BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

In the Matter of the Application of Kansas City Power & Light Company for Approval to Extend its Demand-Side Management Programs	))))	Docket No. 18-KCPE-124-TAR

NOTICE OF FILING OF EVALUATION MEASUREMENT AND VERIFICATION BY EVERGY METRO, INC.

COME NOW Evergy Metro, Inc. d/b/a Evergy Kansas Metro ("Evergy" or the "Company") (formerly known as Kansas City Power & Light Company or KCP&L-KS)[1] and submits its evaluation, measurement and verification (EM&V) for the KCP&L-KS Legacy Thermostat program pursuant to the Commission order in Docket No. 18-KCPE-124-TAR.

1. In the Joint Settlement Agreement approved by the Commission in Docket No. 18-KCPE-124-TAR ("18-124 Docket"), the signatories agreed that

> the DSM programs contained within KCP&L's Application will be extended until February 1, 2020. KCP&L will utilize Navigant to conduct a limited evaluation, measurement and verification ("EM&V") study (impact analysis and cost-benefit test results only). The cycling events included in the EM&V will adhere to the parameters specified in Staff's Report. The completed EM&V will be filed no later than October 1, 2019 and will cover only the 2017 and 2018 program years.[2]

The Commission issued its Order Approving the Joint Settlement Agreement on August 7, 2018.[3]

2. Evergy has completed the EM&V for the KCP&L-KS Legacy Thermostat program and it is attached hereto. The EM&V performed for the KCP&L-KS Legacy Thermostat program indicates that the program was cost effective for the 2017 and 2018 program years. The EM&V

---

[1] Evergy filed an Adoption Notice with the Commission in Docket No. 20-KCPE-122-CCN, notifying the Commission that its legal name had changed from Kansas City Power & Light Company to Evergy Metro, Inc. and that it was adopting all tariffs, schedules, and rules and regulations of Kansas City Power & Light Company. The Adoption Notice tariff will become effective on Oct. 7, 2019.

[2] Joint Settlement Agreement, 18-124 Docket, at ¶ 7 (July 6, 2018).

[3] Order Approving Joint Settlement Agreement, 18-124 Docket (Aug. 7, 2018)

also indicates that the program passes the standard cost-benefit tests utilized when DSM programs are evaluated.

3. Evergy respectfully requests that the Commission accept its EM&V for the KCP&L-KS Legacy Thermostat program.

Respectfully submitted,

/s/ Cathryn J. Dinges

Cathryn J. Dinges (#20848)
Corporate Counsel
818 South Kansas Avenue
Topeka, Kansas 66612
Telephone: (785) 575-8344
Fax: (785) 575-8136
Cathy.Dinges@evergy.com

Counsel for Evergy Metro, Inc.

CERTIFICATE OF SERVICE

I hereby certify that on this 1st day of October, 2019, the foregoing Notice was electronically served on the following parties of record:

CARY CATCHPOLE, Accountant/Economist
CITIZENS' UTILITY RATEPAYER BOARD
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
c.catchpole@curb.kansas.gov

THOMAS J. CONNORS, Attorney at Law
CITIZENS' UTILITY RATEPAYER BOARD
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
tj.connors@curb.kansas.gov

STACY HARDEN, SENIOR REGULATORY ANALYST
CITIZENS' UTILITY RATEPAYER BOARD
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
s.harden@curb.kansas.gov

TODD E. LOVE, ATTORNEY
CITIZENS' UTILITY RATEPAYER BOARD
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
t.love@curb.kansas.gov

DAVID W. NICKEL, CONSUMER COUNSEL
CITIZENS' UTILITY RATEPAYER BOARD
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
D.NICKEL@CURB.KANSAS.GOV

SHONDA RABB
CITIZENS' UTILITY RATEPAYER BOARD
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
s.rabb@curb.kansas.gov

DELLA SMITH
CITIZENS' UTILITY RATEPAYER BOARD
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
d.smith@curb.kansas.gov

ROBERT J. HACK, LEAD REGULATORY COUNSEL
KANSAS CITY POWER & LIGHT COMPANY
ONE KANSAS CITY PL, 1200 MAIN ST
16TH FLOOR
KANSAS CITY, MO 64105
ROB.HACK@EVERGY.COM

ROGER W. STEINER, CORPORATE COUNSEL
KANSAS CITY POWER & LIGHT COMPANY
ONE KANSAS CITY PL, 1200 MAIN ST
16TH FLOOR
KANSAS CITY, MO 64105
roger.steiner@evergy.com

ANTHONY WESTENKIRCHNER, SENIOR PARALEGAL
KANSAS CITY POWER & LIGHT COMPANY
ONE KANSAS CITY PL, 1200 MAIN ST
16TH FLOOR
KANSAS CITY, MO 64105
anthony.westenkirchner@evergy.com

PHOENIX ANSHUTZ, LITIGATION COUNSEL
KANSAS CORPORATION COMMISSION
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
p.anshutz@kcc.ks.gov

BRIAN G. FEDOTIN, GENERAL COUNSEL
KANSAS CORPORATION COMMISSION
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
b.fedotin@kcc.ks.gov

ROBERT VINCENT, LITIGATION COUNSEL
KANSAS CORPORATION COMMISSION
1500 SW ARROWHEAD RD
TOPEKA, KS 66604
r.vincent@kcc.ks.gov

/s/ Cathryn J. Dinges

KCP&L-KS Legacy Thermostat Evaluation, Measurement, & Verification (EM&V) Study

Prepared for:

Kansas City Power and Light

Submitted by:
Navigant Consulting, Inc.
1375 Walnut Street
Suite 100
Boulder, CO 80302

303-728-2521
navigant.com

August 20, 2019

TABLE OF CONTENTS

Disclaimer ..... **ii**

Executive Summary ..... **iii**

Program History iii
Impact Results iii
Cost-Effectiveness v

1. Program Impacts **1**

1.1 Data 1
1.2 Approach 3
1.2.1 Non-Event Days Selection 3
1.2.2 Regression Model Specification 4
1.2.3 Unadjusted Baseline Prediction 5
1.2.4 Day-of Load Adjustment 5
1.2.5 Calculated Impact and Uncertainty 6
1.3 DR Impacts 7

2. Cost-Effectiveness **10**

2.1 Approach 10
2.2 Cost-Effectiveness Results 11

Appendix A. DR Impacts **A-1**

A.1 Detailed Approach A-1
A.2 Data Tables – Non-Event and Event Date Matches A-2
A.3 Data Tables – Average Event Impact A-4
A.4 Data Tables – Hourly Impact A-5

Appendix B. Cost-Effectiveness **B-1**

B.1 Input Assumptions B-1
B.2 Summary B-2
B.3 Calculation Tables B-4

DISCLAIMER

Copyright

Disclaimer

This report ("report") was prepared for Kansas City Power and Light on terms specifically limiting the liability of Navigant Consulting, Inc. (Navigant), and is not to be distributed without Navigant's prior written consent. Navigant's conclusions are the results of the exercise of its reasonable professional judgment. By the reader's acceptance of this report, you hereby agree and acknowledge that (a) your use of the report will be limited solely for internal purpose, (b) you will not distribute a copy of this report to any third party without Navigant's express prior written consent, and (c) you are bound by the disclaimers and/or limitations on liability otherwise set forth in the report. Navigant does not make any representations or warranties of any kind with respect to (i) the accuracy or completeness of the information contained in the report, (ii) the presence or absence of any errors or omissions contained in the report, (iii) any work performed by Navigant in connection with or using the report, or (iv) any conclusions reached by Navigant as a result of the report. Any use of or reliance on the report, or decisions to be made based on it, are the reader's responsibility. Navigant accepts no duty of care or liability of any kind whatsoever to you, and all parties waive and release Navigant from all claims, liabilities and damages, if any, suffered as a result of decisions made, or not made, or actions taken, or not taken, based on this report.

Confidentiality

This report contains confidential and proprietary information. Any person acquiring this report agrees and understands that the information contained in this report is confidential and, except as required by law, will take all reasonable measures available to it by instruction, agreement or otherwise to maintain the confidentiality of the information. Such person agrees not to release, disclose, publish, copy, or communicate this confidential information or make it available to any third party, including, but not limited to, consultants, financial advisors, or rating agencies, other than employees, agents and contractors of such person and its affiliates and subsidiaries who reasonably need to know it in connection with the exercise or the performance of such person's business.

[1] The terms of the client engagement letter or contract usually provide that the Client is the owner of the copyrighted report, but in some contracts, Navigant retains ownership of the copyright.

EXECUTIVE SUMMARY

Kansas City Power and Light (KCP&L) commissioned Navigant Consulting, Inc. (Navigant) to provide Evaluation, Measurement and Verification (EM&V) services for KCP&L's legacy thermostat program in their Kansas service territory (KCP&L-KS) for years 2017 and 2018. Through the EM&V study, Navigant calculated demand response (DR) impacts from the program for program years 2017 and 2018 and the cost-effectiveness of the program.

The KCP&L-KS legacy thermostat program is a DR air conditioning (AC) cycling program implemented by CLEAResult designed to reduce, or shift, load during peak summer demand periods. The program currently serves nearly 16,700 residential[2] participants throughout the KCP&L-KS territory.

This report presents the results of the EM&V study of the program with regard to program impacts and cost-effectiveness.

Program History

The KCP&L-KS legacy thermostat program is a demand response program that has provided free programmable thermostats to residential and small business customers who in turn provide the opportunity for load reduction on peak summer days from June 1 through September 30. During an event, participating thermostats receive a one-way signal that initiates a 50% HVAC cycling strategy to achieve demand savings.

The program has been delivering demand savings since it began in the summer of 2005. The last thermostats were delivered to customers in 2015. Since then, the thermostats continue to have the opportunity to deliver demand savings every summer, however there is evidence that some thermostats may be malfunctioning, have been removed, or are otherwise no longer able to respond to events.

Impact Results

Table ES - 1 presents the findings by year and customer class. The legacy thermostat program delivered an average impact of 5.7 MW (2017) and 4.4 MW (2018) across all events in each year. Navigant found that KCP&L-KS residential impacts are lower than the evaluated results of other 50% cycling AC direct load control programs, including Westar's WattSaver program, as seen in Figure ES - 1. Navigant hypothesizes that the 2018 impacts are lower due to more devices having been removed, failing to receive the event signal, or otherwise stopped responding to the events. The residential sector drives total program impacts. The three participants in the small business sector had a negligible impact on overall program reductions.

KCP&L provided Navigant with participant interval consumption data, program tracking data, and the event schedule to support the impact evaluation. Navigant supplemented the KCP&L data with weather

[2] This report does not include the impacts for three small business customers. Due to the small sample size and wide confidence intervals of the estimated impacts for these customers, the results are not generalizable to a wider population and are negligible to the total program impacts.

data from the National Oceanic and Atmospheric Administration (NOAA). The interval consumption data included hourly consumption data for all KCP&L-KS program participants for whom Advanced Metering Infrastructure (AMI) data are available for all months of the summer DR seasons of 2017 and 2018. Navigant utilized AMI data for a total of 12,880 participants for the analysis of 2017 and 2018 program years. This sample represents 77% of program participants in those years.

Navigant used the weather data to select event-like non-event days to derive the baseline for the five events. Navigant then calculated the baseline using a regression analysis applied to customer AMI data. The regression model controlled for individual-specific effects, weather, calendar, and program effects. Following the regression analysis, we applied a day-of load adjustment to fine-tune impacts and address effects not otherwise wholly captured by the regression model. Navigant estimated the impacts by calculating the difference between the adjusted estimated baseline and the actual event day demand[3]. Details on the approach are discussed in Section 1.2.

Table ES - 1. KCP&L-KS Legacy Thermostat Program Impact Results

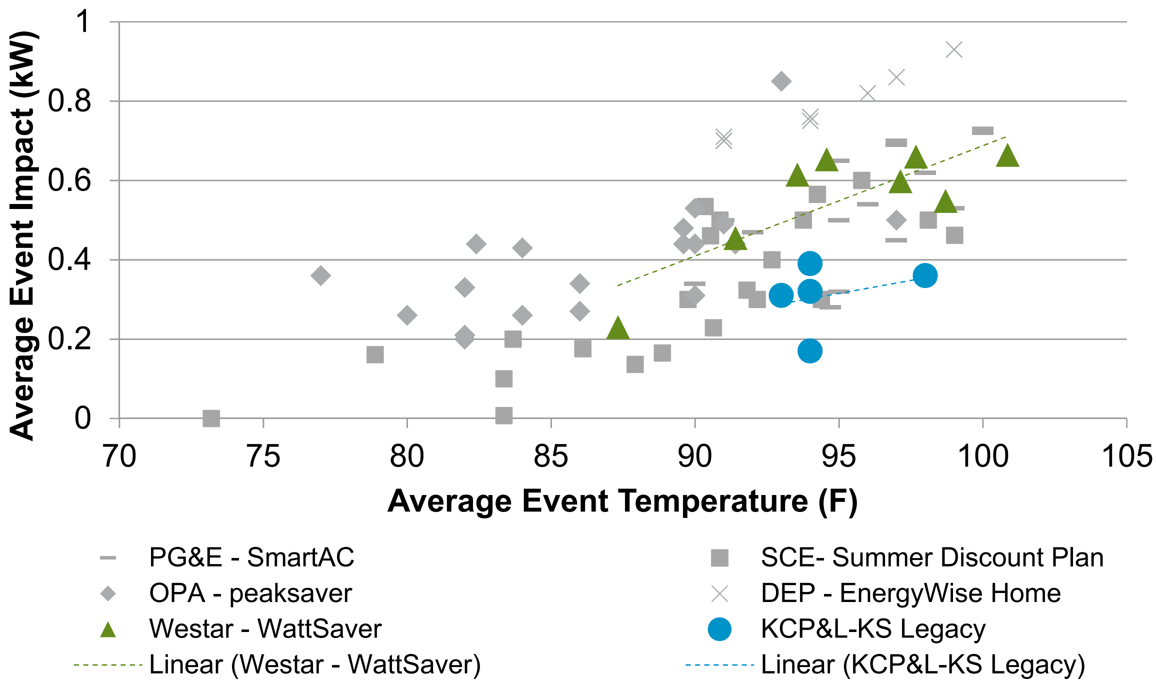
Year	Participants	Program Avg Impact (kW)[4]	Program Maximum Impact (kW)[5]	Avg. Impact (kW/Participant)
2017	16,683	5,676	6,531	0.34
2018	16,683	4,427	6,039	0.27

[3] Confidence intervals were derived from regression-estimated parameters capturing program effects.

[4] Program Average Impact is the simple average of the three events in 2017 and two events in 2018.

[5] Program Maximum Impact is the event with the largest total impact. See Table 2-2 for details on total impact by event.

Figure ES - 1. Comparison of Residential AC Direct Load Control Program Impacts



Cost-Effectiveness

Navigant calculated the cost-effectiveness for the program using the total resource cost test (TRC), utility cost test (UCT), and rate impact measure (RIM) test. The primary inputs for the program's cost-effectiveness are deferred capacity costs and program administration costs. The maximum event impacts for each year were used in calculating the program's cost-effectiveness because that represents the total deferred capacity achieved in that year. Navigant assumed the following costs and benefits of the program to be zero for the cost-effectiveness calculations:

1. Incentives: KCP&L did not provide incentive payments to program participants in 2017 and 2018.
2. Participant Cost: Incremental costs of the thermostats were incurred in prior years.

Given the assumptions above, the TRC, UCT, and RIM tests result in the same benefit cost ratios for a given year. Further, the Participant Cost Test cannot be calculated as both the benefits (bill savings and incentives) and costs (purchase of the thermostat) are zero. Section 2.1 further describes the assumptions and approach for evaluating the program's cost-effectiveness.

Navigant found the KCP&L-KS legacy thermostat program to be cost-effective for both 2017 and 2018. Table ES - 2 presents the total avoided capacity costs, program administration costs, net benefits and benefit cost ratios for the program. The program will remain cost-effective assuming administrative cost reductions are commensurate with attrition in the program and capacity avoided costs remain the same.

Table ES - 2. KCP&L-KS Legacy Thermostat Program Cost-Effectiveness Results

Year	Total Avoided Capacity Costs	Program Administration Costs	Net Benefit ($)	Benefit Cost Ratios (TRC, UCT, RIM)
2017	** [redacted] **	$167,144	$575,806	**4.45**
2018	** [redacted] **	$139,179	$565,057	**5.06**

1. PROGRAM IMPACTS

This section presents Navigant's impact evaluation of the KCP&L-KS legacy thermostat program. Navigant first presents the data supporting the analysis, followed by the approach employed. Lastly, Navigant summarizes the impacts for each event and the program overall.

1.1 Data

Navigant submitted a formal data request to KCP&L for the data required to support the regression analysis and evaluation of DR impacts. The data consists of participant interval data[6], participant tracking data, and event schedule. In addition to the data supplied by KCP&L, Navigant collected weather data from NOAA. The participant interval data, weather data, and event schedule data were used to estimate the average counterfactual (baseline) demand per customer during DR events. The weather data was also employed to select event-like non-event days to include in the estimation data set. Table 1-1 describes the categories and examples of data fields provided by KCP&L.

Table 1-1. Description of Data Used for Analysis

Category	Description	Fields
Participant Interval Data	Hourly consumption data for all KCP&L-KS program participants for whom AMI data are available for all months of the summer DR seasons of 2017 and 2018	• Consumption (kWh) • Date • Hour ending in which the demand in that interval was observed • Customer account number
Weather Data	Hourly weather data in Kansas City for the length of the DR season in 2017 and 2018	• Dewpoint temperature • Relative humidity • Heat index • Dry bulb temperature • Time stamp of the period ending in which the weather in that interval was observed

[6] According to the Stipulation and Agreement (Docket No. 18-KCPE-124-TAR), "the cycling events included in the EM&V will adhere to the parameters specified in Staff's report [which are that] 'KCP&L will collect data from 400 PT subscribers and 400 non-subscribers and provide to Staff and CURB (Citizens' Utility Ratepayer Board). Data provided from the PT program subscribers and non-subscribers shall come from subscribers and non-subscribers within the same zip code.'" Navigant did not include non-participant data in the analysis and instead used event-like non-event days to estimate the counterfactual baselines. This approach ensures consistency with the Westar legacy thermostat program evaluation.

Category	Description	Fields
Participant Tracking Data	Program tracking data	• Customer account numbers • Date of enrollment in program • Customer class
Event Schedule	DR event schedule	• Day • Date • Event hours and time zone

The number of active customers and devices do not vary across the two event seasons, as seen in Table 1-2. New customers were not enrolled during this time and customers leaving the program were not tracked. The inability to track customers who do not continue participating in the program may contribute to lower average impact for all customers. By comparison, Westar's device management practices allowed Navigant to measure program attrition and remove non-participating customers from the analysis, so the Westar total impacts likely include fewer non-responding thermostats. Navigant used 12,880 customers with AMI data, or approximately 77% of active customers, in the regression analysis. Navigant scaled the per-participant impacts estimated from the sample of participants with available AMI data to estimate the total program impact for a given year and customer class.

Table 1-2. Event Schedule and Participants by Event

Event Day	Event Date	Event Hours	Active Devices	Active Customers
Wednesday	July 12, 2017	2-5 PM	16,740	16,868
Thursday	July 20, 2017	2-4 PM	16,740	16,868
Friday	July 21, 2017	4-6 PM	16,740	16,868
Thursday	June 28, 2018	4-6 PM	16,740	16,868
Monday	August 6, 2018	4-6 PM	16,740	16,868

1.2 Approach

This section describes the five main steps in Navigant's approach for the program impact evaluation.

1. Non-Event Days Selection
2. Regression Model Specification
3. Unadjusted Baseline Prediction
4. Day-of Adjustment Calculation
5. Estimation of Impacts and Uncertainty

1.2.1 Non-Event Days Selection

The average event counterfactual (baseline) demand was estimated using event and event-like non-event days. For each event day and weather station, two non-event days were selected based on the proximity of its hourly temperature observations to the event day's hourly temperature observations.

Holidays were excluded from the pool of non-event days from which the event-like non-event days were selected. "Holidays" are days where load patterns are expected to deviate from a standard weekday pattern, even if the day itself is not a statutory holiday. For instance, in 2017, July 4 fell on a Tuesday. It is likely that residential demand patterns on Monday, July 3 were materially different from those of a typical Monday, and thus not a suitable control for a DR event that took place on a standard weekday.

Table 1-3 shows the list of Kansas statutory holidays excluded for the baseline estimation.

Table 1-3. Kansas Statutory Holidays

Day	Holiday Date	Holiday
Monday	May 29, 2017	Memorial Day
Monday	July 3, 2017	Independence Day
Tuesday	July 4, 2017	Independence Day
Monday	September 4, 2017	Labor Day
Monday	May 28, 2018	Memorial Day
Wednesday	July 4, 2018	Independence Day
Monday	September 3, 2018	Labor Day

Across all weather stations, a total of 12 unique non-event days were included in the regression. Table 1-4 lists the 12 unique non-event days. Appendix A.2 contains a more detailed table summarizing the temperatures of selected non-event days and distance of temperatures from the corresponding event day for each event day and weather station.

Table 1-4. Selected Non-Event Days

Non-Event Day	Date
1	7/10/2017

2	7/11/2017
3	7/25/2017
4	6/11/2018
5	6/15/2018
6	6/18/2018
7	6/29/2018
8	7/5/2018
9	7/11/2018
10	7/12/2018
11	7/13/2018
12	7/16/2018

1.2.2 Regression Model Specification

Navigant estimated baselines using a regression analysis applied to customer AMI data. The regression controlled for the following variables:

1) **Individual-Specific Effects:** This captures fixed effects or all time-invariant differences in demand between customers. For example, such effects can include size of the house or the equipment being controlled. Controlling for fixed effects is standard practice in evaluation wherein the panel data contains observations obtained over multiple time periods for the same individuals.
2) **Weather Effects:** These capture the effect of multi-day heat and humidity build-up, and temperature on the estimated baseline.
3) **Hourly Effects:** These account for the hour of the day.
4) **Program Effects:** These include the impact of curtailment during the event, and curtailment after the event, referred to as snapback. Important note: the estimated parameters associated with the program effects dummies deliver an estimated impact equivalent to the difference between the unadjusted baseline and actual demand. These values are not directly used in the estimation of the impacts (estimated as the difference between the adjusted baseline and the actual demand) but are estimated to deliver the standard errors which (when appropriately adjusted using the day-of adjustment) are used to provide the estimated uncertainty associated with the impacts.[7]

Appendix A.1 discusses the regression equation Navigant used in greater detail.

Navigant's original approach was to use the estimated program effects parameters resulting from the regression analysis to deliver estimated impacts directly. Upon further examination of the preliminary results derived directly from the program effect dummy variable parameter estimates, Navigant observed that the baseline for August 6, 2018, a relatively cool day, appeared to be overstating baseline demand (and therefore, impacts). To correct this, Navigant applied a day-of load adjustment. Due to the application of day-of load adjustment, the program impact dummy variable parameters resulting from the

[7] Unadjusted counterfactual (baseline) demand is estimated by applying the observed independent variable values to all estimated parameters, except those associated with program effects (or, equivalently, applying all observed independent variables to estimated parameters but setting all program effect dummy variables to zero).

regression analysis were not used directly to deliver the estimated impacts. The impact parameters were still used for estimation of standard errors, as discussed in Section 1.2.5.

1.2.3 Unadjusted Baseline Prediction

To estimate the unadjusted baseline, Navigant used predicted values, actual demand, and residuals and curtailment and snapback estimated impact parameters from the regression analysis (Equation 1 and Equation 2).

Equation 1

$$\hat{y}_{i,t} = Actual\ Demand_{i,t} - e_{i,t}$$

Where "$\hat{y}_{i,t}$" is the predicted value and $e_{i,t}$ is the residual.

Equation 2

$$Unadjusted\ Baseline\ _{i,t} = \hat{y}_{i,t} - (estimated\ impact\ parameters)_{i,t}$$

This is analytically equivalent to setting all program treatment dummy variables to zero, and applying these values to the estimated parameters.[8]

1.2.4 Day-of Load Adjustment

Navigant applied a day-of load adjustment to fine-tune program impacts and address effects that are not otherwise wholly captured by the regression analysis. Capturing day-of realities in the baseline estimation is essential for calculating more accurate program impacts. A percent adjustment factor comparing the unadjusted baseline to actual demand during an early-afternoon hour preceding the event was developed as per Equation 3.

Equation 3.

$$Percent\ Adjustment\ (\%) = 1 - \left[\frac{(Baseline\ \ - Actual\ Demand\ )}{Baseline}\right]$$

Note that for each customer, averages across an hour before the event were used in Equation 3. However, the adjustment was applied to the hourly baseline estimation resulting from the regression model by multiplying it by the percent adjustment (Equation 4).

[8] The regression equation uses a standard "ex-post only" battery of dummies approach for controlling for treatment effects. A dummy variable exists for each time interval in which an event occurred. Each dummy variable takes a value of one only once in a given individual's time series. For example, the first program dummy variable is equal to one when the given interval is the first interval of the first event, and zero otherwise, the second program dummy variable is equal to one when the given interval is the second interval of the first event, etc.

This means that the unadjusted baseline is analytically equivalent to the predicted values, had all intervals in which a treatment effect was expected been excluded from the estimation set. As noted above, the reason for including the treatment dummies (despite not using them directly for the calculating estimated impacts) was to obtain the cluster-robust standard errors required for quantifying the estimated uncertainty of the impacts.

Equation 4.

$$Adjusted\ Baseline\ = Percent\ Adjustment\ \times Baseline$$

The day-of load adjustment can increase or decrease the estimated program impact depending on the load profiles in the hour preceding the event. Customers that have requested it are notified via e-mail prior to an event. The adjustments are not a cause for concern since pre-cooling behavior is not evident in the plots of actual demand (see Figure 1-1. Residential Load Profiles).

Table 1-5 summarizes the average percent adjustments applied to the unadjusted baseline and impacts for each event. As may be observed, for all but one event, the adjustment is trivial. The only event where the adjustment has a material impact is the August 6, 2018 event. This was a relatively cool event (see Table 1-7), and it was the observation that the unadjusted estimates overstated baseline demand (and thus impacts) for this event that motivated Navigant to apply the adjustment.

Table 1-5. Average Percent Day-of Load Adjustment

Event Date	Percent Day-of Load Adjustment
July 12, 2017	101%
July 20, 2017	104%
July 21, 2017	103%
June 28, 2018	99%
August 6, 2018	91%

1.2.5 Calculated Impact and Uncertainty

Using a day-of-load adjustment means that the estimated impact resulting from the regression analysis cannot be used. Navigant calculated the adjusted impacts by taking the difference between the adjusted baseline and the actual load. (Equation 5).

Equation 5

$$Adjusted\ Impact\ = Adjusted\ Baseline - Actual\ Demand$$

Navigant used the estimated treatment dummy parameter standard errors from the regression analysis to estimate the standard errors associated with the adjusted impact, as per Equation 6 . The regression-estimated standard errors delivered by the regression model are cluster-robust standard errors (clustering by individual account number).

Equation 6

$$Adjusted\ Standard\ Error =\ Percent\ Adjustment\ \times Standard\ Error$$

1.3 DR Impacts

The KCP&L-KS legacy thermostat program delivered an average impact of 5.7 MW (2017) and 4.4 MW (2018) across the five events. The average impact per participant was 0.34 kW and 0.27 kW for 2017 and 2018, respectively, as shown in Table 1-6.

Table 1-6. KCP&L-KS Legacy Thermostat Program Impact Results

Year	Participants*	Program Avg Impact (kW)[9]	Program Maximum Impact (kW)[10]	Avg. Impact* (kW/Participant)
2017	16,683 (13,063)	5,676	6,531	0.34 (0.43)
2018	16,683 (13,063)	4,427	6,039	0.27 (0.34)

* Numbers in parentheses indicate estimated number of participants and average impact per participant excluding non-responding thermostats.

Navigant investigated the hypothesis that the lower KCP&L-KS impacts were due to more devices being removed or damaged, and thus not responding to the events, by conducting customer-level regression analysis. Navigant used customer-level regression models specified similar to the model used to estimate event counterfactuals and identified customers whose program effect coefficient was near zero. Approximately 21.7% of thermostats met the criteria and are likely not responding to the events. Assuming these customers achieved zero demand reduction, then the estimated number of responding thermostats is 13,063, and the per-customer response level might have been approximately 0.39 kW (approximately 0.43 kW in 2017 and 0.34 kW in 2018) for the responding population.

The residential sample had an average of 12,705 customers with available data in 2017, which increased by 1.3% to 12,865 in 2018. This represents 76% and 77% of the population in 2017 and 2018, respectively. Table 1-7 summarizes the average number of participants in the sample, temperature, impact per customer, and relative precision at 90% confidence interval by event date. Compared to 2017, 2018 had lower average impacts due to low impacts for the last event in the season on August 6, 2018, a relatively cool day with approaching evening storms. Furthermore, it is possible that additional thermostats in 2018 were not receiving the event signal compared to 2017. Appendix A.1 provides detail on how Navigant calculated impacts for each event.

Table 1-7. KCP&L-KS Legacy Thermostat Program Impact by Event

Event Date	Average Participants in Sample	Average Temperature (°F)	Average Impact per Customer (kW)	Relative Precision at 90% CI
July 12, 2017	12,701	93	0.31	7.91%
July 20, 2017	12,707	94	0.32	10.42%

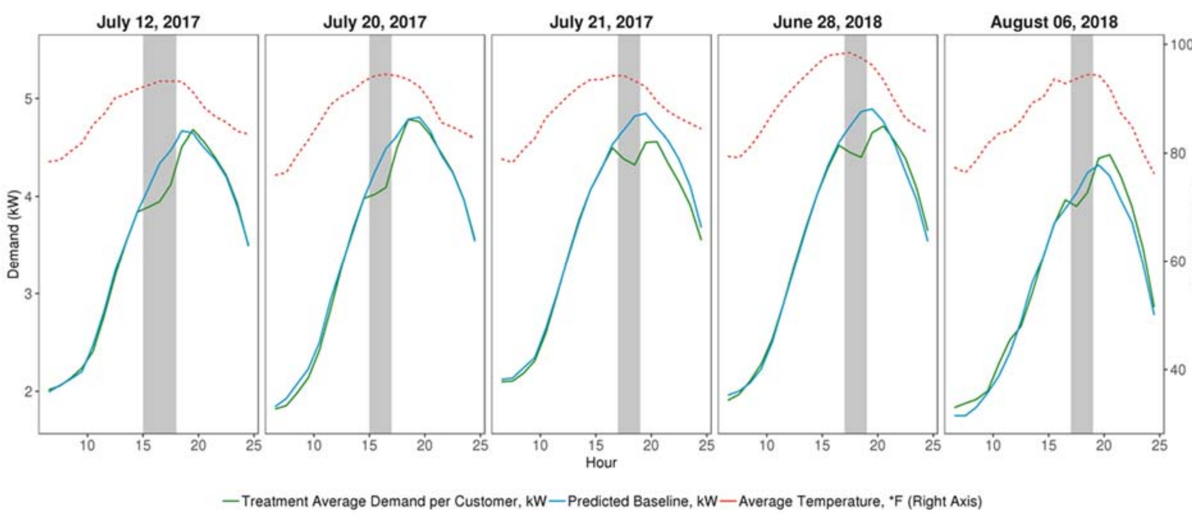
[9] Program Average Impact is the average of the three events in 2017 and two events in 2018.

[10] Program Maximum Impact is the event with the largest total impact. See Table 2-2 for details on total impact by event.

July 21, 2017	12,707	94	0.39	8.36%
2017 Average	**12,705**	**94**	**0.34**	**8.90%**
2017 Total Participants	**16,740**			
June 28, 2018	12,849	98	0.36	8.72%
August 6, 2018	12,880	94	0.17	17.21%
2018 Average	**12,865**	**96**	**0.27**	**12.97%**
2018 Total Participants	**16,740**			

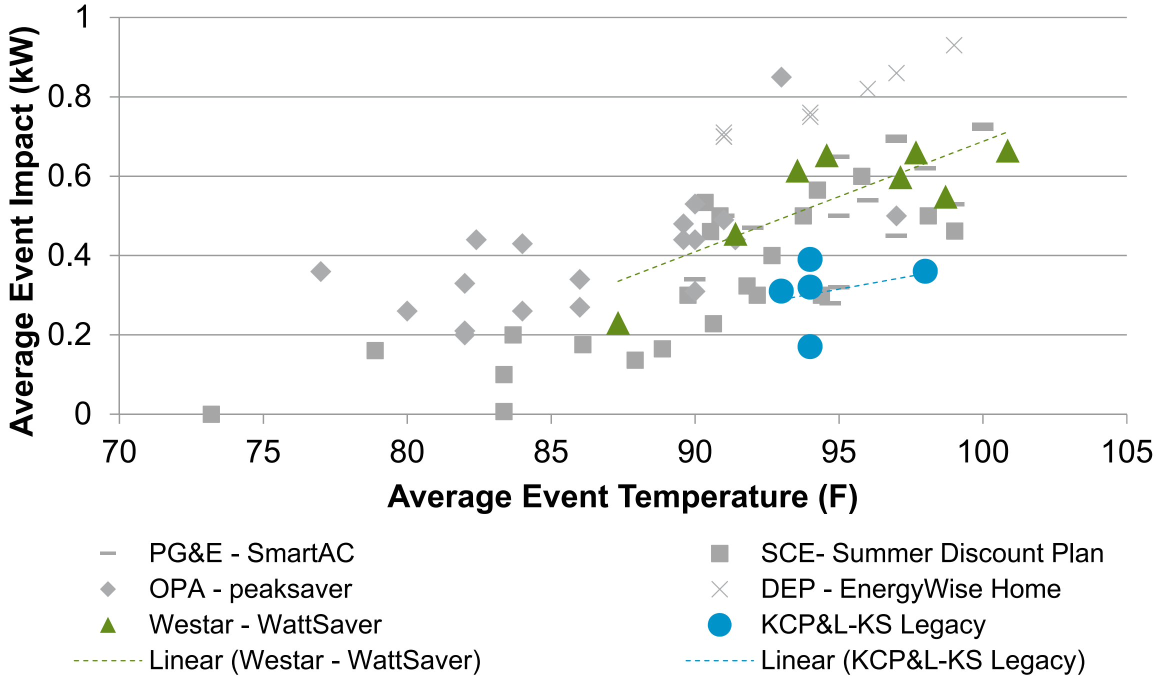
Figure 1-1 shows the residential customers' load profiles for the five events. The plot illustrates the event impact as it highlights the difference between the actual load profile (green) and baseline load profile (blue). The curtailment also occurs during the highest temperatures hours of the day as seen on the plot (red). Snapback impact is not evident immediately after the DR events. Overall, the plots display reasonable baselines and thus impact estimation.

Figure 1-1. Residential Load Profiles



Navigant found that KCP&L-KS's residential event impacts are lower than the evaluated results of other 50% cycling AC direct load control programs, including Westar's WattSaver program, as seen in Figure 1-2. Navigant hypothesizes that the 2018 residential impacts are lower due to more devices having been removed, failing to receive the event signal, or otherwise stopped responding to the events. By comparison, the KCP&L-KS Legacy thermostat is 4 years older than the Westar WattSaver program, the programs beginning in 2005 and 2009 respectively. The older age of the thermostats in the KCP&L-KS program and the increased device management efforts in the Westar program is driving some of the differences in impacts between the two programs. The impacts shown for Pacific Gas and Electric (PG&E), Southern California Edison (SCE), Ontario Power Authority (OPA), and Duke Energy Progress (DEP) are from events called in the summers of 2010 through 2014, which suggests the devices called for those events were newer on average than the KCP&L-KS devices during the summers of 2017 and 2018.

Figure 1-2. Comparison of Residential Direct Load Control Programs Impacts



2. COST-EFFECTIVENESS

This section presents the results of the cost-effectiveness analysis conducted by Navigant.

2.1 Approach

Navigant calculated cost-effectiveness for the KCP&L-KS legacy thermostat program for each year (2017 and 2018) using the following four standard cost-effectiveness tests:

1. **Participant Cost Test (PCT):** The PCT compares the cost and benefits of the customer installing the required equipment (e.g., smart thermostat) and participating in the program. It considers benefits such as tax credits, incentives or rebates, and bill savings resulting from the energy saved. Participant cost would include any expenses for equipment, installation, and operation and maintenance.
2. **Utility Cost Test (UCT):** The UCT compares the program administration costs to avoided supply-side resource costs. Benefits include deferred generation, transmission and distribution, fuel, and operations and maintenance (O&M) expenses, while costs include program administration and any incentives provided to participants.
3. **Ratepayer Impact Measure (RIM):** The RIM test compares the program administrator costs, incentives paid and utility revenue impacts with the benefits of avoided supply-side costs. This test captures potential cross-subsidization impacts or revenue shifts which ratepayers may need to compensate for through increase rates.
4. **Total Resource Cost (TRC):** The TRC test combines the PCT and RIM test. It compares both the program administrator and customer costs to avoided supply-side resource costs.

The inputs for the cost-effectiveness analysis are presented in Table 2-1. The primary inputs for the program's cost-effectiveness are total avoided costs and program administration costs. The remaining inputs are or are assumed to be zero for the following reasons:

1. Incentives: KCP&L did not provide incentive payments to program participants during 2017 and 2018.
2. Participant Cost: Incremental costs of the thermostats are zero in 2017 and 2018 because these costs were incurred in prior years.
3. Participant Bill Savings and Utility Revenue: Navigant assumed customer bill savings and the resulting utility revenue impacts are negligible for cost-effectiveness testing due to the limited energy savings given the small number and short duration of events,

Given the above, the benefit cost ratios and net benefits for the UCT, RIM, and TRC tests are the same. Further, the PCT is not applicable for the KCP&L-KS legacy thermostat program in 2017 and 2018 because both the benefits (Bill Savings and Incentives) and costs (Participant Costs) are zero.

Table 2-1. Cost-Effectiveness Analysis Data

Parameters	2017	2018
Benefits		
Avoided Capacity Cost	** [redacted] **	** [redacted] **
Costs		
Program Administrative Costs	$167,141	$139,179
Incentive Costs	$0	$0
Participant Costs	** [redacted] **	** [redacted] **
Other		
Line Loss Factor	** [redacted] **	** [redacted] **
Net to Gross Ratio	1.0	1.0

The maximum achieved impacts for each year were used in calculating the program's cost-effectiveness because this represents the deferred capacity potential for the program for that year. Maximum achieved impacts were determined by multiplying the impact per customer with the active customers for each event and selecting the maximum demand reduction for the program population per year (highlighted in Table 2-2).

Table 2-2. Program Impact by Event

Event Date	Total Program Impact (kW)
July 12, 2017	5,216
July 20, 2017	5,280
July 21, 2017	**6,531**
June 28, 2018	**6,039**
August 6, 2018	2,814

2.2 Cost-Effectiveness Results

The analysis shows that the KCP&L-KS legacy thermostat program is cost-effective for both 2017 and 2018. The benefit cost ratio for 2017 is 4.45, and 5.06 in 2018. The higher benefit cost ratio in 2018 is due to decreased program administration costs and increased avoided capacity benefits. Table 2-3 summarizes the total avoided costs, program administration costs, net benefits, and benefit cost ratios for the program using the maximum achieved impacts for each year.

Table 2-3. KCP&L-KS Legacy Thermostat Program Cost-Effectiveness Results

Year	Total Avoided Costs	Program Administration Costs	Net Benefit ($)	Benefit Cost Ratios (TRC, UCT, RIM)
2017	$742,947	$167,141	$575,806	**4.45**
2018	$704,236	$139,179	$565,057	**5.06**

The results for the TRC, UCT, and RIM tests are identical for a given year because the incentive and participant costs, lost utility revenue, and participant bill savings are zero. This analysis suggests that cost-effectiveness will stay consistent assuming administrative cost reductions are commensurate with attrition in the program and capacity avoided costs remain the same. Appendix B contains the detailed analysis for each of the cost-effectiveness test.

APPENDIX A. DR IMPACTS

A.1 Detailed Approach

Sample Processing

The analysis did not require additional sampling to accommodate the size of the data.

Regression Model

Navigant estimated program impacts using a regression analysis applied to customer AMI data. The regression model specifications are specified by Equation 7 and further described below.

Equation 7

$$y_{i,t} = \alpha_i + \beta_1 CDH_t + \beta_2 HBU_t \quad \sum_{h=1}^{H=24} \beta_{3,h} hour_{h,t} + \sum_{c=1}^{C=11} \gamma_{1,c} c_{c,t} + \sum_{s=1}^{S=20} \gamma_{2,s} sb_{s,t} + \varepsilon_{i,t}$$

Where:

α_i	=	Is an individual-level fixed effect.
$hour_{h,t}$	=	Is a set of 24 dummy variables flagging each hour of the day. Each one is equal to one when hour *t* is the *h*-th hour of the day, and zero otherwise.
CDH_t	=	A variable capturing the cooling degree-hours observed at period *t*.
HBU_t	=	A variable capturing the heat build-up observed at period *t*. This variable is calculated in the following manner: $\sum_{b=0}^{B=72} 0.96^b hIndex_{t-b}$, where $hIndex_{t-b}$ is the NOAA heat index[11] observed by customer *i* in hour of sample *t-b*. The value 0.96 acts as a geometric weight for the lagged observations of the heat index. The terminal value of *b*, *B=72* indicates that this variable value is a function of the 72 hours (3 days) leading up to the period in hour *t*.
$c_{c,t}$	=	A set of dummies to capture the DR event hourly periods. Each variable is equal to one when hour *t* is the *c*-th DR hour observed in the 2-year period. There are 11 of these variables because: 1 three-hour event + 4 two-hour events = 11 event hours.
$sb_{s,t}$	=	A set of dummies to capture the snapback impacts in the 4-hour period immediately following the end of each event. Each variable is equal to one when hour *t* is the *s*-th hour of snapback assumed in the 2-year period. There are 20 of these variables because: 5 events * 4 hours of snapback following each event = 20 snapback hours.
$\varepsilon_{i,t}$	=	Errors

[11] NOAA – National Weather Service, *The Heat Index Equation,* accessed March, 2018 http://www.wpc.ncep.noaa.gov/html/heatindex_equation.shtml

A.2 Data Tables – Non-Event and Event Date Matches

The table below was produced using R programming due to the volume of weather data supporting the analysis.

Weather Station	Non-Event Date	Event Date	Rank	Non-Event Day Dry Bulb Temperature (F)	Match Distance
KANSAS CITY DOWNTOWN AIRPORT MO US	7/11/2017	7/12/2017	1	86.708	13.638
	7/10/2017	7/12/2017	2	86.25	15.067
	7/11/2017	7/20/2017	1	86.708	14.036
	7/10/2017	7/20/2017	2	86.25	16.186
	7/11/2017	7/21/2017	1	86.708	18.439
	7/10/2017	7/21/2017	2	86.25	20.075
	7/12/2018	6/28/2018	1	91.194	6.0369
	6/29/2018	6/28/2018	2	90.542	10.44
	7/16/2018	8/6/2018	1	86.875	13.107
	6/18/2018	8/6/2018	2	86.708	13.837
KANSAS CITY INTERNATIONAL	7/11/2017	7/12/2017	1	83.917	13.565
	7/10/2017	7/12/2017	2	83.021	13.955
	7/11/2017	7/20/2017	1	83.917	15.215
	7/10/2017	7/20/2017	2	83.021	17.342
	7/11/2017	7/21/2017	1	83.917	18.868
	7/25/2017	7/21/2017	2	83.292	21.817
	7/12/2018	6/28/2018	1	86.896	9.2736
	7/11/2018	6/28/2018	2	86.75	9.7596
	6/11/2018	8/6/2018	1	82.958	14.616
	7/5/2018	8/6/2018	2	82.792	15.033
LAWRENCE ASOS KS US	7/11/2017	7/12/2017	1	85.167	14.799
	7/10/2017	7/12/2017	2	84.208	17.664
	7/11/2017	7/20/2017	1	85.167	18.276
	7/10/2017	7/20/2017	2	84.208	22.782
	7/11/2017	7/21/2017	1	85.167	20.125
	7/10/2017	7/21/2017	2	84.208	25.14
	6/29/2018	6/28/2018	1	89.417	9.7468
	6/11/2018	6/28/2018	2	86.448	20.786
	6/11/2018	8/6/2018	1	86.448	15.381
	6/15/2018	8/6/2018	2	85.875	18.655
	7/10/2017	7/12/2017	1	81.75	13.748

Weather Station	Non-Event Date	Event Date	Rank	Non-Event Day Dry Bulb Temperature (F)	Match Distance
OLATHE JOHNSON CO EXECUTIVE AIRPORT KS US	7/11/2017	7/12/2017	2	81.708	14.56
	7/10/2017	7/20/2017	1	81.75	12.369
	7/11/2017	7/20/2017	2	81.708	13.342
	7/10/2017	7/21/2017	1	81.75	15.524
	7/11/2017	7/21/2017	2	81.708	15.748
	7/12/2018	6/28/2018	1	86.5	7.8102
	7/13/2018	6/28/2018	2	84.958	9.8995
	6/11/2018	8/6/2018	1	82.542	9.9889
	7/16/2018	8/6/2018	2	83.417	10.203
OLATHE JOHNSON CO INDUSTRIAL AIRPORT KS US	7/10/2017	7/12/2017	1	83.167	14.697
	7/11/2017	7/12/2017	2	83.417	16.248
	7/11/2017	7/20/2017	1	83.417	16.248
	7/10/2017	7/20/2017	2	83.167	16.371
	7/11/2017	7/21/2017	1	83.417	19.57
	7/10/2017	7/21/2017	2	83.167	19.824
	7/12/2018	6/28/2018	1	88.625	8.775
	6/29/2018	6/28/2018	2	87.792	10.149
	6/11/2018	8/6/2018	1	84.667	11.554
	7/5/2018	8/6/2018	2	85	11.769

A.3 Data Tables – Average Event Impact

The following table represents the aggregated results across each customer class by event. The table below was produced using R programming due to the volume of the interval data supporting the analysis. Each column was determined as follows:

- **Avg. Event Standard Error**: Using regression output and standard errors for the adjusted impacts as discussed in Section 1.2.5 and Appendix A.1
- **Avg. Event Impact**: Regression output
- **Adjusted Avg. Event Impact**: Difference between Avg. Adjusted Baseline and Avg. Actual Demand (where negative impact denotes a reduction in demand)
- **Avg. Percent Adjustment for Impact**: Adjusted Avg. Event Impact divided by Avg. Event Impact
- **Avg. Baseline**: Difference between Avg. Actual Demand and residuals as discussed in Section 1.2.3
- **Avg. Adjusted Baseline**: Avg. Percent Adjustment for baseline multiplied by Avg. Baseline
- **Avg. Actual Demand**: Based on AMI interval data
- **Avg. Percent Adjustment for Baseline**: see Section 1.2.4

Event Date	Customer Class	Avg. Event Standard Error	Avg. Event Impact	Adjusted Avg. Event Impact	Avg. Delta Impact	Avg. Percent Adjustment for Impact	Avg. Baseline	Avg. Adjusted Baseline	Avg. Actual Demand	Avg. Number of Accounts	Minimum Number of Accounts	Maximum Number of Accounts	Avg. Dry Bulb Temperature	Avg. Percent Adjustment for Baseline
7/12/2017	Residential	0.015	-0.310	-0.313	-0.006	1.013	3.249	3.291	3.252	12701	12700	12702	85.739	1.013
7/20/2017	Residential	0.020	-0.319	-0.316	0.034	1.038	3.199	3.321	3.254	12707	12707	12707	85.500	1.038
7/21/2017	Residential	0.020	-0.319	-0.391	0.034	1.031	3.342	3.446	3.379	12707	12707	12708	86.332	1.031
6/28/2018	Residential	0.019	-0.319	-0.362	-0.014	0.994	3.374	3.353	3.334	12849	12848	12850	87.987	0.994
8/6/2018	Residential	0.018	-0.319	-0.169	-0.084	0.914	3.181	2.909	2.961	12880	12880	12880	84.690	0.914

A.4 Data Tables – Hourly Impact

The following table represents the aggregated hourly results by event. The table below was produced using R programming due to the volume of the interval data supporting the analysis.

Hour Ending	Event Date	Customer Class	Avg. Event Standard Error	Avg. Event Impact	Adjusted Avg. Event Impact	Avg. Delta Impact	Avg. Percent Adjustment for Impact	Avg. Baseline	Avg. Adjusted Baseline	Avg. Actual Demand	Avg. Number of Accounts	Avg. Dry Bulb Temperature	Avg. Percent Adjustment for Baseline
15	7/12/2017	Residential	0.001	-0.234	-0.195	-0.039	1.013	4.034	4.086	3.891	12702	92.456	1.013
16	7/12/2017	Residential	0.013	-0.403	-0.391	-0.012	1.013	4.283	4.339	3.948	12702	93.187	1.013
17	7/12/2017	Residential	0.008	-0.294	-0.351	0.058	1.013	4.415	4.472	4.121	12702	93.187	1.013
15	7/20/2017	Residential	0.001	-0.234	-0.232	-0.002	1.038	4.097	4.254	4.022	12707	94.187	1.038
16	7/20/2017	Residential	0.021	-0.403	-0.401	-0.003	1.038	4.328	4.494	4.093	12707	94.456	1.038
17	7/21/2017	Residential	0.001	-0.234	-0.288	0.054	1.031	4.533	4.674	4.386	12708	94.223	1.031
18	7/21/2017	Residential	0.020	-0.403	-0.495	0.091	1.031	4.673	4.818	4.324	12708	93.223	1.031
17	6/28/2018	Residential	0.001	-0.234	-0.261	0.026	0.994	4.742	4.712	4.452	12850	98.457	0.994
18	6/28/2018	Residential	0.020	-0.403	-0.463	0.060	0.994	4.896	4.865	4.402	12850	97.458	0.994
17	8/6/2018	Residential	0.001	-0.234	-0.135	-0.100	0.914	4.411	4.034	3.899	12880	93.630	0.914
18	8/6/2018	Residential	0.018	-0.403	-0.203	-0.201	0.914	4.642	4.245	4.043	12880	94.378	0.914

APPENDIX B. COST-EFFECTIVENESS

B.1 Input Assumptions

Input	2017 Value	2018 Value	Notes
Net-to-Gross	1	1	NTG assumed to be 1
Avoided Costs			
Avoided Capacity Cost ($/kW/ yr)	[redacted]	[redacted]	Email from Corrine 3/25
Avoided Energy Rate ($ per kWh)	N/A	N/A	Not needed for DR analysis
Administrative / Program Costs			
Total Program Costs	$167,141	$139,179	Email from Corrine 3/22
Incentive / Participant Costs			
Incentive Costs	$0.00	$0.00	Email from Corrine 3/22
Participant Costs	[redacted]	[redacted]	Email from Corrine 3/22
Discount Rates			
Participant Discount Rate	** [redacted]	** [redacted]	Used to discount participant costs - not needed because we are evaluating past years
WACC	** [redacted]	[redacted]	Used to discount avoided costs - not needed because we are evaluating past years
Line Loss Factors			
Transmission	* [redacted] **	[redacted]	Email from Corrine 3/26
Distribution (Primary Circuit)	** [redacted]	[redacted]	Email from Corrine 3/26
Secondary	** [redacted]	* [redacted]	Email from Corrine 3/26

B.2 Summary

NTG = 1 , Total Impact[12]		2017			2018		
		TRC	Utility	Ratepayer	TRC	Utility	Ratepayer
(a)	Avoided energy costs (fuel, O&M of power plants, T&D lines)	** [redacted]	** [redacted]	** [redacted] **	** [redacted]	** [redacted]	** [redacted]
(b)	Avoided capacity costs (constructing power plants, T&D lines, pipelines, balancing, storage)						
(c)	Participants' incremental cost (above baseline) of efficient equipment	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
(d)	Incentives (rebates)	N/A	$0.00	$0.00	N/A	$0.00	$0.00
(e)	Program administration costs (staff, marketing, evaluation, etc.)	$167,141.00	$167,141.00	$167,141.00	$139,179.00	$139,179.00	$139,179.00
(f)	Lost utility revenue / lower energy bills (due to lower sales)	N/A	N/A	$0.00	N/A	N/A	$0.00
	Benefit:Cost Ratio	**3.57**	**3.57**	**3.57**	**3.71**	**3.71**	**3.71**
	Net Benefit	**$429,868.87**	**$429,868.87**	**$429,868.87**	**$377,025.78**	**$377,025.78**	**$377,025.78**
		(a+b)/(c+e)	**(a+b)/(d+e)**	**(a+b)/(d+e+f)**	**(a+b)/(c+e)**	**(a+b)/(d+e)**	**(a+b)/(d+e+f)**

[12] Uses the total demand impact for 2017 and 2018.

NTG = 1 , Max Impact[13]		2017			2018		
		TRC	**Utility**	**Ratepayer**	**TRC**	**Utility**	**Ratepayer**
(a)	Avoided energy costs (fuel, O&M of power plants, T&D lines)	** [redacted]	** [redacted]	** [redacted]	** [redacted]	** [redacted]	** [redacted]
(b)	Avoided capacity costs (constructing power plants, T&D lines, pipelines, balancing, storage)						
(c)	Participants' incremental cost (above baseline) of efficient equipment	[redacted]	** [redacted]	[redacted]	[redacted]	[redacted]	[redacted]
(d)	Incentives (rebates)	N/A	$0.00	$0.00	N/A	$0.00	$0.00
(e)	Program administration costs (staff, marketing, evaluation, etc.)	$167,141.00	$167,141.00	$167,141.00	$139,179.00	$139,179.00	$139,179.00
(f)	Lost utility revenue / lower energy bills (due to lower sales)	N/A	N/A	$0.00	N/A	N/A	$0.00
	Benefit:Cost Ratio	**4.45**	**4.45**	**4.45**	**5.06**	**5.06**	**5.06**
	Net Benefit	**$575,805.72**	**$575,805.72**	**$575,805.72**	**$565,056.63**	**$565,056.63**	**$565,056.63**
		(a+b)/(c+e)	**(a+b)/(d+e)**	**(a+b)/(d+e+f)**	**(a+b)/(c+e)**	**(a+b)/(d+e)**	**(a+b)/(d+e+f)**

[13] Uses the maximum demand impact for 2017 and 2018.

B.3 Calculation Tables

Calculations - Total Impact[14]				
	Units		**2017**	**2018**
NTG factor			1	1
Line loss factor			[redacted]	[redacted]
Year				
Avoided costs				
Energy	$/kWh		N/A	N/A
Residential				
Commercial				
Capacity	$/kW		[redacted]	[redacted]
Present worth factor (utility)			[redacted]	[redacted]
Present worth factor (participant)				
Gross savings (at meter)				
Energy	kWh	Energy Impact	**-**	**-**
Residential			N/A	N/A
Commercial			N/A	N/A
Demand	kW	Peak Demand	**5,676**	**4,427**
Residential			5,676	4,427
Commercial			-	-
Net energy savings (at meter)				
Energy			**-**	**-**
Residential			N/A	N/A
Commercial			N/A	N/A
Demand			**5,675.60**	**4,426.84**
Residential			5,675.60	4,426.84
Commercial			-	-
Net cost savings (at generator)				
Annual energy avoided cost			**$0.00**	**$0.00**
Residential			N/A	N/A
Commercial			N/A	N/A
Annual demand avoided cost			[redacted]	[redacted]
Residential				
Commercial				
Total avoided costs			[redacted]	[redacted]
Discounted avoided costs				
Bill Impact				
Annual Bill Impact			**$0.00**	**$0.00**
Residential			N/A	N/A
Commercial			N/A	N/A

[14] Uses total demand impact for 2017 and 2018.

Calculations - Max Impact[15]	Units		2017	2018
NTG factor			1	1
Line loss factor			[redacted]	[redacted]
Year				
Avoided costs				
Energy	$/kWh		N/A	N/A
Residential				
Commercial				
Capacity	$/kW		[redacted]	[redacted]
Present worth factor (utility)			[redacted]	[redacted]
Present worth factor (participant)			[redacted]	[redacted]
Gross savings (at meter)				
Energy	kWh	Energy Impact	**-**	**-**
Residential			N/A	N/A
Commercial			N/A	N/A
Demand	kW	Peak Demand	**6,531**	**6,039**
Residential			6,531	6,039
Commercial			-	-
Net energy savings (at meter)				
Energy			**-**	**-**
Residential			N/A	N/A
Commercial			N/A	N/A
Demand			**6,531**	**6,039**
Residential			6,531	6,039
Commercial			-	-
Net cost savings (at generator)				
Annual energy avoided cost			**$0.00**	**$0.00**
Residential			N/A	N/A
Commercial			N/A	N/A
Annual demand avoided cost			** [redacted]	[redacted]
Residential			[redacted]	[redacted]
Commercial			[redacted]	[redacted]

[15] Uses maximum demand impact from 2017 and 2018.

Total avoided costs	** [redacted]	[redacted]
Discounted avoided costs	** [redacted]	[redacted]
Bill Impact		
Annual Bill Impact	**$0.00**	**$0.00**
Residential	N/A	N/A
Commercial	N/A	N/A