand and energy impacts affected by participation in other Georgia Power energy efficiency programs?
3. What data should the program collect to effectively measure program impacts?
4. Are pre-heating or pre-cooling detectable in the data, and if so, what is the net effect on energy savings?
5. Do the demand and energy impacts vary by the type of Nest thermostat?
6. Do the demand and energy impacts vary by other measurable participant characteristics (such as occupancy, schedules, etc.)?[7]

PROCESS QUESTIONS

CUSTOMER EXPERIENCE QUESTIONS

1. Are customers satisfied with the enrollment process?
2. Are customers aware of when the DR events are taking place?
3. How do customers engage with the DR events?
4. How does the BYOT program affect customer satisfaction with Geogia Power overall?
5. What actions do participants take as part of the DR events, if any?
6. What barriers to action exist for participants?
7. Do awareness, engagement, satisfaction, or actions taken change over time or season?
8. Is the incentive level for participation appropriate?

[7] ILLUME was unable to answer impact research questions 5 and 6 because Nest was unable to provide an identifier with which to merge to the AMI data per its contract with Georgia Power.

PILOT METRICS

1. Did the pilot meet the recruiting and participation goals?
2. Are the methods for tracking participation and impacts scalable? Are different approaches needed for a pilot versus a full-scale program?
3. What other metrics should a program track to assess program success?

2.2 EVALUATION ACTIVITIES

This section summarizes the evaluation activities conducted for the evaluation of the Bring Your Own Thermostat Pilot. See APPENDIX A for more detailed methodology.

STAFF INTERVIEWS

ILLUME and Georgia Power staff met weekly throughout the duration of pilot. During these meetings, the ILLUME team was able to gather insight into the history of the pilot, recruitment efforts, pilot program goals and objectives, and barriers for meeting those goals. The evaluation team also conducted a retrospective interview with program manager Audrey Ewen on March 22, 2019.

IMPACT ANALYSIS

The ILLUME team estimated demand reduction and energy savings achieved during the DR events by using hourly AMI data for participating homes, an estimate of double-counted savings (through an examination of pilot participant involvement in other Georgia Power energy efficiency programs), and an analysis of device-level event participation using the Nest thermostat data. See APPENDIX A for a more detailed impact analysis methodology.

Double-Counted Impacts

Double-counted impacts (demand reductions or energy savings) can occur if customers participated in other energy efficiency programs and impacts from those actions are claimed by the energy efficiency program and are captured in the analysis of AMI data for the BYOT Pilot. We assessed the risk of double-counted impacts by cross-referencing the BYOT participants with program tracking data from the following Georgia Power energy efficiency programs:

- Water heater demand response
- Home Energy Improvement Program
- Refrigerator Recycling Program
- HVAC Service
- Marketplace

Ultimately, we found very little participation in other energy efficiency programs during the time periods used for baseline day selection and, as such, minimal risk of double-counted impacts. If we had found a greater likelihood of double-counted impacts, our methodology would be to subtract the claimed impacts of the energy efficiency program measures from the estimated BYOT event impacts.

Event Participation Analysis

The ILLUME team analyzed event completion rates using Nest thermostat data. Unfortunately, the team could not link thermostat data to either the AMI or survey data, because Nest did not provide a linking variable to identify a specific customer premise, meter, account or address. Per Nest's contract with Georgia Power, Nest could not provide a link from utility account numbers to the thermostat data.

PARTICIPANT SURVEYS

The ILLUME team used two types of online surveys to understand the customer experience. The first was an in-depth customer experience survey to assess motivations for participation, user experience with enrollment and the pilot program, customer satisfaction, and demographics. The team sent email invitations for the customer experience survey to all 1,314 unique participant emails after the August 21, 2018, event. Participants that had not yet responded to the customer experience survey continued to receive invitations to this survey after subsequent events.

The team also used a shorter follow-up survey to provide a longitudinal perspective on the customer experience, including understanding actions taken during and around DR events. Once a participant completed the customer experience survey, the team invited them to take the shorter follow-up survey after any remaining DR events.

We invited all 1,314 participants to participate in a survey (either customer experience or follow up, depending on previous survey completion) within three days of the six DR Events listed in Table 2[8]. In total, 971 participants, or 74%, completed the full customer experience survey. A total of 181 participants completed longitudinal surveys (the full customer experience survey and five additional follow-up surveys). Table 2 provides more detail about the number of participants that responded to each event survey.

TABLE 2. SURVEY RESPONSES

	8/21/2018 EVENT	9/5/2018 EVENT	9/13/2018 EVENT	11/28/2018 EVENT	12/6/2018 EVENT	1/15/2019 EVENT
Event Surveys	617	563	494	471	453	446
Response Rate	47%	44%	39%	36%	34%	34%

[8] The ILLUME team invited participants to take the survey three days after the first event and one day after the remaining events for which surveys were sent.

3. FINDINGS

This section provides detailed findings from the BYOT Pilot evaluation.

3.3 KEY FINDINGS

Key findings resulting from all research include:

Key Finding #1. The BYOT Pilot achieved an average demand reduction between 0.83 and 0.91 kW per event per household for the summer DR events and an average demand reduction between 0.68 and 1.16 kW per event per household for winter events. Four of the five winter events had smaller reductions than any of the summer events. The winter event also had variability in reductions between events. Aggregate demand reductions across all BYOT participants ranged from 1,032 kW to 1,124 kW for summer events. Aggregate demand reductions for the winter events ranged from 826 kW to 1,409 kW.

Key Finding #2. Across all participants the pilot achieved energy savings between 1,849 and 2,085 kWh per event day for the summer DR events while winter energy impacts ranged from an increase in usage by 462 kWh to a savings of 3,681 kWh across all participants per event day. While energy use increased in the pre-and post-event phases, in all but one event, these increases did not offset the reductions during the event phase, resulting in energy savings on eight out of nine event days.

Key Finding #3. Respondents were highly satisfied with Georgia Power and the Rush Hour Rewards program. Across the DR events, survey respondents gave Georgia Power a mean satisfaction rating of 4.5 on a 1-to-5 scale, where 1 means *not at all satisfied* and 5 means *completely satisfied*. Survey respondents gave the Rush Hour Rewards program a similar mean satisfaction rating of 4.4 on the same 1 to 5 scale. The majority of respondents who were less than *completely satisfied* with the program (rating of 4 or lower) cited reasons unrelated to the program such as high bills and power outages. Fewer respondents expressed concerns about the effects of the program on their home, a lack of understanding of the program, or issues with their Nest thermostat.

Key Finding #4. Respondents were satisfied with all aspects of Rush Hour Rewards program. Respondents rated various program components on a 1-to-5 scale, where 1 means *not at all satisfied* and 5 means *completely satisfied*. While respondents were satisfied with all aspects of the program, they were more satisfied with some aspects than others. Participants gave the lower ratings to the enrollment process (mean 4.1) and the report provided after an event (mean ranging from 3.9 to 4.2) and higher mean ratings to how Nest adjusts their thermostat, ease of overriding events, and the amount of notice before an event.

Key Finding #5. Satisfaction with Georgia Power and the Rush Hour Rewards program remains high across DR events and is slightly higher for winter events, suggesting that consecutive seasons of DR events do not negatively affect satisfaction. Across the DR events, mean satisfaction ratings for both Georgia Power and the program remained high, between 4.3 to 4.5 and 4.2 to 4.4 respectively, on a 1-to-5 scale, where 1 means *not at all satisfied* and 5 means *completely satisfied*. The mean satisfaction ratings for both Georgia Power and the program captured after the winter events were slightly higher than responses collected after the summer events, suggesting either that winter participation correlates to higher satisfaction and/or that prolonged program participation does not

negatively impact satisfaction. Participants also reported higher satisfaction with the number of DR events, ease of overriding events, and with the post-event report on the winter surveys compared to the summer surveys.

Key Finding #6. Nearly all (95%) of survey respondents would participate in the program if Georgia Power offered it again. In the last three surveys we fielded, we asked respondents if they would enroll in the Rush Hour Rewards program if Georgia Power offers it again in the future, and 95% of respondents indicated they would.[9]

Key Finding #7. The rates at which respondents reported disruption to routines, negative effects, or discomfort as a result of the DR events remained consistently low across events and seasons. Across all events, only between 5% to 7% of respondents noted a negative effect as a result of the adjustments to their thermostat. Specifically, between 9% to 15% of respondents noted discomfort with the temperature being too hot in the summer or too cold in the winter. Very few participants (between 3% and 6% for each event) noted disruption to routines including cooking and cleaning when returning home (during summer events), getting ready for work in the morning (during winter events), sleep, and activities involving children (i.e. sleeping babies).

Key Finding #8. Participants opted out of DR events at higher rates during winter than summer, however, across seasons, opt-outs typically occurred with less than an hour left of the three-hour event. On average, 12% of participants opted-out of winter events and 4% opted out of summer events. The ILLUME team found that unique devices generally did not opt out of multiple events during this pilot, meaning the same participants did not repeatedly override events. Our review of existing research suggests there are a few reasons beyond discomfort for opting out of an event, and that opt-outs often occur when there is not much time remaining in an event[10]. Survey respondents were also more likely to be home during the winter events than summer, which could explain the lower completion rate in winter.

Key Finding #9. While respondents were satisfied with the program and Georgia Power overall, several customer comments indicate possible customer misperceptions. Several survey respondents made comments indicating a lack of understanding of some program details, concerns that the program could affect heating/cooling equipment negatively, and frustration in not knowing when to expect the bill credit. Additionally, 32% of respondents were motivated to enroll in the program to save money on energy bills, which does not always happen as a result of DR events outside of time-of-use or peak pricing rate designs. Notably, a small number of comments also indicated potential issues with events adjusting thermostats for natural gas furnaces or adjusting the temperature more than a few degrees. Even if the DR events did not cause these issues, the participants believe that they did.

Key Finding #10. Survey respondents were least satisfied with the amount of the bill credit compared to other program components, with only 27% indicating they were *completely satisfied* and 28% indicating they were *moderately satisfied* with the amount of the bill credit. Among the various program components for which satisfaction was measured, the bill credit received the fewest *completely satisfie*d ratings. While not a major source of dissatisfaction, some respondents (n=6) were confused about when to expect the bill credit and two respondents said the amount of the bill credit affected their satisfaction with Georgia Power overall.

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[9] 590 respondents took at least one of the winter surveys.

[10] Navigant Consulting and ILLUME Advising, "Understanding the Role of Weather in Air Conditioning Use Behavior and Demand Response Program Participation (BEH 2)," 2018.

Key Finding #11. There is a subset of participants highly likely to take additional energy-saving actions during DR events. Between 62% and 76% of longitudinal respondents reported taking at least one additional action across the six survey events and between 45% and 60% reported taking two or more actions. These actions included: adjusting the thermostat temperature in the efficient direction; shutting of the HVAC system or pool equipment; avoiding doing laundry, dishes, or cooking; or turning off lights, office equipment, or entertainment systems.

Key Finding #12. Data limitations constrained the types of analysis the team could perform and may have affected the impacts detected by the analysis. The interval meter data available for this analysis contained integer values in hourly intervals which can obscure changes in energy demand and use because residential customers frequently use less than 1 kWh per hour. Additionally, we were unable to link the Nest thermostat data to the Georgia Power interval meter data to provide additional context for understanding impact results because of a restriction in the Nest contract that did not allow Nest to provide a common identifier to ILLUME.

3.4 DESIGN & EVALUABILITY CONSIDERATIONS

For future BYOT DR pilots or programs, the team provides the following program design, data needs, and metrics considerations.

DATA CONSIDERATIONS

Different types of data will facilitate impact and process evaluations, depending on the goals and needs of those evaluations. Below we outline the uses of different types of data to support the evaluation of BYOT DR programs.

Interval meter data are needed to calculate demand reductions. Because interval meter data capture all energy use in the home, higher resolution data captured at shorter time-intervals improve the ability to detect the impact of BYOT DR programs. Hourly data are often insufficient when analyzing impacts of programs with small effects or that start/end on the quarter or half hour. In these instances, shorter interval data (e.g. 15-minute) may be needed to detect impacts. Additionally, because residential customers frequently use less than 1 kWh per hour, integer values for interval meter data will obscure small changes in energy demand and use. Decimal reads for interval data enable greater accuracy in determining changes in energy use.

Device data: Runtime data show the impact of the event on HVAC system run-time, indicating the more direct cause and effect between a DR event and the heating and cooling systems. While we need to make assumptions about system capacities in order to convert run-time reductions to demand reduction, runtime data are informative in the assessment of program impacts.

Device data: Other data such as indoor air temperature, device type, and participation status provide context for better understanding impact results. To leverage this data in analysis requires being able to link device data to the interval meter data via some type of customer account information.

PROGRAM DESIGN CONSIDERATIONS TO FACILITATE IMPACT CALCULATIONS

The current BYOT Pilot used a *within subject baseline* approach to establish the counterfactual — an estimate of what participants' energy demand would have been during the event period in the absence of the event. By

comparing actual metered demand to the counterfactual, we estimate the impact of the event on demand. However, the fact that events occur on the most extreme weather days can complicate establishing the counterfactual by using participants' energy use from other days. We suggest three approaches below. Each has advantages and considerations, so the best option will depend on the future pilot/program considerations.

Within-subject baseline (used in this evaluation) approach uses participants' data from similar non-event days (based on weather) to establish the counterfactual.

> Advantages: Allows the program to include all participants in every event and to hold events on all of the most extreme weather days.
>
> Considerations: Since non-event days can be dissimilar to event days (which are by definition, extreme), modeling needs to consider approaches such as matching on non-event hours, including additional weather metrics, adjusting the baseline, or other approaches to adjust for the differences in event and non-event days.

Participant experimental design splits participants into treatment and control groups for each event and uses the control group demand and energy use as the counterfactual.

> Advantages: The experimental design (assuming groups are balanced) enables simpler modeling and more confidence in the baseline since the baseline is the event day.
>
> Considerations: Since some customers will be part of the control group, the program will not be using all available resources on days when they may be most needed. The size of the control group should be determined through a power analysis taking into consideration the size of the participant group, participation rates, average effect sizes, and variability in effect. The random assignment should take into consideration factors that may affect impacts such as device type, geography, and average energy use to ensure the treatment and control groups are balanced.

Control day approach identifies days that are eligible for events and then randomly assigns a subset as control days. These control days are leveraged for establishing the baseline possibly with other non-eligible, non-event days.

> Advantages: The control days will have similar extreme weather to the event days, providing a baseline of like days to leverage as a counterfactual. All customers participate on event days.
>
> Considerations: This approach is only possible if the demand response resources are not needed on some extreme weather days.

METRICS

Below we list several metrics that will aid in assessing a BYOT DR program from the utility and customer perspective.

- Recruitment: Number of customers signing up for program and number who un-enroll
- Demand reductions per household and per event
- Energy use over entire event (pre, event, post) compared to baseline
- Device participation and reasons for not participating (connection issue, wrong mode, voluntary opt-out, etc.)

- Customer satisfaction with the program (satisfaction with the enrollment process, incentive, number of events, ease of overriding events, amount of notice before events, how the program adjusts temperature settings)

3.5 DETAILED FINDINGS

PILOT PERFORMANCE

Georgia Power did not set specific performance metrics, aside from recruitment, for its BYOT Pilot, and initially targeted 3,000–5,000 participants. The program, however, fell short of its recruitment goals and proceeded with 1,318 participants. Nest attributed this to equipment eligibility requirements and the incentive amount ($50), which was slightly lower than its recommended total of $75 paid in three installments: $25 when enrolling, $25 after the cooling season, and $25 after the heating season.

Georgia Power did successfully meet its objectives for the BYOT Pilot program evaluation of (1) gauging customer understanding and awareness of DR events, (2) identifying actions taken and barriers to action during these events, (3) exploring how DR events affect satisfaction with Georgia Power overall, and (4) evaluating the impact of the BYOT pilot on demand reductions and energy consumption.

IMPACT EVALUATION FINDINGS

In this section, we provide estimated demand reduction and energy savings achieved during the DR events by using hourly AMI data for participating homes. We also assessed the likelihood of double-counted savings (through participation in other Georgia Power energy efficiency programs) and analyzed device participation using the Nest thermostat data.

As noted, the pilot included four summer events between August 16 and September 13 and five winter events between November 28 and January 30. During the summer events, average outdoor temperatures during the event phase were similar across events, ranging from 84.5 to 88.8 degrees Fahrenheit. Average outdoor temperatures during the event phase of winter events were more variable ranging from 37.0 degrees Fahrenheit on January 15, 2019 to 24.9 degrees Fahrenheit on January 30, 2019.

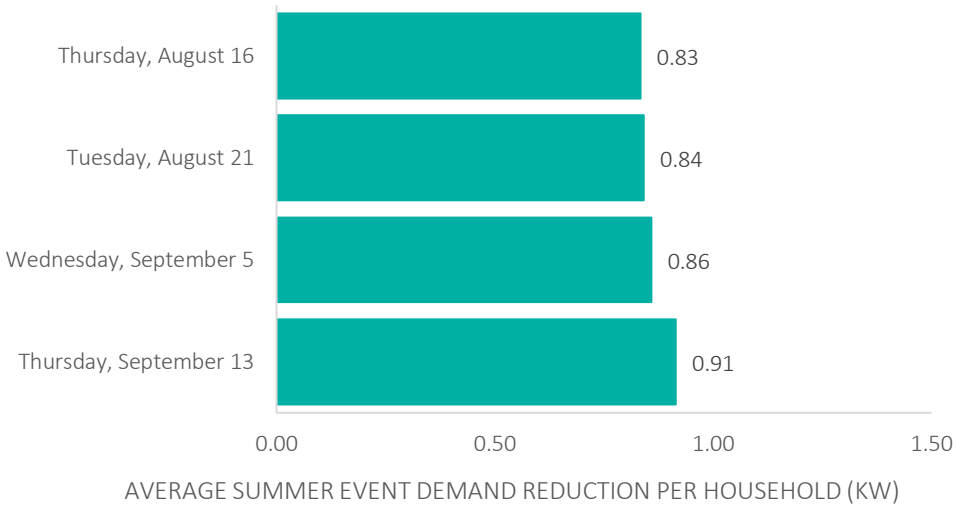
TABLE 3. AVERAGE TEMPERATURES ON EVENT DAYS (°F)

EVENT DATE	PRE-HEATING/ COOLING	EVENT	POST-EVENT
THURSDAY, AUGUST 16	88.7	88.6	84.5
TUESDAY, AUGUST 21	84.7	84.5	81.1
WEDNESDAY, SEPTEMBER 5	87.1	85.9	80.6
THURSDAY, SEPTEMBER 13	88.4	88.8	83.3
WEDNESDAY, NOVEMBER 28	27.8	28.5	35.0
THURSDAY, DECEMBER 6	26.7	33.0	43.3
THURSDAY, JANUARY 10	31.8	31.4	36.0
TUESDAY, JANUARY 15	37.6	37.9	41.3
WEDNESDAY, JANUARY 30	23.5	24.9	33.1

HOUSEHOLD-LEVEL DEMAND REDUCTION

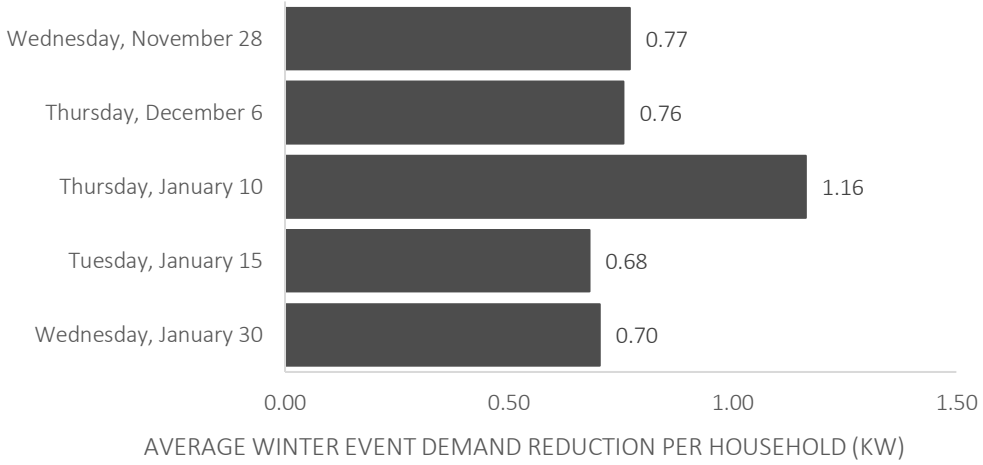
Average household-level demand reductions ranged from 0.83 kW to 0.91 kW for summer events (Figure 1). Demand reductions for the summer events are higher than four out of five of the winter events. Those four winter events had demand reductions that ranged from 0.68 kW to 0.77 kW (Figure 2). The January 10, 2019 event had the highest household-level average demand reduction at 1.16 kW. Given the consistency of impacts from the other four winter events, the team does not recommend using the results of the January 10 event for planning or forecasting. The higher impacts could result from a combination of weather, opt-outs, or poorer performance of the model for fitting the counterfactual. The Regional Technical Forum recently published data from four studies of impacts from winter DR with connected thermostats. Published impacts ranged from 0.7 kW (PGE) to 1.6 kW (BPA Potential Study).[11]

FIGURE 1. ESTIMATED HOUSEHOLD-LEVEL DEMAND REDUCTION BY EVENT: SUMMER



[11] https://nwcouncil.app.box.com/v/20190305DRSubcomPres

FIGURE 2. ESTIMATED HOUSEHOLD-LEVEL DEMAND REDUCTION BY EVENT: WINTER



The pilot affects energy demand in all three phases of the event – pre-event (pre-heating or pre-cooling), event hours, and post-event. Figure 3 and Figure 4 illustrate graphically the increased demand during the pre- and post-event periods and the decrease in demand during the event for example summer and winter days.

FIGURE 3. AVERAGE HOUSEHOLD-LEVEL DEMAND BY EVENT PHASE: AUGUST 21, 2019

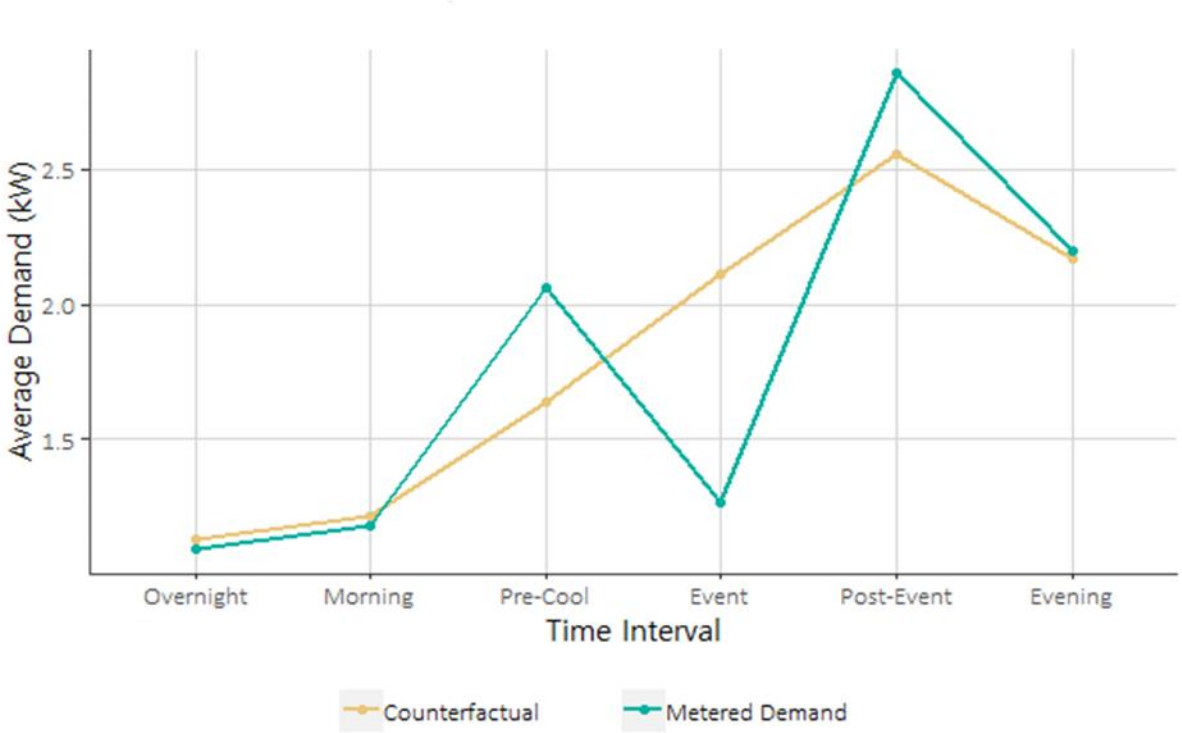


FIGURE 4. AVERAGE HOUSEHOLD-LEVEL DEMAND BY EVENT PHASE: JANUARY 30, 2019

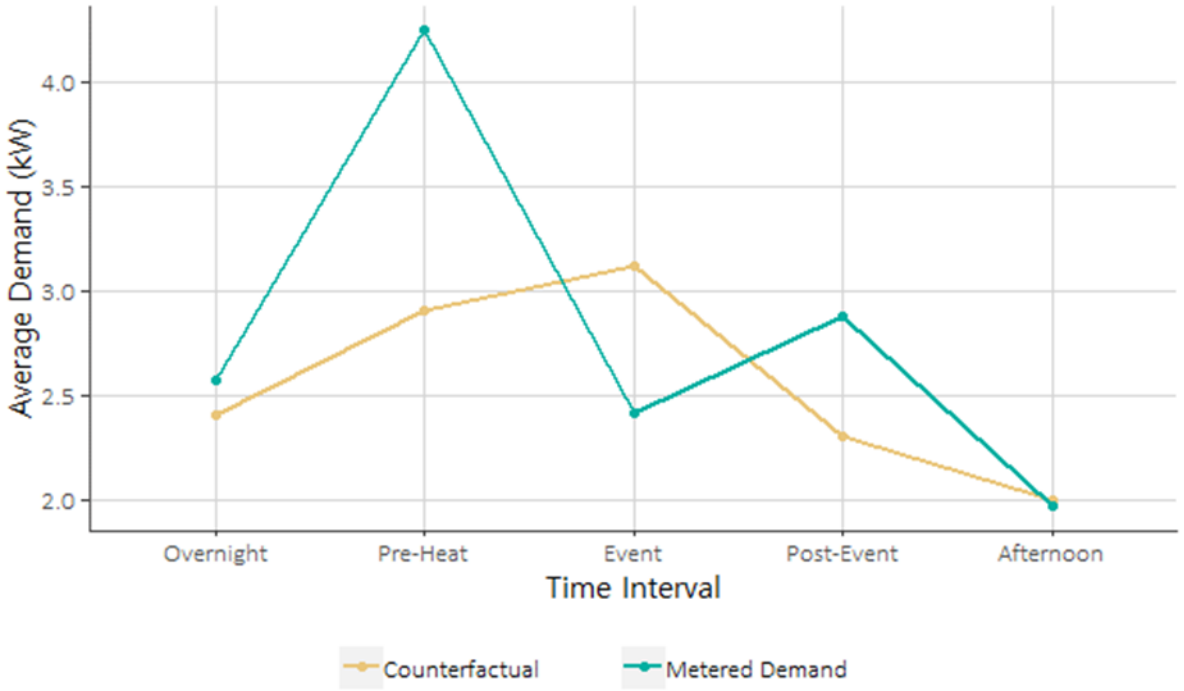


Table 4 and Table 5 show detailed demand impacts for each phase of each event. Notably, the events increase demand during the pre-heating and pre-cooling phases and during the post-event phase. The event on January 30, 2019 displays the largest increase in demand during the pre- and post-event periods. This event day had the coldest temperatures out of all the event and matched non-event days.

TABLE 4. AVERAGE HOUSEHOLD-LEVEL HOURLY IMPACTS: SUMMER EVENTS

SUMMER HOUSEHOLD DEMAND IMPACT	PRE-COOLING (1 HOUR)		EVENT (3 HOURS)		POST-EVENT (2 HOURS)		ALL EVENT RELATED (6 HOURS)	
	KW/HR	S.E.[1]	KW/HR	S.E.[1]	KW/HR	S.E.[1]	KWH/DAY	S.E.[1]
THURSDAY, AUGUST 16	-0.54	0.03	0.83	0.03	-0.21	0.03	1.54	0.10
TUESDAY, AUGUST 21	-0.42	0.02	0.84	0.02	-0.30	0.02	1.50	0.08
WEDNESDAY, SEPTEMBER 5	-0.60	0.03	0.86	0.03	-0.22	0.03	1.54	0.12
THURSDAY, SEPTEMBER 13	-0.49	0.05	0.91	0.05	-0.28	0.05	1.70	0.17

[1] S.E. represents the standard error of hourly impact estimates.

TABLE 5. AVERAGE HOUSEHOLD-LEVEL HOURLY IMPACTS: WINTER EVENTS

WINTER HOURLY DEMAND IMPACT	PRE-HEATING (1 HOUR)		EVENT (3 HOURS)		POST-EVENT (2 HOURS)		ALL EVENT RELATED (6 HOURS)	
	KW/HR	S.E.[1]	KW/HR	S.E.[1]	KW/HR	S.E.[1]	KWH/DAY	S.E.[1]
WEDNESDAY, NOVEMBER 28	-1.04	0.02	0.77	0.02	-0.42	0.02	0.44	0.08
THURSDAY, DECEMBER 6	-1.03	0.02	0.76	0.02	-0.14	0.02	0.97	0.09
THURSDAY, JANUARY 10	-0.35	0.02	1.16	0.02	-0.06	0.02	3.03	0.09
TUESDAY, JANUARY 15	-1.24	0.06	0.68	0.06	0.22	0.06	1.25	0.24
WEDNESDAY, JANUARY 30	-1.34	0.03	0.70	0.02	-0.58	0.02	-0.38	0.09

[1] S.E. represents the standard error of hourly impact estimates.

HOUSEHOLD-LEVEL ENERGY IMPACTS

Across the entire six-hour event periods, participants saved, on average, 1.50 kWh to 1.70 kWh for each summer event, with very similar savings in the first three events and slightly higher savings in the last event (Table 4). Winter events had a more variable effect on total event-related energy use: Energy savings varied from a high of average household savings of 3.03 kWh on January 10, 2019 to an increase in average household energy consumption of 0.38 kWh for the Wednesday, January 30, 2019 event (Table 5). As noted, January 30 had the coldest temperatures across all days included in the analysis. As a result, we observe the largest modeled increases in consumption during the pre-heating, and post-event periods on January 30. So, while event-phase impacts had similar magnitude to several other event days, usage outside the event phase was abnormally high, likely due to the outdoor temperatures.

PROGRAM POPULATION-LEVEL DEMAND REDUCTIONS AND ENERGY IMPACTS

Aggregate demand reductions across all modeled homes were similar for the four summer events, ranging from 1,032 kW to 1,124 kW (Table 6).[12] The summer event with the largest demand reduction (1,124 kW) occurred on Thursday, September 13.

Aggregate demand reductions for the winter events ranged from 826 kW to 1,409 kW (Table 7). Four of the five events achieved similar demand savings, ranging from 826 kW to 935 kW. The largest demand reduction (1,409 kW) occurred on Thursday, January 10..

Aggregate energy savings across all three event phases from summer events ranged from 1,849 kWh to 2,085 kWh. For winter events energy impacts ranged from an increase in energy consumption of 462 kWh to a decrease in

[12] The aggregate demand reduction includes homes in the modeling but does not include homes removed in data cleaning.

energy consumption of 3,681 kWh[13]. The more variable winter results parallel the more variable winter temperatures both between event phases and between events.

TABLE 6. AVERAGE POPULATION-LEVEL HOURLY IMPACTS: SUMMER EVENTS

SUMMER POPULATION DEMAND IMPACT	PRE-COOLING (1 HOUR)		EVENT (3 HOURS)		POST-EVENT (2 HOURS)		ALL EVENT RELATED (6 HOURS)	
	KW/HR	S.E.[1]	KW/HR	S.E.[1]	KW/HR	S.E.[1]	KWH/DAY	S.E.[1]
THURSDAY, AUGUST 16	-672	34	1,032	34	-261	34	1,900	128
TUESDAY, AUGUST 21	-517	25	1,039	25	-373	25	1,849	94
WEDNESDAY, SEPTEMBER 5	-737	41	1,061	41	-272	41	1,896	153
THURSDAY, SEPTEMBER 13	-598	57	1,124	57	-343	57	2,085	212

[1] S.E. represents the standard error of hourly impact estimates.

TABLE 7. AVERAGE POPULATION-LEVEL HOURLY IMPACTS: WINTER EVENTS

WINTER POPULATION DEMAND IMPACT	PRE-HEATING (1 HOUR)		EVENT (3 HOURS)		POST-EVENT (2 HOURS)		ALL EVENT RELATED (6 HOURS)	
	KW/HR	S.E.[1]	KW/HR	S.E.[1]	KW/HR	S.E.[1]	KWH/DAY	S.E.[1]
WEDNESDAY, NOVEMBER 28	-1,263	24	935	24	-510	24	534	97
THURSDAY, DECEMBER 6	-1,249	24	922	24	-170	24	1,177	109
THURSDAY, JANUARY 10	-425	24	1,409	24	-73	24	3,681	109
TUESDAY, JANUARY 15	-1,507	73	826	73	267	73	1,519	292
WEDNESDAY, JANUARY 30	-1,629	36	851	24	-705	24	-462	109

[1] S.E. represents the standard error of hourly impact estimates.

DOUBLE-COUNTED SAVINGS

We found little participation in other energy efficiency programs during the time periods used for baseline day selection. Table 8 lists the count of BYOT participants who also participated in other programs after August 1, 2018, for the summer events and after November 26, 2018, for the winter events. The largest share of cross participation comes from additional Nest products. Since BYOT participants already have a Nest thermostat, this additional purchase may not be for their primary residence. While some participants may be installing a second thermostat, some of these devices may have been given as gifts or for a secondary residence.

Given the uncertainty around how customers are using these purchases, we do not recommend any double-counted impacts adjustments for the additional Nest or other thermostat purchases. Leaving out thermostat purchases, the BYOT pilot customers with participation in other energy efficiency programs comprise less than 1%

[13] The aggregate energy savings across all modeled homes (those not removed in cleaning process) reflects the average savings per hour across the pre- event, and post-event phases, weighted by the number of hours in each of these phases and expanded to all homes in the sample that were valid for use in the adjusted baseline models.

of the BYOT pilot population. The impact of possible double-counted demand reductions or energy savings during the event days is negligible.

TABLE 8. CROSS-PARTICIPATION WITH OTHER GEORGIA POWER PROGRAMS

PROGRAM NAME	NUMBER OF CROSS PARTICIPANTS – SUMMER EVENTS	NUMBER OF CROSS PARTICIPANTS – WINTER EVENTS
Water Heater DR Pilot	1	1
Home Energy Improvement Program	1	0
HVAC Service	0	1
Refrigerator Recycling Program	3	2
Marketplace – Lighting	7	0
Marketplace – Nest Products	15	5
Marketplace – Other thermostats	1	0
Total count of cross participants	27[1]	9

[1] One customer had cross-participation in both the Marketplace and Refrigerator Recycling Program.

ANALYSIS OF EVENT PARTICIPATION

According to the Nest thermostat data, which is available at the device level rather than premise, on average 1,470 devices participated in and completed each event. The Nest data also show that an average of 86% of devices completed each event. The summer events have a higher average completion rate (93%) than the winter events (80%). Table 9 provides participation details for each of the DR events.

TABLE 9: EVENT PARTICIPATION AND COMPLETION RATE* BY EVENT FROM NEST DATA

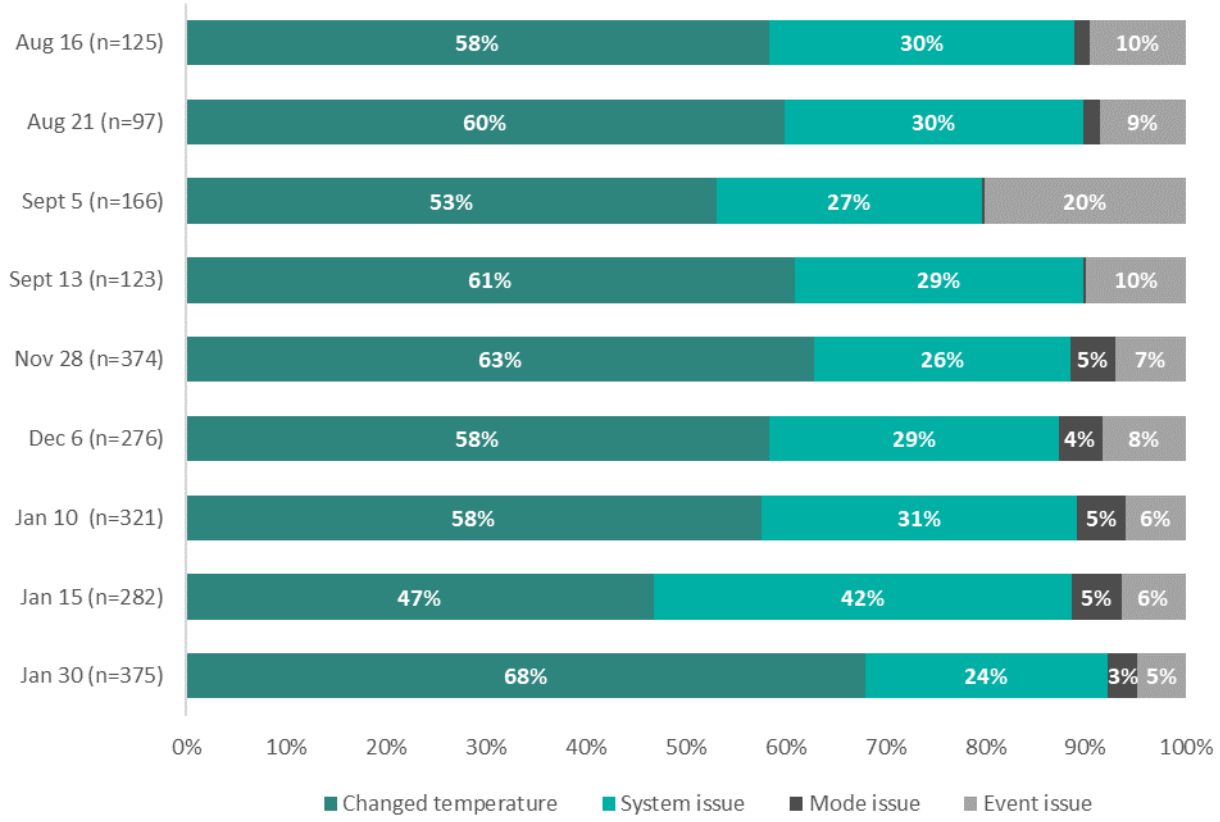
	AUG 16	AUG 21	SEPT 5	SEPT 13	SUMMER AVERAGE	NOV 28	DEC 6	JAN 10	JAN 15	JAN 30	WINTER AVERAGE
Number devices sent event	1,811	1,818	1,823	1,811	1,816	1,636	1,533	1,563	1,680	1,699	1,622
Number completed	1,686	1,721	1,657	1,688	1,688	1,262	1,257	1,242	1,398	1,324	1,297
Opt-out rate	4%	3%	5%	4%	4%	14%	10%	12%	8%	15%	12%
Total non-complete rate	7%	5%	9%	7%	7%	23%	18%	21%	17%	22%	20%
Completion rate	93%	95%	91%	93%	93%	77%	82%	79%	83%	78%	80%

*ILLUME calculated the completion rate as the percentage of devices sent an event whereas the Nest Rush Hour Event Summary reports provide a completion rate calculated as the percentage of devices that started an event which discounts devices that could not participate because they were offline or experiencing mode issues.

There are several reasons individual devices may not complete an event such as system error (e.g. device was off at event start time or during event), event issue (e.g. the device received the event late because it was not online at event start time), manual temperature change in the inefficient direction, or a Nest mode error (e.g. the device

was in cooling during a winter event). We provide the full description from Nest and the broad categories in APPENDIX B. As shown in Figure 5, the most common reason for not completing a DR event was manually opting out by changing the temperature. The second most common reason was a system issue like the Nest being off during the start of the event.

FIGURE 5: NON-COMPLETE REASON BY EVENT



For the participants who changed the temperature during the event, the average indoor temperature when they opted out was about 75 degrees Fahrenheit during the summer events and 68 degrees Fahrenheit during the winter events, which is similar to the average temperatures of those that completed the events. Table 10 compares the indoor air temperature of devices that opted out of an event by adjusting the temperature to those that completed the event.

TABLE 10: AVERAGE INDOOR TEMPERATURE BY EVENT COMPLETION

	AUG 16	AUG 21	SEPT 5	SEPT 13	NOV 28	DEC 6	JAN 10	JAN 15	JAN 30
Opted out	75.2 (n=125)	75.2 (n=97)	75.2 (n=166)	75.1 (n=123)	68.5 (n=374)	68.4 (n=276)	68.6 (n=321)	68.2 (n=282)	68.5 (n=375)
Completed event	75.6 (n=1,686)	75.6 (n=1,721)	75.6 (n=1,657)	75.6 (n=1,688)	67.3 (n=1,262)	67.3 (n=1,257)	67.3 (n=1,242)	67.4 (n=1,398)	67.3 (n=1,324)

Note: Temperatures shown in Fahrenheit

Devices that eventually opted out generally participated for two hours prior to opting out of an event (Table 11). On average, participants had less than an hour left of the event when they changed the temperature on their Nest thermostat. This is consistent with other thermostat DR events that we have researched which list three primary reasons for opting out of events: (1) customers may not know that they are "opting out" of an event by changing the temperature on their device, (2) if customers knew that the event was only an hour longer, they may be less inclined to opt out, or (3) customers may have an uncommon event like a dinner party or guests that forces them to opt out when they otherwise would not.[14] The first does not apply in the case of the Rush Hour Rewards program as both the mobile app and device alert the user that they will be discontinuing the Energy Rush Hour and ask for confirmation before adjusting temperature, but the other reasons could apply.

TABLE 11: AVERAGE TIME IN EVENT BEFORE OPTING OUT

	AUG 16 (n= 125)	AUG 21 (n= 97)	SEPT 5 (n= 166)	SEPT 13 (n= 123)	NOV 28 (n= 374)	DEC 6 (n= 276)	JAN 10 (n= 321)	JAN 15 (n= 282)	JAN 30 (n= 375)
Time before opting out	2.4	2.6	2.5	2.5	2.2	2.0	2.3	2.2	2.2

Very few devices opted out of multiple events; 2% of devices opted out of all summer events and 3% opted out of all winter events. No devices opted out of all nine events. Repeat opt-outs were higher in winter than summer, 17% of devices in the winter opted out of two or more events and 12% opted out of two or more summer events. The majority of devices that opted out of an event only opted out of one or two events (24% of devices in the summer and 33% in the winter).

TABLE 12: NUMBER OF OPT-OUTS*

NUMBER OF EVENTS	% OF SUMMER DEVICES (n= 1,570)	% OF WINTER DEVICES (n= 1,335)
Completed all events	71%	59%
Opted out of one event	17%	24%
Opted out of two events	7%	9%
Opted out of three events	3%	4%
Opted out of four events	2%	3%
Opted out of five events (winter only)	-	1%

*Table includes those who *Completed* the event and those who opted out, or *Temperature Change*. All other reasons for not completing the event were not included in the calculation.

PROCESS EVALUATION FINDINGS

In this section, we report findings from the post-event participant surveys described in Section 2.2 Evaluation Activities. We report event-specific findings based on all surveys for each event, but when examining the impact of the program over time, we based our findings only on those surveys from respondents that completed all six surveys (referred to as longitudinal respondents). Otherwise, the event-specific results are considered static and should be read as stand-alone statistics. It should be noted that compared to respondents that took fewer than 6 surveys,

[14] Navigant Consulting and ILLUME Advising, "Understanding the Role of Weather in Air Conditioning Use Behavior and Demand Response Program Participation (BEH 2)," 2018.

respondents that took all six surveys were: more likely to be home during the event, allow Nest to adjust their temperature during an event (participate in the event), more satisfied with the program and Georgia Power overall, more likely to have income of $100,000/year or more, and more likely to be white. There were not significant differences in the educational levels of the two groups of respondents. The evaluation team arrived at this decision based on results of an attrition analysis explained in greater detail in APPENDIX A.

DEMAND RESPONSE EVENT EXPERIENCE

EVENT NOTIFICATION

Nest notifies Rush Hour Rewards participants of a DR event or *"Energy Rush Hour"* prior to an event through the mobile app and on the Nest device. The thermostat continues to display *"Rush Hour"* throughout the event and if the user changes the temperature they are asked if they would like to stop participating in the Rush Hour. After the event, participants can access information about the event through the mobile app or an emailed report.

Each survey asked respondents if they remembered receiving any messages from Nest regarding an Energy Rush Hour and if they remembered being notified for the specific event directly prior to the survey.[15] The majority of respondents remember receiving messages from Nest notifying them of Energy Rush Hours in general through the mobile app or Nest display but fewer were able to recall the specific notification for the event directly prior to the survey (Table 13). There were no significant effects of time or season on recall of event notifications among longitudinal respondents.

TABLE 13: FULL SURVEY AWARENESS OF NEST NOTIFICATIONS BY EVENT

	AUG 21 (n=617)	SEPT 5 (n=563)	SEPT 13 (n=494)	NOV 28 (n=471)	DEC 6 (n=453)	JAN 15 (n=446)
Remember any event notification	88%	92%	91%	94%	96%	93%
Remember specific event notification	69%	72%	81%	78%	80%	85%

Source: Survey Question C3. "Have you received any messages from Nest notifying you of an Energy Rush Hour through the mobile app or the Nest display?" and Question C5. "Do you remember getting notified for an Energy Rush Hour on [Event Date and Time]?"

As noted previously, Nest notified participants of DR events through the mobile app and the thermostat display and sent a post-event report through email. For all events, the largest percentages of respondents received the event notification through the mobile app, and smallest received the post-event email. The longitudinal analysis showed that significantly more respondents saw the device notification in winter than in summer, which may be expected as respondents were significantly more likely to be home during the winter events ($p < 0.10$).

Based on the respondents included in the longitudinal analysis, the proportion of those who received the notification before the event increased with each event and is higher in winter than summer (Table 14). This could be a function of becoming more familiar with the program and being more aware of event notifications or of the greater likelihood of being home during winter event times.

[15] All event surveys launched one to three days after the event.

TABLE 14: WHEN LONGITUDINAL RESPONDENTS RECALL RECEIVING NOTIFICATION BY EVENT

	AUG 21 (n=130)	SEPT 5 (n=139)	SEPT 13 (n=151)	NOV 28 (n=149)	DEC 6 (n=149)	JAN 15 (n=159)
Before event	91%	86%	86%	91%	97%	98%
During event	25%	24%	21%	24%	24%	25%
After event	3%	3%	5%	3%	6%	4%
Unsure	4%	6%	4%	3%	1%	0%

Source: Survey Question C7. "Did you get a notification before, during, and/or after the Energy Rush Hour?" (Multiple responses allowed)

EVENT PARTICIPATION

Compared to opt-out rates calculated with the Nest thermostat data, which accounts for all program participants, self-reported opt-out rates are slightly higher for the summer events and substantially lower for the winter events. For all six surveyed events, the majority of survey respondents indicated they let Nest adjust their thermostat during the event, therefore not opting out (Table 15). This difference in opt-out rates could imply that the general survey population may not be representative of the full Georgia Power Rush Hour Rewards program population or that respondents misstate or misremember their participation.

TABLE 15: FULL SURVEY COMPLETION RATES BY EVENT

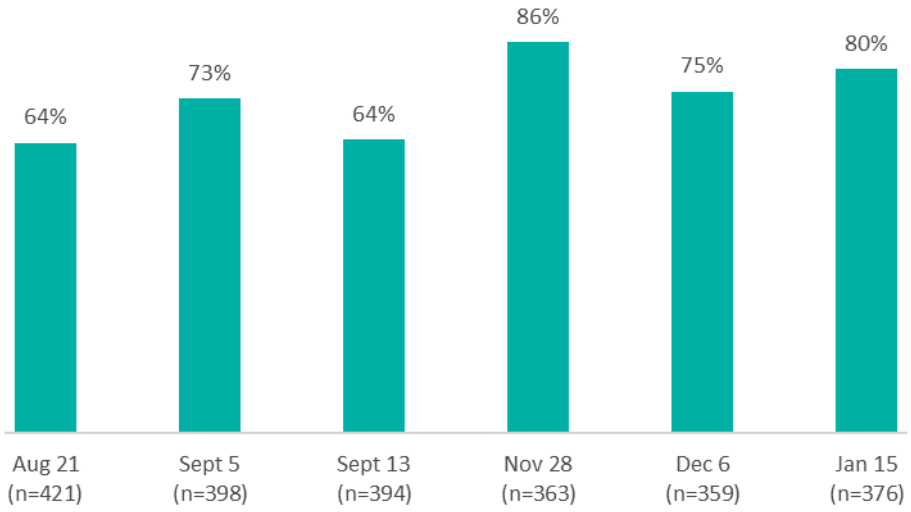
	AUG 21 (n = 617)	SEPT 5 (n = 563)	SEPT 13 (n = 494)	NOV 28 (n = 471)	DEC 6 (n = 453)	JAN 15 (n = 446)
Opted out of event	8.3%	7.3%	8.6%	4.7%	7.7%	3.4%
Did not opt out of event	91.7%	92.7%	91.4%	95.3%	92.3%	96.6%

Source: Survey Question C8. "What did you do after getting the notification about the Energy Rush Hour?"

EVENT EXPERIENCE

The majority of respondents were home for part or all of the event (at least 64% of respondents were home for each of the surveyed events). The highest number of respondents who reported they were home during the event was for the first winter event on November 28, 2018. Based on the longitudinal analysis, we found that respondents were statistically more likely to be at home during the winter events than the summer events ($p < 0.10$). This makes sense given that the winter events occurred in the morning (between 6 a.m. and 10 a.m.).

FIGURE 6. PERCENTAGE OF RESPONDENTS HOME DURING PART OR ALL OF EVENT BY EVENT

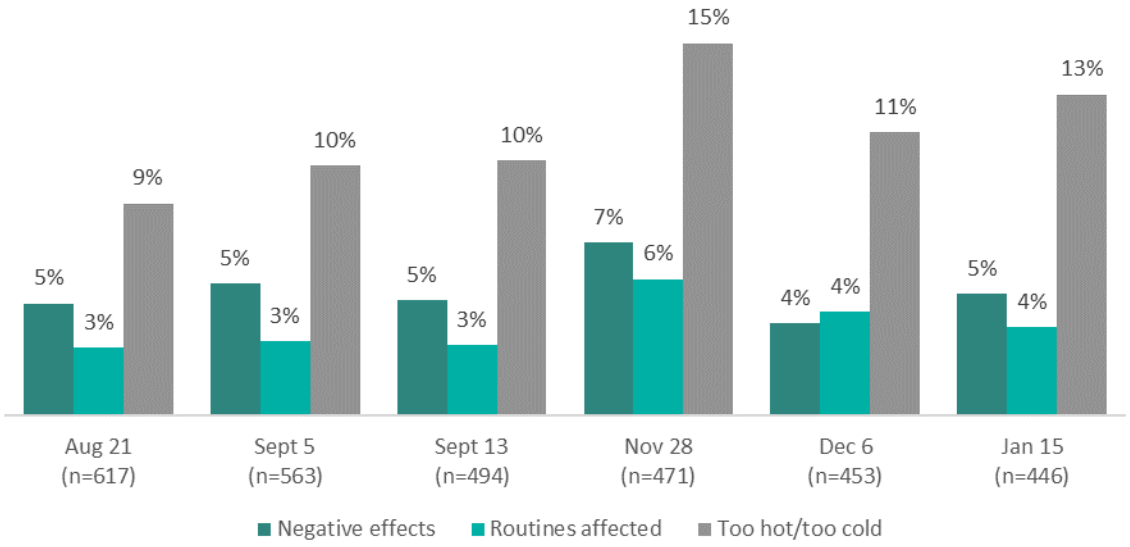


Source: Survey Question C9. "Again, thinking about the most recent Energy Rush Hour on [Event Date and Time] were you…At home during the entire Energy Rush Hour, At home part of the time or Not at home during the event?" Base = respondents who were aware the Energy Rush Hour took place.

Generally, respondents reported little disruption in routines, negative effects or discomfort due to temperature as a result of the DR events. Respondents most frequently reported discomfort due to temperatures (too hot in summer and too cold in winter), but across all events this represented 15% or fewer respondents (Figure 7). Among longitudinal respondents, there were no significant differences between seasons.

Few respondents said the event affected their routines; the responses ranged from 3% (summer events) to 6% (November 28 event). Routines that were affected were cooking and cleaning when returning home (during summer), getting ready for work in the morning (during winter), sleep, and activities involving children (i.e. sleeping babies). Based on the open-ended questions, a few survey respondents were taken aback by the cold temperature when they woke up during the first ever winter event. For example, one respondent said, "Our downstairs thermostat was at 55 when we woke up—the dogs were freezing. I had to turn up the heat on that Nest." For each event, between 5% and 7% of respondents reported experiencing any negative effect as a result of having their temperature adjusted.

FIGURE 7: EVENT EFFECTS ON ALL RESPONDENTS



Sources: Survey Question C10. "Were you or anyone in your home uncomfortably [If summer then "hot"; if winter then "cold"] during the most recent Energy Rush Hour on [event date]?"; Survey Question C12. "Were any routines in your home affected by this Energy Rush Hour?" Survey Question C14. "Did you or others in your home experience any negative effects as a result of having your thermostat's setting changed through the Energy Rush Hour?" Base = full event population.

Further, as shown in Table 16 and Table 17, the proportion of respondents reporting any disruption in routine, negative effects, or discomfort because of the DR events remained consistently low across the events. Among longitudinal respondents, the proportion of respondents who faced any negative effect (responding *yes* to uncomfortably cold or hot, routines affected, or any negative effects) did not change over time or by season.

TABLE 16: NEGATIVE IMPACTS OF EVENTS ON ALL RESPONDENTS BY EVENT

	AUG 21 (n = 617)	SEPT 5 (n = 563)	SEPT 13 (n = 494)	NOV 28 (n = 471)	DEC 6 (n = 453)	JAN 15 (n = 446)
Faced any negative effect from the event	17%	18%	15%	21%	15%	17%

TABLE 17: NEGATIVE IMPACTS OF EVENTS ON LONGITUDINAL RESPONDENTS BY EVENT

	AUG 21 (n = 182)	SEPT 5 (n = 182)	SEPT 13 (n = 182)	NOV 28 (n = 182)	DEC 6 (n = 182)	JAN 15 (n = 182)
Faced any negative effect from the event	12%	15%	12%	15%	13%	13%

ADDITIONAL ACTIONS TAKEN DURING EVENTS

While the program communications did not specifically ask participants to take additional actions during times of high energy use, we asked respondents if they took any additional energy saving actions after getting the event notification, like avoiding doing laundry or cooking, during the event. Overall, 30% or fewer respondents took at least one additional energy-saving action during the DR events. There is a significant difference between the

longitudinal and non-longitudinal respondents for taking any energy saving action during the event. Those in the longitudinal analysis are statistically more likely than those not in the longitudinal analysis, in each event, to have taken any energy saving action ($p < 0.10$). As noted, these respondents were also significantly more likely to be home during the event.

TABLE 18: ADDITIONAL ACTIONS TAKEN DURING EVENT BY EVENT

	AUG 21 (n = 617)	SEPT 5 (n = 563)	SEPT 13 (n = 494)	NOV 28 (n = 471)	DEC 6 (n = 453)	JAN 15 (n = 446)
Any action taken during event	30%	29%	27%	29%	30%	28%
Two or more actions taken during event	24%	23%	21%	23%	23%	23%

Sources: Survey Question C11. "Did you take any of the following actions during the last Energy Rush Hour?" Base = full event population.

TABLE 19: ADDTIONAL ACTIONS TAKEN BY LONGITUDINAL RESPONDENTS DURING EVENT BY EVENT

	AUG 21 (n = 182)	SEPT 5 (n = 182)	SEPT 13 (n = 182)	NOV 28 (n = 182)	DEC 6 (n = 182)	JAN 15 (n = 182)
Any action taken during event	70%	76%	64%	66%	62%	68%
Two or more actions taken during event	60%	58%	51%	48%	45%	51%

Source: Survey Question C11. "Did you take any of the following actions during the last Energy Rush Hour?" Base = longitudinal respondents.

SATISFACTION WITH THE PROGRAM AND GEORGIA POWER

PROGRAM SATISFACTION

Respondents were satisfied with the Rush Hour Rewards program overall and its components. The average program satisfaction rating after each event ranges from 4.2 to 4.4 (on a scale of 1 to 5 where 1 is *not at all satisfied* and 5 is *completely satisfied*). Table 20 shows the mean ratings for each of the various program components after each event. Respondents gave some of the lowest satisfaction ratings, relative to others, for the report they receive after an Energy Rush Hour. Scores range from 3.6 (September 5 event) to 4 (all winter events). On the other hand, ease of overriding an Energy Rush Hour had some of the highest satisfaction ratings, ranging from 4.7 in the summer events to 4.8 in the winter events. All other components (number of Energy Rush Hours, how Nest adjusts thermostat during Energy Rush Hours, and the amount of notice before Energy Rush Hours) had satisfaction scores between 4.3 (number of Energy Rush Hours and amount of notice before Energy Rush Hour) and 4.5 (all three categories).

TABLE 20: MEAN SATISFACTION WITH PROGRAM COMPONENTS BY EVENT

	AUG 21	SEPT 5	SEPT 13	NOV 28	DEC 6	JAN 15
Number of Energy Rush Hours	4.2 (n = 593)	4.3 (n = 555)	4.4 (n = 492)	4.5 (n = 470)	4.5 (n = 452)	4.4 (n = 440)
How Nest adjusts thermostat during Energy Rush Hours	4.3 (n = 595)	4.4 (n = 563)	4.5 (n = 491)	4.5 (n = 470)	4.5 (n = 451)	4.5 (n = 439)
Ease of overriding Energy Rush Hours	4.6 (n = 594)	4.6 (n = 555)	4.7 (n = 491)	4.7 (n = 468)	4.8 (n = 451)	4.8 (n = 440)
Amount of notice before Energy Rush Hours	4.3 (n = 595)	4.3 (n = 554)	4.3 (n = 491)	4.5 (n = 470)	4.5 (n = 452)	4.5 (n = 440)
Report you receive after an Energy Rush Hour	3.9 (n = 595)	3.8 (n = 553)	4.0 (n = 491)	4.1 (n = 470)	4.2 (n = 450)	4.2 (n = 440)
Rush Hour Rewards program	4.2 (n = 595)	4.2 (n = 554)	4.4 (n = 491)	4.4 (n = 469)	4.4 (n = 450)	4.4 (n = 438)

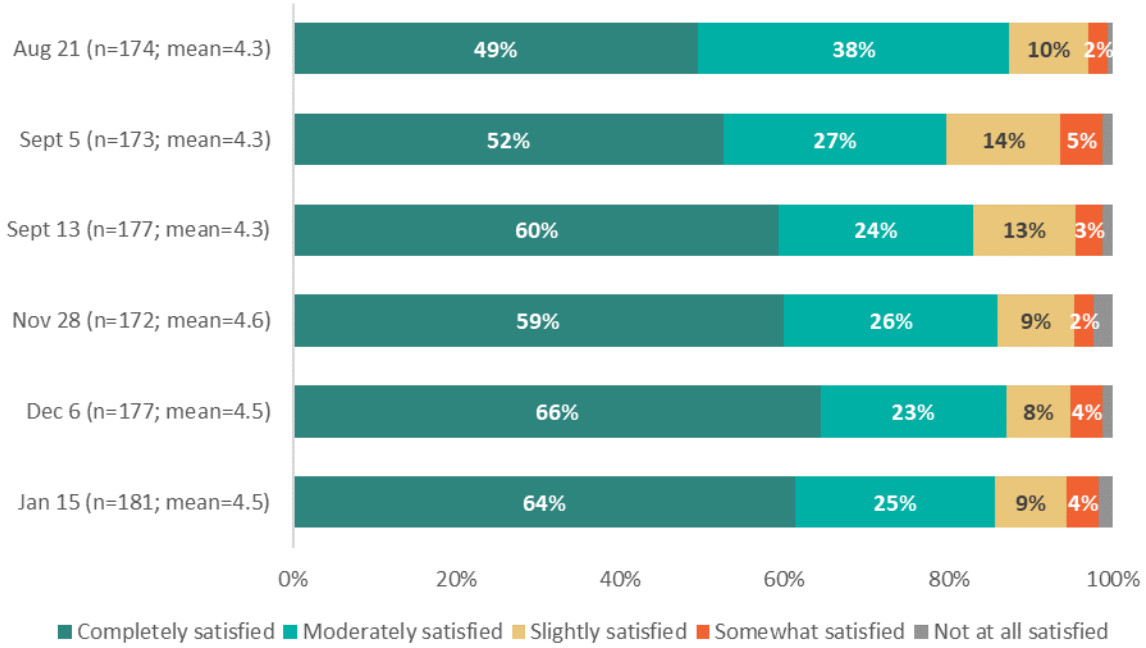
Source: Survey Question E1. Please rate your satisfaction with each of the following aspects of the Rush Hour Rewards program using a 1-to-5 scale where 1 is *not at all satisfied* and 5 is *completely satisfied*.

Among the longitudinal respondents, satisfaction with Rush Hour Rewards increased between the summer and winter events (Figure 8). There is a statistically significant increase in the mean program satisfaction in the winter events.[16] For winter, longitudinal respondents gave the number of events, ease of overriding, and the report significantly higher ratings than they did summer events.[17]

[16] ($F = 3.032$; $p < 0.10$; numerator df = 1, denominator df = 1052)

[17] All statistically significant at $p < 0.10$. Program satisfaction, ($F = 5.063$; $p < 0.10$; numerator df = 1, denominator df = 1060); ease of overriding events, events ($F = 5.755$; $p < 0.10$; numerator df = 1, denominator df = 934); report received after the event, ($F = 10.392$; $p < 0.10$; numerator df = 1, denominator df = 829).

FIGURE 8. LONGITUDINAL SATISFACTION WITH RUSH HOUR REWARDS BY EVENT



Source: Survey Question E1_G. "Please rate your satisfaction with each of the following aspects of the Rush Hour Rewards program: RHR overall."

On the winter surveys nearly all respondents (95%) said they would participate in the Rush Hour Rewards program again if Georgia Power offers the program in the future.[18] Those who said they would not participate again said that it was too inconvenient (n=2), the incentive was too low (n=3), it did not work with their current rate structure (n=3), or they just generally did not like the program (n=3). The following respondent comments illustrate these sentiments:

> *"Because … the morning rush hour is generally happening at a time when everyone in my house needs to shower, and we need the heat functioning properly to keep the bathrooms and pipes warm."*
>
> *"$100 is not worth the hassle of the program, would need at least $500 to make it worth my while."*
>
> *"Because it's horrible for those on tiered programs i.e. the nights and weekend rate or the EV rate."*

[18] 590 respondents took at least one of the winter surveys. Summer surveys did not include this question.

OVERALL SATISFACTION WITH GEORGIA POWER COMPANY

The overall satisfaction with Georgia Power after each event was high. The majority (ranging from 87% to 95%) of respondents were either *completely or moderately satisfied* with Georgia Power after each event. The mean satisfaction ratings ranged from a 4.3 (September 5 event) to a 4.5 (winter events).

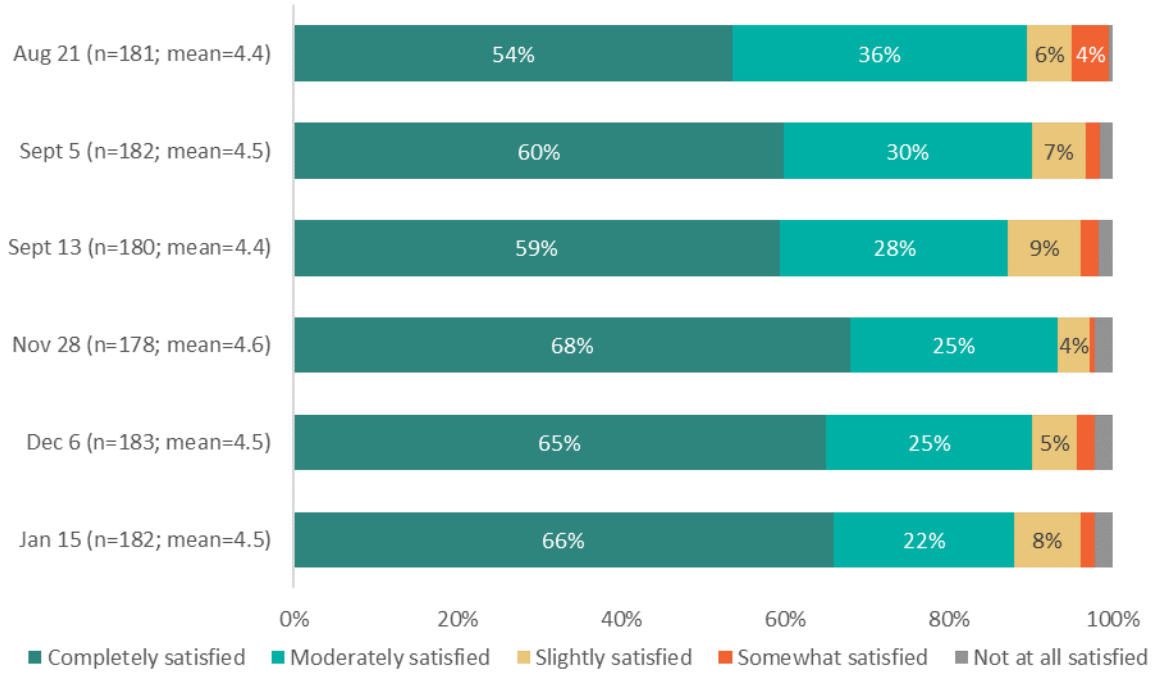
TABLE 21. MEAN SATISFACTION WITH GEORGIA POWER

	AUG 21 (n=594)	SEPT 5 (n=555)	SEPT 13 (n=492)	NOV 28 (n=470)	DEC 6 (n=452)	JAN 15 (n=442)
Mean satisfaction with GPC	4.4	4.3	4.4	4.5	4.5	4.5

Source: Survey Question E2. "Taking into consideration all aspects of your utility service experience, please rate your current satisfaction with Georgia Power overall."

Among longitudinal respondents, satisfaction with Georgia Power increased between the summer and winter events. The small but statistically significant[19] increase suggests that having events in two seasons did not harm satisfaction with Georgia Power. Figure 9 displays the satisfaction with Georgia Power over time among longitudinal respondents.

FIGURE 9: LONGITUDINAL SATISFACTION WITH GEORGIA POWER BY EVENT



Source: Survey Question E2. "Taking into consideration all aspects of your utility service experience, please rate your current satisfaction with Georgia Power overall."

[19] ($F = 3.49$; $p < 0.10$; numerator df = 1, denominator df = 1084).

All respondents were asked to explain why they rated their satisfaction with Georgia Power the way they did. Respondents offered several reasons for their satisfaction ratings including: (1) high bills, (2) needing more information about the effects of the program on their home, and (3) not understanding of the Rush Hour Rewards program details. While few respondents gave *somewhat or not at all satisfied* ratings to Georgia Power overall, the reasons for lower satisfaction ratings offer insight into program performance. For example, after a winter event, one respondent said, "*Since the thermostat was adjusted higher than our usual setting in any case, I am not sure that we saved any energy, and may have spent more in heating on account of this past rush hour. That aspect should be considered, and, if so, a refund should be provided*." Table 22 provides additional reasons for less than *completely satisfied* ratings.

TABLE 22. REASON FOR ALL SATISFACTION RATINGS BY EVENT

	AUG 21 (n=125)	SEPT 5 (n=36)	SEPT 13 (n=14)	NOV 28 (n=5)	DEC 6 (n=9)	JAN 15 (n=8)	TOTAL
High bills	44	12	5	3	2	3	69
Want more information about the effects of the program on their home	17	4	1	0	0	1	23
Don't understand Rush Hour Rewards	11	8	1	0	1	1	22
Power outages	16	4	1	0	0	0	21
Issues with Nest or RHR (i.e. issues with their device or components of the program)[20]	9	2	3	1	1	1	17
Has issues with Vogtle nuclear plant	5	2	2	1	1	0	11
Wants GPC to increase use of renewables	5	1	0	2	2	1	11
Issues with billing (i.e. discrepancies in amount owed, online bill pay)	7	2	1	0	0	1	11
No other options in utility	8	0	0	0	1	0	9
Issues with customer service	3	1	0	1	1	0	6

Source: Survey Question E3. "Why did you rate it [Georgia Power overall] that way?" (coded open end responses)

[20] This category includes comments about the bill credit amount.

PROGRAM ENROLLMENT AND UNDERSTANDING

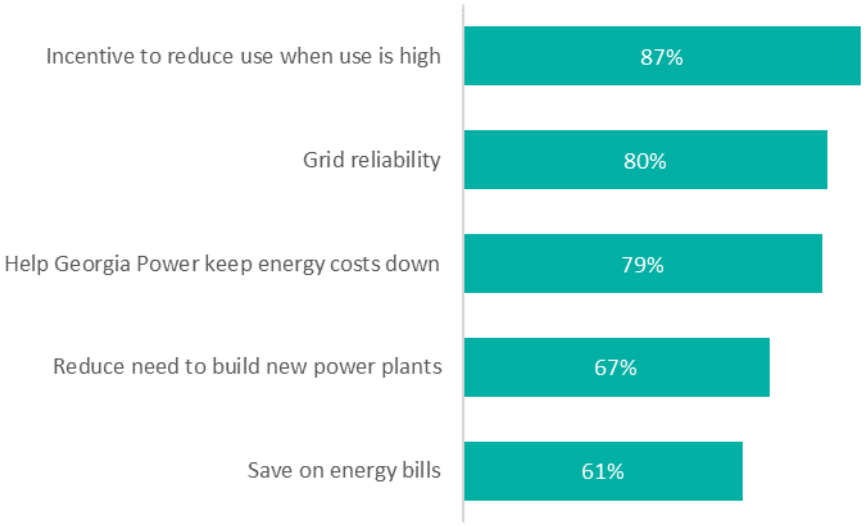
ENROLLMENT EXPERIENCE

Participants gave high ratings for the process of enrolling in the Rush Hour Rewards program, with a mean rating of 4.1 on a 1-to-5 scale where 1 is *not at all satisfied* and 5 is *completely satisfied.* Further, 60% were *completely satisfied* with the enrollment experience. Respondents reported they enrolled in the program to save money on energy bills (32%) or to earn the $50 bill credit (24%). Respondents also cited interest in programs offered through their Nest thermostat (16%) and being environmentally responsible (14%) as reasons for participating in the program.

PROGRAM UNDERSTANDING

Most participants understand why Georgia Power offers the Rush Hour Rewards program. The largest percentage (87%) of participants agreed that Georgia Power offers the program to give customers an incentive to reduce energy use at times when electricity use is high, which is consistent with the Nest recruitment email messaging. The fewest participants agreed that Georgia Power offers the program to help customers save money on their electricity bills. Figure 10 provides more detail on respondent understanding of why Georgia Power offers the program.

FIGURE 10: WHY GEORGIA POWER OFFERS PROGRAM

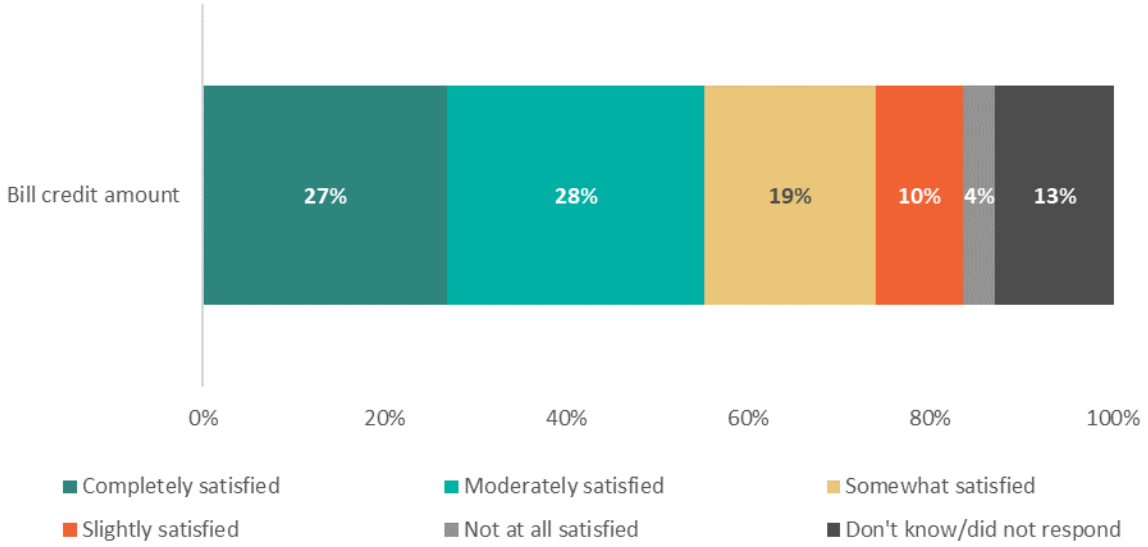


Source: Survey Question C16. "To the best of your knowledge, why do you think Georgia Power is offering the Rush Hour Rewards program?" (Multiple responses allowed)

BILL CREDIT SATISFACTION AND UNDERSTANDING

Participants received a $25 bill credit for enrolling in the program and another $25 bill credit after the first year. Just over half (55%) of respondents were *moderately* or *completely satisfied* with these amounts, for a mean rating of 3.7 (Figure 11).

FIGURE 11: SATISFACTION WITH THE BILL CREDIT AMOUNT (n=971)



Source: Survey Question E1_B. "Please rate your satisfaction with each of the following aspects of the Rush Hour Rewards program: the bill credit amount."

Some respondents were confused about when they would receive the bill credits. Six respondents, across all surveys, said they rated Georgia Power overall the way they did because they had not yet received the bill credit. For instance, one respondent said, "I still haven't seen the rate rebate." And another said, "Would prefer to recognize credit after each period rather than up front and after the first year. It would also be nice to know what my bill would have been that day without rush hour."

NEST CUSTOMER EXPERIENCE

Over three-quarters of the respondents (77%) have a Nest Learning thermostat and 17% have a Nest Thermostat E in their home. The remaining respondents listed other thermostat types or were unsure of what type of thermostat they had at the time of the survey; however, they would have to have one of the Nest thermostats to be eligible for the program. Respondents are highly satisfied with their Nest thermostats—they find them easy to use and believe they help save energy. Nearly all (88%) stated they are *moderately* or *completely satisfied* with the thermostat; of those, 71% are *completely satisfied* with their Nest thermostat. Seventy-six percent *completely agreed* that their Nest is easy to use. Furthermore, 70% of respondents *moderately* or *completely agreed* that their Nest helps them identify how they can save energy.

Very few respondents (6%) were less than *moderately satisfied* with their Nest, but those that were less satisfied stated they did not like that the Nest thermostat learned, that it did not work like they expected, and that they were unsure if they were actually saving money. As one respondent noted, "*It constantly changes the temperature in my apt on its [sic] own. It can be set at 68 one minute then change itself to 74 the next. It's kind of a pain to keep track of.*"

Issues with the Nest thermostat also affected satisfaction with Georgia Power overall for a small number of respondents. Across all surveys, 13 respondents gave less than *completely satisfied* ratings for Georgia Power overall because they had issues with their Nest thermostat. As one respondent said, "Because of the lack of response to the Nest unit that has stopped working. I'm totally unable to see anything from my phone in the Nest

app and have been for several weeks." Additionally, three respondents said that they were unsure how their Nest was handling their natural gas heating systems during the winter events. They were worried that the Nest, and the program, were affecting their furnaces negatively, as illustrated in the following survey comments:

> *"Need to stop changing temperature for furnaces which use natural gas in the winter, not electricity."*
>
> *"They keep messing with the thermostat for furnace units which don't use electricity (they use gas), they shouldn't be allowed to change those units as it doesn't pertain to their business."*
>
> *"During the winter they are adjusting my Nest on units which use natural gas. They shouldn't be messing with those as they are concerned with electric usage."*

Most participants are not bothered by having Nest and Georgia Power adjust their temperature setting during the DR events. Two-thirds of participants agreed (both moderately and completely) that having Georgia Power adjust their thermostat does not bother them. Additionally, a small number of respondents (n=23) across all surveys expressed frustration with Georgia Power based on a faulty understanding of how the program adjusts their thermostat. The following respondent comments illustrate this lack of understanding:

> *"I remember enrolling in this program but am not alerted on a daily basis when Georgia Power sets my Nest to pre-cool. Sometimes, I don't come home right after work, so Georgia Power is pre-cooling a house for no one. Georgia Power should not be able to override Nest's 'away' settings."*
>
> *"I am also a peak demand customer with GA Power and this program typically reduces power consumption during those peak hours. I [sic] am a little less than satisfied due to the longer running of my AC unit after the rush hour completed it ran for significantly longer to cool the home back off."*
>
> *"Sometimes it gets really hot or extremely cold, there is no in between. It's no problem to adjust the temperatures myself though."*

Participants regularly use the Nest app to control their thermostats and monitor their energy use. The largest percentages of respondents adjust their temperature remotely on a weekly basis but prefer to monitor their energy usage on a monthly basis with the majority (67%) viewing the Home Report monthly. Table 23 shows more detail about how participants engage with their Nest thermostat.

TABLE 23. NEST USAGE HABITS (N=971)

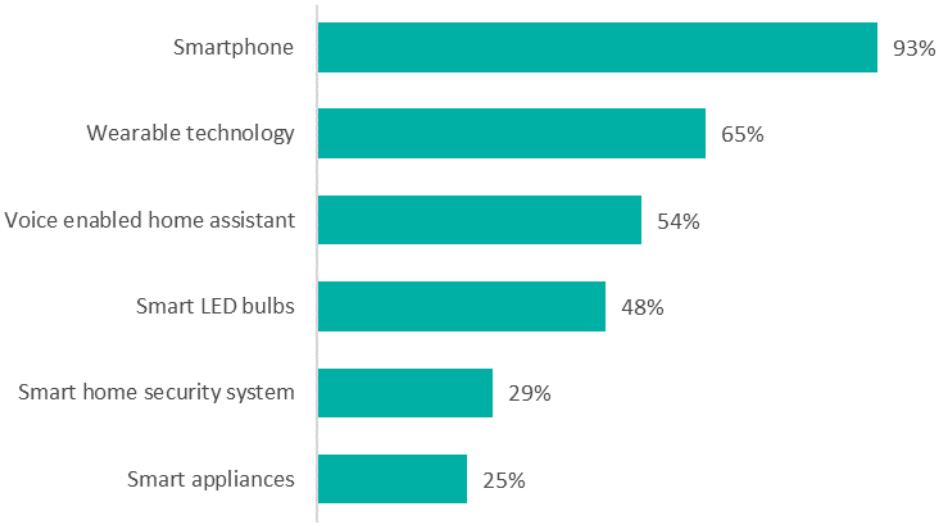
	DAILY	WEEKLY	MONTHLY	ONCE EVERY FEW MONTHS	ONCE OR TWICE PER YEAR	DON'T KNOW
Adjust temperature through phone	27%	33%	13%	14%	5%	2%
View Energy History to see daily energy use	14%	29%	35%	11%	3%	2%
View the Home Report to see monthly energy use	6%	9%	67%	9%	3%	3%

PARTICIPANT DEMOGRAPHICS

CUSTOMER ATTITUDES & BEHAVIORS

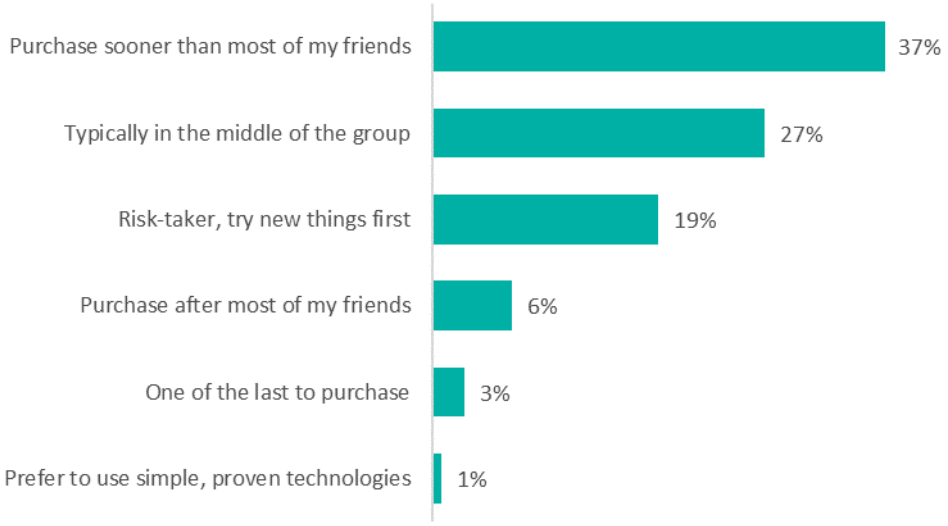
As might be expected in a bring your own thermostat program, most participants consider themselves 'early adopters' of new technology and most own smart technology other than their thermostat. Ninety-three percent own smartphones and 82% own a smartphone plus another smart technology item other than their Nest thermostat (FIGURE 12. and FIGURE 13.).

FIGURE 12. TECHNOLOGY ADOPTION PREFERENCE (N=796)



Source: Survey Question F1. "Do you or any member of your household own any of the following? (select all that apply)"

FIGURE 13. SMART TECHNOLOGY ADOPTION (n=806)



Source: Survey Question F2. "Some people like to be the first people to try out a new product while others like to wait and see what works well or what becomes popular before making a purchase. Thinking about how soon you buy new technologies, which of the following best describes you? (You can think of things like electronics or appliances)"

DEMOGRAPHICS

Nearly half of the participants live in newer homes (built in 2005 or later). Additionally, most of the participants own their homes (66%) and have lived in their current house for 5 years or less (76%). Under one-third (29%) live alone. Table 29 in APPENDIX B provides more detail about the housing characteristics of program participants.

Program participants are generally between 25 and 44 years old, well-educated, and affluent. Seventy-one percent are between 25 and 44 years old, 74% have four year or advanced degrees and 39% reported household incomes of $75,000 or more. Table 30 in APPENDIX B provides additional detail on the demographic characteristics of participants.

APPENDIX A. DETAILED METHODOLOGY

IMPACT ANALYSIS METHODOLOGY

DATA CLEANING AND PREPARATION

Georgia Power provided ILLUME with customer data and hourly meter data for summer of 2018 (August and September) and winter of 2018–2019 (November through February). ILLUME cleaned and prepared the program data, resolving any data complications by employing a combination of industry best practices and guidelines set by Georgia Power. The team identified a valid set of utility-meter data (a unique combination of customer utility and meter ID's) for each event. The team excluded observations from the analysis according to the following logic:

- Excluded row observations with missing usage values.
- Excluded row observations if usage in one hour was less than usage in the previous hour (resulting in negative usage values).
- Excluded utility-meters if more than 5% of the row observations were removed for one of the above cases.
- Excluded utility-meters if any data was missing or invalid during the three-hour event period.

Table 2 shows the final sample sizes for each summer event after ILLUME removed invalid observations.

TABLE 2: FINAL SAMPLE SIZES FOR EACH SUMMER EVENT

EVENT DATE	AMI SAMPLE SIZE
August 16, 2018	1,238
August 21, 2018	1,235
September 5, 2018	1,237
September 13, 2018	1,230

Table 3 shows the final sample sizes for each winter event after ILLUME removed invalid observations.

TABLE 3: FINAL SAMPLE SIZES FOR EACH WINTER EVENT

EVENT DATE	AMI SAMPLE SIZE
November 28, 2018	1,214
December 6, 2018	1,213
January 10, 2019	1,215
January 15, 2019	1,214
January 30, 2019	1,216

We received AMI data as hourly, cumulative, integer values. We converted cumulative values to hourly interval power draw. With integer hourly values, we often calculated interval power draws as 0 kW if power draw in one hour was less than 1 kW. For the summer events, we adjusted for the resulting high number of 0 kW intervals by combining hours and associated energy consumption into the following periods:

- Late Night: 12a.m. – 6a.m.
- Morning: 6a.m. – 2p.m. (6 a.m. – 3 p.m. on September 5)
- Pre-Cooling: 2p.m. – 3p.m. (3 p.m. – 4 p.m. on September 5)
- Event: 3p.m. – 6p.m. (4 p.m. – 7 p.m. on September 5)
- Post-Event: 6p.m. – 8p.m. (7 p.m. – 9 p.m. on September 5)
- Evening: 8p.m. – 12a.m. (9 p.m. – 12 a.m. on September 5)

For the winter events, we combined hours and associated energy consumption in the following periods:

- Overnight: 12a.m. – 5a.m. (12a.m. – 6a.m. on December 6th and January 15th)
- Pre-heating: 5a.m. – 6a.m. (6a.m. – 7a.m. on December 6th and January 15th)
- Event: 6a.m. – 9a.m. (7a.m. – 10a.m. on December 6th and January 15th)
- Post-event: 9a.m. – 11a.m. (10a.m. – 12p.m. on December 6th and January 15th)
- Afternoon: 11a.m. – 1p.m. (12p.m. – 1p.m. on December 6th and January 15th)
- Remainder: 1p.m. – 12a.m.

ADJUSTED BASELINE DATE MATCHING

ILLUME estimated the demand reduction achieved during the summer DR events by using hourly AMI data for participating homes. Since the pilot study does not have a control group, the team estimated an adjusted baseline model for each event to establish baseline energy consumption. We selected three non-event days for this model from a candidate set of days that closely matched each event day based on the following criteria:

1. Candidate non-event days should be days which maximize the number of hourly temperatures that lie within ±10% of the hourly event day temperatures;
2. Candidates must be within two weeks of the matching event day for summer events, within four weeks for winter events;
3. Candidate must not be a holiday or weekend day (Friday, Saturday, or Sunday); and
4. Candidate must not be a different event day.
5. Candidate days can only be considered as matches for *at most* two different event days
6. No two event days can have more than one matched day in common

For the winter events, we found that outdoor temperatures in the afternoon and evening tended to have more matches between candidate baseline days and the event day compared with morning temperatures, which varied more widely. This phenomenon resulted in the adjusted baseline model performing poorly during the critical morning hours when the DR event took place. The team resolved this challenge by updating the matching methodology to select candidates based on temperature comparisons between 12a.m. and 1p.m. This resulted in improved predictive power in the adjusted baseline model.

Figure 14 through Figure 22 in APPENDIX B show the demand and average temperature by time interval for baseline and event days.

MODELING

We used data from the selected non-event days in a linear fixed effects regression model to estimate an adjusted baseline for each event period. We tested model specifications for summer and winter independently. The final model specification for summer events included terms that account for humidity, time of day, outdoor temperature (as cooling degree hours with a base temperature of 65°F), interactions between temperature and humidity, and interactions between temperature and time of day, and. The final model specification for winter events included terms that accounted for humidity, time of day, wind chill, outdoor temperature (as heating degree hours with a base temperature of 65°F), interactions between wind chill and time of day, and interactions between temperature and time of day.

The model specification used to estimate the adjusted baseline for the summer events is given by the following equation:

$$kW_{t,i} = \alpha_i + \beta_{int,t} \cdot interval + \beta_{cdh,t} \cdot cdh65_t + \beta_{dew,t} \cdot dewpoint_t + \beta_{cdh,dew,t} \cdot cdh65_t \cdot dewpoint_t + \beta_{int,cdh,t} \cdot interval \cdot cdh65_t$$

Where:

$kW_{t,i}$	=	Average hourly metered electricity usage for the i^{th} unique utility-meter during time interval *t*.
α_i	=	A fixed effect for the i^{th} unique utility-meter.
interval	=	A categorical variable indicating the time interval used for analysis.
cdh65	=	The average cooling degree hours (with base temperature 65°F) during time interval *t*.
dewpoint	=	The average dewpoint during time interval *t*.
β	=	Estimated model coefficients.

The team used a similar model specification to estimate the adjusted baseline for the winter events but added wind chill factor, a 24-hour lag for weather, and utilized different interactions. The winter model specification is given by the following equation:

$$kW_{t,i} = \alpha_i + \beta_{int,t} \cdot interval + \beta_{hdh,t} \cdot hdh65_t + \beta_{dew,t} \cdot dewpoint_t + \beta_{chill,t} \cdot chill_t + \beta_{lag,t} \cdot lag24\_hdh_t + \beta_{int,hdh,t} \cdot interval \cdot hdh65_t + \beta_{int,chill,t} \cdot interval \cdot chill_t$$

Where:

$kW_{t,i}$	=	Average hourly metered electricity usage for the i^{th} unique utility-meter during time interval *t*.
α_i	=	A fixed effect for the i^{th} unique utility-meter.
interval	=	A categorical variable indicating the time interval used for analysis.
hdh65	=	The average heating degree hours (with base temperature 65°F) during time interval *t*.
dewpoint	=	The average dewpoint during time interval *t*.
chill	=	The average wind chill factor during time interval *t*.
lag24_hdh	=	The average base 65°F heating degree hours during time interval *t* on the previous day.
β	=	Estimated model coefficients.

ILLUME estimated peak demand reduction and energy savings during an event day by comparing the adjusted estimated baseline energy use to actual metered energy use during the day of each event. In addition to this, the team also estimated the overall "event-related" impact on energy use, defined as the overall energy impact in the pre-cooling (or pre-heating), event, and post-event intervals taken together.

DOUBLE-COUNTED SAVINGS

As noted in Section 2.2 Evaluation Activities, double-counted impacts (demand reductions or energy savings) can occur if customers participated in other energy efficiency programs and impacts from those actions are claimed by the energy efficiency program and are captured in the analysis of AMI data for the BYOT Pilot. We assessed the risk of double-counted impacts by cross-referencing the BYOT participants with program tracking data from the following Georgia Power energy efficiency programs:

- Water heater demand response
- Home Energy Improvement program
- Refrigerator Recycling program
- HVAC Service
- Marketplace

We flagged any participation that occurred during the periods of time from which we selected baseline days. The impact analysis used non-event baseline days from the event seasons to establish the counterfactuals – what would participants' energy use have been in absence of the events. Any participation in other energy efficiency programs that took place prior to the time period used for baseline day selection become part of the baseline. For example, if a customer installed a high efficiency air conditioner in June, then that device affects energy use on both the baseline days and the event days (as the first date for baseline day selection is August 1) and thus is netted out of impact calculations. Only participation in other energy efficiency programs that occurs in-between selected baseline days can affect BYOT impacts. Ultimately, we found very little participation in other energy efficiency programs during the time periods used for baseline day selection and, as such, minimal risk of double-counted impacts.

SURVEY METHODOLOGY

ATTRITION ANALYSIS

In order to understand the systematic differences between survey respondents who took surveys in different ways (i.e. those who took just one vs. those who took more than one) the ILLUME team conducted an attrition analysis. In this analysis, we looked at the differences between those who took all three surveys in one season and those who took fewer than three surveys (referred to as, "All Summer" or "All Winter"); we also looked at the differences between those who took all six surveys (referred to as, "Longitudinal Group") and those who did not. Significant differences between the responses in any of these three categories, would indicate a need to treat the longitudinal analysis of the responses differently.

In order to test this, we compared the responses between All Summer, All Winter, and the Longitudinal Group and those were not in the groups on six key survey questions and four demographic questions. As shown in Table 24, there were significant differences between participants in any of the three groups and those who were not. Satisfaction with the RHR program, likelihood to be home during the event, income, and race were significantly different across the three groups. The differences in education between groups were not significantly different.

TABLE 24: SIGNIFICANT DIFFERENCES BETWEEN GROUPS

SURVEY QUESTION/TOPIC	ALL SUMMER	ALL WINTER	LONGITUDINAL GROUP
Have you received any messages from Nest notifying you of an Energy Rush Hour through the mobile app or the Nest display?	-	More likely to remember any notifications ($z = 1.85$, $p < 0.10$)	-
Do you remember getting notified for an Energy Rush Hour on *most recent energy rush hour date and time*?	-	More likely to recall specific event notification ($z = 1.83$, $p < 0.10$)	More likely to recall specific event notification ($z = 1.85$, $p < 0.10$)
What did you do after getting the notification about the Energy Rush Hour?	More likely to let Nest control the thermostat ($z = 3.29$, $p < 0.10$)	-	-
Were you at home for all, part or none of the Energy Rush Hour?	***More likely to be home for part or all of the event ($z = 2.38$, $p < 0.10$)***	***More likely to be home for part or all of the event ($z = 2.10$, $p < 0.10$)***	***More likely to be home for part or all of the event ($z = 3.47$, $p < 0.10$)***
Were any routines in your home affected by this Energy Rush Hour?	-	-	-
***Satisfaction with* the Rush Hour Rewards program overall**	**More satisfied with the Rush Hour Rewards program overall** ($t = 1.83$, $p < 0.10$)	**More satisfied with the Rush Hour Rewards program overall** ($t = 2.85$, $p < 0.10$)	**More satisfied with the Rush Hour Rewards program overall** ($t = 1.68$, $p < 0.10$)
Taking into consideration all aspects of your utility service experience, please	More satisfied with GPC overall ($t = 2.08$, $p < 0.10$)	More satisfied with GPC overall ($t = 2.57$, $p < 0.10$)	-

rate your current satisfaction with Georgia Power overall?			
Home ownership	-	-	-
Income ($100k per year or more)	**More likely to have an income of $100k/year or more** ($z = 3.06$, $p < 0.10$)	**More likely to have an income of $100k/year or more** ($z = 1.78$, $p < 0.10$)	**More likely to have an income of $100k/year or more** ($z = 3.28$, $p < 0.10$)
Education (Four-year degree or more)	-	-	-
Race (white)	**More likely to be white** ($z = 3.90$, $p < 0.10$)	**More likely to be white** ($z = 4.83$, $p < 0.10$)	**More likely to be white** ($z = 3.05$, $p < 0.10$)

Because we found significant differences between the all summer, all winter, and longitudinal groups and survey respondents not in those groups, we proceeded using a within group analysis for the longitudinal analysis of the survey responses. This means that when making statements about how the program experience changes over time, we used only those who took all surveys (longitudinal group) and analyzed how their responses change over time. We included within-subjects analysis as well to measure how much individual program experience changed over time. Table 25, Table 26, and Table 27 provide additional detail on the significant differences between respondent groups.

TABLE 25: DETAILED SIGNIFICANT DIFFERENCES FOR LONGITUDINAL GROUP*

SURVEY QUESTION/TOPIC	QUESTION TYPE	SIGNIFICANT DIFFERENT AT A 90% CONFIDENCE INTERVAL	THOSE THAT TOOK ALL SIX SURVEYS WERE…
Have you received any messages from Nest notifying you of an Energy Rush Hour through the mobile app or the Nest display?	Survey	No	-
Do you remember getting notified for an Energy Rush Hour on *most recent energy rush hour date and time*?	Survey	No	-
Were you at home for all, part or none of the Energy Rush Hour?	**Survey**	**Yes**	**More likely to be home for all or part of the event.**
What did you do after getting the notification about the Energy Rush Hour?	**Survey**	**Yes**	**More likely to do nothing (allow Nest to adjust temperature) after receiving the notification**
Were any routines in your home affected by this Energy Rush Hour?	Survey	No	-
***Satisfaction with* the Rush Hour Rewards program overall**	**Survey**	**Yes**	**More satisfied with the Rush Hour Rewards program overall**
Taking into consideration all aspects of your utility service experience, please rate your current satisfaction with Georgia Power overall?	**Survey**	**Yes**	**More satisfied with GPC overall**
Home ownership	Demographic	No	-
Income ($100k per year or more)	**Demographic**	**Yes**	**More likely to have an income of $100k/year or more**
Education (Four-year degree or more)	Demographic	No	-
Race (white)	**Demographic**	**Yes**	**More likely to be white**

*This table shows the significant differences between those that took all 6 surveys (longitudinal group) and those that did not take all 6 surveys.

TABLE 26: DETAILED SIGNIFICANT DIFFERENCES FOR ALL WINTER GROUP*

SURVEY QUESTION/TOPIC	QUESTION TYPE	SIGNIFICANT DIFFERENT AT A 90% CONFIDENCE INTERVAL	THOSE THAT TOOK ALL THREE SURVEYS WERE…
Have you received any messages from Nest notifying you of an Energy Rush Hour through the mobile app or the Nest display?	Survey	Yes	More likely to remember any notifications
Do you remember getting notified for an Energy Rush Hour on *most recent energy rush hour date and time*?	Survey	Yes	More likely to recall specific event notification
Were you at home for all, part or none of the Energy Rush Hour?	Survey	Yes	More likely to be home for all or part of the event.
What did you do after getting the notification about the Energy Rush Hour?	Survey	No	-
Were any routines in your home affected by this Energy Rush Hour?	Survey	No	-
Satisfaction with the Rush Hour Rewards program overall	Survey	Yes	More satisfied with the Rush Hour Rewards program overall
Taking into consideration all aspects of your utility service experience, please rate your current satisfaction with Georgia Power overall?	Survey	Yes	More satisfied with the GPC overall
Home ownership	Demographic	No	-
Income ($100k per year or more)	Demographic	Yes	More likely to have an income of $100k/year or more
Education (Four-year degree or more)	Demographic	No	-
Race (white)	Demographic	Yes	More likely to be white

*This table shows the significant differences between those that took all 3 winter surveys (all winter group) and those that took 1 or 2 winter surveys.

TABLE 27: DETAILED SIGNIFICANT DIFFERENCES FOR ALL SUMMER GROUP*

SURVEY QUESTION/TOPIC	QUESTION TYPE	SIGNIFICANT DIFFERENT AT A 90% CONFIDENCE INTERVAL	THOSE THAT TOOK ALL THREE SURVEYS WERE…
Have you received any messages from Nest notifying you of an Energy Rush Hour through the mobile app or the Nest display?	Survey	No	-
Do you remember getting notified for an Energy Rush Hour on *most recent energy rush hour date and time*?	**Survey**	**Yes**	**More likely to remember the notification for the Energy Rush Hour event**
Were you at home for all, part or none of the Energy Rush Hour?	**Survey**	**Yes**	**More likely to be home for all or part of the event.**
What did you do after getting the notification about the Energy Rush Hour?	Survey	No	-
Were any routines in your home affected by this Energy Rush Hour?	Survey	No	-
***Satisfaction with* the Rush Hour Rewards program overall**	**Survey**	**Yes**	**More satisfied with the Rush Hour Rewards program overall**
Taking into consideration all aspects of your utility service experience, please rate your current satisfaction with Georgia Power overall?	Survey	No	-
Home ownership	Demographic	No	-
Income ($100k per year or more)	**Demographic**	**Yes**	**More likely to have an income of $100k/year or more**
Education (Four-year degree or more)	Demographic	No	-
Race (white)	**Demographic**	**Yes**	**More likely to be white**

*This table shows the significant differences between those that took all 3 summer surveys (all summer group) and those that took 1 or 2 summer surveys.

APPENDIX B. SUPPLEMENTARY FIGURES AND TABLES

Demand and Temperature Plots - The top figure for each day shows average household demand during each event phase. In each graph the green line represents the actual metered energy consumption, the gold line represents the adjusted baseline energy consumption (the counterfactual), and the three grey lines represent the three matched baseline days. The bottom figure displays average outdoor temperatures during each time interval for the selected three baseline days and the event day.

FIGURE 14. AUGUST 16 DEMAND AND TEMPERATURE BY INTERVAL

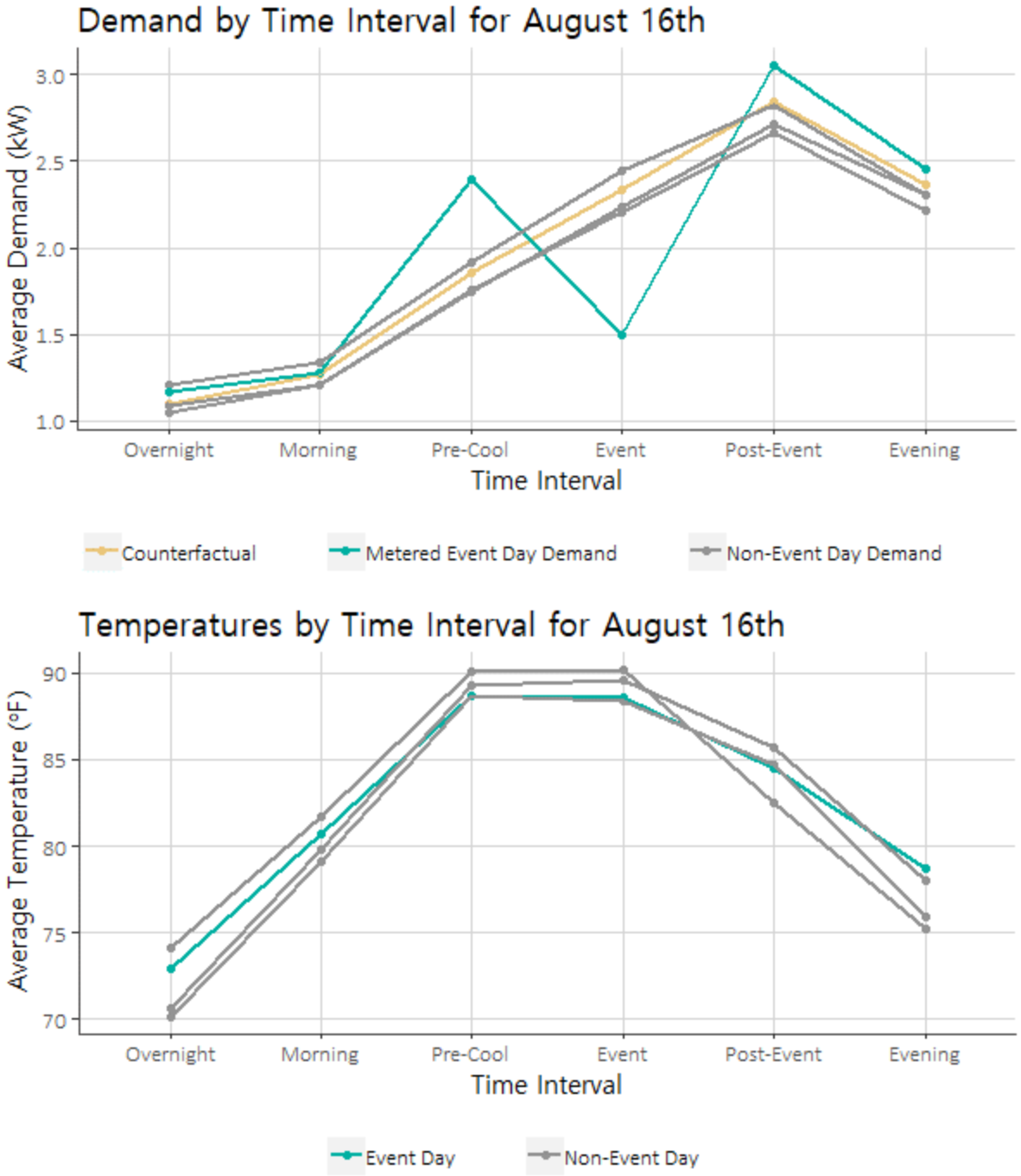


FIGURE 15. AUGUST 21 DEMAND AND TEMPERATURE BY INTERVAL

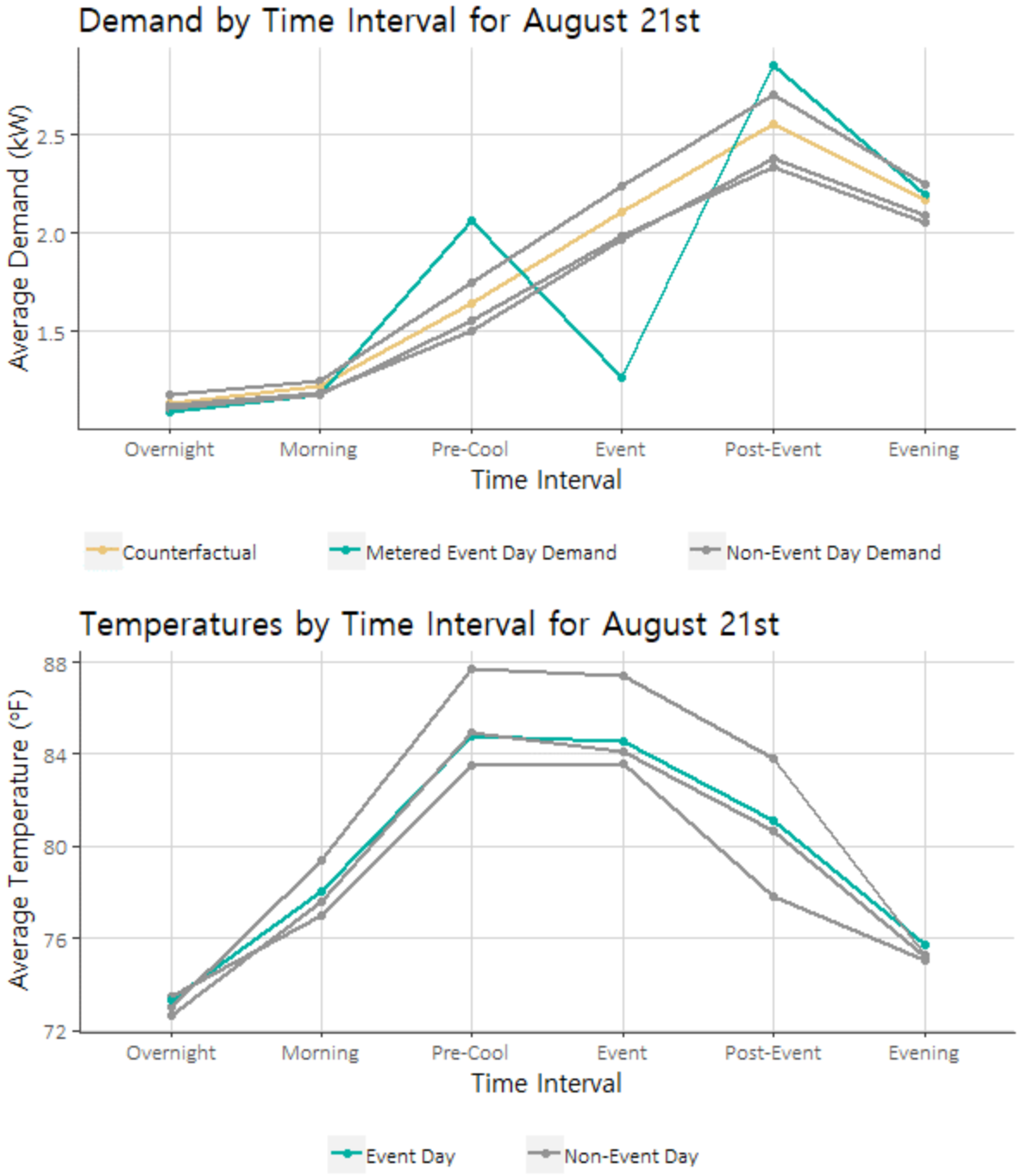


FIGURE 16. SEPTEMBER 5 DEMAND AND TEMPERATURE BY INTERVAL

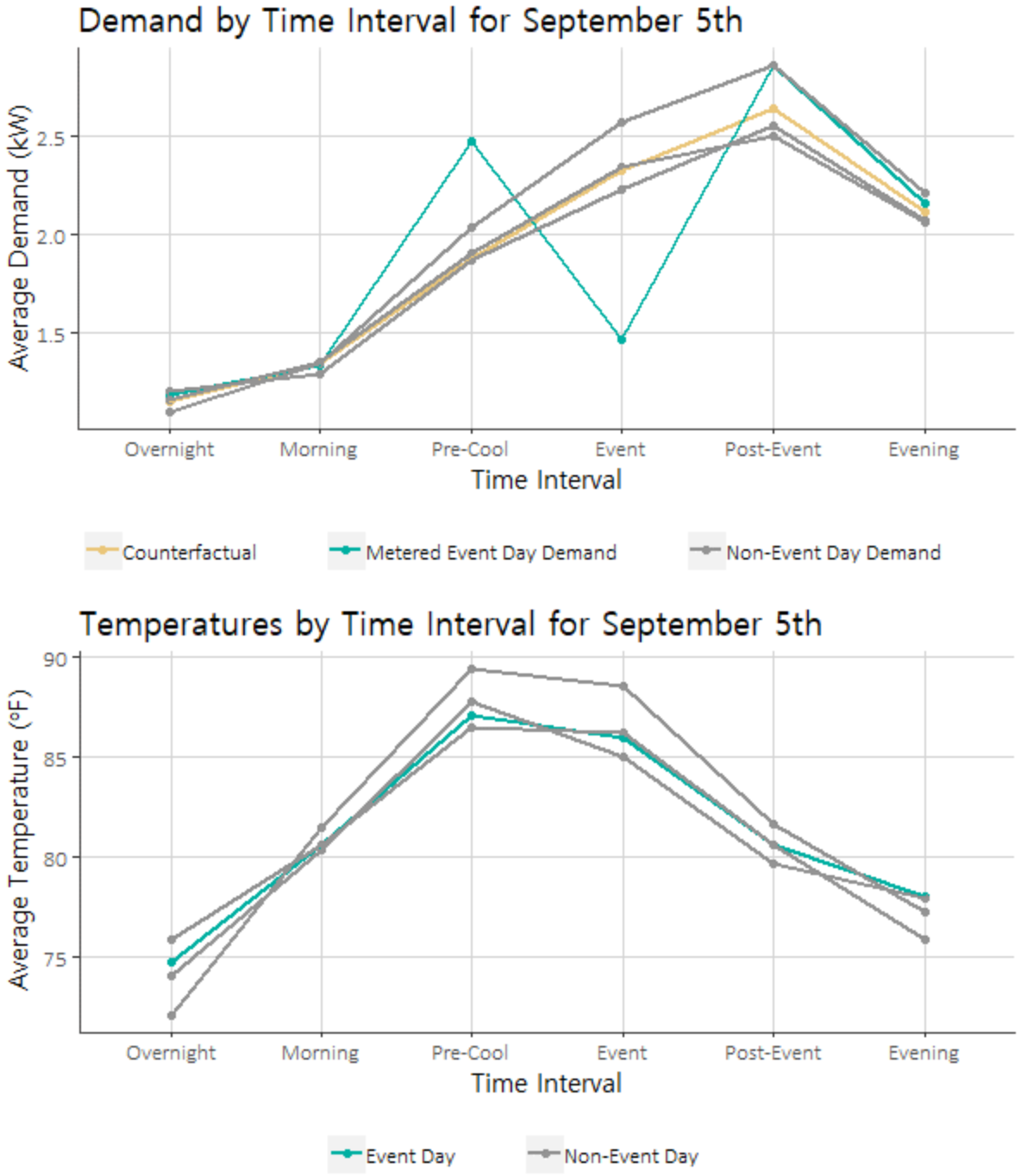


FIGURE 17. SEPTEMBER 13 DEMAND AND TEMPERATURE BY INTERVAL

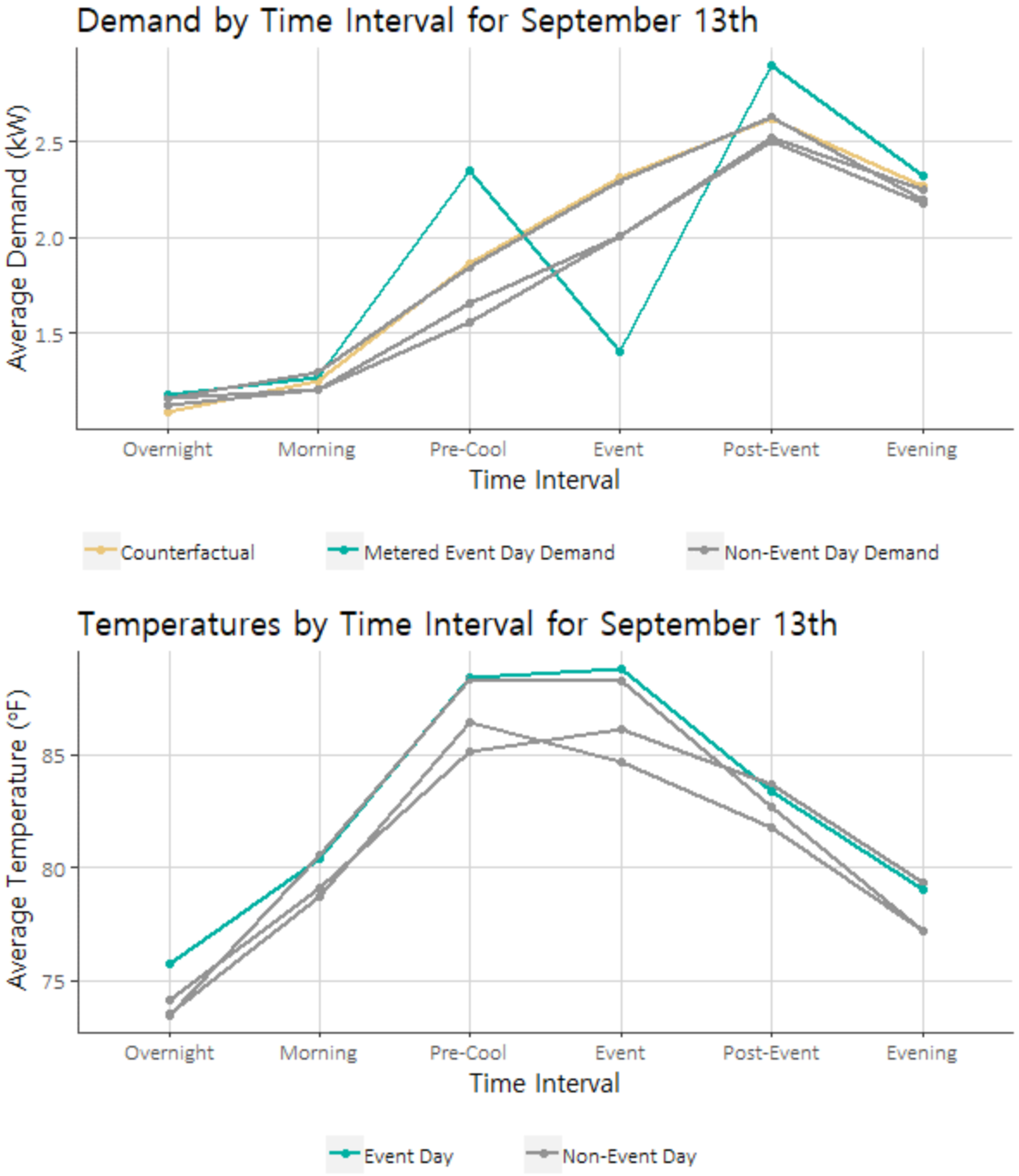


FIGURE 18. NOVEMBER 28 DEMAND AND TEMPERATURE BY INTERVAL

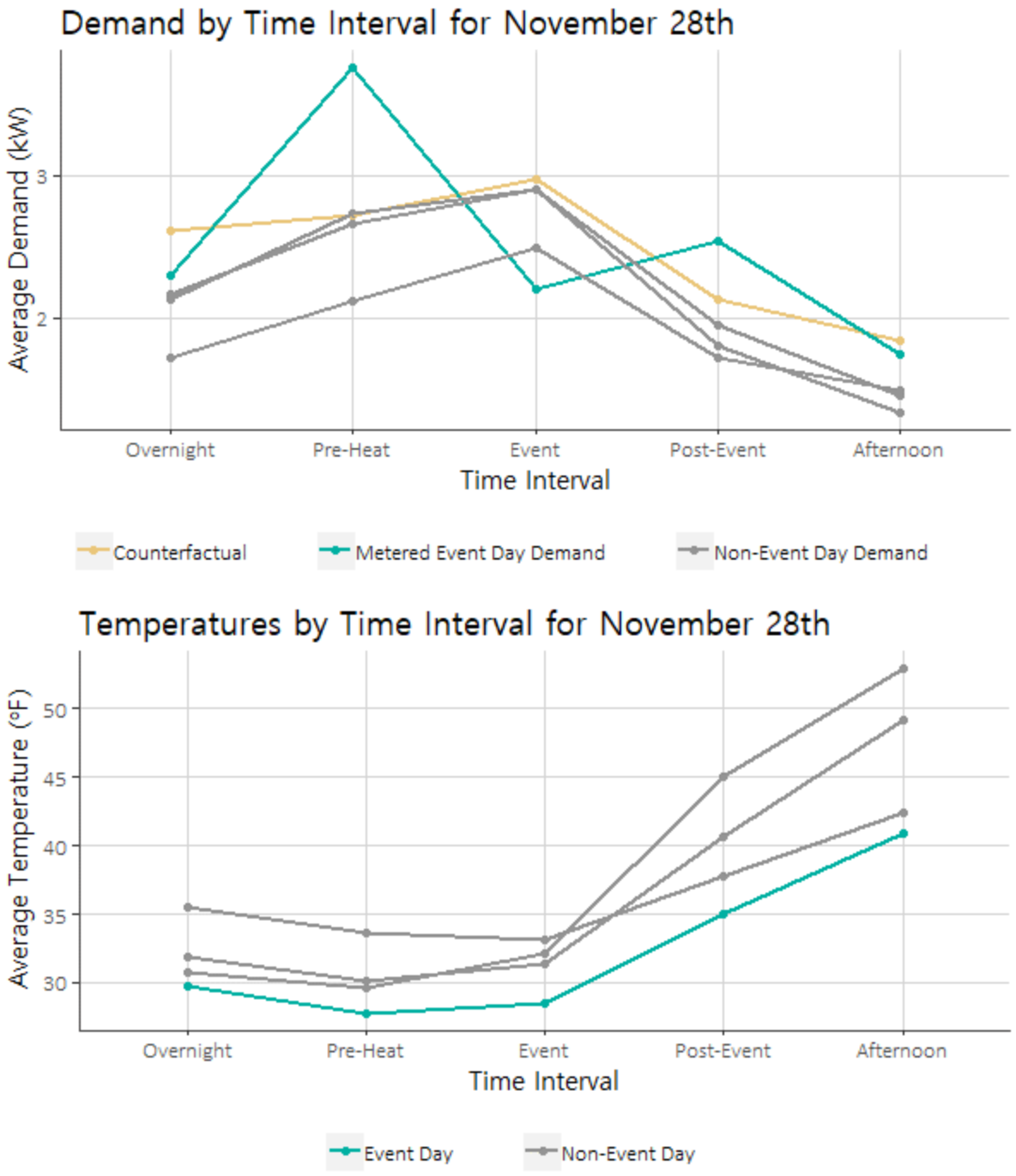


FIGURE 19. DECEMBER 6 DEMAND AND TEMPERATURE BY INTERVAL

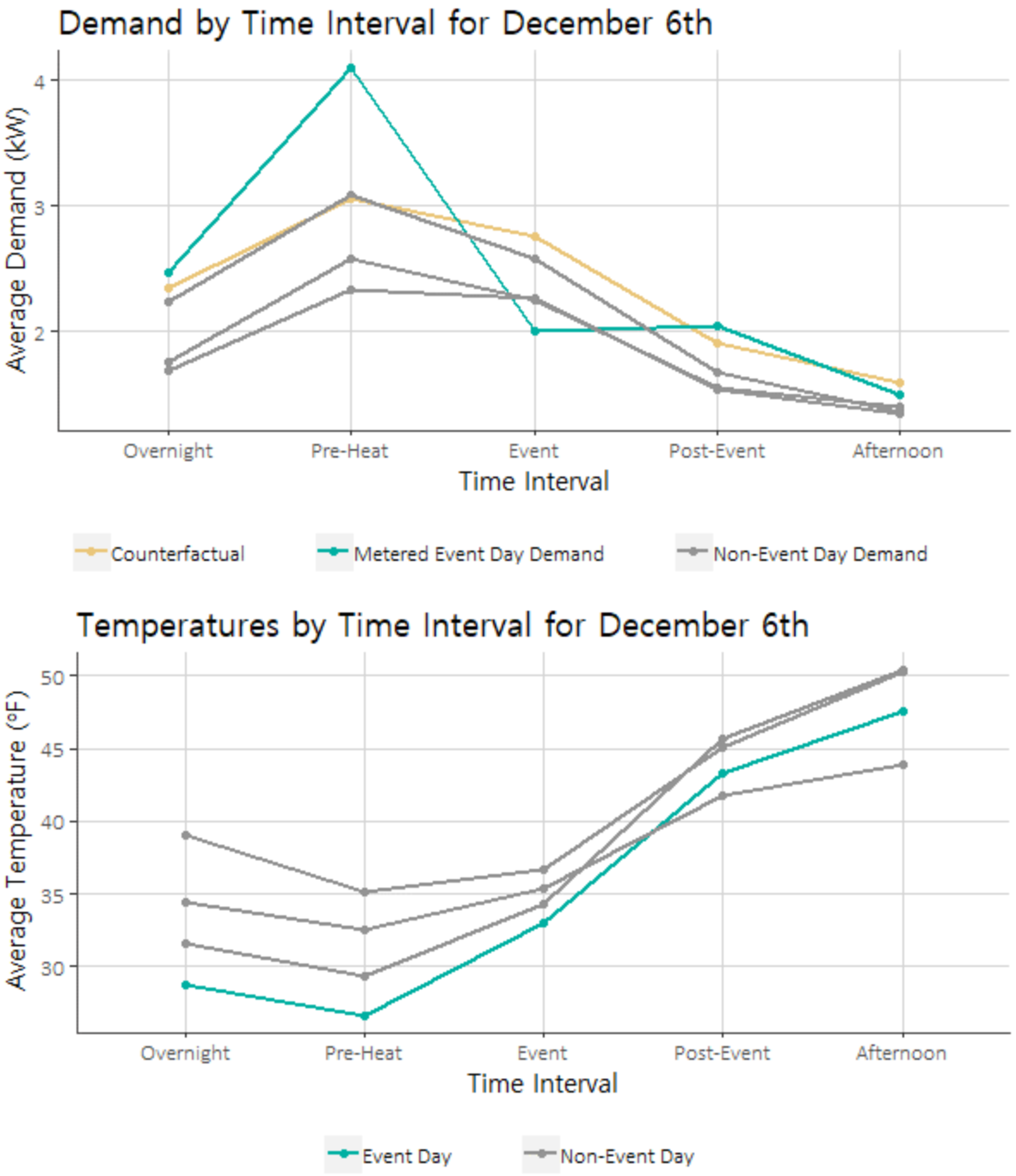


FIGURE 20. JANUARY 10 DEMAND AND TEMPERATURE BY INTERVAL

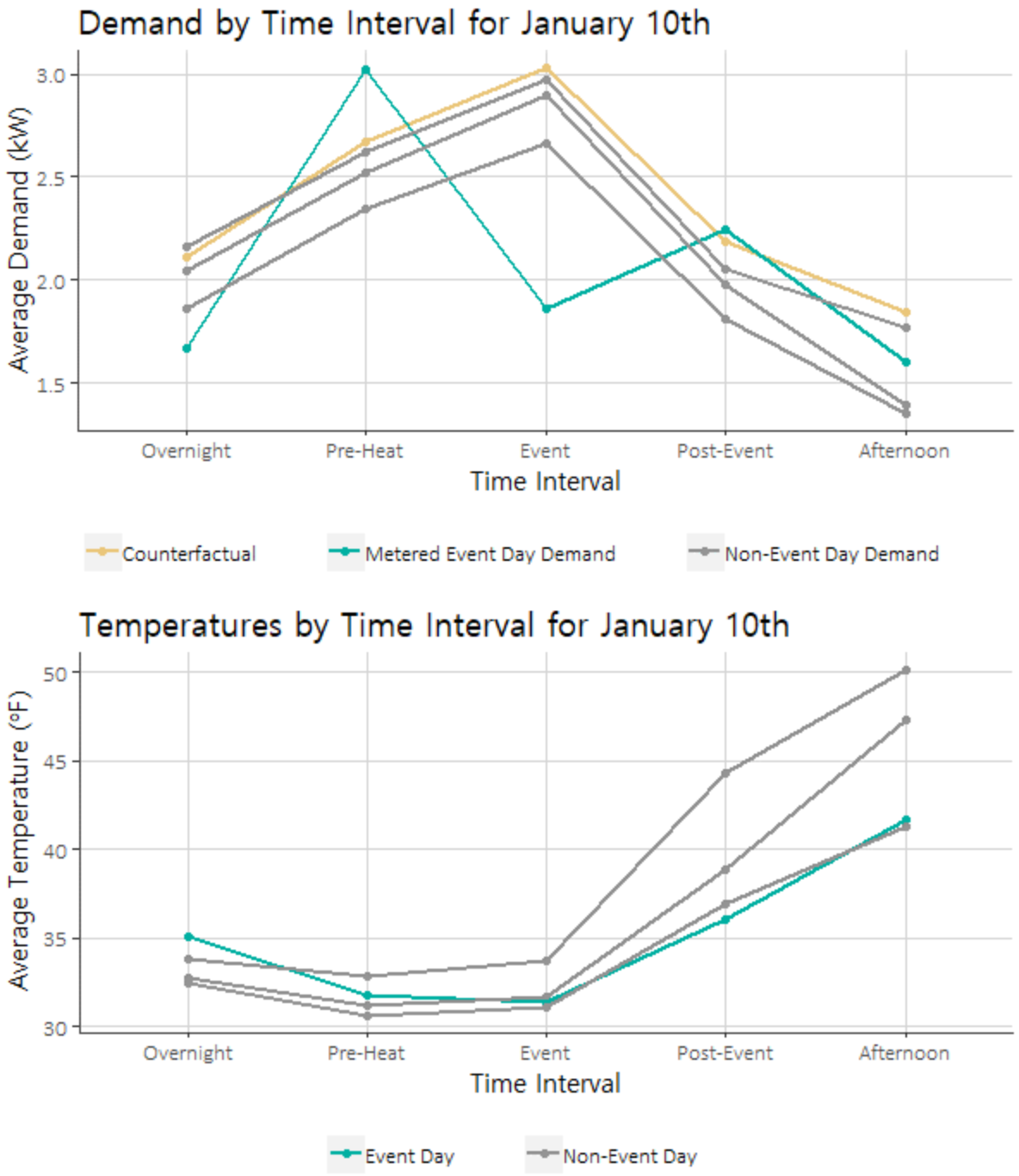


FIGURE 21. JANUARY 15 DEMAND AND TEMPERATURE BY INTERVAL

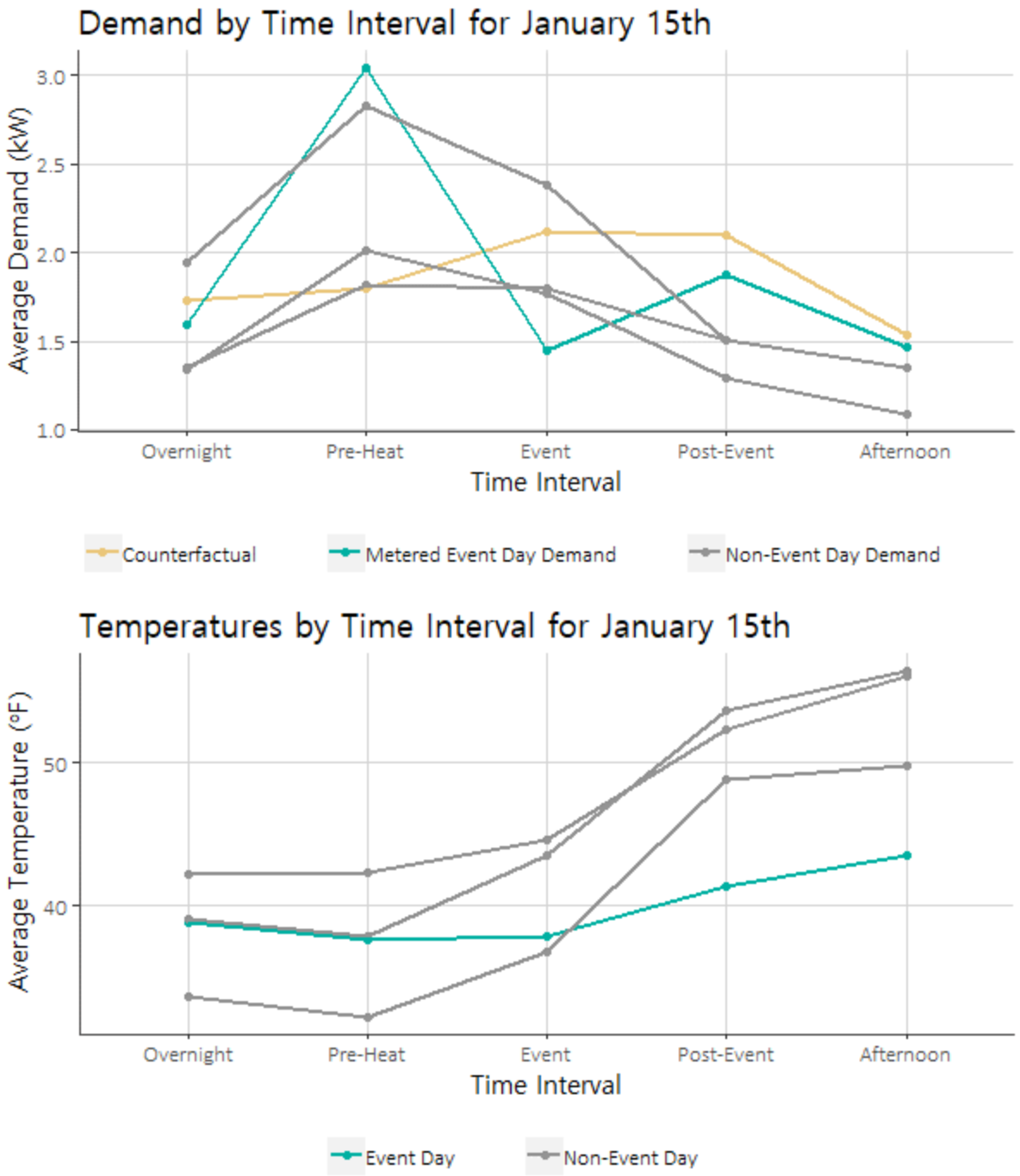


FIGURE 22. JANUARY 30 DEMAND AND TEMPERATURE BY INTERVAL

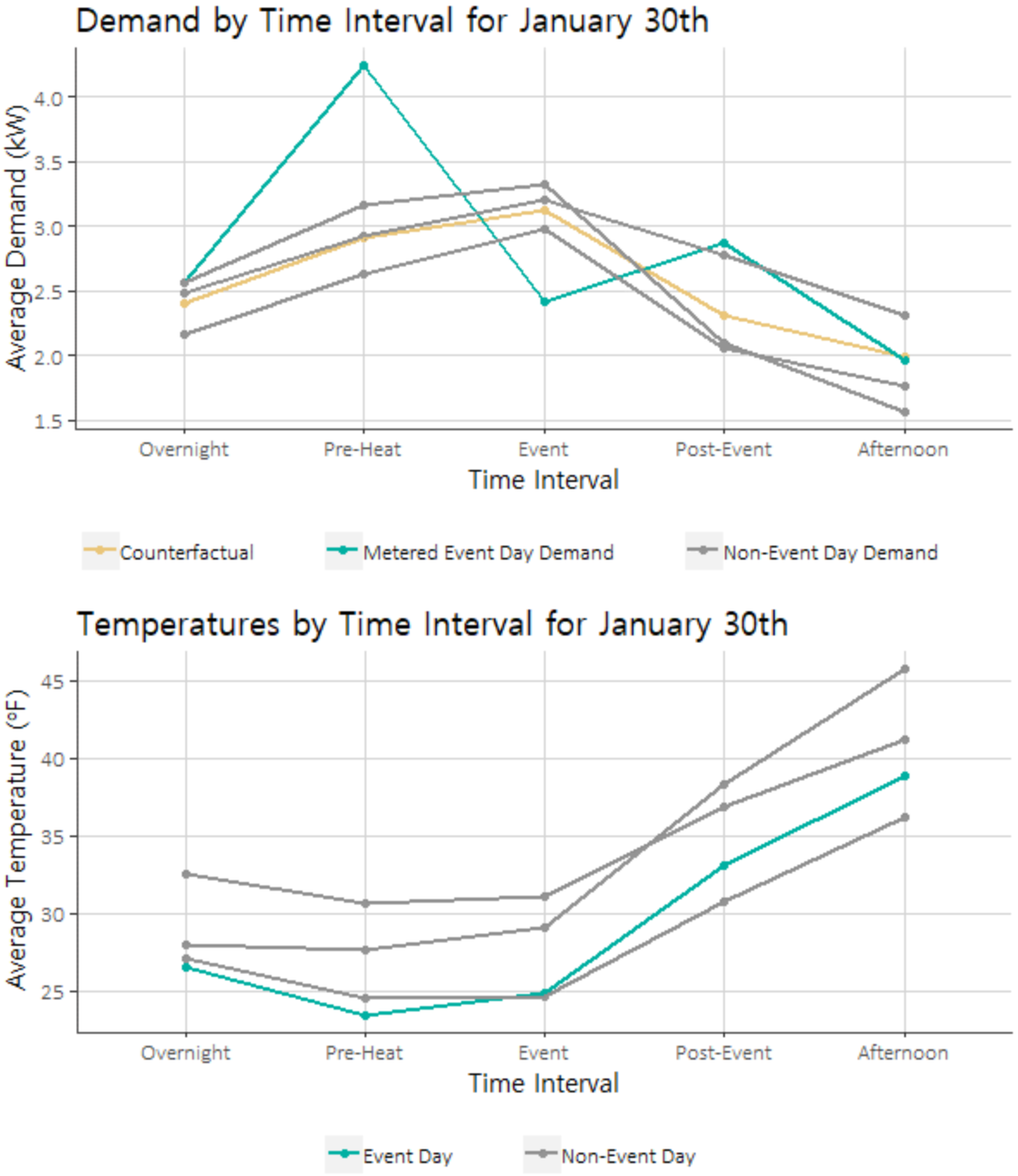


TABLE 28: REASONS FOR NON-COMPLETION

EVENT NOT RECEIVED	NEST DESCRIPTION	CATEGORY
Killed before event	The service stopped the event when it was in event received or presenting event	Event issue
Mode change	The user changed the schedule mode during the event. If event requires cooling, and the user changes the thermostat to heating, the event will stop for mode change. A mode change really means schedule mode change, where valid schedule modes are heating, cooling, or heat-cool mode. If the user changes between any of these modes during the event, the event will stop because each mode has its own schedule, and the optimization is no longer valid.	Mode issue
Received late	The device received the event after the qualification stop time. A device can receive an RHR event late if it is not connected to the internet when the event is sent, and it does not reconnect until after the RHR event begins. This could happen many different reasons, for instance, if the user's home wireless network stops working for some reason. In this case, the user will not see any notifications about the RHR event.	Event issue
System off at event start	The device was off at the event start time	System issue
System off during qualification	The device was off at the qualification stop time	System issue
System turned off during event	The device was turned off during the event	System issue
Temperature change	The user changed the target temperature in the inefficient direction during the peak period	Changed temperature
Wrong schedule mode at event start	The device was in the wrong schedule mode at the event start time. When an RHR event is scheduled, the required schedule mode must be selected: heating or cooling. If a device is in heating and the event requires cooling, then the event will not run with a stop reason of wrong schedule mode.	Mode issue
Wrong schedule mode during qualification	The device was in the wrong schedule mode at the qualification stop time	Mode issue

TABLE 29. HOUSEHOLD CHARACTERISTICS[21]

HOME OWNERSHIP (n = 910)	PERCENT
Not sure	0%
Own	70%
Rent	30%
TENURE IN CURRENT HOME (n = 910)	
One year or less	36%
2-3 years	34%
4-5 years	10%
6-10 years	9%
More than 10 years	10%
Not sure	0%
HOME VINTAGE (n = 910)	
1900 to 1939	4%
1940 to 1959	5%
1960 to 1979	6%
1980 to 1989	4%
1990 to 1999	10%
2000 to 2004	13%
2005 or later	49%
Not sure	6%
PEOPLE LIVING IN HOME (n = 897)	
1	29%
2	38%
3	14%
4	14%
5 or more	6%

[21] Some percents may not add to 100% due to rounding.

TABLE 30. PARTICIPANT DEMOGRAPHICS

AGE (N = 894)	PERCENT
18-24	2%
25-44	72%
45-64	21%
65 and older	5%
ANNUAL INCOME (n = 898)	
Less than $25,000	1%
$25,000 to less than $50,000	10%
$50,000 to less than $75,000	20%
$75,000 to less than $100,000	19%
$100,000 to less than $150,000	20%
$150,000 to less than $200,000	11%
$200,000 or over	12%
Not sure	5%
EDUCATIONAL ATTAINMENT (n = 904)	
Some high school or less	1%
High school graduate or equivalent	4%
Some college, no degree	10%
Two-year college degree	5%
Technical college degree or certificate	5%
Four-year college degree	41%
Graduate or professional degree	33%
Not sure	1%
RACE AND ETHNICITY (n = 971)	
American Indian or Alaska Native	1%
Asian	8%
Black or African American	15%
Hispanic, Latino, or Spanish origin	7%
Native Hawaiian or Other Pacific Islander	0%
Middle Eastern or North African	1%
White	61%
Some other race, ethnicity, or origin	3%

APPENDIX C. FULL CUSTOMER EXPERIENCE SURVEY

Georgia Power's BYOT Pilot will engage approximately 1,318 residential customers. Participants will receive a total of six annual demand response events through their Nest app, three in summer, and three in winter. To be eligible for this pilot, customers must have either a Nest Learning thermostat, or a Nest Thermostat E and have an active account with Georgia Power. The objectives of the BYOT Pilot evaluation are to 1) gauge customer understanding and awareness of peak events 2) identify actions taken and barriers to action for energy reductions during these events 3) explore how events affect satisfaction with Georgia Power overall and 4) evaluate the impact of the BYOT pilot on energy savings.

This memo outlines the research goals, sampling plan, and timeline for the in-depth customer experience surveys. The draft survey instrument appears at the end of this memo.

RESEARCH GOALS

ILLUME researchers will conduct multiple online surveys with pilot program participants to assess how awareness, engagement, satisfaction, and actions taken vary over time or by season. We will use these surveys to gather feedback to help improve the pilot program as well as customer experience with their Nest thermostat and demand response events during both warm and cold weather months.

The ILLUME team will send the first survey after a summer DR event. This survey will be in-depth and will be used to assess motivations for participation, user experience with enrollment, and the pilot program.

ILLUME will send short (5 minute) follow-up surveys after each consecutive DR event. We will use these shorter surveys to provide a longitudinal perspective into the customer experience, including understanding actions taken during and around DR events. This survey instrument will be provided in a separate document.

ILLUME will send the links to these online surveys via email to the census of pilot participants. We will target recruiting 150 respondents per survey.

The table below outlines specific research questions for the in-depth customer experience survey and cross-references the survey questions that will be used to help answer those questions.

TABLE 31: RESEARCH QUESTIONS

TOPIC	RESEARCH QUESTION	SURVEY QUESTIONS
Screening/Pilot Program Awareness	Are customers aware that they enrolled in the program?	B1
	What motivates customers to participate in the program?	B2

Demand Response Events	Are participants aware of when the demand response events are taking place?	C1 – C5
	How do participants engage with the demand events?	C6 – C9
	What actions, if any, do participants take as part of the demand response events?	C10
	What barriers to action exist for participants?	C11 – C14
	Do participants understand why Georgia Power is offering the program?	C15
Nest Customer Experience	Which features of their Nest Learning Thermostat or Nest Thermostat E do participants use?	D1
	How satisfied are particpants with their Nest Learning Thermostat or Nest Thermostat E?	D2 & D3
Satisfaction	Are customers satisfied with program elements such as the enrollment process, the number of events, ease of overriding events, and event notification?	E1, E4
	How does the BYOT program affect participant satisfaction with Geogia Power overall?	E2 & E3
Customer Attitudes and Behaviors	What are participant attitudes toward technology and saving energy?	F1 & F2
Demographics	What are the demographic characteristics of pilot participants?	G1 – G8

SURVEY GUIDE

A. INVITATION FOR ONLINE RESPONDENTS

INITIAL INVITATION

Subject: Georgia Power Rush Hour Rewards Program Survey

Sender: GPC Rush Hour Rewards

Dear [CUSTOMER_NAME],

Thank you for participating in Georgia Power's Rush Hour Rewards Program. We are very interested in learning how customers like you use their Nest thermostats and interact with the Rush Hour Rewards Program. We invite you to share your experience through this 10-minute survey. In addition, we would love to collect your feedback in four to five short 5-minute follow up surveys over the next six months. You will be entered into a drawing to **win a $100 Visa® gift card** for each survey you complete and customers that complete all surveys will be entered into a drawing to **win a $500 Visa® gift card**.

If you cannot complete the survey all at one time or you accidentally exit the survey mid-course, you can resume where you left off by clicking on the link from this email or hitting the back button in your browser. Results will not be recorded until the final submit button is clicked.

Complete the survey by [SURVEY CLOSE DATE] to be entered in the drawing.

Click HERE to take the survey

Or copy and paste the URL below into your internet browser:

[SURVEY LINK]

Don't miss out on this chance to share your experience!

Sincerely,

Audrey Ewen
Georgia Power Energy Efficiency – Rush Hour Rewards Program
G2NRHRP@southernco.com

REMINDER INVITATION

Subject: "Last Chance to Win $100 from Georgia Power"

Dear [FIRST AND LAST NAME],

Thank you for participating in Georgia Power's Rush Hour Rewards Program. We invite you to share your experience through this 10-minute online survey. As a thank you for your time, you'll be entered into a drawing to **win a $100 Visa® gift card**.

Don't miss this chance to share your experience! Complete the survey by [SURVEY CLOSE DATE] **to be entered in the drawing.**

If you cannot complete the survey all at one time or you accidentally exit the survey mid-course, you can resume where you left off by clicking on the link from this email or hitting the back button in your browser. Results will not be recorded until the final submit button is clicked.

Click HERE to take the survey

Or copy and paste the URL below into your internet browser:

[SURVEY LINK]

Sincerely,

Audrey Ewen
Georgia Power Energy Efficiency – Rush Hour Rewards Program
G2NRHRP@southernco.com

LANDING PAGE

[THIS IS THE LANGUAGE THE SURVEY RESPONDENT WILL SEE AFTER CLICKING THE LINK TO THE SURVEY. THIS PAGE WILL ALSO CONTAIN THE GEORGIA POWER COMPANY LOGO.]

Thank you for participating in Georgia Power's Rush Hour Rewards Program! Your response to this survey will help us understand your experience with the program so far. Your responses will be kept confidential and will be used to help Georgia Power provide the best value to our customers.

To be eligible for the gift card drawing be sure to complete the survey by [SURVEY CLOSE DATE] and click submit.

We appreciate your input!

Click on the "Next" and "Back" buttons at the bottom of each page to navigate through the survey.

B. PILOT PROGRAM AWARENESS

B1. According to our records, you enrolled in Georgia Power's Rush Hour Rewards program during the summer of 2018. As a reminder, this program provides you with bill credits ($25 for signing up and an additional $25 after the first year) for using less electricity during peak energy rush hours. Is this correct?

1. Yes
2. No [TERMINATE]

98. [Not Sure] [TERMINATE]

B2. Why did you to enroll in this program? Please select the one main reason for participating. [SINGLE RESPONSE; RANDOMIZE]

1. To earn a total $50 bill credit
2. To save money on my energy bills
3. It was the environmentally responsible thing to do
4. To help Georgia Power by using less energy at times of high demand
5. To take advantage of programs offered through my Nest thermostat
6. To help reduce the need to build additional power plants
7. Other (Please specify)

98. [Not Sure]

C. DEMAND RESPONSE EVENTS

C1. What type of thermostat do you have in your home? (select all that apply) [MULTIPLE RESPONSE; RANDOMIZE]

1. Nest Learning Thermostat
2. Nest Thermostat E
3. Other (Please specify)

98. [Not Sure]

C2. How many thermostats do you have enrolled in the Rush Hour Rewards Program?

1. 1
2. 2
3. 3
4. 4
5. Other (Please specify)

98. [Not Sure]

C3. Have you received any messages from Nest notifying you of an Energy Rush Hour through the mobile app or the Nest display? [SINGLE RESPONSE]

1. Yes
2. No

98. [Not Sure]

[IF C3 = 1]

C4. How many Energy Rush Hours notifications do you remember being notified of this winter?

1. [NUMERIC OPEN END]

98. [Not Sure]

[IF C3 = 1]

C5. Do you remember getting notified for an Energy Rush Hour on [insert most recent energy rush hour date AND TIME]? [SINGLE RESPONSE]

1. Yes
2. No [SKIP TO C16]

98. [Not Sure] [SKIP TO C16]

[IF C5 = 1 ASK C6 THROUGH C15]

C6. Thinking about that most recent Energy Rush Hour on [INSERT MOST RECENT ENERGY RUSH HOUR DATE], did you get notified through…(select all that apply) [MULTIPLE RESPONSE]

1. The mobile app on your phone
2. On your Nest thermostat
3. Via email
4. Other (Please specify)

98. [Not Sure]

[IF C6 = 1]

C7. Did you get a notification before, during, and/or after the Energy Rush Hour? (select all that apply) [MULTIPLE RESPONSE]

1. Before the Energy Rush Hour
2. During the Energy Rush Hour
3. After the Energy Rush Hour

98. [Not Sure]

C8. WHAT DID YOU DO AFTER GETTING THE NOTIFICATION ABOUT THE ENERGY RUSH HOUR? [SINGLE RESPONSE]

[Responses after the summer events]

1. Nothing (let Nest control my thermostat)
2. Manually raised the temperature setting
3. Raised the temperature setting through the mobile app
4. Lowered my heat setting further to save more energy
5. Something else (Please specify)

98. [Not Sure]

[Responses after the winter events]

1. Nothing (let Nest control my thermostat)
2. Manually changed the temperature setting
3. Changed the temperature setting through the mobile app
4. Something else (Please specify)

98. [Not Sure]

C9. Again, thinking about the most recent Energy Rush Hour on [insert most recent energy rush hour date], were you… [SINGLE RESPONSE]

1. At home during the entire Energy Rush Hour
2. At home part of the time
3. Not at home during the event

98. [Not Sure]

[IF C9 = 1 or 2]

C10. Were you or anyone in your home uncomfortably [IF SUMMER EVENT = 1 THEN "HOT" ELSE "COLD"] during the most recent Energy Rush Hour on [INSERT MOST RECENT ENERGY RUSH HOUR DATE]? [SINGLE RESPONSE]

1. Yes
2. No

98. [Not Sure]

C11. Did you take any of the following actions during the last Energy Rush Hour? [ONE RESPONSE FOR EACH ITEM]

	YES	NO	DON'T KNOW	NA
a. [IF SUMMER EVENT = 1 THEN "INCREASED" ELSE "DECREASED"] the temperature on my thermostat to save more energy	1	2	3	4
b. [IF SUMMER EVENT = 1] Turned off the air conditioning	1	2	3	4
c. [IF WINTER EVENT = 1] Turned off heat pump	1	2	3	4
d. Avoided doing laundry	1	2	3	4
e. Avoided running the dishwasher	1	2	3	4
f. Avoided running my spa or pool pump	1	2	3	4
g. Avoided cooking	1	2	3	4
h. Turned off lights not in use	1	2	3	4
i. Turned off office equipment (computer, printer, etc.)	1	2	3	4
j. Turned off entertainment systems (TV, Nintendo, etc.)	1	2	3	4
k. Took other energy-saving action(s) (Please specify)	1	2	3	4

C12. Were any routines in your home affected by this Energy Rush Hour? [SINGLE RESPONSE]

1. Yes
2. No

98. [Not Sure]

[IF C12 = 1]

C13. What routines were affected? [OPEN RESPONSE]

C14. Did you or others in your home experience any negative effects as a result of having your thermostat's setting changed through the Energy Rush Hour? [SINGLE RESPONSE]

1. Yes
2. No

98. [Not Sure]

[IF C14 = 1]

C15. Please describe any negative effects you or others in your home experienced. [OPEN RESPONSE]

[ASK ALL]

C16. To the best of your knowledge, why do you think Georgia Power is offering the Rush Hour Rewards program? [ONE RESPONSE FOR EACH ITEM]

	YES	NO	DON'T KNOW
a. To help customers save money on electricity bills	1	2	3
b. To improve the reliability of the electricity power grid and avoid power outages	1	2	3
c. To help reduce the need to build new power plants	1	2	3
d. To give customers an incentive to reduce use at times when electricity use is high	1	2	3
e. To help Georgia Power keep energy costs down	1	2	3

D. NEST CUSTOMER EXPERIENCE

D1. About how often do you…(Please select the response that best represents how often you do each of these items) [ONE RESPONSE FOR EACH ITEM]

	DAILY	WEEKLY	MONTHLY	ONCE EVERY FEW MONTHS	ONCE OR TWICE PER YEAR	NEVER	DON'T KNOW
a. Use your phone to change the temperature in your home while you are away	1	2	3	4	5	6	98
b. Look at Energy History to see your daily energy use	1	2	3	4	5	6	98
c. Look at the Home Report to see monthly energy use	1	2	3	4	5	6	98

D2. To what extent do you agree with the following statements about your Nest? [ONE RESPONSE FOR EACH ITEM; RANDOMIZE]

	DO NOT AGREE AT ALL	SLIGHTLY AGREE	AGREE SOMEWHAT	AGREE MODERATELY	AGREE COMPLETELY	DON'T KNOW
a. My Nest is easy to use	1	2	3	4	5	98
b. My Nest helps me identify how I can save energy	1	2	3	4	5	98
c. Letting Georgia Power adjust my Nest doesn't bother me	1	2	3	4	5	98
d. I am satisfied with my Nest thermostat	1	2	3	4	5	98

[IF D2d < 3]

D3. Why did you rate your satisfaction with your thermostat that way? [OPEN RESPONSE]

E. CUSTOMER SATISFACTION

E1. Please rate your satisfaction with each of the following aspects of the Rush Hour Rewards Program. [ONE RESPONSE FOR EACH ITEM]

	NOT AT ALL SATISFIED	SLIGHTLY SATISFIED	SOMEWHAT SATISFIED	MODERATELY SATISFIED	COMPLETELY SATISFIED	DON'T KNOW
a. Enrolling in Rush Hour Rewards	1	2	3	4	5	98
b. The amount of the total bill credit	1	2	3	4	5	98
c. The number of Energy Rush Hours	1	2	3	4	5	98
d. How Nest adjusts your thermostat setting during Energy Rush Hours	1	2	3	4	5	98
e. The ease of overriding Energy Rush Hours	1	2	3	4	5	98
f. The amount of notice before an Energy Rush Hour	1	2	3	4	5	98
g. The report you receive after an Energy Rush Hour	1	2	3	4	5	98
h. The Rush Hour Rewards program overall	1	2	3	4	5	98

E2. Taking into consideration all aspects of your utility service experience, please rate your ***current*** satisfaction with Georgia Power overall? [SINGLE RESPONSE]

NOT AT ALL SATISFIED	SLIGHTLY SATISFIED	SOMEWHAT SATISFIED	MODERATELY SATISFIED	COMPLETELY SATISFIED	DON'T KNOW
1	2	3	4	5	98

[IF E2 < 3]

E3. Why did you rate it that way? [OPEN RESPONSE]

[Questions E4 and E5 were added after the summer events]

E4. The current Rush Hour Rewards Program ends in the spring of 2019. If Georgia Power offers the program again in the future, would you enroll?

1. Yes
2. No

98. [Not Sure]

[IF E4 = 2]

E5. Why wouldn't you enroll in the Rush Hour Rewards Program again?

F. CUSTOMER ATTITUDES AND BEHAVIORS

F1. Do you or any member of your household own any of the following? (select all that apply) [MULTIPLE RESPONSE]

1. Smartphone
2. Wearable technology (e.g. smart watch or fitness tracker)
5. Smart LED bulbs
6. Smart appliances (e.g. smart ranges, refrigerators, washers & dryers, dishwashers)
7. Smart home security system
8. Voice enabled home assistant (e.g. Amazon Echo or Google Home)
9. None of the above

98. [Not Sure]

F2. Some people like to be the first people to try out a new product while others like to wait and see what works well or what becomes popular before making a purchase. Thinking about how soon you buy new technologies, which of the following best describes you? (You can think of things like electronics or appliances) [SINGLE RESPONSE]

1. I'm a risk-taker and I like to try new things as soon as possible, even if they are untested.
2. I typically purchase new technology sooner than a lot of my friends.
3. I'm typically in the middle of the group when purchasing new technology.
4. I purchase new technology *after* most of my friends have purchased it.
5. I am one of the last people to purchase new technology.
6. I prefer to use simple technologies that have been proven to work for many years.

98. [Not Sure]

G. HOUSEHOLD DEMOGRAPHICS

G1. Do you rent or own your home? [SINGLE RESPONSE]

1. Rent
2. Own

98. [Not Sure]

G2. How many years have you lived in your current home? [SINGLE RESPONSE]

1. One year or less
2. 2-3 years
3. 4-5 years
4. 6-10 years
5. More than 10 years

98. [Not Sure]

G3. When was your home built? [SINGLE RESPONSE]

1. Before 1900
2. 1900 to 1939
3. 1940 to 1959
4. 1960 to 1979
5. 1980 to 1989
6. 1990 to 1999
7. 2000 to 2004
8. 2005 or later

98. [Not Sure]

G4. Including you, how many people are currently living in your home year-round? Include all members of your household whether or not they are related to you, but do not include anyone who is just visiting, or children who may be away at college or in the military.

1. [NUMERIC OPEN END]

98. [Not Sure]

G5. In what year were you born?

1. [NUMERIC OPEN END]

G6. Which of the following categories best represents your total annual household income before taxes? [SINGLE RESPONSE]

1. Less than $25,000
2. $25,000 to less than $50,000
3. $50,000 to less than $75,000
4. $75,000 to less than $100,000
5. $100,000 to less than $150,000
6. $150,000 to less than $200,000
7. $200,000 or over

98. [Not Sure]

G7. What is the highest level of education you have completed? [SINGLE RESPONSE]

1. Some high school or less
2. High school graduate or equivalent
3. Some college, no degree
4. Technical college degree or certificate
5. Two-year college degree
6. Four-year college degree
7. Graduate or professional degree

98. [Not Sure]

G8. Which categories describe you? (Select all that apply) [MULTIPLE RESPONSE]

1. American Indian or Alaska Native (for example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, or Nome Eskimo Community.)
2. Asian (for example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, or Japanese)
3. Black or African American (for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, or Somalian)
4. Hispanic, Latino, or Spanish origin (for example, Mexican or Mexican American, Puerto Rican, Cuban, Salvadorian, Dominican, or Colombian)
5. Native Hawaiian or Other Pacific Islander (For example, Native Hawaiian, Samoan, Chamorro, Tongan, Fijian, or Marshallese)
6. Middle Eastern or North African (for example, Lebanese, Iranian, Egyptian, Syrian, Moroccan, or Algerian)
7. White (for example, German, Irish, English, Italian, Polish, or French)
8. Some other race, ethnicity, or origin

98. [Not Sure]

APPENDIX D. FOLLOW UP CUSTOMER EXPERIENCE SURVEY

Georgia Power's BYOT Pilot will engage approximately 1,318 residential customers. Participants will receive a total of at least six annual demand response events through their Nest app, three in summer, and three in winter. To be eligible for this pilot, customers must have either a Nest Learning thermostat, or a Nest Thermostat E and have an active account with Georgia Power. The objectives of the BYOT Pilot evaluation are to 1) gauge customer understanding and awareness of peak events 2) identify actions taken and barriers to action for energy reductions during these events 3) explore how events affect satisfaction with Georgia Power overall and 4) evaluate the impact of the BYOT pilot on energy savings.

This memo outlines the research goals, sampling plan, and timeline for the in-depth customer experience surveys. The draft survey instrument appears at the end of this memo.

RESEARCH GOALS

ILLUME researchers will conduct multiple online surveys with pilot program participants to assess how awareness, engagement, satisfaction, and actions taken vary over time or by season. We will use these surveys to gather feedback to help improve the pilot program as well as customer experience with their Nest thermostat and demand response events during both warm and cold weather months.

The ILLUME team will send a first survey after a summer DR event. This survey will be in-depth and will be used to assess motivations for participation, user experience with enrollment, and the pilot program.

ILLUME will then send short (5 minute) follow-up surveys after each consecutive DR event. We will use these shorter surveys to provide a longitudinal perspective into the customer experience, including understanding actions taken during and around DR events. This document provides the outline for these short follow-up surveys.

ILLUME will send unique web links to these online surveys via email to the census of pilot participants. We will target recruiting 150 respondents per survey. Participants that have not yet completed the longer (first) customer experience survey will receive a link to that survey.

The table below outlines specific research questions for the in-depth customer experience survey and cross-references the survey questions that will be used to help answer those questions.

TABLE 32: RESEARCH QUESTIONS

TOPIC	RESEARCH QUESTION	SURVEY QUESTIONS
Demand Response Events	Are participants aware of when the demand response events are taking place?	C3 – C5

	How do participants engage with the demand events?	C6 – C9
	What actions, if any, do participants take as part of the demand response events?	C10
	What barriers to action exist for participants?	C11 – C14
Satisfaction	Are customers satisfied with program elements such as the number of events, ease of overriding events, and event notification?	E1 & E4
	How does the BYOT program affect participant satisfaction with Geogia Power overall?	E2 & E3

SURVEY GUIDE

A. INVITATION FOR RESPONDENTS THAT COMPLETED FULL SURVEY

INITIAL INVITATION

Subject: Georgia Power Rush Hour Rewards Program Survey #[SURVEY NUMBER]

Sender: GPC Rush Hour Rewards

Dear [CUSTOMER_NAME],

Thank you for participating in Georgia Power's Rush Hour Rewards Program. This is the [SURVEY NUMBER] survey to learn how customers like you use their Nest thermostats and interact with the Rush Hour Rewards Program. We invite you to share your experience through this 5-minute survey. You will be entered into a drawing to **win a $100 Visa® gift card** for each survey you complete and customers that complete all surveys will be entered into a drawing to **win a $500 Visa® gift card**.

If you cannot complete the survey all at one time or you accidentally exit the survey mid-course, you can resume where you left off by clicking on the link from this email or hitting the back button in your browser. Results will not be recorded until the final submit button is clicked.

Complete the survey by [SURVEY CLOSE DATE] to be entered in the drawing.

Click HERE to take the survey

Or copy and paste the URL below into your internet browser:

[SURVEY LINK]

Don't miss out on this chance to share your experience!

Sincerely,

Audrey Ewen
Georgia Power Energy Efficiency – Rush Hour Rewards Program
G2NRHRP@southernco.com

REMINDER INVITATION

Subject: Second Chance to Win $100 from Georgia Power

Dear [FIRST AND LAST NAME],

Thank you for participating in Georgia Power's Rush Hour Rewards Program. This is the [SURVEY NUMBER] survey to learn how customers like you use their Nest thermostats and interact with the Rush Hour Rewards Program. We invite you to share your experience through this 5-minute survey. As a thank you for your time, you'll be entered into a drawing to **win a $100 Visa® gift card**. Customers that complete all surveys will be entered into a drawing to **win a $500 Visa® gift card**.

Don't miss this chance to share your experience! Complete the survey by [SURVEY CLOSE DATE] **to be entered in the drawing.**

If you cannot complete the survey all at one time or you accidentally exit the survey mid-course, you can resume where you left off by clicking on the link from this email or hitting the back button in your browser. Results will not be recorded until the final submit button is clicked.

Click HERE to take the survey

Or copy and paste the URL below into your internet browser:

[SURVEY LINK]

Sincerely,

Audrey Ewen
Georgia Power Energy Efficiency – Rush Hour Rewards Program
G2NRHRP@southernco.com

LANDING PAGE

[THIS IS THE LANGUAGE THE SURVEY RESPONDENT WILL SEE AFTER CLICKING THE LINK TO THE SURVEY. THIS PAGE WILL ALSO CONTAIN THE GEORGIA POWER COMPANY LOGO.]

Thank you for participating in Georgia Power's Rush Hour Rewards Program! Your response to this survey will help us understand your experience with the program so far. Your responses will be kept confidential and will be used to help Georgia Power provide the best value to our customers.

To be eligible for the gift card drawing be sure to complete the survey by [SURVEY CLOSE DATE] and click submit.

We appreciate your input!

Click on the "Next" and "Back" buttons at the bottom of each page to navigate through the survey.

SHORT FOLLOW-UP SURVEY

C. DEMAND RESPONSE EVENTS

C3. Have you received any messages from Nest notifying you of an Energy Rush Hour through the mobile app or the Nest display? [SINGLE RESPONSE]

1. Yes
2. No

98. [Not Sure]

[IF C3 = 1]

C4. How many Energy Rush Hours do you remember being notified of this winter?

1. [NUMERIC OPEN END]

98. [Not Sure]

[IF C3 = 1]

C5. Do you remember getting notified for an Energy Rush Hour on [INSERT MOST RECENT ENERGY RUSH HOUR DATE AND TIME]? [SINGLE RESPONSE]

1. YES
2. NO [SKIP TO C16]

98. [Not Sure] [SKIP TO C16]

[IF C5 = 1 ASK C6 THROUGH C15]

C6. Thinking about that most recent Energy Rush Hour on [INSERT MOST RECENT ENERGY RUSH HOUR DATE], did you get notified through…(SELECT ALL THAT APPLY) [MULTIPLE RESPONSE]

1. The mobile app on your phone
2. On your Nest thermostat
3. Via email
4. Other (Please specify)

98. [Not Sure]

[IF C6 = 1,2,3,4]

C7. Did you get a notification before, during, and/or after the Energy Rush Hour? (select all that apply) [MULTIPLE RESPONSE]

1. Before the Energy Rush Hour
2. During the Energy Rush Hour
3. After the Energy Rush Hour

98. [Not Sure]

C8. What did you do after getting the notification about the Energy Rush Hour? [SINGLE RESPONSE]

[Responses after the summer events]

6. Nothing (let Nest control my thermostat)
7. Manually raised the temperature setting
8. Raised the temperature setting through the mobile app
9. Lowered my heat setting further to save more energy
10. Something else (Please specify)

98. [Not Sure]

[Responses after the winter events]

1. Nothing (let Nest control my thermostat)
2. Manually changed the temperature setting
3. Changed the temperature setting through the mobile app
4. Something else (Please specify)

98. [Not Sure]

C9. Again, thinking about the most recent Energy Rush Hour on [INSERT MOST RECENT ENERGY RUSH HOUR DATE], were you… [SINGLE RESPONSE]

1. At home during the entire Energy Rush Hour
2. At home part of the time
3. Not at home during the Energy Rush Hour

98. [Not Sure]

[IF C9 = 1 or 2]

C10. Were you or anyone in your home uncomfortably [IF SUMMER EVENT = 1 THEN "HOT" ELSE "COLD"] during the most recent Energy Rush Hour on [INSERT MOST RECENT ENERGY RUSH HOUR DATE]? [SINGLE RESPONSE]

1. Yes
2. No

98. [Not Sure]

C11. Did you take any of the following actions during the last Energy Rush Hour? [ONE RESPONSE FOR EACH ITEM]

	YES	NO	DON'T KNOW	NA
a. [IF SUMMER EVENT = 1 THEN "INCREASED" ELSE "DECREASED"] the temperature on my thermostat to save more energy	1	2	3	4
b. [IF SUMMER EVENT = 1] Turned off the air conditioning	1	2	3	4
c. [IF WINTER EVENT = 1] Turned off heat pump	1	2	3	4
d. Avoided doing laundry	1	2	3	4
e. Avoided running the dishwasher	1	2	3	4
f. Avoided running my spa or pool pump	1	2	3	4
g. Avoided cooking	1	2	3	4
h. Turned off lights not in use	1	2	3	4
i. Turned off office equipment (computer, printer, etc.)	1	2	3	4
j. Turned off entertainment systems (TV, Nintendo, etc.)	1	2	3	4
k. Took other energy-saving action(s) (Please specify)	1	2	3	4

C12. Were any routines in your home affected by this Energy Rush Hour? [SINGLE RESPONSE]

1. Yes
2. No

98. [Not Sure]

[IF C12 = 1]

C13. What routines were affected? [OPEN RESPONSE]

C14. Did you or others in your home experience any negative effects as a result of having your thermostat's setting changed through the Energy Rush Hour? [SINGLE RESPONSE]

1. Yes
2. No

98. [Not Sure]

[IF C14 = 1]

C15. Please describe any negative effects you or others in your home experienced. [OPEN RESPONSE]

E. CUSTOMER SATISFACTION

E1. Please rate your satisfaction with each of the following aspects of the Rush Hour Rewards Program. [ONE RESPONSE FOR EACH ITEM]

	NOT AT ALL SATISFIED	SLIGHTLY SATISFIED	SOMEWHAT SATISFIED	MODERATELY SATISFIED	COMPLETELY SATISFIED	DON'T KNOW
c. The number of Energy Rush Hours	1	2	3	4	5	98
d. How Nest adjusts your thermostat setting during Energy Rush Hours	1	2	3	4	5	98
e. The ease of overriding Energy Rush Hours	1	2	3	4	5	98
f. The amount of notice before an Energy Rush Hour	1	2	3	4	5	98
g. The report you receive after an Energy Rush Hour	1	2	3	4	5	98
h. The Rush Hour Rewards program overall	1	2	3	4	5	98

E2. Taking into consideration all aspects of your utility service experience, please rate your ***current*** satisfaction with Georgia Power overall? [SINGLE RESPONSE]

NOT AT ALL SATISFIED	SLIGHTLY SATISFIED	SOMEWHAT SATISFIED	MODERATELY SATISFIED	COMPLETELY SATISFIED	DON'T KNOW
1	2	3	4	5	98

[IF E2 < 3]

E3. Why did you rate it that way? [OPEN RESPONSE]

[Questions E4 and E5 were added after the summer events]

E4. The current Rush Hour Rewards Program ends in the spring of 2019. If Georgia Power offers the program again in the future, would you enroll?

1. Yes
2. No

98. [Not Sure]

[IF E4 = 2]

E5. Why wouldn't you enroll in the Rush Hour Rewards Program again?