

# Louisville Gas and Electric Company and Kentucky Utilities

## Commercial Rebates Program Impact and Process Evaluation





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## 1.0 EXECUTIVE SUMMARY

Louisville Gas and Electric Company and Kentucky Utilities Company (LG&E and KU) offers energy efficiency programs to their customers throughout their Kentucky service territory. These programs cover electric and natural gas energy efficiency measures, as applicable. This report details the activities, results, and recommendations from the process and impact evaluation of program year 2018 (PY2018) for the Commercial Rebates program.

### 1.1 BACKGROUND

The Commercial Rebates program helps commercial customers earn cash rebates for making energy-saving improvements to their existing facilities, or by building new facilities above state building code. The program provides prescriptive and custom rebates for customer's overall energy usage<sup>1</sup>. The program began in 2008 as a prescriptive program focused on existing buildings, but the program has since expanded to include a custom component. In 2015, the program added new construction facilities, including major renovations, and LEED (Leadership in Energy and Environmental Design) projects. Rebates are available to all LG&E and KU commercial electric customers, defined as business customers who contribute to demand side management (DSM) mechanisms as part of their monthly bills. In 2019, the program was opened to industrial customers (if they do not opt-out) who pay into the DSM mechanism and rebranded to the Business Rebates program.

### 1.2 EVALUATION METHODOLOGY

The evaluation included both impact and process activities. To support both the impact and process evaluation, Tetra Tech began by conducting interviews with LG&E and KU program staff and Franklin Energy Services (Franklin) implementation staff.

For the impact evaluation, Tetra Tech conducted a tracking system review and identified energy savings associated with rebated custom and prescriptive measures. Desk reviews were completed for a sample<sup>2</sup> of custom and prescriptive projects to review deemed savings values in the individual project documentation and compare them to the savings algorithms included in the Deemed Savings workbook<sup>3</sup>. In addition to the desk reviews of prescriptive and custom projects, Tetra Tech assessed the new construction project applications submitted in 2018, including a review of each applicant's project documentation and a consumption analysis.

For the process evaluation, Tetra Tech reviewed program materials and conducted a telephone survey of program participants to understand customers' experiences with the program, their reasons for participating, and their satisfaction with various aspects of the program. We also conducted in-depth interviews with business advocates, which are organizations who work with customers to complete energy efficiency projects. A nonparticipant telephone survey was also completed to better understand customers' needs for energy efficiency programs and services, assess current program awareness, and collect general customer demographics.

<sup>1</sup> In 2017, the program provided a custom rebate of \$100 per kW saved. Starting April 1, 2018 the custom rebate was changed to \$0.03 per kWh.

<sup>2</sup> An impact sampling memo was provided to LG&E and KU for review, and approved on May 31, 2019.

<sup>3</sup> The LG&E and KU program manager provided the Deemed Savings workbook to Tetra Tech. This workbook included measure-level savings and incentives for each prescriptive measure. The file name is "LGE KU\_Com Rebates Deemed Savings Values\_DRAFT REVISED\_31May2017 d1.xlsx"



### 1.3 SUMMARY OF KEY FINDINGS

Overall, it is the opinion of Tetra Tech that the Commercial Rebates program operated effectively in PY2018, resulting in considerable energy savings and high participant satisfaction. Participating customers and business advocates that were interviewed spoke highly of the program and their interactions with program staff. The evaluation identified 71,346,553 kWh and 14,714 kW savings reduction as a result of the program activities in PY2018. The program’s impact evaluation findings are separated into dates that are before and after April 1, 2018, because that is the date that rebates were adjusted from \$100 per kW (pre-April 1, 2018) to \$0.03 per kWh (post-April 1, 2018) to reflect LG&E and KU’s focus from demand to energy savings<sup>4</sup>. The savings information in the tables below is split by that date based on the “Received By” date in the program tracking database.

**Table 1-1. Evaluation Savings Results for PY2018**

Utility	Program Track	kW Savings		kWh Savings	
		Calculated Claimed <sup>5</sup>	Evaluated	Calculated Claimed	Evaluated
<b>Evaluation Savings Results for Incentive Before April 1, 2018</b>					
LGE	Prescriptive <sup>6</sup>	6,202	6,182	31,274,660	31,249,301
	Custom <sup>7</sup>	641	518	N/A	N/A
	New Construction <sup>8</sup>	N/A	N/A	N/A	N/A
KU	Prescriptive	3,804	3,973	19,561,342	19,932,292
	Custom	254	205	N/A	N/A
	New Construction	N/A	N/A	N/A	N/A
<b>Total</b>		<b>10,901</b>	<b>10,878</b>	<b>50,836,001</b>	<b>51,181,593</b>

<sup>4</sup> Because LG&E and KU’s avoided capacity costs were being calculated as zero, and other programs were ending, changes were made to how the incentives were being calculated, including moving the emphasis from demand (kW) to energy (kWh). This is described in a letter filed with the commission that can be found in the following link:

[https://psc.ky.gov/trf4/uploadedFiles/500\\_Louisville\\_Gas\\_and\\_Electric\\_Company/11292017023504/2-2018\\_Summary\\_Budget\\_Reduction.pdf](https://psc.ky.gov/trf4/uploadedFiles/500_Louisville_Gas_and_Electric_Company/11292017023504/2-2018_Summary_Budget_Reduction.pdf)

<sup>5</sup> Savings were not captured in the tracking system; as a result, Tetra Tech calculated the claimed values based upon information in the tracking data (these are called “Calculated Claimed” savings).

<sup>6</sup> Prescriptive Calculated Claimed Savings were assigned to each claimed measure using the savings in the Deemed Savings spreadsheet.

<sup>7</sup> Custom Calculated Claimed savings before April 1 were calculated based on the rebate amount of \$100 per kW. For this time period, kWh could not be calculated based on information available.

<sup>8</sup> New construction project savings were not available in the tracking data or documentation.



Utility	Program Track	kW Savings		kWh Savings	
		Calculated Claimed <sup>9</sup>	Evaluated	Calculated Claimed	Evaluated
<b>Evaluation Savings Results for Incentive After April 1, 2018</b>					
LGE	Prescriptive	1,732	1,754	8,624,147	8,705,613
	Custom <sup>9</sup>	N/A	N/A	606,726	581,512
	New Construction	N/A	N/A	N/A	N/A
KU	Prescriptive	1,900	2,082	9,577,855	9,589,690
	Custom	N/A	N/A	1,344,000	1,288,146
	New Construction	N/A	N/A	N/A	N/A
<b>Total</b>		<b>3,631</b>	<b>3,836</b>	<b>20,152,727</b>	<b>20,164,960</b>
<b>Evaluation Savings Results – PY2018</b>					
<b>Overall Total</b>		<b>14,532</b>	<b>14,714</b>	<b>70,988,728</b>	<b>71,346,553</b>

Through the evaluation activities, Tetra Tech identified the following findings and recommendations for consideration by LG&E and KU.

**Finding #1: The data tracking system did not contain the measure-level claimed savings.**

The program tracking database did not contain the measure-level savings. It is an industry best practice to include this information as part of the information tracked by the program. Tracking savings at a measure-level allows for aggregation to determine savings at different levels. This information is also typically tracked as part of the implementation progress towards goal. Further, the evaluation needs this information as something to compare against when conducting the impact evaluation.

*Recommendation: Ensure measure-level savings are tracked either in the program tracking database or separately in the program implementer's database. If the program implementer is tracking savings, collaborate on a system or process to deliver measure-level savings data to LG&E and KU.*

**Finding #2: The “Quantity” variable was used to capture the quantity of the logged unit of measure.**

For the “Quantity” variable, the program tracking system captured the combined units of measure (e.g., tons, horsepower, watts)<sup>10</sup> rather than recording the quantity (or number of units) of the equipment installed. Creating separate fields for each type of measurement is an industry best practice. This allows programs to identify the quantity of equipment or capacity/size through simple equations.

*Recommendation: Quantity, wattage, HVAC capacity (tons), horsepower, kW, and kWh should each be tracked in their own field.*

<sup>9</sup> Custom Calculated Claimed savings after April 1 were calculated based on the rebate amount of \$0.03 per kWh. For this time period, kW could not be calculated based on information available.

<sup>10</sup> As an example, the “Quantity” for a customer who installed one 5-horsepower motor is recorded in the tracking system as 5. Ideally, “Quantity” would be tracked as one and a separate variable named “Horsepower” would have recorded the horsepower as 5.

**Finding #3: Lighting measures were tracked at a high-level.**

Additional measures for different lighting conditions and wattages allow for prescriptive handling of most lighting projects and limit the need for custom measures. The segmentation compartmentalizes measures, so that baseline regulation adjustments over time do not impact all measures. The critical items for inclusion are:

- LED Tubes
- LED Fixtures – Troffers
- LED Fixtures – Low/High Bay

In addition to these, many programs are separating the exterior lighting into pole-mounted fixtures, wall-mounted fixtures, and screw-in lamps.

*Recommendation: Add more specific measure codes for lighting equipment.*

**Finding #4: The same measure was discovered in both the prescriptive and custom paths.**

Some contractors were able to figure out how to apply for custom rebates for measures that should have been prescriptive projects. As a result, these projects received larger rebates than they should have. Providing guidance can ensure that measures and projects are handled consistently, whether the applicant or installer is familiar with the Commercial Rebates program eligibility rules or not. This was largely noticed for lighting measures.

*Recommendation: Provide guidance regarding the use of custom versus prescriptive measures.*

**Finding #5: Project documentation did not include information related to assumptions used in the custom calculations.**

Each custom project has unique components that need to be documented. The following items should typically be included as part of project documentation:

- Pre-retrofit equipment or lighting fixture type
- Lighting hours of operation
- Logged data for claiming power capacitor
- Installation verification photos and/ or inspection notes.

*Recommendation: Provide documentation for assumptions used in custom measure calculations.*

**Finding #6: Business advocates who submit large numbers of applications found it challenging to track which applications have been paid when checks were received.**

Adding enrollment IDs or premise address to rebate letters or checks would allow customers to track which projects have been paid, particularly for those customers (and business advocates) who submit multiple applications. Additionally, as is done for the application, it was requested that congratulatory letters be sent electronically rather than by mail.

*Recommendation: Consider adding identifying information (i.e., address or enrollment IDs) to rebate checks or accompanying letters. Tetra Tech notes that LG&E and KU is working with Franklin to add the enrollment ID onto the check details.*

*Recommendation: Consider sending the congratulatory letter electronically.*

**Finding #7: The data tracking system did not contain contact details for program participants.**

During the tracking database review process, Tetra Tech found participating contact names were missing for most of the records. An industry best practice is to collect participant contact information and record it in the tracking database.

*Recommendation: Track contact names for program participants.*

**Finding #8: Participating and nonparticipating customers heard about the program through different methods.**

Over one-half of program participants that completed a telephone survey mentioned their contractor or vendor as the method by which they learned about the program (56 percent). This is consistent with LG&E and KU's strategy of outreach to contractors to promote the program and similar to PY2017 evaluation results. Three-quarters of nonparticipants surveyed were not aware that LG&E and KU offered energy efficiency programs. Nonparticipants who were aware heard about the program through direct mail (58 percent), specifically through bill inserts or some other direct mailing from LG&E and KU. One-third of nonparticipant survey respondents said just being aware of programs would increase their likelihood of future participation.

*Recommendation: Continue to market the program through different methods, including email and hard copy mail, which was the preferred methods of nonparticipating survey respondents.*

## 2.0 INTRODUCTION

This report presents the detailed results for the PY2018 impact and process evaluation of the Commercial Rebates program offering in LG&E and KU's service territory.

### 2.1 PROGRAM DESCRIPTION

The Commercial Rebates program helps commercial customers earn cash rebates for making energy-saving improvements to their existing facilities, or by building new facilities above state building code. The program provides prescriptive and custom rebates for customer's overall energy usage<sup>11</sup>. The program began in 2008 as a prescriptive program focused on existing buildings, but has since expanded to include a custom component. In 2015, the program added new construction facilities, including major renovations, and LEED (Leadership in Energy and Environmental Design) projects. Rebates are available to all LG&E and KU commercial electric customers which are defined as business customers who contribute to demand side management (DSM) mechanisms as part of their monthly bills. In 2019, the program was opened to industrial customers who paid into the DSM mechanism and was rebranded to the Business Rebates program.

The program maintains a list of eligible prescriptive measures and reviews rebate applications to determine if the measure(s) included are on the eligible prescriptive list. Improvements not found on the prescriptive list are considered a custom improvement.

For PY2018, eligible prescriptive energy efficiency improvements included:

- Chillers
- Lighting and fixtures (CFLs and LEDs)
- Air conditioning units
- Motors and pumps
- Variable frequency drives
- Occupancy sensors

The following measures were eligible custom improvements in PY2018:

- LED lighting
- Compressed air systems
- Exhaust ventilation
- Energy management systems
- Day lighting controls
- Induction lighting
- Insulation

Also included in the program were rebates for energy audits. Customers could earn back 25 percent of the cost of the energy audit after making qualifying, energy-efficient improvements to the facility. Audit amounts were capped at \$3,000 in PY2018. Customers had to qualify for another rebate category when applying for an energy audit rebate.

To request a rebate application, customers called LG&E or KU's 800 number, emailed LG&E and KU, or signed up through MyAccount, all of which were accessible on LG&E and KU's program website. Once a customer signed up, Franklin emailed the customer an application. Customers were then required to read the rebate application, collect supporting documentation, and return the application packet to Franklin. The application went through a final review and a rebate amount was finalized.

<sup>11</sup> In 2017, the program provided a custom rebate of \$100 per kW saved. Starting April 1, 2018, the custom rebate was changed to \$0.03 per kWh.

Once the rebate application was approved by LG&E and KU a congratulatory letter and the rebate check was mailed, which was typically within four to six weeks. For PY2018, the rebate check process was handled by EFI (Energy Federation Incorporation) and transitioned to Franklin for PY2019.

LG&E and KU and Franklin have shared the outreach for the program, which have consisted of one-on-one meetings with customers to explain the program and answer any questions they have. Franklin has also held occasional “Power Breakfast” meetings to discuss the program with contractors or business advocates—there were three of these meetings held in PY2018. Additionally, LG&E and KU implement marketing efforts through various media channels such as radio, print and digital advertisements, articles in the quarterly commercial customer newsletter, and press conferences/releases for projects receiving large rebates. LG&E and KU monitor outreach activities monthly and through quarterly meetings with Franklin.

## 2.2 EVALUATION METHODS

### Summary of Researchable Questions and Evaluation Activities

This section describes the analytic methods and data collection activities implemented as part of the PY2018 impact and process evaluation of the Commercial Rebates program. Tetra Tech designed a methodology to evaluate the program and address the key researchable questions outlined in the program’s Detailed Evaluation Plan (DEP)<sup>12</sup>.

### Key Researchable Questions

Table 2-1 below outlines the key researchable questions identified during in-depth interviews with LG&E and KU and Franklin staff, along with the activities performed to address each.

**Table 2-1. Researchable Questions**

Researchable Question	Activity to Support the Question
<b>Program Awareness</b>	
How effective is the program marketing? What marketing and outreach efforts are most successful in generating customer leads?	<ul style="list-style-type: none"> <li>• Program and implementation staff interviews</li> <li>• Participant surveys</li> <li>• Nonparticipant surveys</li> <li>• Business advocate interviews</li> </ul>
How do customers prefer to hear about, and become involved in, the program?	<ul style="list-style-type: none"> <li>• Participant surveys</li> <li>• Nonparticipant surveys</li> </ul>
<b>Program Administration and Processes</b>	
Is there any part of the program processes that are unclear? How can the process be improved?	<ul style="list-style-type: none"> <li>• Participant surveys</li> <li>• Business advocate interviews</li> </ul>
Is there any additional equipment that could be incentivized?	<ul style="list-style-type: none"> <li>• Implementation staff interview</li> <li>• Participant surveys</li> <li>• Business advocate interviews</li> </ul>

<sup>12</sup> A DEP was delivered to LG&E and KU for review and was approved on May 2, 2019.

Researchable Question	Activity to Support the Question
How effective is the collaboration between LG&E and KU and Franklin?	<ul style="list-style-type: none"> <li>• Program and implementation staff interviews</li> </ul>
<b>Ease of Participation</b>	
What are customers' perceptions of the application form (i.e., is it clear, concise, and easy to complete) and process?	<ul style="list-style-type: none"> <li>• Participant surveys</li> </ul>
What barriers exist for participation in the program?	<ul style="list-style-type: none"> <li>• Program and implementation staff interviews</li> <li>• Participant survey</li> <li>• Business advocate interviews</li> </ul>
What is the process customers go through for the program? How many touchpoints? How long does it take before they receive the rebates? Does the timeline vary for custom and prescriptive measures?	<ul style="list-style-type: none"> <li>• Program and implementation staff interviews</li> <li>• Participant surveys</li> </ul>
<b>Program Satisfaction</b>	
Are participants satisfied with rebate levels, the amount of time it takes to receive the rebate, and the application process? How could these areas be improved? Are there enhancements needed to improve the design and delivery of the program?	<ul style="list-style-type: none"> <li>• Program and implementation staff interviews</li> <li>• Participant surveys</li> <li>• Business advocate interviews</li> </ul>
Does participation affect participants' perception of the utility and, if so, how?	<ul style="list-style-type: none"> <li>• Participant surveys</li> </ul>
<b>Customer Characteristics and Decision-Making Processes</b>	
How has participating in the program affected installation of energy efficiency measures in addition to what was rebated through the program, if at all?	<ul style="list-style-type: none"> <li>• Participant surveys</li> </ul>
What are the characteristics of the participating population and how does that compare to the eligible population?	<ul style="list-style-type: none"> <li>• Program and implementation staff interviews</li> <li>• Participant surveys</li> <li>• Nonparticipant surveys</li> </ul>
<b>Program Performance Indicators</b>	
Is the appropriate information being collected to support quality assurance/ quality control processes, as well as evaluation activities?	<ul style="list-style-type: none"> <li>• Program and implementation staff interviews</li> <li>• Tracking system review</li> </ul>
Are program goals set appropriately? What barriers were there to reaching program goals and metrics? Why might the program exceed goals?	<ul style="list-style-type: none"> <li>• Program and implementation staff interviews</li> </ul>
<b>Program Impacts</b>	
Which measures were installed and are they still installed? What was the age of the equipment that was replaced? Was it operating full time?	<ul style="list-style-type: none"> <li>• Tracking system review</li> <li>• Participant surveys</li> </ul>

Researchable Question	Activity to Support the Question
Did the program claim reasonable savings for the prescriptive and custom measures?	<ul style="list-style-type: none"> <li>• Tracking system review</li> <li>• Project documentation review</li> <li>• Desk reviews</li> </ul>
Did the method to determine new construction percent savings over code reasonably represent the project? How much energy savings did the new construction projects save?	<ul style="list-style-type: none"> <li>• Project documentation review</li> <li>• Energy savings calculation development</li> <li>• Consumption analysis of constructed building</li> </ul>

### Detailed Evaluation Activities

Table 2-2 documents the activities performed to support the impact and process evaluation of this program.

**Table 2-2. Program Evaluation Activities Summary**

	Activities
Overarching Evaluation Activities	<b>Program staff interviews.</b> Conducted two in-depth interviews—one with LG&E and KU program staff, and one with Franklin staff.
Impact Evaluation Activities	<p><b>Tracking system review.</b> Assessed information included in the tracking system and calculated savings values to individual measures.</p> <p><b>Desk reviews.</b> Conducted desk reviews for a sample of 45 prescriptive and custom projects, which included 145 individual measures.</p> <p><b>New construction desk reviews and consumption analysis.</b> Conducted desk reviews for all PY2018 new construction participant projects. The desk reviews included reviewing project documentation, measure codes, COMcheck reports, and energy models, as well as developing calculations to estimate energy savings for 26 projects. A consumption analysis was completed on the new construction participants to determine normalized energy consumption of the new facility under actual conditions.</p>
Process Evaluation Activities	<p><b>Participant customer survey.</b> Completed 150 telephone surveys with a sample of PY2018 Commercial Rebates program participants.</p> <p><b>Nonparticipant customer survey.</b> Completed 142 telephone surveys with a random sample of nonresidential customers in LG&amp;E and KU's service territory who had not previously participated in an energy efficiency program in the past two years.</p> <p><b>Business advocate interviews.</b> Conducted eight in-depth interviews with business advocates.</p>

Below is additional information related to the methodologies used for the PY2018 evaluation activities associated with LG&E and KU's Commercial Rebates program evaluation. More detail can be found in Section 3 (impact evaluation) and Section 4 (process evaluation).

- **Program and implementation staff interviews.** Tetra Tech conducted interviews with LG&E and KU program staff on March 11, 2019, and with Franklin staff on March 21, 2019. These interviews were used to help ensure Tetra Tech had a comprehensive understanding of the program and its various functions, along with identifying and prioritizing researchable questions for the evaluation.



- **Tracking system review.** Tetra Tech conducted a review of the tracking data to identify individual measures incentivized and review the paid rebate amounts. Because the tracking system did not include kWh or kW savings, a “claimed” savings value was generated by Tetra Tech using the Deemed Savings workbook<sup>13</sup> provided by LG&E and KU for prescriptive measures. Custom project savings were calculated by taking the rebate amount divided by \$100/kW (pre-April 1, 2018) or \$0.03/kWh (post-April 1, 2018). For new construction measures, Tetra Tech determined evaluated savings only. Energy audit measures did not include savings values, which seemed appropriate to Tetra Tech.
- **Desk reviews.** Tetra Tech conducted desk reviews on a sample of 45 randomly selected PY2018 Commercial Rebates projects (40 prescriptive projects and five custom projects). For prescriptive projects, the review consisted of comparing the claimed rebate to the expected rebate, how the measure code compared to equipment specifications in the documentation, and compared the Tetra Tech calculated energy savings (based on the Deemed Savings workbook) to the energy savings verified through the documentation provided. For custom measures, the review consisted of how the measure code compared to equipment specifications in the documentation.
- **New construction measures.** Tetra Tech assessed the reasonableness of savings for the new construction projects. To do this, Tetra Tech completed a consumption analysis for each project to determine energy use for the building. Project documentation was used to determine the energy savings, based on how much above code the building was constructed to.
- **Participant customer survey.** Tetra Tech completed 150 telephone surveys with a sample of PY2018 Commercial Rebates program participants. The goal of the survey was to understand customers’ experiences with the program, their reasons for participating, and their satisfaction with various aspects of the program. The surveys were administered through Tetra Tech’s in-house survey research center in July 2019. A copy of the participant survey can be found in Appendix C.
- **Nonparticipant customer survey.** Tetra Tech completed telephone surveys with 142 nonresidential customers who had not participated in any LG&E and KU program in the past two years. The nonparticipant survey assessed customer awareness of LG&E and KU’s program offerings, interest in future program participation and rebates, their perceptions of energy efficiency, customer firmographics, and any recent energy efficiency improvements. The surveys were administered through Tetra Tech’s in-house survey research center in June and July 2019. A copy of the nonparticipant survey can be found in Appendix D.
- **Business advocate interviews.** Tetra Tech completed eight business advocate in-depth interviews. The goal of the interviews was to gather feedback on program processes, program awareness, barriers to participation, and satisfaction with the program offerings. The interviews were conducted by Tetra Tech senior staff in June and July 2019. A copy of the interview guide can be found in Appendix E.

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<sup>13</sup> The LG&E and KU program manager provided the Deemed Savings workbook to Tetra Tech. This workbook included measure-level savings and incentives for each prescriptive measure. The file name is “LGE KU\_Com Rebates Deemed Savings Values\_DRAFT REVISED\_31May2017 d1.xlsx”

### 3.0 PROGRAM SAVINGS AND IMPACT EVALUATION FINDINGS

This section presents the results of the quantitative and qualitative gross impact results for the PY2018 Commercial Rebates program evaluation. Key impact evaluation activities involved tracking system review, desk reviews, and documentation reviews for a sample of projects.

#### 3.1 EVALUATED SAVINGS RESULTS

In this subsection we present the electric energy and demand savings results. LG&E and KU customers could apply for rebates through the PY2018 Commercial Rebates program across three different program tracks—prescriptive, custom, and new construction. Tetra Tech sampled 40 prescriptive projects, five custom projects, and reviewed all new construction projects at some level. Detailed results for the measure level reviews of sampled prescriptive, custom, and new construction projects can be found in Appendix A, B, and C, respectively. Where measure-level adjustments were made, they were small and largely due to in clarifications provided to assumptions or calculation methodology. Due to the change in how rebates were paid for custom measures (described more in Section 3.4), evaluated results are presented across two tables—one table that includes evaluated savings for projects paid prior to April 1, 2018 and one table that includes savings for projects paid after April 1, 2018.

**Table 3-1. Evaluated Savings for Rebates Paid Prior to April 1, 2018**

Utility	Program Track	kW		kWh	
		Calculated Claimed	Evaluated	Calculated Claimed	Evaluated
LG&E	Prescriptive	6,202	6,182	31,274,660	31,249,301
	Custom	641	518	N/A	N/A
	New Construction	N/A	N/A	N/A	N/A
KU	Prescriptive	3,804	3,973	19,561,342	19,932,292
	Custom	254	205	N/A	N/A
	New Construction	N/A	N/A	N/A	N/A
<b>Total</b>		<b>10,901</b>	<b>10,878</b>	<b>50,836,001</b>	<b>51,181,593</b>

**Table 3-2. Evaluated Savings for Rebates Paid After April 1, 2018**

Utility	Program Track	kW		kWh	
		Calculated Claimed	Evaluated	Calculated Claimed	Evaluated
LG&E	Prescriptive	1,732	1,754	8,624,147	8,705,613
	Custom	N/A	N/A	606,726	581,512
	New Construction	N/A	N/A	N/A	N/A
KU	Prescriptive	1,900	2,082	9,577,855	9,589,690
	Custom	N/A	N/A	1,344,000	1,288,146
	New Construction	N/A	N/A	N/A	N/A
<b>Total</b>		<b>3,631</b>	<b>3,836</b>	<b>20,152,727</b>	<b>20,164,960</b>

Lighting measures had a large impact on the overall program savings. Because of this, the program could provide more descriptive measure categories that focus on the equipment type rather than the wattage of the lighting. The more detailed equipment definition creates the opportunity to increase lighting savings and provide better insight into what type of equipment the rebates support. This will become increasingly important to understand as the lighting market changes and the baseline equipment changes over the course of the next few years. The potential update to EISA (Energy Independence and Security Act) regulations for screw-in light bulbs is an example of the adjustments that may need to occur. Tetra Tech provides options for naming and tracking lighting equipment measures in Section 3.3, although there many options that may work for the program, and coordination with the implementation is critical to ensure success.

### 3.2 SAVINGS METHODOLOGY

The PY2018 Commercial Rebates program included three program tracks—prescriptive, custom, and new construction. Each program track had its own approach to savings methodology. This section describes Tetra Tech’s approach to sampling based on the savings methodologies for each of these program tracks. As a first step, Tetra Tech reviewed LG&E and KU’s tracking system, which contained information about individual measures, including a rebate type, which Tetra Tech utilized to stratify measures into general categories. Table 3-3 summarizes the measures contained in the PY2018 participant tracking database<sup>14</sup>.

**Table 3-3. PY2018 Mapping of Commercial Measure Subtypes to Commercial Measure Types**

Comm Rebate Subtype	Comm Rebate Type
AIR COOLED CHILLER	Chiller
WATER COOLED CHILLER	Chiller
OTHER NOT DEFINED	Custom
ENERGY_AUDIT	Energy Audit
GROUND SOURCE HP	HVAC
PTAC	HVAC
ROOFTOP AC	HVAC
ROOFTOP HP	HVAC
UNITARY AC	HVAC
UNITARY HP	HVAC
LEED NEW_CONSTRN	LEED New Construction
CFL	Lighting
LED LIGHTS	Lighting
METAL HALIDE	Lighting
OCCUPANCY SENSOR	Lighting
T12 8FT REPLACED BY HPT8	Lighting
T5 WITH ELEC BAL	Lighting
T8 WITH ELEC BAL	Lighting

<sup>14</sup> The Comm Rebate Subtype and Comm Rebate Type variables were included in the tracking file named, “2220 BW Report.xlsx” provided to Tetra Tech on April 9, 2019.

Comm Rebate Subtype	Comm Rebate Type
MOTOR	Motor Pump VFD
PUMP	Motor Pump VFD
VFD	Motor Pump VFD
NEW_CONSTRN	New Construction

In reviewing the participant tracking data file, Tetra Tech determined there were 3,663 total records in the tracking file. After removing the records with no savings attached, 2,631 records remained as the valid population<sup>15</sup> from which to sample from. Table 3-4 provides the count of these records below.

**Table 3-4. PY2018 Participant Population Summary by Territory**

Criteria	LG&E	KU	Total Number of Records
<b>Original Data File</b>	<b>2,157</b>	<b>1,506</b>	<b>3,663</b>
“Results” Rows	549	397	946
Energy Audit Rows	19	67	86
<b>Remaining Records</b>	<b>1,589</b>	<b>1,042</b>	<b>2,631</b>

The next step was to aggregate the data, which was conducted at the Contract Account-by-Enrollment ID level. This allowed Tetra Tech to sample and assess multiple Comm Rebate Types and Comm Rebate Subtypes that were installed for a given project (Enrollment ID). The table below shows the number of records available to sample from for the desk reviews activity, once data aggregation was completed.

**Table 3-5. PY2018 Desk Review Data Aggregation Summary by Territory**

Criteria	LG&E	KU	Total Number of Records
<b>Records After Cleaning</b>	<b>1,589</b>	<b>1,042</b>	<b>2,631</b>
Data Aggregation*	740	392	1,132
<b>Impact Sampling Frame**</b>	<b>849</b>	<b>650</b>	<b>1,499</b>

\*Data aggregation was conducted at the Enrollment ID-by-Comm Rebate Type level.

\*\*Impact Sampling Frame count corresponds to the number of unique Enrollment ID-by-Comm Rebate Type rows. This is the total population from which the sample of desk reviews was selected.

For sampling purposes, Tetra Tech stratified the measures by equipment type and estimated savings<sup>16</sup>. Table 3-6 outlines the number of measures based on the total number of projects in the energy savings grouping for each utility. Individual measures were sampled by the stratum. Each measure was connected to a project (enrollment ID) with additional measures, and when a single measure from a project was selected, all the measures from that project were incorporated into the desk review process. As a result, the quantity of measures reviewed exceeded the quantity of the sample selected.

<sup>15</sup> The population is defined as the unique number of contract account numbers in the population file.

<sup>16</sup> Tetra Tech originally (e.g., during the sampling phase) approximated savings per measure based upon \$0.03/kWh to aid in measure and project stratification. During the desk review process, Tetra Tech learned that projects completed prior to April 1, 2018 still had savings calculated based on \$100/kWh.

**Table 3-6. Number of Projects Sampled by Utility**

Stratum	LG&E		KU	
	Enrollment ID Count*	Sample Size (Projects)	Enrollment ID Count*	Sample Size (Projects)
<b>High (&gt; 200MWh)</b>				
Prescriptive - Chiller	0	0	2	1
Prescriptive - HVAC	1	0	2	1
Prescriptive - Lighting	39	8	35	4
Prescriptive - Motor Pump VFD	4	1	4	2
Custom	3	2	3	1
<b>Subtotal</b>	<b>41</b>	<b>11</b>	<b>37</b>	<b>9</b>
<b>Low (≤ 200MWh)</b>				
Prescriptive - Chiller	4	1	0	0
Prescriptive - HVAC	22	2	44	2
Prescriptive - Lighting	608	8	415	5
Prescriptive - Motor Pump VFD	25	1	8	1
Custom	57	3	41	2
<b>Subtotal</b>	<b>663</b>	<b>15</b>	<b>455</b>	<b>10</b>
<b>New Construction</b>				
LEED New Construction	1	1	4	1
New Construction	11	1	16	2
<b>Subtotal</b>	<b>12</b>	<b>2</b>	<b>20</b>	<b>3</b>
<b>Total</b>	<b>714</b>	<b>28</b>	<b>511</b>	<b>22</b>

\*\*Enrollment ID Count corresponds to the number of unique Enrollment IDs receiving Comm Rebate Type. Multiple Enrollment IDs could have received multiple measures. Therefore, the total number of unique Enrollment IDs in each Comm Rebate Type does not sum to the total number of unique Enrollment IDs.

Tetra Tech notes that the original sampling process included selecting 40 prescriptive projects, five custom projects, and five new construction. After discussions with LG&E and KU during the impact evaluation, it was decided that Tetra Tech should review all new construction projects. As a result, the five sampled new construction projects were incorporated into a targeted evaluation of the new construction projects described in Section 3.5. The remaining 45 sampled projects included 147 individual measures—138 prescriptive measures and nine custom measures. The table below provides a breakdown of the number of prescriptive and custom measures sampled by utility.

**Table 3-7. Number of Prescriptive and Custom Measures Sampled by Utility**

Utility	Stratum	Number of Measures Sampled	Calculated Claimed kW	Calculated Claimed kWh
LG&E	Prescriptive - Chiller	1	6.12	12,673
	Prescriptive - HVAC	6	2.57	6,609
	Prescriptive - Lighting	70	1,465.42	7,145,749
	Prescriptive - Motor Pump VFD	16	121.59	495,023
	Custom	5	207.25	33,722
	<b>Subtotal</b>	<b>98</b>	<b>1,803</b>	<b>7,693,776</b>
KU	Prescriptive - Chiller	2	99.00	228,948
	Prescriptive - HVAC	5	15.65	35,741
	Prescriptive - Lighting	25	436.31	2,156,709
	Prescriptive - Motor Pump VFD	13	221.23	1,206,567
	Custom	4	183.18	1,091,371
	<b>Subtotal</b>	<b>49</b>	<b>955</b>	<b>4,719,336</b>
<b>Total</b>		<b>147</b>	<b>2,758</b>	<b>12,413,112</b>

### 3.3 PRESCRIPTIVE PROJECTS

Tetra Tech calculated the claimed savings amount in order to determine a base savings for the evaluation. The prescriptive measures utilized the Deemed Savings workbook<sup>17</sup> that detailed the kW and kWh savings for the prescriptive measures. Tetra Tech connected the unit savings to each prescriptive measure in the tracking system to those in the workbook and multiplied by the quantity to develop the calculated claimed savings.

Tetra Tech reviewed the project documentation submitted for 138 prescriptive measures and found 122 of the measures matched the Tetra Tech calculated claimed savings. The documentation for each of the measures was sufficient to identify the qualification of each measure into the proper deemed category. The results in the table below are summarized by the stratum categories.

<sup>17</sup> The LG&E and KU program manager provided the Deemed Savings workbook to Tetra Tech. This workbook included measure-level savings and incentives for each prescriptive measure. The file name is "LGE KU\_Com Rebates Deemed Savings Values\_DRAFT REVISED\_31May2017 d1.xlsx"

**Table 3-8. Sampled Prescriptive Projects Results by Utility**

Utility	Prescriptive Stratum	Number of Measures Sampled	Calculated Claimed kW	Evaluated kW	Calculated Claimed kWh	Evaluated kWh
LG&E	Chiller	1	6.12	6.12	12,673	12,673
	HVAC	6	2.57	2.55	6,609	6,684
	Lighting	70	1,465.42	1,464.26	7,145,749	7,141,337
	Motor Pump VFD	16	121.59	117.95	495,023	494,658
	<b>Subtotal Prescriptive</b>	<b>93</b>	<b>1,596</b>	<b>1,591</b>	<b>7,660,054</b>	<b>7,655,351</b>
KU	Chiller	2	99.00	128.78	228,948	299,927
	HVAC	5	15.65	15.60	35,741	35,627
	Lighting	25	436.31	451.42	2,156,709	2,138,254
	Motor Pump VFD	13	221.23	221.18	1,206,567	1,206,214
	<b>Subtotal Prescriptive</b>	<b>45</b>	<b>772</b>	<b>817</b>	<b>3,627,965</b>	<b>3,680,021</b>
<b>Total</b>		<b>138</b>	<b>2,368</b>	<b>2,408</b>	<b>11,288,019</b>	<b>11,335,372</b>

The adjustments of energy savings between the calculated claimed savings and evaluated savings occurred for several reasons, largely associated with the claimed VRM code and quantity. Table 3-9 identifies the adjustment type, quantity of measure, and notes about the actual adjustment that were made to the 16 measures.

**Table 3-9. Measure Adjustment Overview**

Measure Adjustment Type	Quantity (Number of Measures Adjusted)	Detailed Description
Specification changed VRM	6	Occurred when the specification of equipment was close to the breakpoint between measures. The majority occurred when a 10W lamp was really consuming 9.5W, which then changed the measure category from LED INTERIOR > 10W and < 50W to LED INTERIOR < 10W.
Specification adjusted claimed value	6	Occurred when the quantity of a unit was tons of HVAC, and the claimed value was rounded to the nearest whole number. For the evaluation, Tetra Tech used the actual capacity of the HVAC units to two decimal points for calculations.
Quantity installed adjusted	3	There were small adjustments to quantities of motors for two measures on a single project, and a quantity of LED exit signs for another project.
Installed equipment difference	1	There was a large lighting project that purchased more lights than were installed. The evaluated savings only included installed lights.

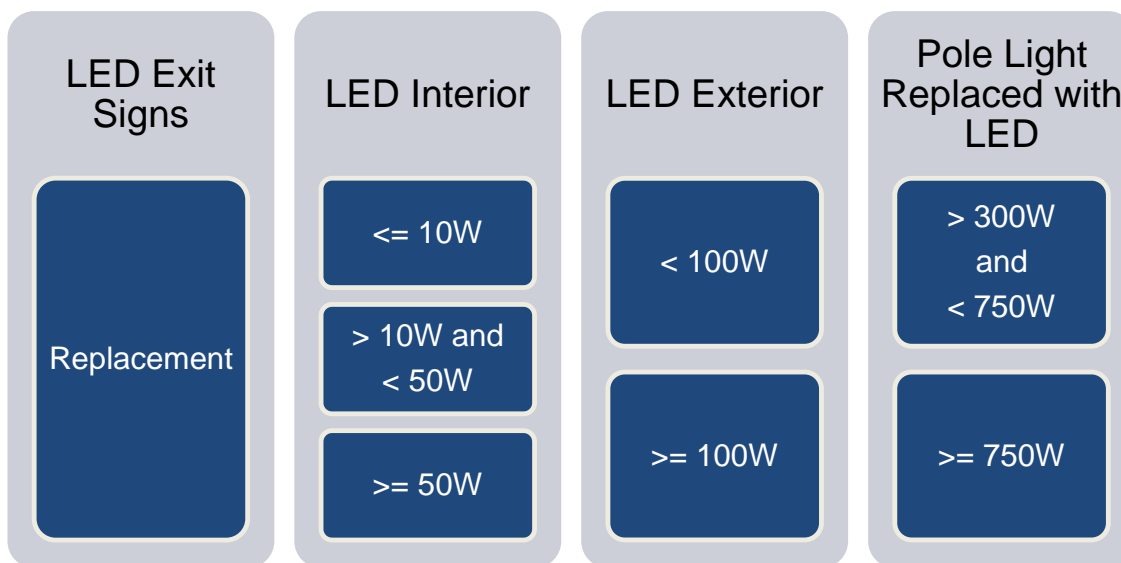


## Lighting Measures

Because lighting measures accounted for more than 80 percent of the program's energy savings, Tetra Tech carefully reviewed the lighting measure categories. Tetra Tech found that LG&E and KU has been following industry standards for lighting equipment eligibility and providing rebates for equipment that is creating energy savings. Tetra Tech also found that in many cases, rebates were based on the wattage of the lighting used rather than the equipment type. The lighting equipment technology is continually (and quickly) adjusting with new technology, lower prices, and changing government regulations. Because these factors tend to happen in subsets of lighting technology, a program that has more clearly defined lighting equipment categories (rather than wattages) is better able to respond to these adjustments year over year in individual categories without having to make large program adjustments.

In completing the tracking system review, Tetra Tech found a range of LED wattages. Based on the measure names in the tracking system for LED lighting, Tetra Tech separated the measures into four categories to help visualize the LED lighting measures and their associated wattages, see Figure 3-1. The LED exit signs measure category was a narrowly defined category with limited variation between the different existing and installed equipment pairings. The LED interior and LED exterior categories provided limitation on the installed equipment wattage, although the existing equipment wattage included a wide range across those categories. The pole light replaced with LED category limited the existing equipment wattage, but the installed equipment wattage could vary widely across the category.

Figure 3-1. PY2018 Prescriptive LED Lighting Measure Categories



Because each wattage category defined above had a unique distribution of equipment, Tetra Tech worked to identify the type of equipment installed for each LED lighting measure category. As this information was not recorded in the program tracking database, Tetra Tech used project documentation to complete this task. This needed to be done in order to determine the reasonableness of savings at the measure level. That is, in order to determine savings in any one of these categories, a defined range for both existing equipment and installed equipment wattage is necessary. A more narrowly defined range will result in more accurate energy savings estimates for these prescriptive measures. The most accurate option is to track the individual wattage of both the existing and installed equipment. A slightly less rigorous level of tracking detail is to utilize a range of the installed equipment wattage and the interior/exterior location and add tracking for the installed equipment type (screw in, linear tube,

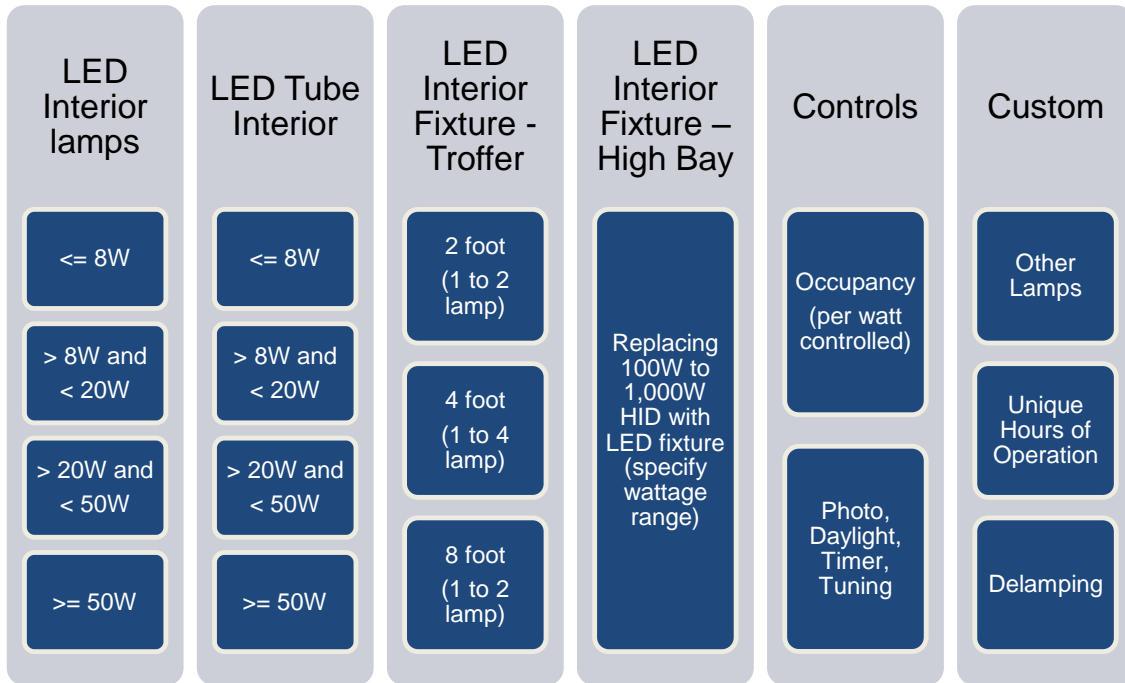
fixture, etc.). The addition of the installed equipment type will limit the types of lighting it is replacing and therefore will allow for a more accurate level of savings.

As examples, the LED interior lamps less than 10W was split evenly between screw-in lamps and LED tubes. The greater than 10W to 50W category was nearly two-thirds LED tubes, nearly one-third screw-in lamps and less than five percent LED fixtures (troffers). The greater than 50W category had few projects, and they were split between a screw-in lamp (corn-cob high powered LED), LED replacements for 8-foot tubes, and LED high bays. Additionally, Tetra Tech found that the majority of the equipment that was greater than 10W was between 10W and 20W. The equipment that was greater than 50W was primarily between 50W and 70W. The LED troffers and LED high bays were the fixtures that were outside of those wattage ranges, and they were also the projects which other applicants submitted as custom.

Tetra Tech recommends developing new categories for interior prescriptive lighting measures. The new categories will create the ability to more accurately determine savings, provide more flexibility to adjust to market conditions, and reduce the need to use custom measures for lighting projects (also see Figure 3-2). In particular, Tetra Tech recommends the following:

- Create equipment-based prescriptive categories for LED screw-in lamps, LED tubes, LED troffer fixtures, and LED high bays.
- Create smaller categories for lamp wattage by using breakpoints at 8 watts, 20 watts, and 50 watts, instead of 10 watts and 50 watts for screw-in lamps and LED tubes.
- Base the LED troffer measure on replacement of the existing fixture, not the wattage of the new installed fixture.
- Base the LED tube measure on a one-for-one lamp replacement of various lengths of either the exiting or installed equipment.
- Base the high bay lights replacement on a one-for-one replacement of specific existing HID lights (e.g., 400W metal halide) with an LED fixture or lamp that is less than or equal to a define LED wattage (e.g., LED < 120W).
- Allow for the ability to use a custom measure that includes situations such as delamping and unique hours of operations, as well as other specialty lighting.

Figure 3-2. Tetra Tech Recommended LED Interior Lighting Measure Categories

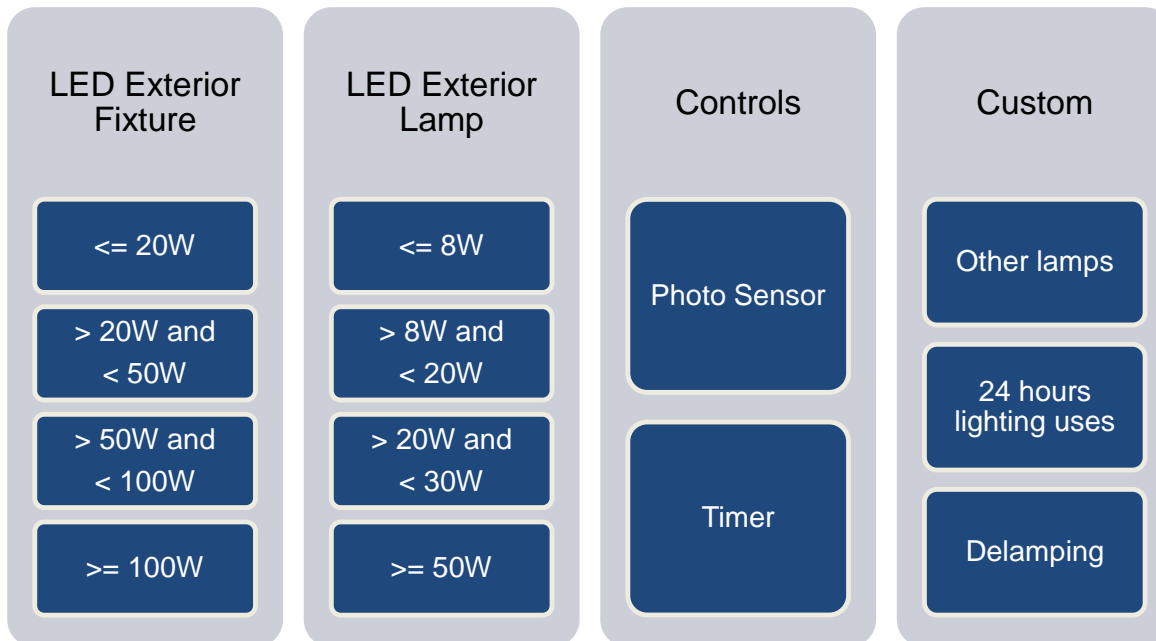


Tetra Tech found a similar opportunity with exterior lighting. The exterior lighting less than 100W had many lights near the high and low end of the measure range; there were equal amounts of lamps between 24 and 30W as there were between 70 and 80W. The middle measure category between 30W and 70W had a similar number of lamps as the two smaller ranges. The exterior lighting greater than 100W was relatively evenly distributed between 100 and 200W. The pole light replacement measure had only four projects in the sample.

As with the interior lighting measures, Tetra Tech recommends developing new categories for exterior prescriptive lighting measures. The outcomes in the exterior lighting market may not be as obvious as the interior measures, but the new categories will still create the ability to more accurately determine savings, provide more flexibility to adjust to market conditions, and reduce the need to use custom measures (also see Figure 3-3). In particular, Tetra Tech recommends the following:

- Create equipment-based prescriptive categories for LED screw-in lamps and LED fixtures.
- Create smaller categories for lamp wattage by using breakpoints similar to interior lighting: 8W, 20W, and 50W. A 100W breakpoint will also be helpful for exterior lighting categories.
- Eliminate the specific pole light replacement and redefine that as a LED fixture (exterior).
- Include a custom measure which will account for unique exterior situations.

Figure 3-3. Tetra Tech Recommended LED Exterior Lighting Categories



By implementing these lighting recommendations, measure-level savings will become more robust. Tetra Tech does note that this comes with additional levels of effort required for the applicant. That is, the applicant will be required to identify the type of equipment installed along with the current identification of the wattage and interior/exterior location. Additionally, the current Deemed Savings workbook will need to be updated to include additional levels of detail. Implementing these changes will also result in an increase in the number of projects that can be accurately represented by a prescriptive measure. With more measures moving to prescriptive, the volume of custom lighting projects will decrease, thereby reducing the review of custom applications and increasing the efficiency of program staff.

### 3.4 CUSTOM PROJECTS

Similar to the prescriptive projects, because the tracking system for the Commercial Rebates program did not include savings values for custom measures, Tetra Tech calculated the claimed savings amount in order to determine a base savings for the evaluation. Tetra Tech calculated these savings based on the rebate amounts paid and documented in the tracking system. For PY2018, there were two different incentive amounts provided—prior to April 1, 2018, the rebate amount was \$100/kW saved and after April 1, 2018, the rebate amount was \$0.03/kWh saved. This meant that for projects completed and paid prior to April 1, no kWh savings were tracked and for projects completed and paid after April 1, no kW savings were tracked. Of the 112 custom measures in PY2018, 57 received the \$100/kW rebate and 55 received the \$0.03/kWh rebate. Tetra Tech sampled nine sites that had custom projects completed in 2018—seven of the projects were lighting, one was water heating, and one was a power capacitor. Five of the lighting projects were completed after the April 1, 2018 rebate change, and the other four projects were completed before the April 1, 2018 rebate change.

The custom lighting projects consisted of the parts of the lighting system that either did not fit into a prescriptive category or where it was more advantageous for the applicant to complete a custom

calculation compared to submitting a prescriptive application. As a result, Tetra Tech determined savings for the custom lighting projects using both the custom methodology (either \$100/kW or \$0.03/kWh) and the prescriptive methodology. Although this is manageable, the equipment that could fit into a lighting category should be submitted through the prescriptive application process.

The custom lighting projects documentation included the equipment specification, invoice, written communication, and a custom calculation spreadsheet. The custom savings calculations were done correctly in determining the difference between the existing and new wattage and in multiplying that by the hours of operation. The assumptions regarding the baseline wattage and hours of use were not included in the documentation. As a result, Tetra Tech made assumptions for these values. Below are two examples of the unknown introduced by the undocumented assumptions:

- A custom project installed 2x4 LED troffer fixtures to replace T8 lamps. The custom project claimed the baseline fixture included four 32-watt T8 lamps with a normal ballast for 818 fixtures. There were also prescriptive measures, including 2x4 and 1x4 LED troffer fixtures that replaced the 2-lamp and 1-lamp fixtures. There were no pictures or inspection logs to confirm that the split between 4-lamp, 2-lamp, and 1-lamp baseline T8 fixtures was accurate.
- A custom project replaced 450-watt metal halide lights with 140-watt LED fixtures at a County Fairground barn. The assumed hours of operation were 4,380, which is equal to the fixture being on during all dark hours for an entire year (12 hours per day for 365 days). The documentation should have included notes related to these hours of operation, as this many hours of operation seemed high for typical operation at a fairgrounds barn.

The customer where the custom water heating project was installed had an energy audit completed, though the custom project was not identified in the energy audit. Likely because of this, the project documentation contained no information regarding the baseline equipment or operations of the replaced water heater, though it did include information regarding the proposed equipment. The submitted calculation provided several assumptions which included that the baseline and proposed water heater would provide the same amount of hot water and have the same efficiency in both conditions. This assumption created a calculation that showed no energy savings, although the peak demand was reduced because the electric heating element size was reduced<sup>18</sup>. The calculation created the peak demand by subtracting the baseline heating element size from the new heating element size, but it did not use a coincidence factor that is normally required to adjust gross peak demand reduction to a peak demand reduction. The most impactful assumption was the baseline heating element size, which was assumed to be 80 kW in the calculation. A typical large commercial water heater has a heating element size between 6 kW and 12 kW. This 80 kW assumption is outside the normal range of manufactured units, so Tetra Tech adjusted the baseline heating element assumptions to 8 kW, assuming a typo.

The power factor correction custom measure savings were calculated based on the documented process for claiming the kVA improvement associated with the installed project. LG&E and KU agreed to pay for the kVA improvement at a rebate rate equal to the peak kW reduction incentive structure<sup>19</sup>. Tetra Tech found that the project followed the documented process and calculation. We note that this project did not include any energy savings by nature of the equipment; therefore, the project would not have received an incentive if the application was received under the updated PY2018 rebate structure (\$0.03/kWh).

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<sup>18</sup> This project received a \$100/kW rebate; under the newer \$0.03/kWh rebate structure, it would not have received a rebate.

<sup>19</sup> This project received a \$100/kW rebate; under the newer \$0.03/kWh rebate structure, it would not have received a rebate.

Due to the unique nature of the custom projects, Tetra Tech determined it was not appropriate to extrapolate the savings from the sample to the population of custom measures. The results in the table below summarize the savings for the sampled custom measures only by utility and by the paid rebate date.

**Table 3-10. Savings Results for Sampled Custom Projects by Utility**

Utility	Stratum	Number of Measures	kW		kWh	
			Calculated Claimed	Evaluated	Calculated Claimed	Evaluated
LG&E	Custom (before April 1)	3	198.78	126.86	7,047	7,253
	Custom (after April 1)	2	8.47	8.67	26,675	27,118
KU	Custom (before April 1)	1	71.98	72.80	630,580	637,746
	Custom (after April 1)	3	111.20	106.89	460,791	441,836
<b>Total</b>		<b>9</b>	<b>390.43</b>	<b>315.22</b>	<b>1,125,093</b>	<b>1,113,953</b>

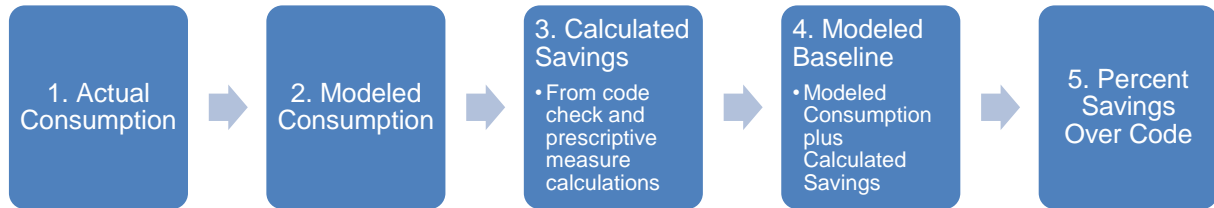
### 3.5 NEW CONSTRUCTION PROJECTS

LG&E and KU asked Tetra Tech to review all 32 of the PY2018 new construction projects to determine the reasonableness of the method to determine the amount of savings over code (and thus, the rebate paid). Rebates were largely determined by assessing to what degree the building design was a certain percent better than code. This method did not specify the amount of energy saved over the year. For the five LEED new construction projects, the rebate was determined based upon the value of the LEED certification metric. Tetra Tech initially reviewed each project’s documentation to determine if there was enough supporting information in the project files to estimate savings. Because Tetra Tech found that the files did not have consistent calculation methods or assumptions determine energy savings, the evaluation of these projects largely consisted of a consumption (billing) analysis for each building and an expert judgement on the percent savings over code that used secondary sources. Tetra Tech evaluated 26 new construction projects with the following methodology. The five LEED new construction projects were not evaluated.

#### New Construction Evaluated Savings Methodology

The evaluation of the new construction projects and comparison to the energy code required a slightly different methodology than a typical project. Based upon information available at the time of the evaluation and documentation provided as part of the application process, Tetra Tech came up with the process to determine savings that is outlined in Figure 3-4. This “stepped” process utilized the actual building consumption data and the project documentation. Based on the consumption data and the estimated energy savings, Tetra Tech developed an estimate of the percent savings over code from a normalized energy model of the constructed building.

Figure 3-4. New Construction Projects Energy Saving Calculation Steps



The evaluation of the new construction projects required a multi-step process to both estimate the amount of electricity (kWh) savings over code and set a baseline consumption of code to determine the percent savings over code. The first step required determination of the actual consumption of the project; each site had at least 12 months of historical operating data to analyze.

**Step 1: Determine the actual consumption.** Tetra Tech modeled kWh consumption using each site's historical billing data via PRISM modeling.

- From PRISM modeling, Tetra Tech could determine the base temperatures for heating and cooling for each site.
- Once the correct base temperatures for heating and cooling were determined, Tetra Tech estimated baseload, heating load, and cooling load for each site.
- The result of this step was that the estimated impact of heating on consumption, cooling on consumption, and base loads on consumption was generated.

**Step 2: Determine the weather-normalized consumption, or modeled consumption<sup>20</sup>.** Using base load, heating load, and cooling load consumption estimates for each site, Tetra Tech applied typical meteorological year (TMY)<sup>3</sup> weather data.

- Weather-normalized heating load—the consumption tied to heating—was computed by applying an estimate of kWh consumption tied to each degree-day increase in heating degree day (HDD) to typical HDD found in any given year for the billing periods of interest for each project.
- Weather-normalized cooling load—the consumption tied to cooling—was computed by applying estimate of kWh consumption tied to each degree-day increase in cooling degree day (CDD) to typical CDD found in any given year for the billing periods of interest for each project.
- The result of this step was that for each site, an estimate of what consumption would be in a typical year under typical meteorological conditions was generated. This is weather-normalized energy consumption.

<sup>20</sup> There were four projects where Tetra Tech was unable to develop an energy baseline to match the new construction project. This is because these projects only accounted for energy consumption on part of the electric meter. Therefore, the baseline energy consumption of the new construction project was unable to be extracted from the information available.



**Step 3: Calculate estimated savings<sup>21</sup>.** Using the project documentation, the estimated savings over code was calculated.

- Documentation typically included design information about interior and exterior lighting, HVAC, and building shell. When design information was included, the COMcheck software report was included to compare these components to the applicable code. Additionally, the selection of assumptions of energy code, building type, floor area, and proposed equipment were reviewed and adjusted when necessary.
- For lighting calculations, the current stated operation of the building was used to apply annual hours of use to calculate kWh savings over code.
- For HVAC, calculations were completed using the HVAC prescriptive calculation method with the COMcheck defined code and design efficiency values for both ground source heat pumps and air conditioners. The effective full load hours (EFLH) was utilized from the Indiana TRM for the particular building type at the Evansville location.
- The shell energy savings were not included because very few participants submitted documentation regarding the building shell. The projects that did including this information indicated the estimate was less than five percent better than code.

**Step 4: Determine modeled baseline.** The modeled baseline was calculated by adding the modeled consumption (Step 2) to the calculated estimated savings (Step 3).

**Step 5: Calculate percent savings over code.** The percent savings over code was determined using the modeled baseline (Step 4) and the modeled consumption (Step 2).

$$\text{Percent savings over code} = \frac{(\text{Modeled Baseline} - \text{Modeled Consumption})}{\text{Modeled Baseline}}$$

## Measure Codes

Each new construction project was assumed to be a certain percent over the code compliance level. To try to calculate the savings level, the program required that projects submit COMcheck reports for interior lighting, exterior lighting, HVAC, and shell, which were weighted to get a complete value. This method used the equipment size or capacity as the indicator of level over code and only compared the energy-consuming equipment submitted, neither size or capacity of the units incorporated the energy consumption of the building. Through this process, the program found that 24 of the 26 measures had claimed energy savings greater than 25 percent over code.

Tetra Tech evaluated this measure code selection by creating an estimated percent savings over code for each building using the savings methodology described above. Tetra Tech found that the measure savings over code were overstated in many of the cases, once information regarding the whole building was incorporated. Savings details can be found in Appendix C for the 22 projects Tetra Tech was able to evaluate<sup>22</sup>.

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<sup>21</sup> Four projects completed energy modeling for the proposed building. The models provided more detail related to projected energy savings associated with the designed building and operating profile with all design elements. For these four projects, this information was used to determine the calculated savings.

<sup>22</sup> Four of the 26 new construction projects were removed from the analysis because the information available was insufficient to set a baseline energy consumption for the new construction only.

**Table 3-11. Measure Level Savings**

Measure Savings Over Code	Under 25,000 Square Feet		Over 25,000 Square Feet	
	Claimed	Evaluated	Claimed	Evaluated
Over 25%	16	5	8	5
20% to 25%	0	2	1	0
15% to 20%	0	6	1	0
10% to 15%	0	1	0	1
Less than 10%	0	2	0	4

Tetra Tech determined that half of the projects where the building size was over 25,000 square feet did recognize 25 percent savings over code. Of the other half of these larger buildings that did not recognize savings of over 25 percent over code, almost all had less than 10 percent savings over code. For buildings under 25,000 square feet, Tetra Tech found that one-third of the projects remained at the 25 percent savings over code level. The remaining smaller buildings were generally evenly spread across the various other measure code savings categories. There are two primary reasons why the evaluated measure codes are lower than the claimed measure codes:

- Post-install consumption data availability: the actual consumption data of a facility after 12 months of operation provided enough information to create a baseline amount of consumption to benchmark the savings.
- Consumption-based calculations: the COMcheck results compared the equipment capacities or tested efficiency to determine a savings over code, Tetra Tech expanded the calculations to compare electricity consumption between code and designed.

To determine the savings over code, Tetra Tech needed to calculate an energy savings for each project to compare to the baseline energy consumption. The challenge here was that the amount of savings did not correlate with the measure category because the baseline energy consumption varied greatly across commercial buildings. For example, a building that saves 25,000 kWh per year could be 30 percent savings over code for a religious building type, 15 percent savings over code for a restaurant building type, or five percent over code for a large warehouse building type.

### Building Modeling

Four of the buildings evaluated submitted energy models of the designed building and an associated code compliant building. Tetra Tech found that for three of the four projects<sup>23</sup> the billing analysis identified actual consumption that was slightly lower than the energy model. The model for these three projects calculated about twice as much savings per square foot than the simplified method that calculated lighting, HVAC, and envelope savings separately (and then adding all three together). While completing an energy model could increase the level of effort at the time of application, the energy modeling is likely responsible for increased attention to the energy consumption of the facility throughout the design process, and thus increase energy savings. The table below shows the effect of the measure-level savings approach compared to the three buildings that included energy models with their applications.

<sup>23</sup> One project was an animal kennel that had multiple meters and variable occupancy in which the consumption did not match the design energy model. Therefore, energy savings in the model was accepted as evaluated, but not included in the comparison of the building calculation types.

**Table 3-12. New Construction Projects Savings Approach Comparison**

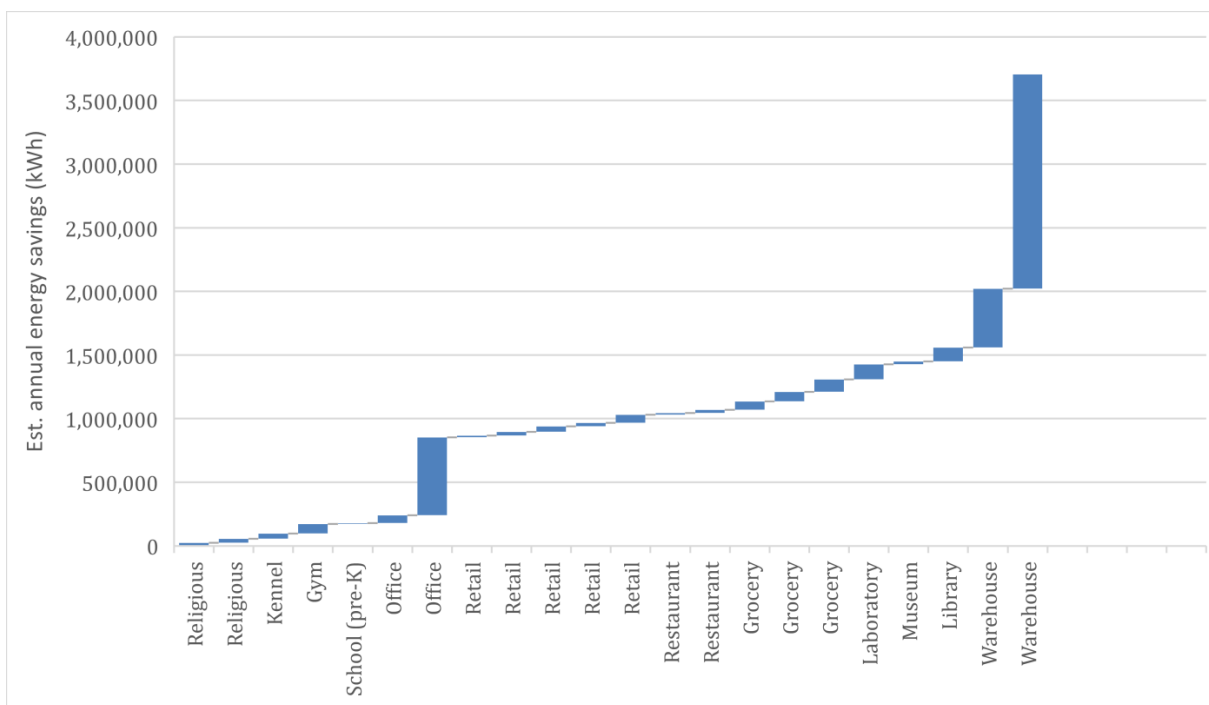
Building type	kWh/Square Foot Savings	Percent of Code Savings
Average of the program not modeled	3.3	18.7%
Warehouse modeled	5.5	34.7%
Office modeled	5.1	51.0%
Library modeled	5.7	38.8%

The energy models also included the natural gas savings associated with building operation. While not used for this analysis, this information could be used to determine a total energy percent better than code.

### Evaluated Energy Savings

Tetra Tech found that all projects had energy savings beyond a code baseline building. With the limited information available, Tetra Tech estimated that the total savings was 4,182 MWh per year. Figure 3-5 shows the estimated energy savings over code-compliant buildings categorized by building type. The total estimated energy savings for the new construction projects is heavily dependent on a few large projects, but each project provided positive energy savings based on design.

Figure 3-5. Estimated Annual Savings by Building<sup>24</sup>



<sup>24</sup> The four facilities with an asterisks denote the projects that where Tetra Tech wa unable to set a baseline energy consumption.

Two components drove the two largest individual building savings (one office and the one warehouse)—both buildings were large and both had an energy model completed to account for all sources of potential energy savings over code. Together, these two buildings accounted for 55 percent of the evaluated savings. A third building, a warehouse, was a large facility which was not modeled, but evaluated savings accounted for an additional 11 percent of the savings. All other projects are three percent or less of the evaluated savings.

The building type affects the amount of savings per square foot. Higher intensity buildings tend to have a greater opportunity to save electricity per square foot constructed. Restaurant and groceries are typically high-intensity buildings, and the restaurant and grocery buildings completed in PY2018 had a high amount of savings per square foot of building. Even though buildings sizes were not large (each of the groceries was under 25,000 square feet and the restaurants were under 10,000 square feet), their total energy savings were a substantial contributor to the program. While Tetra Tech was able to identify savings through the savings methodology process, requiring energy models as part of the application process could likely result in more savings.

## 4.0 PROCESS EVALUATION FINDINGS

This section provides summaries and detailed findings from the process evaluation activities. The process evaluation was designed around the key researchable questions identified in the methodology section (Section 1.2). Activities included interviews with program and implementation staff, interviews with business advocates, and telephone surveys with both participating and nonparticipating customers.

### 4.1 STAFF INTERVIEWS AND TELEPHONE SURVEYS SUMMARY

#### Staff Interviews

Discussions with program and implementation staff revealed a few changes to the program since the last evaluation cycle conducted for PY2017. These changes included a new program implementer, updates to rebate amounts, and the inclusion of new construction projects.

Franklin was brought on in 2016. Both Franklin and LG&E and KU reported a good working relationship with each other. Goals have been achieved and projects continue to be in the pipeline. LG&E and KU expect to see an increase in activity in future program years due to repeated requests from chain customers, such as dollar stores—once a project is completed with one chain store, others see the value and want to participate. Additionally, beginning in PY2019 industrial customers are eligible to participate in the program. With this, more LG&E and KU account managers will become aware of the program, further helping program promotion.

Similar to other programs around the country, one area of concern is what will happen with lighting projects when Federal standards change. There was some thought that the volume of lighting projects will decrease, but others felt there is still plenty of opportunity for lighting projects to continue. There was also some concern about managing the program's budget due to an increase in rebate submission. Making sure the program can keep up with demand and that customers are provided feedback promptly could provide challenges.

Overall, both LG&E and KU and Franklin felt the program has been running well and, besides the unknown effects of the change in lighting standards, do not foresee any other major implementation concerns. Both felt there is enough opportunity in the market to continue the program. There were no existing plans for changing measure offerings or rebate levels.

#### Business Advocate Interviews

Business advocates are companies who operate as a consultant working to identify program rebate and rebate opportunities on behalf of companies looking to make energy efficiency improvements. Along with identifying rebate and rebate opportunities, business advocates will often complete the paperwork needed to participate in the programs. Rebates can either go directly to the customer or to the business advocate, depending on their agreement. Business advocates may work for companies on a local, regional, or national level.

We spoke with a variety of business advocates who ranged in size from both the number of projects submitted through LG&E and KU's Commercial Rebates program, as well as by the number of staff they have. All the business advocates we spoke with were aware of the Commercial Rebates program and have been involved with the program for a minimum of two years to over 10 years. The customers who have only completed a few projects with the program tended to be smaller in size and operate

more locally in Kentucky and surrounding states. Larger organizations who submit a higher volume of projects through the program tend to operate nationwide. The business advocates we spoke with worked only with commercial customers, although the type of customer varied. Two of the eight business advocates focused primarily on retail, while two focused on education, and the other four worked with all customer types.

Overall, business advocates were satisfied with the program. They received the support they needed and any questions they had were responded to promptly. They also stated the program is straightforward to follow.

### Participant Surveys

A total of 150 telephone surveys with PY2018 program participants were completed. Tetra Tech aggregated the measure-level tracking data by the contract account number, and summed quantities, rebate amounts, and savings to form the sampling frame of 1,348 records<sup>25</sup>. To limit respondent burden, Tetra Tech selected one measure type per customer account and selected one account for customer contacts with multiple accounts. This resulted in a survey sample of 1,225 records.

For each customer, the record with the highest energy savings, or the account with a less represented measure, such as a custom project and other non-lighting projects, was selected. When reviewing the program data, Tetra Tech noticed about half of the contact names and phone numbers were associated with a contractor or vendor as opposed to a customer. This information was removed and Tetra Tech worked with LG&E and KU to supplement the missing contact details. During the telephone survey, surveyed participants were asked to confirm that they were the person most involved in making the decision to participate in the program to ensure we talked to the appropriate person. Tetra Tech exceeded the overall target of 140 completed participant surveys with a total of 150 surveys. The overall response rate was 15 percent. Table 4-1 below shows the detailed response rate.

**Table 4-1. Participant Survey Response Rate**

	LG&E	KU	Overall
<b>Released Sample</b>	<b>598</b>	<b>429</b>	<b>1,027</b>
Residential line	0	0	0
Vendor / contractor	1	0	1
Recently surveyed	5	3	8
Affiliated with utility	0	0	0
<b>Eligible sample</b>	<b>592</b>	<b>426</b>	<b>1,018</b>
Does not recall participating	15	18	33
Refusal	11	9	20
Incompletes (partial surveys)	2	1	3
Bad number	1	2	3
Attempted but not completed	488	321	809
Completed	75	75	150
<b>Response Rate</b>			
<b>Response Rate (Completed / Eligible Sample)</b>	<b>12.7%</b>	<b>17.6%</b>	<b>14.7%</b>

<sup>25</sup> A process sampling memo was provided to LG&E and KU for review and comment, and was finalized on June 25, 2019.

Participants, overall, were satisfied with the program, did not encounter any problems applying for the rebates, felt the amount of time it took to complete the application was acceptable, and over one-half of participants have already recommended the Commercial Rebates program to others. Of those who have not, almost all participants would recommend the program if given the opportunity.

## Nonparticipant Surveys

A nonparticipant survey was conducted with customers who were not known to have previously participated in a LG&E and KU energy efficiency program within the prior two years. LG&E and KU provided Tetra Tech with a list of nonparticipating customers. Tetra Tech randomly selected a sample of customers by territory to be contacted for the survey effort.

The nonparticipant survey assessed customer awareness of LG&E and KU program offerings, their interest in future program participation and financial rebates, their perception of energy efficiency overall, customer firmographics, and any recent energy efficiency improvements. A total of 142 surveys were completed for an overall response rate of 20 percent. Table 4-2 shows a detailed survey response rate by utility and overall. Detailed findings from the nonparticipant survey effort are integrated throughout the Detailed Results section of this report (Section 4.2).

**Table 4-2. Nonresidential Nonparticipant Survey Response Rate**

	LG&E	KU	Overall
<b>Released Sample</b>	<b>421</b>	<b>376</b>	<b>797</b>
Residential line	0	0	0
Participated in a program	56	27	83
Recently surveyed	4	2	6
Affiliated with utility	3	1	4
<b>Eligible Sample</b>	<b>358</b>	<b>346</b>	<b>704</b>
Refusal	47	33	80
Incompletes (partial surveys)	3	3	6
Language barrier	5	4	9
Bad number	23	27	50
Called out	41	6	47
Attempted but not completed	168	202	370
Completed	71	71	142
<b>Response Rate</b>			
<b>Response Rate (Completed / Eligible Sample)</b>	<b>19.8%</b>	<b>20.5%</b>	<b>20.2%</b>

Overall, nonparticipants were not aware LG&E and KU offers energy efficiency programs (76 percent). Of those that were aware they learned about the programs through bill inserts or some other direct mailing from LG&E and KU. Only one-third have made any energy saving improvements in the past 12 months. One-third said that being aware of the programs would increase their likelihood of participating in a rebate program in the future.



## 4.2 DETAILED RESULTS

This section contains the detailed process evaluation results from the participant and nonparticipant survey efforts and from the business advocate interviews where applicable. The findings have been organized into the following sections:

- Program processes
- Program awareness
- Satisfaction
- Program influence
- Firmographics.

### Program Processes

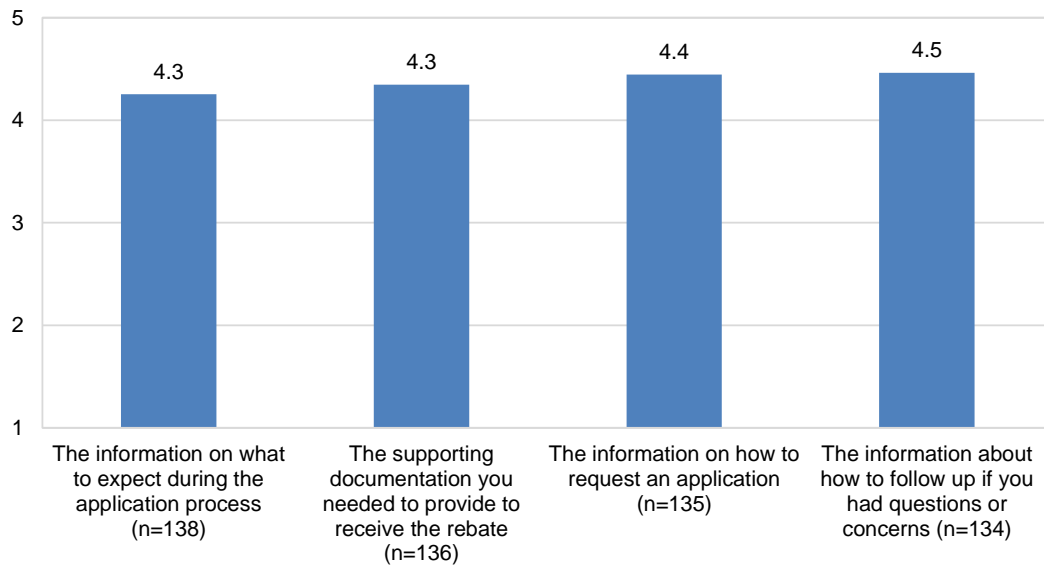
#### Participants

Application requests come into LG&E and KU, who then forwards the information to Franklin. Franklin enters the information into the tracking database and sends out an application to the customer with the program's requirements. Once the application is completed the information goes back to Franklin. LG&E and KU review all applications and once confirmed, the application goes back to Franklin for final processing. A congratulatory letter from LG&E and KU is created and mailed prior to project completion. After project completion LG&E and KU release the rebate funds to Franklin for them to send the rebate check.

The majority of respondents did not encounter any problems applying for the rebates. When asked about the clarity of various program information, such as how to apply for the rebates and how to follow-up if there were any questions or concerns, responses to each resulted in a mean of 4.3 or higher on a 1 to 5 scale where 1 was "not at all clear" and five was "very clear."

Eight respondents rated any of the information a one or two. Some of the reasons for lower ratings included the customer mentioning they were not aware of the program until the contractor had mentioned it, the overall process felt complicated, and the forms required a lot of back and forth to finalize or took a long time. Figure 4-1 below shows the mean ratings for program information.

**Figure 4-1. Mean Rating of Clarity of Program Information**



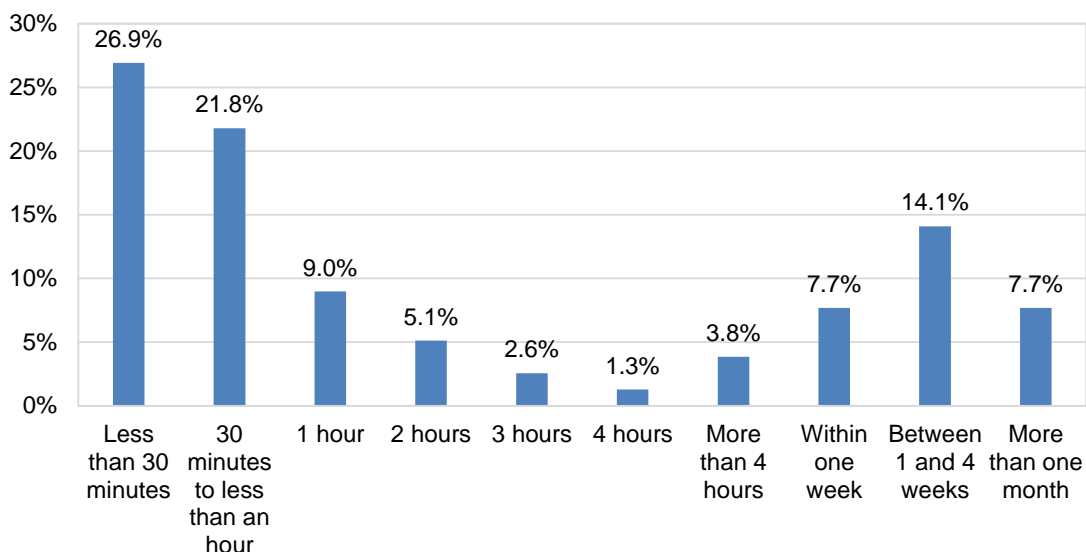
Source: Participant Survey Questions PI1a - PI1d

Less than half of the respondents indicated they were solely responsible for filling out their own application (42 percent). Twenty-two percent of surveyed respondents said their applications were solely completed by the contractor and 18 percent said the application was completed by someone else within their company. Seven percent of respondents indicated they or someone else at their company completed the application with additional assistance from their vendor or contractor.

Over one-half of respondents reported it took one hour or less to complete the rebate application. Conversely, nine percent of respondents reported it took one to four hours to complete the application with another four percent indicating it took more than one four hours. Fourteen percent of respondents said it took one to four weeks to complete and eight percent said it took more than one month<sup>26</sup>.

<sup>26</sup> The survey did not ask if the time it took to complete the application referred to the initial completion time or after any back and forth with Franklin to reach final completion which could account for the large response range.

Figure 4-2. Length of Time to Complete the Rebate Application



Source: Participant Survey Questions RP2

Most of the respondents said the amount of time it took to complete the application was acceptable (90 percent). Of the 10 percent (n=8) who said it was not acceptable, the time it took reported ranged between one hour and more than one month.

When asked how difficult it was to complete the rebate application, respondent responses resulted in a mean rating of 2.1 on a 1 to 5 scale where 1 was “not at all difficult” and 5 was “very difficult.” Two respondents said it was “very difficult” to complete the rebate application; one of these installed a drive/motor while the other installed custom equipment.

Some feedback from those who said it was “not at all difficult” to complete the request and provide supporting documentation included the following:

*It was pretty straightforward and simple information; there wasn't very much information requested.*

*Because it wasn't any big deal, it was easy to use. In our industry, we do a lot of rebate applications, so maybe we are better at it than others that don't have a rebate background.*

*It was very simple, everything was online, and it told me what to expect.*

*It was very clear cut on what needed to be done. It was just up to us to provide the information. We have so many accounts with LG&E; it can get a little involved getting information on our end.*

*With the electricians help it didn't take long to fill it out, he had filled it out before.*

Those who experienced difficulty with the application or provided a rating of a 4 or 5 on the same scale (1 was “not at all difficult” and 5 was “very difficult”) provided the following comments:

*Because of the documentation that had to be provided and I had to follow-up on my own to see what stage the rebate was at or if it was being handled at all.*

*I believe we sent it in and then they said they didn't have a document, but they did have it, so we had to get something else — just a little time-consuming.*

*It took us a while to get the documentation. It needs to be simpler.*

*Because it was difficult, too much info ask for on things I had purchased a long time ago.*

*You have to get invoices from the supplier, and they have to be paid. You have to wait until they get paid. It is hard to get all the paperwork together. It just takes time. Once you get it all together, then it not too bad filling out the rebate form.*

After the project was completed, 41 percent of surveyed participants said they had a site visit to confirm the installation. Of those who received a site visit, satisfaction was high with each aspect of the visit, with an average rating of over nine, where 1 was “not satisfied at all” and 10 was “completely satisfied.”

**Table 4-3. Satisfaction with Factors Related to the Site Visit**

	Mean Rating	Respondents (n)
Courtesy of the contractor	9.8	37
Punctuality of the contractor	9.3	37
Convenience of the site visit time	9.2	40

Source: Participant Survey Questions RP6a to RP6c

**Business Advocates**

Business advocates follow the same application process as individual customers by requesting an application for the program. The business advocate needs to have the account number available along with the customer name, address, and type of application they are requesting. Once requested, LG&E and KU returns an application with the account number and relevant customer information filled in along with an enrollment ID. The business advocate then completes any remaining information (i.e., tax number), signs the application, and returns it to LG&E and KU. Application submission was previously through the United States postal service but is now sent through email. At least two business advocates mentioned this change was a big improvement to the program and expressed appreciation.

Applications are typically sent back to the business advocate or customer within two to three weeks. However, two business advocates did indicate there was a delay in getting the application back. There does not appear to be a systematic reason for the delay (i.e., it does not happen for all custom projects or all prescriptive projects). Business advocates felt the ideal time to get the application back would be three weeks or less, after the request for an application. All business advocates did indicate they received the support they needed. When they had questions, Franklin and LG&E and KU were quick to respond.

Once the application is approved the project is implemented, and paperwork is submitted for payment. In that process, a new identification number is assigned for internal purposes. LG&E and KU provides customers, via the postal service, with payment confirmation. This is useful for business advocates to know payment has been approved; however, there is no identifying information (customer name, address, or enrollment id) for business advocates to track which payments were approved. This is more of a concern for the business advocates who deal with many projects compared to those who are smaller and deal with fewer quantities. For some business advocates, a follow-up phone call is necessary to gain clarity on which projects were included in the payment confirmation letter. The larger business advocates also indicated this confirmation letter could be sent by email, just like the application when first requested. One business advocate mentioned this as their priority request for program.

While business advocates were able to site multiple benefits to working with the program, one business advocate indicated that they ended up passing on five to 10 percent of available rebates because it was too difficult to figure out where projects were in the application process, specifically for multi-site projects.

Some of the mentioned benefits to participating in the program were:

- They appreciate that projects going through the program do not have to be pre-approved. One referred to it as the "saving grace" of the program.
- Being able to provide assistance on behalf of the program and receive rebates makes it easier for customers to make decisions regarding the installation of energy efficient equipment.
- It has made a few projects possible that would not have happened without the rebates by improving the payback period.
- Customers appreciate the amount of time it takes business advocates to provide their service. Most have been using their services since the beginning of the program.
- The customer benefits by saving energy.

## **Program Awareness**

### **Participants and Nonparticipants**

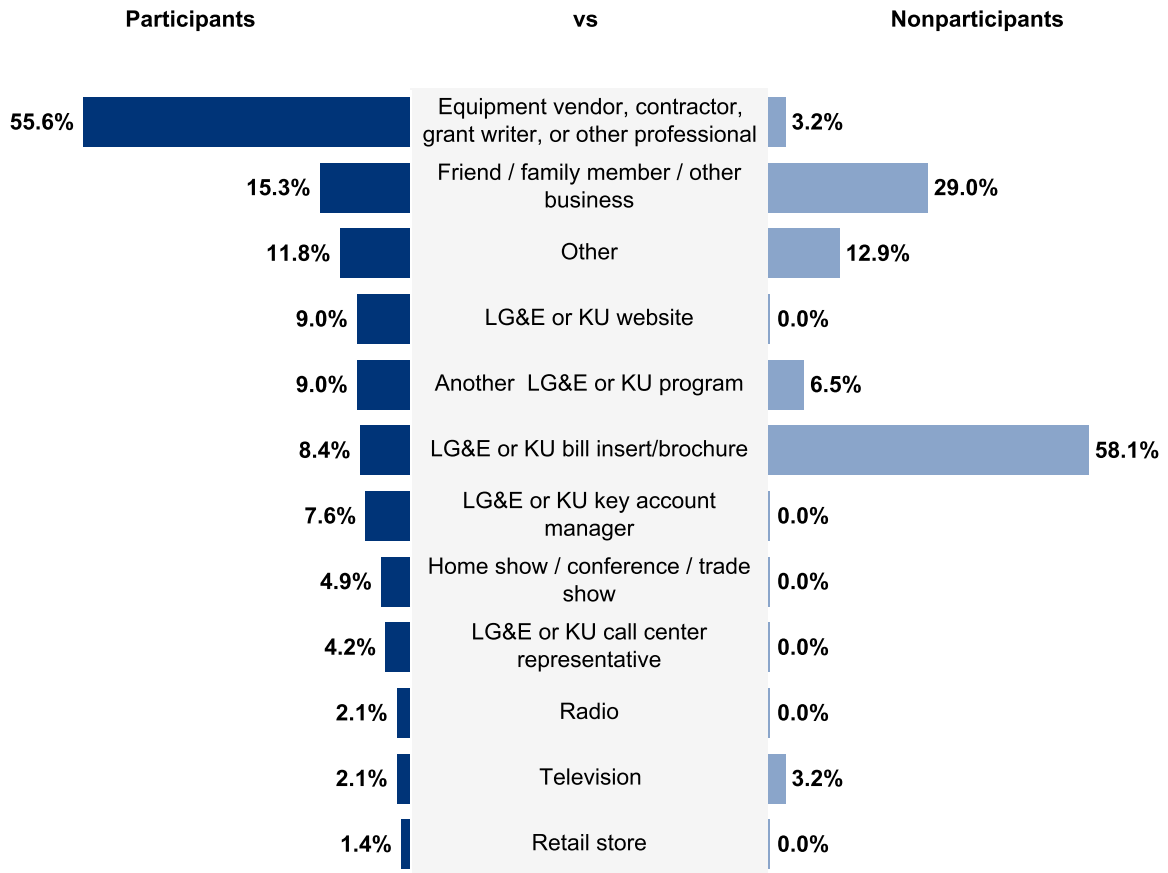
Outreach for the program is shared between LG&E and KU and Franklin. Outreach largely consists of one-on-one meetings with customers to explain the program and answer any questions they have. When LG&E and KU visits customers to conduct outreach efforts, Franklin is invited and encouraged to attend. Franklin also holds occasional "power breakfast" meetings to discuss the program with contractors or business advocates—in PY2018, there were three of these meetings held. Additionally, LG&E and KU continues to implement marketing efforts through various media channels such as radio, print and digital advertisements, articles in the quarterly commercial customer newsletter, and press conferences/releases for projects receiving large rebates.

The main source of program awareness according to program participant survey respondents was from their contractor or vendor (56 percent). This was followed by 15 percent hearing about the program through friends or family members. Nineteen percent indicated they had an account manager and the majority said their account manager has provided them information on LG&E and KU's energy efficiency programs (75 percent), however, only eight percent indicated they first heard about the program from their account manager.

Over one-quarter of nonparticipant survey respondents were not aware of any LG&E and KU program offerings (76 percent). Of those that were aware, the primary source of program awareness was through an LG&E and KU direct mailing (58 percent), followed by word of mouth (29 percent). Nonparticipant survey respondents were also asked if they were specifically aware of the Commercial Rebates program and only two respondents had ever heard of the program.

Figure 4-3 below shows the various methods of general program awareness for both participants and nonparticipants.

Figure 4-3. How Participants and Nonparticipants Became Aware of LG&E and KU Programs



Source: Participant Survey Question P1, Nonparticipant Survey Question PA2

Receiving an email from LG&E and KU was mentioned as the most effective way to communicate program information to the nonparticipants (68 percent). The second most effective way was by hard copy mail (40 percent). Table 4-4 shows the various preferred methods of communication according to nonparticipants.

**Table 4-4. Most Effective Method of Communication Reported by Nonparticipant Respondents**

Method	Percent
Email	68.3%
Hard copy mail	40.1%
Information directly from LG&E or KU	17.6%
A phone call	16.2%
Other	5.6%
Don't know	2.1%
Site visit	1.4%
Trade expo / Conference	0.7%
Online resource	0.7%
Mass advertising campaign	0.7%
<b>Respondents (n)</b>	<b>142</b>

Note: May not total 100 percent as respondents could select more than one answer  
Source: Nonparticipant Survey Question PA4

## Satisfaction

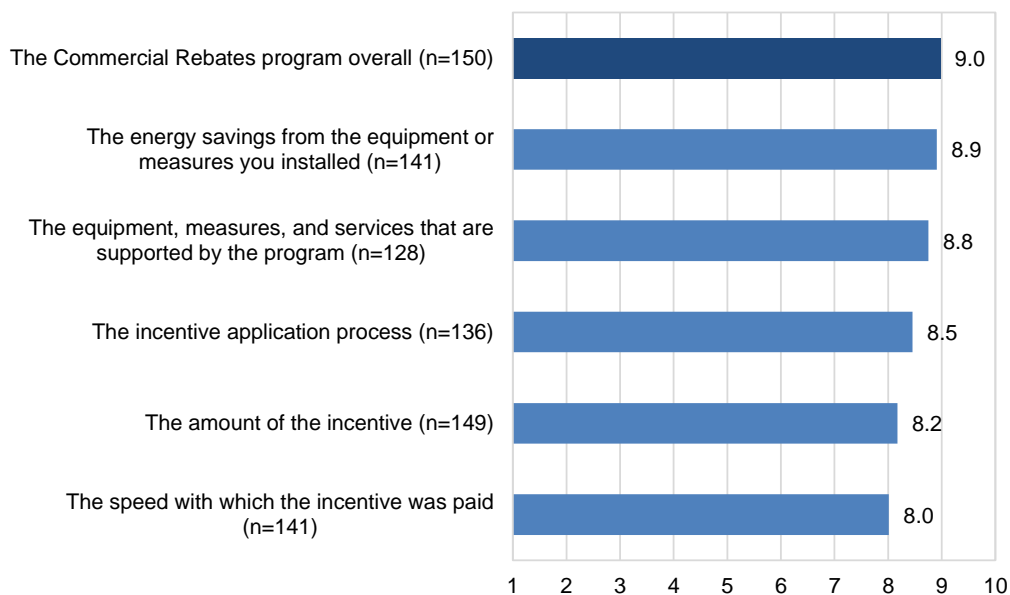
### Participants and Nonparticipants

Participant satisfaction with the program overall, and with different program aspects, was high. Eighty-four percent of participant survey respondents rated their overall program satisfaction an eight or higher on a scale of 1 to 10 where 1 was “not satisfied at all” and 10 was “completely satisfied,” with 64 percent rating it a 10, or completely satisfied.

Using the same scale, participant respondents were asked to rate their satisfaction of individual program components. Again, ratings were high across all program components, resulting in mean ratings ranging between 8.0 and 8.9. The highest rated item was for the energy savings from the equipment installed (mean of 8.9) and the speed in which the rebate was paid was lowest (mean of 8.0).



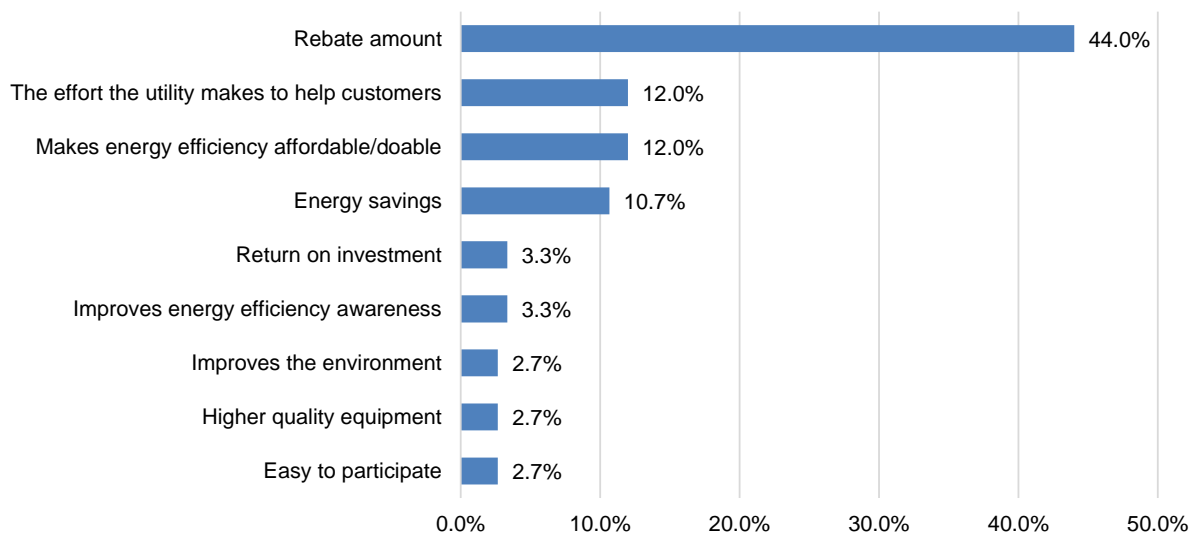
**Figure 4-4. Mean Satisfaction Ratings for Program and Program Components**



Source: Participant Survey Questions SAT2, SAT1a – SAT1e

When asked what they liked best about the program, 44 percent of participant survey respondents mentioned the rebate, followed by the effort the utility makes to help its customers (12 percent) and the program makes energy efficiency more affordable to be able to do projects (12 percent).

**Figure 4-5. Best Thing About the Program (n=140)**



Source: Participant Survey Question FA1

Due to program participation, the opinion of LG&E and KU improved for half of the surveyed participants and remained the same for the remaining. No participant survey respondents indicated their opinion of LG&E and KU worsened as a result of their participation in the program. Some specific comments from participants who said their opinion increased included the following:

*Because I did not realize that LG&E had this program. It's a very good incentive to have to lower the utility bill and lower our carbon footprints.*

*Because it was such a great program, it allows businesses to get the equipment that allows them to get the savings and upgrade their equipment, but it also decreases their overall energy cost drastically.*

*It is a good service, a good option for its customers.*

*It went from being a standard company to one that goes above and beyond.*

*Just because I had no prior knowledge of the program, so it just adds to the overall. Not that I was unfavorable, but it's more favorable to work in a different avenue with other programs. It adds to overall view of KU; KU always worked well with us here.*

*Just that the personal correspondent between [program staff]. The people at LG&E helped walk me thru this project every step of the way.*

*Just the response and communication that was between us and the utility.*

*LG&E's willingness to help charities such as us (we always struggle for funds) means a lot to us on the financial end.*

*They were just good people to work with; they were very helpful.*

*They were willing to participate in our purchase price and give us a cash incentive shows they were more invested in this than we thought they were. It looks like they cared a little more than we thought they did.*

Over half of participant survey respondents (52 percent) have already recommended the Commercial Rebates program to others. Of those who have not, almost all would recommend the program if given the opportunity. One respondent indicated they would not recommend the program and it was because they indicated they "didn't get paid" and one respondent was not sure if they would recommend the program because they felt their electric bill would go down, but they have not seen a change.

When asked about what needs to change for the program, 55 percent of participant survey respondents mentioned no changes were necessary. Of those who felt a change was needed, a more streamlined process for participation and an increase in the rebate amounts were the top two most mentioned changes (21 and 11 percent, respectively). Other suggestions included increasing program awareness and marketing (five percent), more assistance from program staff (three percent), and to include more equipment in the approved measure offerings (two percent).

**Table 4-5. Part of LG&E and KU Program that Needs to be Changed**

Recommended Change	Percent
No changes	55.3%
Streamline processes	21.3%
Increase rebate amount	11.3%
Increase awareness/marketing	5.3%
Other	4.0%
More program assistance	2.7%
Include more equipment	2.0%
<b>Respondents (n)</b>	<b>150</b>

Source: Participant Survey Question FA2

Note that the specific question wording encouraged participants to think of something to change (‘What would you say most needs to be changed about the program?’). When Tetra Tech looked at the 32 respondents who suggested the program be more streamlined, nine of the 29 respondents gave a rating of six or less for their satisfaction with the rebate application process. Three of these nine indicated it took a few weeks or over a month to complete the application, the others said two to over four hours. Similarly, Tetra Tech looked at the 16 respondents who indicated they would like to see an increase in the rebate amount. Eight of the 16 gave a rating of six or less for their satisfaction with the rebate amount.

### **Business Advocates**

Business advocates were equally satisfied with the program. All business advocates rated their overall satisfaction with the program an eight or higher on the same 1 to 10 scale (where 1 was “not at all satisfied” and 10 was “completely satisfied”). The strengths of the program mentioned by business advocates were that it is easy and straight-forward to participate, they continue to see repeat program participants, they appreciate there is no preapproval required, and that the program has a wide variety of equipment available.

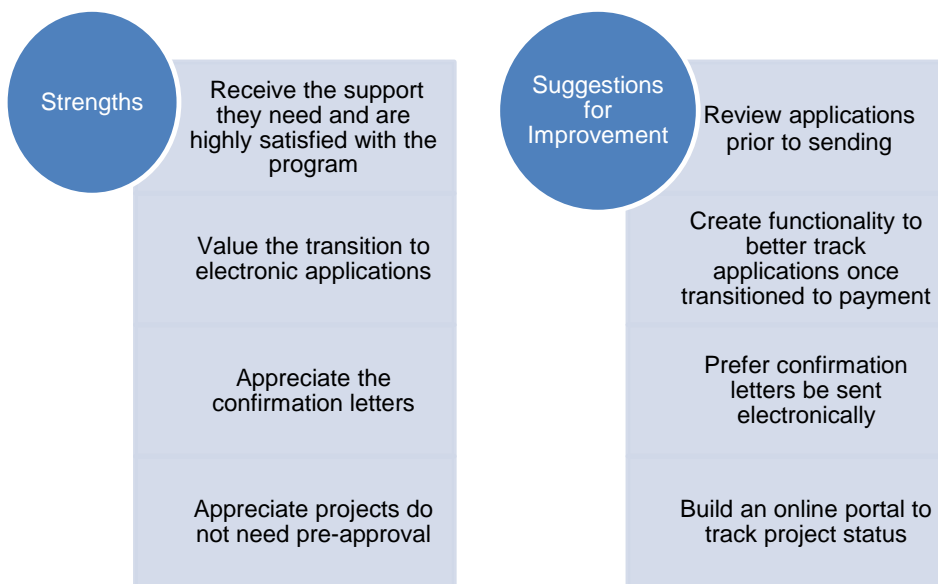
Business advocates were also asked to suggest areas of improvement. Two of the nine respondents would like an online portal where they can have the ability to log-in (as a trade ally if needed) and see all the projects that were submitted through the program, along with their status. One respondent mentioned how Franklin worked in other service territories, namely Consumers Energy, where there was a trade ally portal that works well for, at a minimum, checking on the status of projects. Although a third respondent (an organization with less than 10 projects) specifically indicated that the portal was not necessary as they liked being able to call in and talk with someone about the status.

Other suggestions from business advocates included requesting LG&E and KU spend more time reviewing the application forms prior to sending back to business advocates to ensure the information is correct, adding additional measures to the program, and sending the congratulatory letter electronically. One business advocate, who worked with new construction, would like to see the program include lighting. They can then do the modeling in-house and continue to do everything on behalf of the customer. They otherwise have to work back and forth with the customer’s engineers and, because of this they tend to shy away from those rebates. Another would like to see more prescriptive building envelope rebates, such as windows or window film and insulation that is not considered custom. Regarding the electronic delivery of the congratulatory letter, previously all applications and communications were submitted by mail. The application can now be submitted electronically, however

the congratulatory letter is still mailed. Business advocates expressed appreciation for the application change and have requested that this form be sent electronically as well.

Figure 4-6 below shows a summary of program strengths and suggestions from improvement according to business advocates.

**Figure 4-6. Program Strengths and Suggestions for Improvement from Business Advocates**



Some business advocates mentioned other tools that may be useful when they are working with the program or selling energy-efficient equipment. One respondent mentioned how creating case studies about the program could be used. Highlighting a different type of project and the value could encourage others to ask or consider projects, specifically beyond lighting retrofits. Another respondent mentioned how the rebates need to “be attractive enough to have an impact.” This respondent went on to say that the recent change from a fixed price to a formula makes sense, but it likely benefits larger customers compared to smaller customers with lower usage. A third respondent mentioned that while they appreciate there is a list of program measures available through the program on the website as a pdf file, the respondent felt it would be helpful to have this list in a searchable document so when working with customers they can do some filters and searches to find eligible equipment more quickly.

## Program Influence

### Participants and Nonparticipants

Customers participate in energy efficiency programs for different reasons. The desire to save energy and money was mentioned by almost all participating survey respondents as a factor in their decision to participate in the Commercial Rebates program. Another common factor in participant’s decision was the payback or return on investment (ROI), mentioned by 98 percent of respondents.

**Table 4-6. Reasons for Participation**

Reasons	Yes	Respondents (n)
Desire to save energy/money	99.3%	150
Payback or ROI influence	98.0%	150
Contractor, supplier, or consultant suggestion influence	60.4%	149
Previous audit recommendations	21.6%	148

Source: Participant Survey Question PA2a to PA2d

Just over half of participant survey respondents had other reasons for participating, including to get more energy efficient equipment (13 percent), wanting better lighting (eight percent), and it was convenient to do the project (two percent).

Even though LG&E and KU does not calculate net savings, the evaluation included a few questions in the participant survey asking respondents to assess the program’s effect on their participation (attribution). That is, was the customer’s energy efficient equipment purchase attributable to the program or would the customer have made the same equipment purchase on their own had the program not been offered.

Forty-one percent said they would have installed the same equipment at the same time (including quantity and efficiency). The Commercial Rebates program was effective in encouraging the remaining participant survey respondents to change a portion of their project so that it would qualify for the program or by purchasing additional equipment.

The table below breaks down each component of determining program attribution (timing, quantity, and efficiency). We present overall results and the custom and lighting measure categories. Other measure categories did not have a sufficient number of respondents to be able to report.

**Table 4-7. Project Scope if Program was not Available<sup>27</sup>**

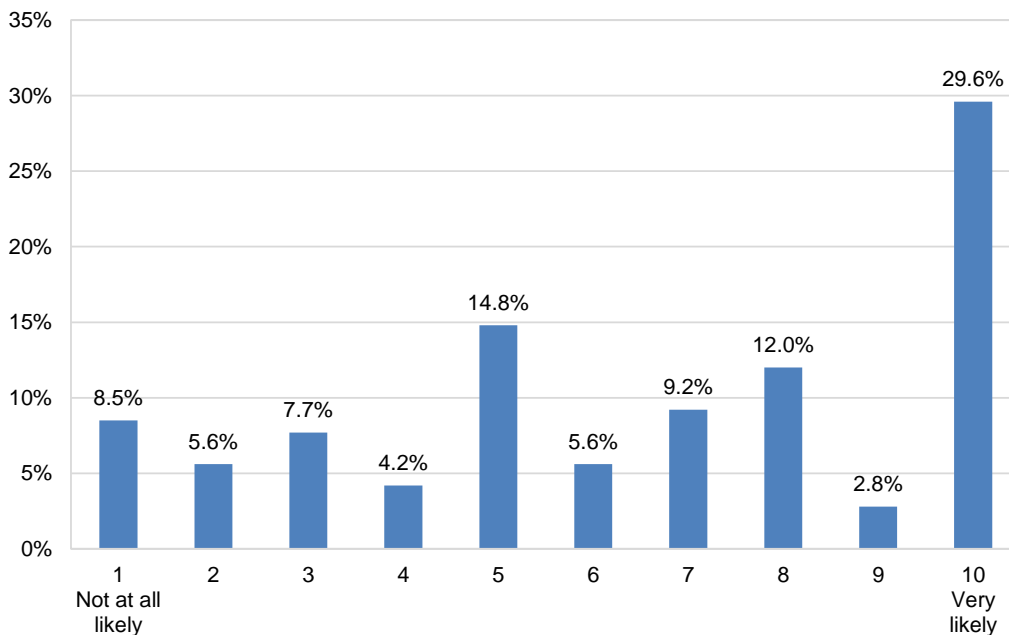
Attribution Category	Custom Measures		Lighting Measures		Overall	
	Percent	n	Percent	n	Percent	n
<b>Timing</b>						
Was going to do at same time	58.6%	29	63.8%	80	64.7%	132
<b>Quantity</b>						
Was going to do the same quantity without the rebate	46.7%	30	44.0%	84	52.9%	136
<b>Efficiency</b>						
Was going to install the same high efficient equipment	51.9%	27	62.7%	83	63.1%	130

Source: Participant Survey Questions FR5, FR7a, FR14

<sup>27</sup> Only showing measure categories with counts greater than 15.

Participant survey respondents were asked about their likelihood to install the same quantity and efficiency of equipment at the same time if the program was not available (using a 1 to 10 scale where 1 was “not at all likely” and 10 was “very likely”). Similar to the results above, almost 30 percent indicated they were “very likely” to install the equipment without the program rebate.

**Figure 4-7. Likelihood of Implementing Same Equipment if Program had not Provided Rebate (n=142)**



Source: Question FR1

Less than half of the nonparticipant survey respondents said they have either replaced or upgraded equipment, or made any other energy saving improvements in the past year (35 percent). Of those that had done one or more of those in the past year the most common equipment mentioned was lighting (57 percent). Forty percent of responses fell into the other category. Responses included air filters, dishwashers, air compressor, ceiling fans, generator, office electronics, small kitchen appliances, and window tinting. Table 4-8 below shows a detailed breakdown of responses.

**Table 4-8. Types of Equipment Replaced or Upgraded in the Past 12 Months**

Type of Equipment	Percent
Lighting	57.4%
Other	40.4%
HVAC / Heating or Cooling systems	36.2%
Water heating	6.4%
Refrigerator / Freezer / Ice machine	6.4%
Controls	2.1%
Oven / Fryer / Steam cooker	2.1%
Clothes washer / Dryer	2.1%
Shell / Insulation / Windows / Doors	2.1%
<b>Respondents (n)</b>	<b>47</b>

Note: May not total 100 percent as respondents could select more than one answer  
Source: Nonparticipant Survey Question PA5

Of those that had replaced equipment in the previous 12 months, none had considered participating in LG&E or KU's Commercial Rebates program because they were not aware of the program.

All nonparticipant survey respondents were asked what would increase their likelihood of participating in a rebate program in the future. Thirty-three percent said being aware of the program would increase their likelihood of participating. Learning about the cost savings and the impact on their energy bill was second with 29 percent, followed by seeing higher rebates or rebates (11 percent). Eight percent said that there is nothing that could be done to increase their likelihood of future program participation. Table 4-9 below shows the detailed response.

**Table 4-9. What Would Increase the Likelihood of Future Rebate Program Participation**

Response	Percent
Awareness of the program / did not know the program existed	32.8%
Cost savings, impact on bill (e.g., lower bill)	28.7%
Higher rebates/incentives	10.7%
Nothing	8.2%
Providing additional information about program	7.4%
Internal agreement	5.7%
Energy savings	5.7%
Availability of funds to make improvements	5.7%
Equipment that would need to be replaced (e.g., old equipment)	3.3%
Making application process less burdensome	2.5%
Better understanding of rebate impact on return on investment (ROI)	2.5%
Financing	0.8%
<b>Respondents (n)</b>	<b>122</b>

Note: May not total 100 percent as respondents could select more than one answer  
Source: Nonparticipant Survey Question PA10



## Firmographics

The participant and nonparticipant surveys asked respondents several questions about their business. Participant survey respondent's business customers tended to be in the office/professional followed by retail, education, and religious worship (all 10 percent or more). Nonparticipant survey respondent business customers were more likely to be retail, followed by warehouse/distribution center, office/professional, and lodging (also all 10 percent or more). The mean age of the building was similar across participants and nonparticipants (46 years old and 45 years old, respectively). The table below shows the detailed business activity and building age.

**Table 4-10. Business Activity and Building Age**

	Participants	Nonparticipants
<b>Business Activity</b>		
Office/professional	17.4%	16.2%
Retail	17.4%	23.9%
Education	13.4%	0.7%
Religious worship	10.7%	4.9%
Other	6.7%	2.1%
Service	6.7%	0.0%
Lodging	5.4%	10.6%
Food sales or service	4.7%	7.0%
Health care	4.7%	9.9%
Warehouse or distribution center	4.0%	14.8%
Industrial/manufacturing	2.0%	5.6%
Municipal/governmental	2.0%	0.0%
Public assembly	2.0%	0.7%
Public order and safety	2.0%	2.8%
Agricultural	0.7%	0.7%
<b>Respondents (n)</b>	<b>149</b>	<b>142</b>
<b>Age of Facility</b>		
Less than 2 years	2.0%	0.0%
2 to 4 years	2.7%	5.8%
5 to 9 years	2.0%	4.4%
10 to 19 years	12.1%	22.6%
20 to 29 years	20.1%	13.1%
30 years or more	61.1%	54.0%
<b>Respondents (n)</b>	<b>149</b>	<b>137</b>
Mean age (n=138)	46.13	45.12

Source: Participant and Nonparticipant Survey Questions F1a, F4b

Participant and nonparticipant respondents were also asked about the facility ownership and number of employees. The majority of participants own and occupy the facility (75 percent). Most of the nonparticipants also own their facility (87 percent), however, just under half of those facilities are rented to others (42 percent). The average number of fulltime employees among participant respondents was 43 while the average number of fulltime employees among nonparticipants was 14. Table 4-11 below shows additional business characteristics for both participant and nonparticipant respondents.

**Table 4-11. Business Characteristics**

	Participants	Nonparticipants
<b>Ownership of Facility</b>		
Company owns and occupies	74.8%	45.3%
Company rents	6.8%	12.9%
Company owns and rents to someone else	18.4%	41.7%
<b>Respondents (n)</b>	<b>147</b>	<b>139</b>
<b>Square Footage of all Buildings</b>		
Under 5,000 sq. ft.	18.8%	52.3%
5,000 to just under 10,000 sq. ft.	13.8%	21.5%
10,000 to just under 25,000 sq. ft.	21.0%	15.4%
25,000 to just under 75,000 sq. ft.	21.0%	6.2%
75,000 sq. ft. or more	25.4%	4.6%
<b>Respondents (n)</b>	<b>138</b>	<b>130</b>
<b>Number of Employees</b>		
Less than 10	30.8%	64.5%
10 to 49	36.4%	31.2%
50 to 99	13.3%	2.2%
100 to 249	11.9%	1.4%
250 to 499	3.5%	0.0%
500 or more	4.2%	0.7%
<b>Respondents (n)</b>	<b>143</b>	<b>138</b>
Mean full-time employees (n=126)	43.44	13.53
Mean part-time employees (n=124)	11.52	3.11
<b>Buildings at this Location</b>		
Mean number of buildings	3.70	2.62
<b>Facility Descriptions</b>		
Company's only location	54.8%	67.6%
One of several company locations	40.4%	24.5%
Company headquarters with several other locations	4.8%	7.9%
<b>Respondents (n)</b>	<b>146</b>	<b>139</b>

Source: Participant and Nonparticipant Survey Questions F2, F4a, F4b, F5, F6, F8b, F9

**APPENDIX A: PRESCRIPTIVE MEASURE-LEVEL DESK REVIEW RESULTS**

Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
1310100	LED INTERIOR > 10W AND < 50W	Lighting	EACH	921	921	\$4,605	\$4,605	118,606	118,606	100%	25.55
	LED EXTERIOR < 100W	Lighting	EACH	71	71	\$710	\$710	29,854	29,854	100%	0.00
	POLE LIGHT REPLACED LIGHT >= 750W	Lighting	EACH	19	19	\$1,672	\$1,672	34,703	34,703	100%	0.00
1320104	LED INTERIOR < = 10W	Lighting	EACH	10	10	\$20	\$20	1,671	1,671	100%	0.38
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	2,150	2,150	\$10,750	\$10,750	276,877	276,877	100%	59.65
1400106	LED INTERIOR > 10W AND < 50W	Lighting	EACH	1,848	1,848	\$9,240	\$9,240	237,985	237,985	100%	51.27
	LED EXTERIOR < 100W	Lighting	EACH	18	18	\$180	\$180	7,569	7,569	100%	0.00
	OCCUPANCY SENSOR - GENERAL	Lighting	WATT	8,817	8,817	\$353	\$353	10,140	10,140	100%	1.16
1400109	UNITARY AIR CONDITIONING <65,000 BTUH (M	HVAC	TON	2	2	\$50	\$38	286	215	75%	0.09
	GROUND SOURCE HEAT PUMP OPEN LOOP <135,0	HVAC	TON	115	115	\$2,300	\$2,300	34,085	34,085	100%	14.67
	ROOFTOP HEAT PUMP ≥65,000 BTU & <135,000	HVAC	TON	10	10	\$300	\$288	354	340	96%	0.20
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	1,847	1,847	\$9,235	\$9,235	237,857	237,857	100%	51.24
	LED EXTERIOR < 100W	Lighting	EACH	20	20	\$200	\$200	8,410	8,410	100%	0.00
	OCCUPANCY SENSOR - GENERAL	Lighting	WATT	10,097	10,097	\$404	\$404	11,612	11,612	100%	1.32

Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
	40 HP MOTORS	Motor	HP	40	0	\$240	\$0	1,096	0	0%	0.00
	20 HP MOTORS	Motor	HP	20	40	\$120	\$240	743	1,485	200%	0.45
1410117	CHILLER	HVAC	TON	284	284	\$7,384	\$7,384	46,141	46,141	100%	22.29
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	841	841	\$4,205	\$4,205	108,304	108,304	100%	23.33
	20 HP PUMPS	Pump	EACH	2	2	\$600	\$600	8,979	8,979	100%	3.01
	3 HP VFDS	VFD	HP	12	12	\$288	\$288	5,666	5,666	100%	1.48
	20 HP VFDS	VFD	HP	40	40	\$960	\$960	18,532	18,532	100%	4.49
	50 HP VFDS	VFD	HP	100	100	\$2,400	\$2,400	63,863	63,863	100%	11.36
	1420123	LED EXTERIOR >= 100W	Lighting	EACH	26	26	\$780	\$780	23,915	23,915	100%
1430124	LED INTERIOR < = 10W	Lighting	EACH	1,726	1,619	\$3,452	\$3,238	288,484	270,600	94%	62.30
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	8,692	8,801	\$43,460	\$44,005	1,119,356	1,133,393	101%	244.17
	LED EXTERIOR < 100W	Lighting	EACH	14	12	\$140	\$120	5,887	5,046	86%	0.00
1450128	LED EXTERIOR >= 100W	Lighting	EACH	8	8	\$240	\$240	7,358	7,358	100%	0.00
1450129	LED EXTERIOR >= 100W	Lighting	EACH	2	2	\$60	\$60	1,840	1,840	100%	0.00
1450130	LED EXTERIOR >= 100W	Lighting	EACH	5	5	\$150	\$150	4,599	4,599	100%	0.00
1450131	CFL - REPLACE INCANDESCENT WITH CFL	Lighting	EACH	9,008	9,008	\$18,016	\$18,016	1,186,894	1,186,894	100%	260.44
	LED INTERIOR < = 10W	Lighting	EACH	24	24	\$48	\$48	4,011	4,011	100%	0.92
	LED EXIT SIGNS (REPLACEMENT)	Lighting	EACH	52	52	\$364	\$364	15,824	15,824	100%	2.45
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	8,829	8,829	\$44,145	\$44,145	1,136,999	1,136,999	100%	244.95
	LED EXTERIOR >= 100W	Lighting	EACH	2	2	\$60	\$60	1,840	1,840	100%	0.00

Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
	RELAMP T8 FIXTURES WITH LOW WATT T8 LAMP	Lighting	EACH	931	931	\$372	\$372	16,106	16,106	100%	3.97
	T8 4 FT 2 LAMP	Lighting	EACH	40	40	\$160	\$160	0	1,611	#DIV/0!	0.41
	T8 4 FT 3 LAMP	Lighting	EACH	45	45	\$270	\$180	0	3,104	#DIV/0!	0.77
	T8 4 FT 4 LAMP	Lighting	EACH	51	51	\$408	\$357	0	3,057	#DIV/0!	0.73
1450140	CFL - REPLACE INCANDESCENT WITH CFL	Lighting	EACH	329	329	\$658	\$658	43,349	43,349	100%	9.51
	LED INTERIOR < = 10W	Lighting	EACH	20	20	\$40	\$40	3,343	3,343	100%	0.77
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	2,146	2,146	\$10,730	\$10,730	276,362	276,362	100%	59.54
	LED EXTERIOR < 100W	Lighting	EACH	2	2	\$20	\$20	841	841	100%	0.00
	LED EXTERIOR >= 100W	Lighting	EACH	1	1	\$30	\$30	920	920	100%	0.00
	RELAMP T8 FIXTURES WITH LOW WATT T8 LAMP	Lighting	EACH	80	80	\$32	\$32	1,384	1,384	100%	0.34
	T8 4 FT 3 LAMP	Lighting	EACH	5	5	\$30	\$30	0	0	#DIV/0!	0.00
	1450147	LED INTERIOR > 10W AND < 50W	Lighting	EACH	3,504	3,504	\$17,520	\$17,520	451,245	451,245	100%
1460148	40 HP VFDS	VFD	HP	120	120	\$2,880	\$2,880	61,238	61,238	100%	14.14
	30 HP VFDS	VFD	HP	30	30	\$720	\$720	13,658	13,658	100%	3.56
	25 HP VFDS	VFD	HP	100	100	\$2,400	\$2,400	45,845	45,845	100%	12.24
	20 HP VFDS	VFD	HP	280	280	\$6,720	\$6,720	129,724	129,724	100%	31.41
	15 HP VFDS	VFD	HP	150	150	\$3,600	\$3,600	72,899	72,899	100%	17.43
	10 HP VFDS	VFD	HP	50	50	\$1,200	\$1,200	23,221	23,221	100%	5.62
	7.5 HP VFDS	VFD	HP	98	98	\$2,352	\$2,340	47,965	47,720	99%	11.41
	5 HP VFDS	VFD	HP	30	30	\$720	\$720	12,979	12,979	100%	3.64
	3 HP VFDS	VFD	HP	33	33	\$792	\$792	15,582	15,582	100%	4.08
	2 HP VFDS	VFD	HP	24	24	\$576	\$576	14,586	14,586	100%	3.19

Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
	1.5 HP VFDS	VFD	HP	12	12	\$288	\$288	7,194	7,194	100%	1.50
	1 HP VFDS	VFD	HP	1	1	\$24	\$18	485	364	75%	0.09
1460160	LED INTERIOR > 10W AND < 50W	Lighting	EACH	42	42	\$210	\$210	5,409	5,409	100%	1.17
	ROOFTOP AIR CONDITIONING ≥65,000 BTU & <	HVAC	TON	10	10	\$300	\$300	564	564	100%	0.37
1460162	LED EXTERIOR < 100W	Lighting	EACH	2	2	\$20	\$20	841	841	100%	0.00
1460164	LED INTERIOR > 10W AND < 50W	Lighting	EACH	690	690	\$3,450	\$3,450	88,858	88,858	100%	19.14
	OCCUPANCY SENSOR - GENERAL	Lighting	WATT	6,263	6,263	\$251	\$251	7,202	7,202	100%	0.82
	CHILLER	HVAC	TON	78	78	\$2,028	\$2,028	12,673	12,673	100%	6.12
	LED INTERIOR < = 10W	Lighting	EACH	1	1	\$2	\$2	167	167	100%	0.04
	LED EXIT SIGNS (REPLACEMENT)	Lighting	EACH	15	15	\$105	\$105	4,565	4,565	100%	0.71
1460169	LED INTERIOR < = 10W	Lighting	EACH	12	12	\$24	\$24	2,006	2,006	100%	0.46
	LED EXIT SIGNS (REPLACEMENT)	Lighting	EACH	8	8	\$56	\$56	2,434	2,434	100%	0.38
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	1,852	1,852	\$9,260	\$9,260	238,501	238,501	100%	51.38
	LED INTERIOR ≥= 50W	Lighting	EACH	171	171	\$1,710	\$1,710	35,628	35,628	100%	7.58
	LED EXTERIOR < 100W	Lighting	EACH	20	20	\$200	\$200	8,410	8,410	100%	0.00
	LED EXTERIOR ≥= 100W	Lighting	EACH	16	16	\$480	\$480	14,717	14,717	100%	0.00
	OCCUPANCY SENSOR - GENERAL	Lighting	WATT	8,804	8,804	\$352	\$352	10,125	10,125	100%	1.15
1460176	UNITARY HEAT PUMP ≥65,000 BTU & <135,000	HVAC	TON	20	20	\$600	\$600	708	708	100%	0.41

Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
	UNITARY HEAT PUMP ≥135,000 BTU & <240,00	HVAC	TON	13	13	\$390	\$390	597	597	100%	0.22
	UNITARY HEAT PUMP <65,000 BTUH (MIN. EFF	HVAC	TON	21	21	\$525	\$525	3,595	3,595	100%	1.11
	LED INTERIOR < = 10W	Lighting	EACH	9	9	\$18	\$18	1,504	1,504	100%	0.35
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	488	488	\$2,440	\$2,440	62,845	62,845	100%	13.54
	LED EXTERIOR < 100W	Lighting	EACH	205	205	\$2,050	\$2,050	86,198	86,198	100%	0.00
	LED EXTERIOR ≥ 100W	Lighting	EACH	36	36	\$1,080	\$1,080	33,113	33,113	100%	0.00
	POLE LIGHT REPLACED LIGHT ≥ 750W	Lighting	EACH	20	20	\$1,760	\$1,760	36,529	36,529	100%	0.00
	OCCUPANCY SENSOR - GENERAL	Lighting	WATT	3,385	3,385	\$135	\$135	3,893	3,893	100%	0.44
1460186	LED INTERIOR > 10W AND < 50W	Lighting	EACH	4,550	4,550	\$22,750	\$22,750	585,949	585,949	100%	126.24
1470187	LED INTERIOR > 10W AND < 50W	Lighting	EACH	861	861	\$4,305	\$4,305	110,880	110,880	100%	23.89
1480188	LED INTERIOR < = 10W	Lighting	EACH	94	94	\$188	\$188	15,711	15,711	100%	3.62
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	142	142	\$710	\$710	18,287	18,287	100%	3.94
	LED INTERIOR ≥ 50W	Lighting	EACH	48	48	\$480	\$480	10,001	10,001	100%	2.13
	LED EXTERIOR < 100W	Lighting	EACH	5	5	\$50	\$50	2,102	2,102	100%	0.00
	POLE LIGHT REPLACED LIGHT > 300W AND < 7	Lighting	EACH	20	20	\$600	\$600	14,454	14,454	100%	0.00
	POLE LIGHT REPLACED LIGHT ≥ 750W	Lighting	EACH	73	73	\$6,424	\$6,424	133,332	133,332	100%	0.00



Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
1480194	CFL - REPLACE INCANDESCENT WITH CFL	Lighting	EACH	2	2	\$4	\$4	264	264	100%	0.06
	LED INTERIOR <= 10W	Lighting	EACH	5	5	\$10	\$10	836	836	100%	0.19
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	2,830	2,830	\$14,150	\$14,150	364,447	364,447	100%	78.52
	LED EXTERIOR < 100W	Lighting	EACH	2	2	\$20	\$20	841	841	100%	0.00
	RELAMP T8 FIXTURES WITH LOW WATT T8 LAMP	Lighting	EACH	900	0	\$360	\$0	15,570	0	0%	0.00
	T5 HO 4 LAMP REPLACING T12	Lighting	EACH	32	8	\$384	\$96	-11,087	-2,772	25%	-0.61
	T8 4 FT 2 LAMP	Lighting	EACH	2	2	\$8	\$8	0	0	#DIV/0!	0.00
	T8 4 FT 3 LAMP	Lighting	EACH	59	59	\$354	\$354	0	0	#DIV/0!	0.00
	T8 4 FT 4 LAMP	Lighting	EACH	21	21	\$168	\$168	0	0	#DIV/0!	0.00
	T8 HIGH-BAY 4 FT 6 LAMP	Lighting	EACH	10	10	\$310	\$310	5,487	5,487	100%	1.17
1480204	5 HP VFDS	VFD	HP	95	16	\$1,520	\$1,520	41,100	41,100	100%	11.54
1480205	WATER COOLED CHILLER, >300 TONS	HVAC	TON	1,978	2	\$51,428	\$71,396	182,807	253,785	139%	106.49
	LED EXIT SIGNS (REPLACEMENT)	Lighting	EACH	6	5	\$42	\$42	1,826	1,522	83%	0.24
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	46	46	\$230	\$230	5,924	5,924	100%	1.28
	LED INTERIOR >= 50W	Lighting	EACH	20	20	\$200	\$200	4,167	4,167	100%	0.89
	LED EXTERIOR < 100W	Lighting	EACH	10	10	\$100	\$100	4,205	4,205	100%	0.00
	150 HP MOTORS	Motor	HP	450	3	\$2,700	\$2,700	12,681	12,681	100%	1.61
	250 HP MOTORS	Motor	HP	750	3	\$4,500	\$4,500	21,135	21,135	100%	2.69
	100 HP MOTORS	Motor	HP	400	4	\$2,400	\$2,400	10,964	10,964	100%	2.72
100 HP VFDS	VFD	HP	400	4	\$9,600	\$9,600	255,452	255,452	100%	45.46	

Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
	150 HP VFDS	VFD	HP	450	3	\$10,800	\$10,800	287,384	287,384	100%	51.14
	250 HP VFDS	VFD	HP	750	3	\$18,000	\$18,000	478,973	478,973	100%	85.23
1490216	LED INTERIOR > 10W AND < 50W	Lighting	EACH	1,920	1,770	\$9,600	\$8,850	247,258	227,941	92%	49.11
1490217	ROOFTOP AIR CONDITIONING ≥65,000 BTU & <	HVAC	TON	8	1	\$240	\$225	451	423	94%	0.27
1490218	7.5 HP PUMPS	Pump	EACH	15	2	\$1,800	\$1,800	24,004	24,004	100%	6.74
	10 HP VFDS	VFD	HP	10	1	\$240	\$240	4,644	4,644	100%	1.12
	7.5 HP VFDS	VFD	HP	15	2	\$360	\$360	7,342	7,342	100%	1.76
	30 HP VFDS	VFD	HP	30	1	\$720	\$720	13,658	13,658	100%	0.00
1500222	LED EXIT SIGNS (REPLACEMENT)	Lighting	EACH	12	12	\$120	\$120	3,652	3,652	100%	0.57
1500224	ROOFTOP AIR CONDITIONING <65,000 BTUH (M	HVAC	TON	5	1	\$125	\$125	716	716	100%	0.29
	ROOFTOP AIR CONDITIONING ≥65,000 BTU & <	HVAC	TON	10	1	\$300	\$295	564	555	98%	0.36
1500226	LED INTERIOR > 10W AND < 50W	Lighting	EACH	164	164	\$820	\$820	21,120	21,120	100%	4.55
1510227	LED INTERIOR > 10W AND < 50W	Lighting	EACH	2,634	2,622	\$13,170	\$13,110	339,207	337,661	100%	72.74
1520228	CFL - REPLACE INCANDESCENT WITH CFL	Lighting	EACH	15	15	\$60	\$60	1,976	1,976	100%	15.00
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	5	5	\$25	\$25	644	644	100%	5.00
1520231	LED INTERIOR > 10W AND < 50W	Lighting	EACH	36	36	\$180	\$180	4,636	4,636	100%	1.00
1520233	LED INTERIOR > 10W AND < 50W	Lighting	EACH	27	27	\$135	\$135	3,477	3,477	100%	0.75
1530236	LED EXIT SIGNS (REPLACEMENT)	Lighting	EACH	7	7	\$70	\$70	2,130	2,130	100%	0.33

Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
	UNITARY AIR CONDITIONING <65,000 BTUH (M	HVAC	TON	3	3	\$9	\$9	430	514	120%	0.16
1530238	LED INTERIOR > 10W AND < 50W	Lighting	EACH	123	123	\$615	\$647	15,840	17,007	107%	3.30
1530239	LED INTERIOR > 10W AND < 50W	Lighting	EACH	122	122	\$610	\$610	15,711	15,711	100%	3.38
	LED INTERIOR >= 50W	Lighting	EACH	4,366	4,366	\$26,196	\$26,196	909,656	909,656	100%	193.64
1530241	LED INTERIOR < = 10W	Lighting	EACH	36	70	\$180	\$350	6,017	11,700	194%	2.69
	LED INTERIOR > 10W AND < 50W	Lighting	EACH	809	775	\$4,045	\$3,875	104,183	99,805	96%	21.50
1530243	LED EXIT SIGNS (REPLACEMENT)	Lighting	EACH	2	2	\$20	\$20	609	609	100%	0.09
1530244	LED EXTERIOR < 100W	Lighting	EACH	30	30	\$390	\$390	12,614	12,614	100%	0.00
	LED EXTERIOR >= 100W	Lighting	EACH	10	10	\$280	\$280	9,198	9,198	100%	0.00
1540246	LED INTERIOR > 10W AND < 50W	Lighting	EACH	33	33	\$165	\$165	4,250	4,250	100%	0.92

**APPENDIX B: CUSTOM MEASURE-LEVEL DESK REVIEW RESULTS**

Evaluation ID	VRM	VRM Type	Unit of Measure	Tracked Quantity	Evaluated Quantity	Tracked Rebate	Evaluated Rebate	Calculated Claimed Savings kWh	Evaluated Savings kWh	kWh RR	Evaluated Calculation Peak kW Savings
1310100	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	EACH	7,198	7,280	\$7,199	\$7,280	239,933	637,746	266%	72.80
1450127	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	EACH	12,232	12,232	\$12,232	\$12,232	NA	0	NA	122.32
1460162	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	EACH	247	254	\$247	\$254	8,233	7,253	88%	2.54
1460176	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	EACH	7,400	200	\$7,400	\$200	NA	0	NA	2.00
1500222	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	KWH	24,283	25,020	\$728	\$751	24,283	25,020	103%	5.71
1520230	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	KWH	36,941	36,941	\$1,108	\$1,071	36,941	36,941	100%	14.21
1520231	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	KWH	12,641	13,083	\$379	\$392	12,641	13,083	103%	5.92
1520233	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	KWH	14,034	14,034	\$421	\$421	14,034	14,034	100%	2.75
1520235	OTHER ENERGY EFFICIENCY IMPLEMENTATION N	Custom	KWH	399,567	379,875	\$11,987	\$11,396	399,567	379,875	95%	86.97

**APPENDIX C: NEW CONSTRUCTION PROJECTS RESULTS**

**Table C-1. New Construction Buildings Analyzed**

Building Number	Facility Type	Evaluated Percent Savings over Code	Modeled Consumption (kWh)	Modeled Baseline (kWh)	Calculated Savings (kWh)	Building Interior Area (SF)	Interior Lighting	Exterior Lighting	HVAC	Envelope
<b>Buildings Under 25,000 Square Feet</b>										
10	Retail	20.9%	58,400	73,830	15,430	6,431	x	x	x	
11	School (pre-K)	7.2%	79,974	86,180	6,206	6,800	x	x		
12	Retail	29.1%	70,634	99,652	29,019	7,489	x	x		
13	Retail	38.3%	69,392	112,518	43,126	7,500	x	x	x	x
14	Retail	27.5%	71,312	98,422	27,111	7,500	x			
15	Religious	33.5%	46,657	70,204	23,547	9,500	x	x	x	
16	Museum	17.5%	104,899	127,141	22,243	18,065	x	x		
17	Kennel	58.9%	28,691	69,871	41,180	18,988	x	x	x	
18	Religious	18.7%	139,249	171,215	31,966	22,182	x	x	x	
19	Retail	15.5%	351,102	415,718	64,616	24,414	x		x	
<b>High Energy Intensity Buildings Under 25,000 Square Feet</b>										
20	Restaurant	16.7%	134,803	161,735	26,932	7,163	x	x	x	
21	Grocery	14.3%	391,978	457,609	65,631	18,042	x	x	x	
22	Grocery	16.0%	397,008	472,510	75,503	18,154	x	x	x	
23	Grocery	17.4%	462,944	560,358	97,414	24,241	x	x	x	x
51	Restaurant	4.9%	231,241	243,186	11,944	3,520	x		x	

Building Number	Facility Type	Evaluated Percent Savings over Code	Modeled Consumption (kWh)	Modeled Baseline (kWh)	Calculated Savings (kWh)	Building Interior Area (SF)	Interior Lighting	Exterior Lighting	HVAC	Envelope
<b>Buildings Over 25,000 Square Feet</b>										
31	Gym	12.4%	534,115	609,467	75,352	30,014	x	x	x	
30	Office	38.0%	103,117	166,242	63,125	31,020	x	x	x	
33	Laboratory	5.8%	1,895,910	2,013,561	117,651	60,764	x	x	x	
32	Warehouse	49.9%	463,116	925,123	462,007	69,651	x	x	x	
<b>Buildings Over 25,000 Square Feet with an Energy Model</b>										
41	Office	51.0%	586,908	1,197,438	610,530	38,035	x	x	x	
40	Library	24.5%	342,832	453,824	110,992	120,043	x		x	
42	Warehouse	34.7%	3,170,935	4,854,427	1,683,492	303,458	x	x	x	

**Table C-2. Buildings Removed from Analysis Due to Unknown Baseline**

Building Number	Facility Type	Evaluated Percent Savings over Code	Modeled Consumption (kWh)	Modeled Baseline (kWh)	Calculated Savings (kWh)	Building Interior Area (SF)	Interior Lighting	Exterior Lighting	HVAC	Envelope
50	Retail	Unknown – meter appears to include other facilities or areas			31,799	9,100	x			
52	Museum	Unknown – project was an addition and partial renovation to metered facility			218,760	64,250	x	x	x	
53	Warehouse	Unknown – meter shows very high energy intensity for non-refrigerated warehouse			111,066	200,500	x	x	x	
54	University	Unknown – meter is for large part of University, not just the new building			115,643	106,000	x	x		

## APPENDIX D: PARTICIPANT SURVEY

### LG&E and KU Commercial Rebates Program Participant Survey Process, Impact, and Attribution

#### Variable List

This survey will be used to assess process issues, verify measure receipt and installation, and assess program attribution for the Commercial Rebate Program. If a participant installed more than one measure type, we will sample only one measure for the survey to limit the length of the effort.

<b>CASEID</b>	Unique case identifier
<b>UTILITY</b>	Utility of the participating customer (LG and E, K U)
<b>CONTACT_NAME</b>	Customer Contact Name
<b>COMPANY</b>	Business/Facility Name
<b>Date</b>	Date of participation
<b>ADDRESS</b>	Service address where measure was installed
<b>CITY</b>	Service city where measure was installed
<b>MeasCat</b>	End-use Category (i.e., lighting)
<b>MeasList</b>	Detailed description of first through eight measure installed
<b>Incentiv</b>	Total incentive/rebate from program
<b>ProgType</b>	Type of project (Custom or Prescriptive)
<b>Cost</b>	Total cost of the equipment ( <b>SET TO 88</b> )
<b>QtyFlag1</b>	Quantity of equipment applies 0     Quantity is not applicable (new construction) 1     Quantity applies (equipment)
<b>EffFlag1</b>	Efficiency of equipment applies 0     Efficiency is not applicable for this measure category (e.g., insulation, VFD, delamping, recycling, occupancy sensors) 1     Efficiency is applicable
<b>OPERFLAG1</b>	Flag is the equipment installed is operational 0     Equipment does not operate (i.e., insulation, recycling) 1     Equipment operates (i.e., lighting, motors)



**NCFLAG1** Flag indication MeasCat is New Construction  
0 MeasCat is not New Construction  
1 MeasCat is New Construction

**Audit** Flag for customers who received a rebate for an audit  
0 Did not receive an audit rebate  
1 Received an audit rebate

**ACCOUNT\_NUM**

*NOTE:  
For all questions, "DON'T KNOW" and "REFUSED" will be coded if offered as a response. Interviewers will probe as needed to minimize the amount of missing data.*

**Introduction**

**INT01** Hello, my name is [INTERVIEWER], and I'm calling on behalf of <UTILITY> regarding your firm's participation in their Commercial Rebates program. May I please speak with [CONTACT] or the person most involved in the decision to purchase the <MeasCat> equipment through the Commercial Rebates program?

- 01 Yes
- 02 No **[ATTEMPT TO CONVERT]**

**PREAMBLE** I'm with Tetra Tech, an independent research firm. On behalf of <UTILITY>, we are following up with customers who participated in an energy efficiency program in 2018 to learn about their experiences. I'm not selling anything, I'd just like to ask about the energy efficiency project you implemented through this program at <ADDRESS> in <CITY>. Your individual responses will be kept confidential. Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored.

- 01 Continue

**I1** And to confirm, are you the person who was most involved in making the decision to [IF INCENTIV>0 INSERT "get incentives" ELSE INSERT "participate"] through the Commercial Rebates program in <DATE> at <ADDRESS> in <CITY>?

- 01 Yes **[SKIP TO CELL1]**
- 02 No
- 88 Don't know
- 99 Refused **[THANK AND CODE AS REFUSAL 91]**

**OTHER\_R** Is there someone else in your firm who would be more knowledgeable about your participation in [UTILITY]'s Commercial Rebates program?

- 01 Yes, there's someone else [RECORD CONTACT INFO]
- 02 No [THANK AND CODE AS INELIGIBLE 81]
- 88 Don't know [THANK AND CODE AS INELIGIBLE 81]
- 99 Refused [THANK AND CODE AS REFUSAL 91]

**AVAILABLE\_R** May I speak with that person?

- 01 Yes, Currently available [SKIP TO INT01]
- 02 Yes, but R is not currently available [SET UP CALLBACK]
- 03 No [THANK AND CODE AS REFUSAL 91]
- 88 Don't know [THANK AND CODE AS INELIGIBLE 81]
- 99 Refused [THANK AND CODE AS REFUSAL 91]

**CELL1** First, have I reached you on your cell phone?

- 01 Yes
- 02 No [SKIP TO I2]
- 99 Refused [SKIP TO I2]

**CELL2** Then I would just like to confirm that you are in a location where it is safe to talk to you on your cell phone.  
[NOTE: We want to be sure the respondent is not talking on their cell phone while driving a car.]

- 01 Yes, it is okay to continue conversation
- 02 No [SCHEDULE A TIME TO CALLBACK AND TERMINATE]

**I2** Are you employed by [COMPANY] or are you a contractor who provides design and/or installation services for [COMPANY]?

[INTERVIEWER NOTE: CODE UNPAID MEMBERS OF AN ADVISORY BOARD OR COMMITTEE AS EMPLOYEES]

- 01 Work directly for company / Employee / Volunteer
- 02 Vendor / Contractor [THANK AND TERMINATE 86]

**FAQ** READ FOLLOWING ONLY AS NEEDED:

**(Sales concern:** I am not selling anything; I simply want to understand what factors were important to your company when deciding to implement this new energy efficiency project and receive an incentive through this program. Your responses will be kept confidential by our firm. If you would like to talk with someone from <UTILITY> to verify this survey is being conducted on their behalf, you can call at 1-800-356-5467.)

**(Who is doing this study:** <UTILITY> has hired our firm to evaluate the program. As part of the evaluation, we're talking with customers that participated in the program to better understand their experiences with the program.)

**(Why are you conducting this study:** Studies like this help <UTILITY> better understand customers' need for and interest in energy efficiency programs and services, and to improve the effectiveness of their programs.)

**(Timing:** This survey should take about 20 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALLBACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070.)

**Employment and Previous Surveys**

**A1** Do you or anyone at your organization currently work for LG&E or KU?

- 01 Yes [SKIP TO ENDCALL]
- 02 No
- 88 Don't know [SKIP TO ENDCALL]

**A2** Have you completed a survey for <UTILITY> related to service for this organization in the past three months?

- 01 Yes [SKIP TO APOLOGY]
- 02 No
- 88 Don't know [SKIP TO ENDCALL]

**Program Awareness**

**P1** How did you learn about the Commercial Rebates program? [DO NOT READ; SELECT ALL THAT APPLY]

From LG&E or KU

- 01 LG&E or KU bill insert
- 02 LG&E or KU website
- 03 LG&E or KU brochure
- 04 LG&E or KU call center representative
- 05 LG&E or KU key account manager
- 06 Another LG&E or KU program

From other source

- 07 Retail store
- 08 Equipment vendor, contractor, grant writer, or other professional
- 09 Home show/conference/trade show
- 10 Newspaper
- 11 Radio
- 12 Television
- 13 Billboard
- 14 Friend/family member/other business
- 15 Other (SPECIFY)
- 88 Don't know / Don't remember

**Communication of Program Information**

<UTILITY> would like to know how clear the program information provided to you was. For the following questions, using a scale of 1 to 5, where 1 means "not at all clear" and 5 means "very clear," how clear were each of the following?

[PROGRAMMING NOTE: randomized a to d]

- PI1a** The information on how to request an application for <UTILITY>'s Commercial Rebates program?
- PI1b** The information on what to expect during the application process?
- PI1c** The supporting documentation and information you needed to provide to receive the rebate?
- PI1d** The information about how to follow up if you had questions or concerns?

- [ALLOW 1-5]
- 88 Don't know
- 99 Refused

**[IF PI1a = 1 OR 2 OR PI1b = 1 OR 2 OR PI1c = 1 OR 2 OR PI1d = 1 OR 2 THEN ASK]**

**PI5a** Why did you give the program information a rating of 1 or a 2?

[RECORD RESPONSE VERBATIM]

**PI8** Do you have an account manager assigned to your business? [SELECT ONE]

- 01 Yes
- 02 No [SKIP TO RP1]
- 88 Don't know [SKIP TO RP1]
- 99 Refused [SKIP TO RP1]

**PI9** Did your <UTILITY> account manager provide you with information on <UTILITY>'s energy efficiency programs? [SELECT ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

#### Rebate Processes

The next series of questions ask about the rebate process.

**RP1** Who filled out or completed your request for the utility rebate application? [DO NOT READ; SELECT ALL THAT APPLY]

- 01 Respondent (self)
- 02 Auditor
- 03 Vendor/contractor
- 04 LG&E or KU account manager
- 05 LG&E or KU call center representative
- 06 Other LG&E or KU staff
- 07 Other (SPECIFY)
- 08 Have not yet applied for an incentive [SKIP TO RP5]
- 88 Don't know / Don't remember [SKIP TO RP5]

[IF RP1 <> 01 Respondent (self) THEN SKIP TO RP5]

**RP2** How long did it take you to provide the supporting documentation and complete the rebate application? (SELECT ONE; READ LIST ONLY AS NEEDED)

- 01 Less than 30 minutes
- 02 30 minutes to less than an hour
- 03 1 hour
- 04 2 hours
- 05 3 hours
- 06 4 hours
- 07 More than 4 hours
- 08 Other response (SPECIFY)
- 88 Don't know / Don't remember **[SKIP TO RP3]**
- 99 Refused **[SKIP TO RP3]**

**RP2a** Was this length of time acceptable to you? [SELECT ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

**RP3** Using a scale of 1 to 5 where 1 means "not at all difficult" and 5 means "very difficult," how difficult was it to complete the request and provide the supporting documentation for the incentive application.

- \_\_\_\_\_ **[ALLOW 1-5]**
- 88 Don't know
- 99 Refused

**[IF RP3 = 1 THEN ASK]**

**RP4L** Why do you say that?

[RECORD VERBATIM]

**[IF RP3 = 4 OR 5 THEN ASK]**

**RP4H** Why do you say that?

[RECORD VERBATIM]

**RP5** After completing the project, did someone come to your site to confirm the equipment you installed? [SELECT ONE]

- 01 Yes
- 02 No [SKIP TO R1c]
- 03 Project has not been completed [SKIP TO R1c]
- 88 Don't know [SKIP TO R1c]
- 99 Refused [SKIP TO R1c]

**RP6** Using a scale of 1 to 10 where 1 means "not satisfied at all" and 10 means "completely satisfied," how satisfied are you with the following aspects of the site visit?

[PROGRAMMING NOTE: randomized a to c]

- RP6a** The courtesy of the person who came to your organization?
- RP6b** The punctuality of the person who came to your organization?
- RP6c** The convenience of the site visit time?

- \_\_\_ [ALLOW 1-10]
- 88 Don't know
- 99 Refused

[IF RP6a-c = 1 OR 2 OR 3 THEN ASK]

**RP9** Why did you give the inspection process those ratings?

[RECORD VERBATIM]

### Installation and Decision Making

[if Meascat = "new construction" (NCFLAG1=1) skip to PA2\_intro]

**R1c** Next, I'd like to focus on the <MeasCat> equipment you implemented through the Commercial Rebate program. [IF MEASLIST IS NOT BLANK SHOW "The <MeasCat> equipment consisted of <MeasList>."]

Is this <MeasCat> equipment still installed [IF EQUIPMENT IS OPERATIONAL (OPERFLAG1=1), INSERT "and operating"] at this facility? [SELECT ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

**R1d** [ASK IF R1c=02] Why is the <MeasCat> equipment no longer installed [IF EQUIPMENT IS OPERATIONAL (OPERFLAG1=1), INSERT "or no longer operating"] at this facility?

[RECORD VERBATIM RESPONSE]

**PA2b1** What was the age of your previous equipment?

\_\_\_\_\_ Years [ALLOW 1-200]

888 Don't know

999 Refused

**PA2b2** Was the previous equipment broken beyond repair? [SELECT ONE]

01 Yes

02 No

88 Don't know

99 Refused

### Reasons for Participation

**PA2\_intro** I'm going to read a list of reasons your organization might have had for participating in the <UTILITY> Commercial Rebates program. Please let me know with a yes or no whether each of the following reasons factored into your decision. [SELECT ONE FOR EACH]

[RANDOMIZE QUESTIONS]

**PA2a** The payback or return on investment.

**PA2b** Your contractor, equipment supplier, or design consultant suggested the program opportunity.

**PA2c** You were following recommendations from a previous energy audit.

**PA2d** You wanted to save energy and money.

01 Yes

02 No

88 Don't know

99 Refused

**PA2i** What other reasons, if any, did you have for participation?

01 No other reasons

02 [RECORD VERBATIM]

88 Don't know

99 Refused



**Attribution**

[if Meascat = "new construction" (NCFLAG1=1) skip to SAT2]

**[IF R1c <> 1 THEN SKIP TO S1a]**

**[FR1-FR14 will be asked if measure category recalled, still installed, and operating.]**

**FR1** Now, I'd like to ask you about your decision to implement the **<MeasCat>** equipment.

On a scale of 1 to 10, with 1 being "not at all likely" and 10 being "very likely," how likely is it that your business would have implemented the same **[IF QTYFLAG1=1, INSERT "quantity"] [IF QTYFLAG1=1 AND EFFFLAG1=1, INSERT "and"] [IF EFFFLAG1=1, INSERT " efficiency of"] <MeasCat>** equipment at that same time if the **<UTILITY>** Commercial Rebates program had not provided the rebate?

\_\_\_\_\_ **[ALLOW 1-10]**

88 Don't know

99 Refused

**FR5i** I'd like to go over all the assistance you received from **<UTILITY>** through this program. According to our records:

**[IF THE TOTAL COST FOR EQUIPEMENT IS GREATER THAN ZERO SHOW]**

**<UTILITY>** paid **[IF INCENTIV>0 INSERT "about \$<INCENTIV>" ELSE INSERT "a portion"]** of the total cost of the **[IF MEASURE HAS EFFICIENCY RATING (EFFFLAG1=1), INSERT "energy efficient"] <MeasCat>** equipment installed through this program.

**[IF THE TOTAL COST FOR EQUIPEMENT IS ZERO]**

**<UTILITY>** paid a portion of the total cost of the **[IF MEASURE HAS EFFICIENCY RATING (EFFFLAG1=1), INSERT "energy efficient"] <MeasCat>** equipment installed through the program.

[PRESS 1 TO CONTINUE]

**FR5** Would your business have installed any type of **<MeasCat>** equipment at the same time without the assistance from **<UTILITY>**?

01 Yes

02 No

88 Don't know

99 Refused

**FR7a** [SKIP IF QUANTITY<=1 (QtyFlag1=0)] Would your business have installed the exact same quantity of <MeasCat> equipment without the assistance from <UTILITY>?

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

**FR14** [SKIP IF efficiency does not apply (EFFFLAG1=0)] Would your business have installed the exact same high efficiency <MeasCat> equipment as what was installed through the program without the assistance from <UTILITY>?

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

**Like Spillover<sup>28</sup>**

**S1a** Now I'd like you to think of the time SINCE you participated in the Commercial Rebates program in [INSERT PARTICIPATION DATE].

Has your company installed any of the same <MeasCat> equipment for this or other facilities in Kentucky ON YOUR OWN, that is without an incentive from <UTILITY>? [SELECT ONE]

- 01 Yes
- 02 No [SKIP TO SAT2]
- 88 Don't know [SKIP TO SAT2]

**S3d** On a scale of 1 to 10, where 1 is "no influence at all" and 10 is "a great deal of influence," how much influence did your participation in the <UTILITY> program have on your decision to install this equipment without an incentive?

- \_\_\_ [ALLOW 1-10]
- 88 Don't know
- 99 Refused

<sup>28</sup> As these surveys are being conducted relatively soon after implementation, estimates of like and unlike spillover are likely to be limited as participants have not had adequate time to install additional equipment.

**S4a** Why didn't you install this <MeasCat> equipment through the <UTILITY> program? [DO NOT READ; SELECT ALL THAT APPLY]

- 01 Too much paperwork
- 02 Cost savings not worth the effort of applying
- 03 Takes too long for approval
- 04 The equipment would not qualify
- 05 Vendor does not participate in program
- 06 Outside LG&E/KU's service territory
- 07 No time - needed equipment immediately
- 08 Thought the program ended
- 09 Didn't know the equipment qualified under another program
- 10 Just didn't think of it
- 11 Unable to get an incentive - unsure why
- 12 Other (SPECIFY)
- 88 Don't know
- 99 Refused

**Program Satisfaction**

**SAT2** The next series of questions ask about your satisfaction with the program and <UTILITY>.

On a scale of 1 to 10 where 1 means "not satisfied at all" and 10 means "completely satisfied," how satisfied are you with the Commercial Rebates program overall?

- \_\_\_\_\_ **[ALLOW 1-10]**
- 88 Don't know
  - 99 Refused

**[IF SAT2=1,2,3,4,5 THEN ASK]**

**SAT2a** Why did you rate your satisfaction with the program that way?

[RECORD VERBATIM]

SAT1 On the same scale [IF NEEDED: of 1 to 10 where 1 means "not satisfied at all" and 10 means "completely satisfied,"] please tell us how satisfied you are with the following aspects of the program and equipment installed.

[RANDOMIZE OPTIONS]

**SAT1a** The equipment, measures, and services that are supported by <UTILITY>'s Commercial Rebate program.

**SAT1b** The incentive application process.

**SAT1c** The speed with which the incentive was paid.

**SAT1d** The amount of the incentive.

**SAT1e** The energy savings from the equipment or measures you installed.

\_\_\_\_\_ [ALLOW 1-10]

77 [FOR SAT1b only] Not involved in application process

88 Don't know

99 Refused

**SAT4** Have you recommended the Commercial Rebates program to others? [SELECT ONE]

01 Yes

02 No

88 Don't know

99 Refused

**SAT4aa** [IF SAT4 = 2, ASK] If given the opportunity, would you recommend the program to others?  
[SELECT ONE]

01 Yes

02 No

88 Don't know

99 Refused

[IF SAT4aa=2 THEN ASK]

**SAT4no** What is the main reason you would not recommend the program to others?

[RECORD VERBATIM]

[IF SAT4aa=88 THEN ASK]

**SAT4dk** What is the main reason you would not recommend the program to others?

[RECORD VERBATIM]

**SAT3** Would you say your opinion of <UTILITY> has improved, worsened, or not changed since your participation in this program?

- 01 Improved
- 02 Worsened
- 03 Has not changed
- 88 Don't know
- 99 Refused

**SAT6** [ASK IF SAT3=1,2] Why do you say that?

[RECORD VERBATIM]

### Final Process Assessment

**FA1** What would you say is the best thing about <UTILITY>'s Commercial Rebates program?

[RECORD VERBATIM]  
88 Don't know

**FA2** What would you say most needs to be changed about the program?

01 [RECORD VERBATIM]  
02 Nothing  
88 Don't know

**Customer Profile**

Lastly, we would like to learn a little more about your company and facility.

**F1a** What business activity accounts for most of the floor space covered by your <UTILITY> bill at <ADDRESS> in <CITY>? [DO NOT READ; SELECT ONE]

- 01 Office / Professional
- 02 Data center / Computer server farm
- 03 Warehouse or distribution center.
- 04 Food sales or service
- 05 Retail
- 06 Education
- 07 Religious worship
- 08 Public assembly
- 09 Health care
- 10 Service
- 11 Lodging
- 12 Public order and safety
- 13 Industrial / Manufacturing
- 14 Agricultural
- 15 Vacant
- 16 Municipal / Governmental
- 17 Other (SPECIFY IN DETAIL)
- 88 Don't know
- 99 Refused

**F1a\_indust** [ASK IF F1a=13] Please specify.

**F1a\_agric** [ASK IF F1a=14] Please specify.

**F1a\_vacant** [ASK IF F1a=15] Please specify.

**F2a** Which of the following best describes the ownership of this facility? [READ LIST; SELECT ONE]

- 01 The organization I work for owns and occupies this facility
- 02 The organization I work for owns this facility but it is rented to someone else
- 03 The organization I work for rents this facility
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**F4a** How old is this facility?

- \_\_\_ Age [ALLOW 0-200]
- 888 Don't know
- 999 Refused

**[IF F4a = Don't know THEN ASK]**

**F4b** Would you say the approximate age is...? [READ LIST UNTIL R ANSWERS; SELECT ONE]

- 01 Less than 2 years
- 02 2-4 years
- 03 5-9 years
- 04 10-19 years
- 05 20-29 years
- 06 30 years or more years
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**F5a** How many buildings are occupied by your firm at this location?

- \_\_\_\_ [ALLOW 1-100]
- 888 Don't know
- 999 Refused

**F6a** What's your best guess as to the size of this facility—that is, the approximate square footage of the space that is cooled or heated? **[IF F5a >1 and not 888, 999, INSERT "Please tell me the total for all of the buildings."]** Is it... [READ LIST UNTIL R ANSWER; SELECT ONE]

- 01 Under 5,000 sq. ft.
- 02 5,000 to just under 10,000 sq. ft.
- 03 10,000 to just under 25,000 sq. ft.
- 04 25,000 to just under 75,000 sq. ft.
- 05 75,000 sq. ft. or more
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**F8a** Excluding any seasonal employees, how many full-time and part-time are employed at this facility?

- F8a\_ft** \_\_\_\_ Number of full-time employees [ALLOW 0-2000]
- F8a\_pt** \_\_\_\_ Number of part-time employees [ALLOW 0-2000]
- 8888 Don't know
- 9999 Refused

**[IF F8a\_ft=8888 OR F8a\_ft=8888] THEN ASK]**

**F8b** Would you say the approximate number of total employees is...? [READ LIST UNTIL R ANSWERS; SELECT ONE]

- 01 Less than 10
- 02 10-49
- 03 50-99
- 04 100-249
- 05 250-499
- 06 500 or more
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**F9a** Which of the following BEST describes the facility? This facility is... [READ LIST; SELECT ONE]

- 01 the only location
- 02 one of several locations
- 03 the headquarters with several locations
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**F10a** Next I'd like to talk about the hours that your business is open.

Is the facility at this location open 24 hours per day, 7 days per week?

- 01 Yes [SKIP TO F10c]
- 02 No [SKIP TO F10c]
- 88 Don't know [SKIP TO F10c]
- 99 Refused [SKIP TO F10c]

**F10b** How many hours per week does your facility operate?

\_\_\_\_\_ Hours per week [ALLOW 0-168]

- 777 Enter per day calculator
- 888 Don't know
- 999 Refused

**F10c** Do you operate your facility differently depending on the season or production cycle?

- 01 Yes (SPECIFY)
- 02 No [SKIP TO F11b]
- 88 Don't know [SKIP TO F11b]
- 99 Refused [SKIP TO F11b]



**F10d** How many hours per week is your business open during the summer, that is, June to September?

- \_\_\_\_\_ Hours per week [ALLOW 0-168]
- 777 Enter per day calculator
- 888 Don't know
- 999 Refused

**F10e** How many hours per week is your business open during the winter, that is, December to February?

- \_\_\_\_\_ Hours per week [ALLOW 0-168]
- 777 Enter per day calculator
- 888 Don't know
- 999 Refused

**F11b** Does your **<MeasCat>** equipment have significantly different operating hours from your business' operating hours we just discussed? [SELECT ONE]

- 01 Yes [PROBE: What are the operating hours?]
- 02 No
- 88 Don't know
- 99 Refused

**F13a** What is the MAIN type of equipment used for cooling your facility? [READ LIST; SELECT ONE]

- 01 Residential-style air conditioner
- 02 Rooftop unit with compressor
- 03 Air cooled chiller
- 04 Water cooled chiller
- 05 Heat pump
- 06 Something else (SPECIFY)
- 07 [DO NOT READ] No cooling used
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**F13aa** [SKIP IF F13a=07] Is the space where your new **<MeasCat>** equipment located air conditioned? [SELECT ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

**Wrap up**

**F15\_title** We're almost done. Just a few final questions.

What is your title?

- 01 President / Owner / Co-owner
- 02 Office Manager
- 03 Facilities director / manager or plant engineer
- 04 CFO / CEO
- 05 Property manager
- 06 Secretary / Treasurer
- 07 Other [SPECIFY]
- 88 Don't know
- 99 Refused

**F15a** If needed, would it be alright if someone followed up with you if we have any additional questions? [SELECT ONE]

- 01 Yes
- 02 No [SKIP TO COM]
- 88 Don't know [SKIP TO COM]
- 99 Refused [SKIP TO COM]

**F15\_name** For verification purposes, would you spell your first and last name? [Contact name on file = <CONTACT\_NAME>]

[RECORD NAME]

**F15\_phone** And what's the best number to reach you at? [Phone number on file = <PHONE\_NUM>]

[RECORD PHONE NUMBER]

**COM** Do you have any comments or suggestions for the program?

- 01 Yes (SPECIFY)
- 02 No
- 88 Don't know
- 99 Refused

**INT99** Those are all the questions I have for you at this time. Thank you for your time with this important evaluation.

CP Completed on phone

## APPENDIX E: NONPARTICIPANT SURVEY

### LG&E and KU Nonresidential Nonparticipant Survey

#### Variable List

This survey will be administered to a sample of LG&E and KU nonresidential customers (excluding industrial customers).

<b>CASEID</b>	Unique case identifier
<b>UTILITY_FULL</b>	Utility of the participating customer
1	Louisville Gas and Electric Company
2	Kentucky Utilities Company
<b>UTILITY</b>	Utility of the participating customer
1	LG and E
2	Kentucky Utilities
<b>CONTACT_NAME</b>	Business Contact Name
<b>COMPANY</b>	Business/Facility name
<b>ADDRESS</b>	Business service address
<b>CITY</b>	Business service city
<b>CUST_TYPE</b>	Service provided to business by utility company
1	Electric
2	Gas
3	Both electric and gas

**Introduction**

**INT01** Hello, my name is [INTERVIEWER NAME], and I'm calling on behalf of <UTILITY>.

I'm not selling anything; I'm conducting research that will help <UTILITY> to serve its customers better.

May I speak with the person most familiar with purchasing and maintaining the energy-using equipment for <COMPANY> at <ADDRESS> in <CITY>?

[IF CONTACT IN SAMPLE] The contact person we have on file is <CONTACT\_NAME>.

01 Yes

02 No

[ATTEMPT TO CONVERT]

**PREAMBLE** I'm with Tetra Tech, an independent research firm. We've been hired by <UTILITY> to talk with some of their customers about the types of energy using equipment they have at their business and about programs that <UTILITY> is offering to business customers.

Let me assure you that your responses will be kept confidential and your individual responses will not be revealed to anyone.

Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored.

**FAQ** [SALES CONCERN: I am not selling anything; we would simply like to learn about your experience with high efficiency equipment and energy efficiency programs. Your responses will be kept confidential. If you would like to talk with someone from <UTILITY> to verify this survey is being conducted on their behalf, feel free to call 1-800-356-5467.

[WHO IS DOING THIS STUDY: <UTILITY> hired our firm to evaluate their nonresidential energy efficiency program. As part of the evaluation, we're talking with customers that chose not to participate in the program to understand their reasons for nonparticipation and gauge their awareness of the programs.]

[WHY ARE YOU CONDUCTING THIS STUDY: Studies like this help <UTILITY> better understand customers' need and interest in energy efficiency programs and services.]

[TIMING: This survey should take about 15 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALL BACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070.]

**CELL1** First, have I reached you on your cell phone?

- 01 Yes
- 02 No
- 99 Refused

**[IF CELL1=1 THEN ASK]**

**CELL2** Then I would just like to confirm that you are in a location where it is safe to talk to you on your cell phone

[NOTE: WE WANT TO BE SURE THE RESPONDENT IS NOT TALKING ON THEIR CELL PHONE WHILE DRIVING A CAR.]

- 01 Yes, it is okay to continue conversation
- 02 No **[SCHEDULE A TIME TO CALLBACK AND TERMINATE]**

**Employment and Previous Surveys**

**A1** Do you or anyone at your organization currently work for LG&E or KU?

- 01 Yes **[SKIP TO ENDCALL]**
- 02 No
- 88 Don't know **[SKIP TO ENDCALL]**

**A2** Have you completed a survey for <UTILITY> related to service for this organization in the past three months?

- 01 Yes **[SKIP TO APOLOGY]**
- 02 No
- 88 Don't know **[SKIP TO ENDCALL]**

**Identification of Decision-Maker**

**C1** Before getting started, are you the person who is most knowledgeable about the decision making process for purchasing new energy-using equipment for the location at <ADDRESS>?

- 01 Yes **[SKIP TO C3]**
- 02 No
- 88 Don't know
- 99 Refused **[TERMINATE]**

**OTHER\_R** Is there someone else at your business that would be more knowledgeable about your organization's decision-making processes related to maintaining existing equipment or purchasing new energy using equipment at this location?

- |    |                            |                             |
|----|----------------------------|-----------------------------|
| 01 | Yes, there's somebody else | [RECORD NAME /CONTACT INFO] |
| 02 | No                         | [TERMINATE]                 |
| 88 | Don't know                 | [TERMINATE]                 |
| 99 | Refused                    | [TERMINATE]                 |

**AVAILABLE\_R** May I speak with that person?

- |    |                                    |                      |
|----|------------------------------------|----------------------|
| 01 | Yes, currently available           | [BEGIN SURVEY AGAIN] |
| 02 | Yes, but R not currently available | [SCHEDULE CALLBACK]  |
| 03 | No                                 | [TERMINATE]          |
| 88 | Don't know                         | [TERMINATE]          |
| 99 | Refused                            | [TERMINATE]          |

**C3** What is your role or title within your organization? [READ IF NEEDED]

- |    |   |
|----|---|
| 01 | President / Owner / Co-owner                    |
| 02 | Office Manager                                  |
| 03 | Facilities director / manager or plant engineer |
| 04 | CFO / CEO                                       |
| 05 | Property manager                                |
| 06 | Secretary / Treasurer                           |
| 07 | Other [SPECIFY]                                 |
| 88 | Don't know                                      |
| 99 | Refused   |

### Screening Questions

**SCR1** To the best of your knowledge, has the business at <ADDRESS> ever participated in any of <UTILITY>'s energy efficiency programs?

- |    |            |
|----|------------|
| 01 | Yes        |
| 02 | No         |
| 88 | Don't know |
| 99 | Refused    |

[IF SCR1 = 1 THEN ASK]

**SCR2** Which programs did your organization participate in?  
[READ LIST, SELECT ALL THAT APPLY]

- 01 Commercial Rebate Program currently called the Business Rebates Program  
[TERMINATE 82]
- 02 Commercial Energy Analysis Program (no longer available) [TERMINATE 82]
- 03 Nonresidential Load Management Program also known as Demand Conservation  
[TERMINATE 82]
- 04 Any other programs? [SPECIFY] [TERMINATE 82]
- 05 [DO NOT READ] None of these [CONTINUE]
- 88 [DO NOT READ] Don't know [TERMINATE 82]

### Program Awareness

Next we would like to ask you a few questions about energy efficiency program awareness overall.

**PA1** Prior to today, were you aware that <UTILITY> offers its commercial and industrial customers programs that help organizations save energy? [SELECT ONE]

- 01 Yes
- 02 No [SKIP TO PA4]
- 88 Don't know [SKIP TO PA4]
- 99 Refused [SKIP TO PA4]

**PA2** What <UTILITY> programs are you aware of? [READ LIST, SELECT ALL THAT APPLY]

- 01 Business Rebate Program, formally Commercial Rebate Program
- 02 Load Management / Direct Load Control also known as Demand Conservation
- 03 Other programs [NO SPECIFIC PROGRAM NAMED]
- 04 Other [SPECIFY]

**PA2a** How did you learn about <UTILITY>'s energy efficiency programs? [DO NOT READ LIST, SELECT ALL THAT APPLY]

- 01 Information directly from <UTILITY>
- 02 Previous experience with a <UTILITY> program
- 03 <UTILITY> event
- 04 Key account manager
- 05 Trade expo / Conference
- 06 Equipment vendor / Contractor
- 07 Colleague at my company
- 08 Colleague at another company
- 09 Online resource / Internet / social media
- 10 Television ad
- 11 Radio ad
- 12 Newspaper / Magazine /Newsletter
- 13 Billboards
- 14 Word of mouth (friends, neighbor)
- 15 Other [SPECIFY]
- 88 Don't know
- 99 Refused

**PA4** What is the most effective method of providing you and your company with information about <UTILITY>'s energy efficiency programs in the future? [DO NOT READ LIST, SELECT ALL THAT APPLY]

- 01 Information directly from <UTILITY>
- 02 <UTILITY> event
- 03 Key account manager with <UTILITY>
- 04 Trade expo / Conference
- 05 Equipment vendor / Contractor
- 06 Colleague at my company or another company
- 07 Online resource
- 08 Mass advertising campaign
- 09 Newspaper / Magazine / Newsletter
- 10 Email
- 11 Hard copy mail
- 12 A phone call
- 13 Site visit
- 14 Other [SPECIFY]
- 88 Don't know
- 99 Refused

**PA4C070** [ASK IF PA4=07] What online resources?

- 01 [RECORD RESPONSE VERBATIUM]



**PA5** Has your business at <ADDRESS> replaced or upgraded equipment or made any other energy saving improvements over the past 12 months? [SELECT ONE]

- 01 Yes
- 02 No [SKIP TO PA10]
- 88 Don't know [SKIP TO PA10]
- 99 Refused [SKIP TO PA10]

**PA6** What types of equipment did your business replace or upgrade at this location? [DO NOT READ LIST, SELECT ALL THAT APPLY]

- 01 HVAC / Heating or Cooling systems
- 02 Water heating
- 03 Lighting
- 04 Controls
- 05 Refrigerator / Freezer / Ice machine
- 06 Oven / Fryer / Steam cooker
- 07 Motors / Drives
- 08 Clothes washer / Dryer
- 09 Shell / Insulation / Windows / Doors
- 10 Other [SPECIFY]
- 88 Don't know
- 99 Refused

**PA7** Did you consider participating in <UTILITY>'s Business Rebates program before completing the replacements or upgrades? [SELECT ONE]

- 01 Yes
- 02 No [SKIP TO PA10]
- 88 Don't know [SKIP TO PA10]
- 99 Refused [SKIP TO PA10]

**PA8** Why didn't you participate in the program? [DO NOT READ, SELECT ALL THAT APPLY]

- 01 Application process too burdensome / too much paperwork
- 02 Take too long to get approval
- 03 Didn't get internal approval for project
- 04 No time to participate / needed equipment immediately
- 05 Rebate/incentive amount wasn't enough
- 06 Unaware of program at that time
- 07 Didn't know program was available for this equipment
- 08 Program requirements were difficult to understand
- 09 The equipment would not qualify
- 10 Application rejected
- 11 Facility manager / property owner did not allow [RENTERS]
- 12 Available capital used elsewhere
- 13 Other [SPECIFY]
- 88 Don't know
- 99 Refused

**PA8C090** [PA4C070 ASK IF PA8=09] Why did the equipment not qualify?

- 01 [RECORD RESPONSE VERBATIUM]

**PA10** What would increase the likelihood of your business participating in a program that offers rebates on energy saving equipment? [DO NOT READ LIST, SELECT ALL THAT APPLY]

- 01 Nothing
- 02 Higher rebates/incentives
- 03 Making additional equipment eligible
- 04 Providing additional information about program
- 05 Making application process less burdensome
- 06 Internal agreement
- 07 Cost savings, impact on bill (e.g., lower bill)
- 08 Energy savings
- 09 Availability of funds to make improvements
- 10 Equipment that would need to be replaced (e.g., old equipment)
- 11 Financing
- 12 Better understanding of rebate impact on return on investment (ROI)
- 14 Awareness of the program / did not know the program existed
- 13 Other [SPECIFY]
- 88 Don't know
- 99 Refused

**[IF PA10C03 = 1 THEN ASK]**

**PA10C03O** What additional equipment should be eligible?

- [RECORD RESPONSE VERBATIM]

**[IF PA10C04 = 1 THEN ASK]**

**PA10C04O** What additional program information should be available?

[RECORD RESPONSE VERBATIM]

**PA12** For the facility at <ADDRESS>, in the next two years, do you plan on upgrading or replacing...?  
[ROTATE LIST]

For PA12a through PA12h

01 Yes

02 No

88 Don't know

99 Refused

- a. The HVAC system
- b. Any water heating systems
- c. Any lighting equipment
- d. Any control systems
- e. Any refrigerators, freezers, or ice machines
- f. Any motors or drives
- g. The building shell or insulation (Including windows and doors)
- h. Anything else [SPECIFY]

**PA13** Would receiving a rebate from <UTILITY> increase the likelihood of this facility participating in the program in the future? [SELECT ONE]

01 Yes

02 No

88 Don't know

99 Refused

**Decision-Making Process Questions**

Next are some questions about decision making at your business.

**D1** If you were considering implementing, modifying, or installing new energy using equipment at your company, where would you look for trusted information? [DO NOT READ LIST, SELECT ALL THAT APPLY]

- 01 Review of <UTILITY> website
- 02 <UTILITY> program staff
- 03 Key account manager
- 04 General Internet search [e.g., Google search]
- 05 Contractor / Vendor/Retailer
- 06 Engineer
- 07 Manufacturer / Supplier / Distributor
- 08 Colleague / Co-worker
- 09 Internal management staff
- 10 Internal facilities management staff
- 11 Word of mouth / another business
- 12 Advertising campaign
- 13 Trade show or expo
- 14 Financial advisor
- 15 Other [SPECIFY]
- 88 Don't know
- 99 Refused

**D2** And who would you contact to implement the new equipment or measure? [DO NOT READ LIST, SELECT ALL THAT APPLY]

- 01 <UTILITY>
- 02 Contractor / Vendor
- 03 Engineer
- 04 Manufacturer
- 05 Internal staff / Colleague
- 06 Friend / Family
- 07 Landlord / Building owner
- 08 Other [SPECIFY]
- 88 Don't know
- 99 Refused

D3 On a scale of 1 to 10, with 1 being "not at all important" and 10 being "very important", how important would each of the following be to your business when considering new equipment or processes? [ROTATE LIST] [RECORD 1-10 FOR EACH STATEMENT]

- D3a Age or condition of existing equipment
- D3b Amount of manufacturer or utility rebate available
- D3c Recommendation of a contractor or supplier
- D3d Initial purchase cost
- D3e Length of payback period or return on investment (ROI)
- D3f Efficiency level of new equipment
- D3g Environmental concerns
- D3h Budget availability
- D3i Saving energy

**[IF D3e = 6,7,8,9,10 THEN ASK]**

D3ea What payback period or ROI do you strive for? [DO NOT READ, SELECT ONE]

- 01 One-year payback period
- 02 2-4-year payback period
- 03 5-10-year payback period
- 04 11 years or more payback period
- 05 100 percent ROI
- 06 Other [SPECIFY]
- 88 Don't know

D3j Is there any other consideration not already mentioned? [SELECT ONE]

- 01 Yes [SPECIFY]
- 02 No
- 88 Don't know
- 99 Refused

**[IF D3j = 1 THEN ASK]**

D3ja On a scale of 1 to 10, with 1 being "not at all important" and 10 being "very important," how important would this other consideration be to your business when considering new equipment or processes? [INTERVIEWER NOTE: We're talking about "<D3jO>"]

- \_\_\_ [RECORD IMPORTANCE 1-10]
- 88 Don't know
- 99 Refused

**D4** Does your company have any policies related to energy efficiency standards or sustainability plans that you need to consider when purchasing new equipment or making improvements to this facility? [SELECT ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

**[IF D4 = 1 THEN ASK]**

**D5** Which of the following best describes this policy? [READ LIST, SELECT ONE]

- 01 Purchase energy efficient equipment regardless of cost
- 02 Purchase energy efficient equipment if it meets payback or return on investment criteria
- 03 Purchase standard efficiency equipment that meet code
- 04 Something else [SPECIFY]
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**D6** I am going to list obstacles or barriers that businesses face when identifying, purchasing, or implementing energy efficiency improvements. For each option, please indicate if your business has experienced these obstacles or barriers. [ROTATE LIST] [SELECT ONE FOR EACH STATEMENT]

For D6a through D6h

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

**D6a** Need to incorporate purchases or plans into longer term budget

**D6b** Lack of capital budget

**D6c** Time constraints of internal staff to implement

**D6d** Approval by decision-makers

**D6e** Uncertainty regarding return on investment

**D6f** Lack of awareness or knowledge about equipment characteristics or performance

**D6g** Lack of knowledge about how to obtain assistance from <UTILITY>

**D6h** Low prioritization of energy efficiency or conservation in your firm

**Customer Profile**

Lastly, we would like to learn a little more about your company and facility.

**F1a** What business activity accounts for most of the floor space covered by your <UTILITY> bill at <ADDRESS> in <CITY>? [DO NOT READ; SELECT ONE]

- 01 Office/professional
- 02 Data center/computer server farm
- 03 Warehouse or distribution center.
- 04 Food sales or service
- 05 Retail
- 06 Education
- 07 Religious worship
- 08 Public assembly
- 09 Health care
- 10 Service
- 11 Lodging
- 12 Public order and safety
- 13 Industrial/Manufacturing (SPECIFY)
- 14 Agricultural (SPECIFY)
- 15 Vacant (SPECIFY)
- 16 Municipal/Governmental
- 17 Other (SPECIFY IN DETAIL)
- 88 Don't know
- 99 Refused

**F1a\_indust** [ASK IF F1a=13] Please specify.

**F1a\_agric** [ASK IF F1a=14] Please specify.

**F1a\_vacant** [ASK IF F1a=15] Please specify.

**F2a** Which of the following best describes the ownership of this facility? [READ LIST; SELECT ONE]

- 01 The organization I work for owns and occupies this facility
- 02 The organization I work for owns this facility but it is rented to someone else
- 03 The organization I work for rents this facility
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**[IF F2a = 03, THEN ASK]**

**F2aa** When considering making any improvements at your facility, do you need your property manager or landlord's permission or approval? [SELECT ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

**F4a** How old is this facility?

- \_\_\_ Age [ALLOW 0-200]
- 888 Don't know
- 999 Refused

**[IF F4a = Don't know THEN ASK]**

**F4b** Would you say the approximate age is...? [READ LIST UNTIL R ANSWERS; SELECT ONE]

- 01 Less than 2 years
- 02 2-4 years
- 03 5-9 years
- 04 10-19 years
- 05 20-29 years
- 06 30 years or more years
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused

**F5a** How many buildings are occupied by your firm at this location?

- \_\_\_ [ALLOW 1-100]
- 888 Don't know
- 999 Refused

**F6a** What's your best estimate of the approximate square footage of the space that is cooled or heated at this facility? **[IF F5a >1 and not 888, 999, INSERT "Please tell me the total for all of the buildings."]** Is it... [READ LIST UNTIL R ANSWERS; SELECT ONE]

- 01 Under 5,000 sq. ft.
- 02 5,000 to just under 10,000 sq. ft.
- 03 10,000 to just under 25,000 sq. ft.
- 04 25,000 to just under 75,000 sq. ft.
- 05 75,000 sq. ft. or more
- 88 [DO NOT READ] Don't know
- 99 [DO NOT READ] Refused



F8a Excluding any seasonal employees, how many full-time and part-time people are employed at this facility?

F8a\_ft \_\_\_\_\_ Number of full-time employees [ALLOW 0-2000]  
F8a\_pt \_\_\_\_\_ Number of part-time employees [ALLOW 0-2000]  
8888 Don't know  
9999 Refused

**[IF F8a\_ft=8888 OR F8a\_pt=8888] THEN ASK]**

F8b Would you say the approximate number of **total** employees is...? [READ LIST UNTIL R ANSWERS; SELECT ONE]

01 Less than 10  
02 10-49  
03 50-99  
04 100-249  
05 250-499  
06 500 or more  
88 [DO NOT READ] Don't know  
99 [DO NOT READ] Refused

F9a Which of the following BEST describes the facility? This facility is... [READ LIST; SELECT ONE]

01 the only location  
02 one of several locations  
03 the headquarters location with several locations  
88 [DO NOT READ] Don't know  
99 [DO NOT READ] Refused

**[IF F9a = 02 OR 03 THEN ASK]**

F10a At what level are your company's budget decisions made? [READ LIST, SELECT ONE]

[LOCALLY: EACH STORE OR COMPANY LOCATION MAKES INDEPENDENT BUDGET DECISIONS]

01 Locally  
02 Regionally  
03 Nationally  
04 Worldwide  
05 Some other level [SPECIFY]  
88 [DO NOT READ] Don't know  
99 [DO NOT READ] Refused

**F10b** When creating budgeting and financial plans, how far into the future does your company plan?  
[SELECT ONE]

- 01 Less than 1 year (monthly, daily, day-to-day)
- 02 One year
- 03 Two years
- 04 Three years
- 05 Four years
- 06 Five years
- 07 Ten years
- 08 Other [SPECIFY]
- 88 Don't know
- 99 Refused

**Wrap up**

**F15a** Would you like someone from <UTILITY> to contact you directly to provide more information and answer any questions you may have about their energy efficiency programs? [SELECT ONE]

- 01 Yes
- 02 No [SKIP TO COM]
- 88 Don't know [SKIP TO COM]
- 99 Refused [SKIP TO COM]

**F15\_name** For verification purposes, would you spell your first and last name? [Contact name on file = <CONTACT\_NAME>]

[RECORD NAME]

**F15\_phone** Just to confirm, what is the best number to reach you at? [Phone number on file = <PHONE\_NUM>]

[RECORD TELEPHONE INFORMATION]

**F15\_email** And what is the best email address to use?

[RECORD EMAIL ADDRESS]

- 99 Refused

**COM** Thank you for taking the time to complete this survey. Do you have any comments you'd like to share with <UTILITY>? [SELECT ONE]

- 01 Yes [RECORD RESPONSE VERBATIM]
- 02 No
- 88 Don't know
- 99 Refused

**COMO** Respondent comments.

**INT99** Those are all the questions we have. Thank you for your time.

CP Completed on phone

**APPENDIX F: BUSINESS ADVOCATE INTERVIEW GUIDE**

**LG&E and KU PROGRAM STAFF INTERVIEW GUIDE**

**Interviewee(s):**

**Interviewer(s):**

**Program/Area of responsibility:** Business Rebates

**Date(s):**

**A. Program Design, Implementation, and Marketing**

- 1) Let’s talk about the staffing changes for this program. (Probe for: LG&E and KU staff, implementation contractors (Franklin) and the various trade allies)
  - When we last evaluated this program, Rhonda was the program manager and MaGrann was the implementer. When did you transition into the role? And it looks like Franklin became involved in 2016, is that correct?
    - <NOTE: Rhonda’s responsibilities included ensuring the program meets its monthly goals and to forecast participation each month; marketing the program through networking and in-person meetings with customers.>
  - In reviewing program documentation, Franklin is responsible for outreach to customers, contractors and vendors, processing and reviewing rebate applications, trade ally training, Quality Assurance, and on-site verifications. Anything we’re missing?
    - In the last evaluation there was concern about the outreach capabilities of MaGrann. Has this improved now that Franklin is on board? Any concerns with Franklin? On the flip side, what has worked well?
  
- 2) In addition to the staffing, how has the program changed since it was last evaluated in 2013? Have there been any challenges along the way?
  - Any changes to the incentivized measures?
  
  - Any changes to incentive levels?
  
  - Any changes to the application?
    - <NOTE: Rhonda was hoping to make the 12-page application simpler. Current applications look like it’s about 4 pages.>

- 3) Any changes to the marketing activities that have been used to reach the target markets?
  - When we spoke last, Rhonda had indicated she wanted MaGrann to do more of the outreach. Has Franklin taken on more of that responsibility?
  - Which methods of outreach have been the most effective?
    - <NOTE: Rhonda had focused on in-person meetings. LG&E and KU's Business First publication with electronic banner ads, articles in trade publications and local business magazines (e.g., the Lang Report) were used on the past.>
  - Have there been certain marketing messages that seemed to resonate with customers?
  - Are there certain geographic areas being targeted?
    - <NOTE: Restaurants/hotels/retail were areas that were being considered in the last evaluation.>
- 4) Has the program met its goals over the last few years? If not, why not? Do you anticipate the program will meet its goals in 2019? If not, what do you think are some of the issues that will keep the program from meeting or perhaps exceeding its potential?
- 5) What is the mix of projects? The program has historically been all prescriptive measures – is that still the same?
  - Is the mix what you expect?
  - Are you focused on any specific measures?
- 6) What's working well in the program?
- 7) What do you see as future challenges for the program? How is LG&E and KU addressing those challenges?

## B. Program Operations

- 1) I'd like to review the program from the customer perspective (high level).
  - Customer requests an application either by phone or online
    - In the last evaluation, we learned that about 99% are received through via email. Is that still the case?
  - Franklin completes an application and sends the application to the customer for confirmation and signature.
    - <NOTE: Franklin has 10 business days.>
  - Customer provides supporting documentation (invoices, specification sheets, calculations).
    - Are these provided with the application or the applications gets essentially preapproved and then once the project is completed, then the supporting documentation is provided?
  - Franklin verifies the application packet and follows up with questions as needed.
    - How often are follow-ups needed?
    - How long does Franklin have to review?
  - Once Franklin verifies the paperwork, the energy savings are verified (for NC and custom) and a rebate amount calculated.
    - How long does this process typically take?
  - LG&E and KU approves the rebate application and rebate check is mailed.
    - Who mails the rebate check – Franklin or LG&E and KU?
- 2) What QA/QC processes are in place?
  - <NOTE: Rhonda previously reviewed every all applications to make sure there is a complete audit trail and all requirements are met. Rhonda's manager also reviewed the entire package before the rebate is paid.>
    - Any changes to this process?
  - Site verification was previously done for 1 out of 4 enrollments by LG&E and KU. MaGrann also did their own site verifications.
    - Is this still the case?
    - <NOTE: Franklin's contract says they will perform on-site verifications of 25% of custom and prescriptive projects. 100% of custom and prescriptive projects with rebates greater than or equal to \$10,000 will receive on-site verifications.>
- 3) Does the program engage retailers, contractors, etc.?
  - <NOTE: Rhonda had previously tried to market to them like customers, presented to and worked with Trane and various AC and mechanical contractors but said it was a bit of a struggle. >
    - Any outreach done to contractors?

### C. Program Impacts

- 1) For savings calculations, has LG&E and KU used the Excel file that was created by Tetra Tech?
  - IF YES, has the information provided by Tetra Tech been updated at all?
  - IF NO, what information is used to calculate savings?
    - How are the inputs for each technology or project determined for baseline, effective useful life, persistence of savings, cost, or savings factors? Who makes this determination?
- 5) Are there types of projects that are streamlined for energy savings calculations? It appears there are some workbooks available to the customer as part of the application. How have these been working to define project scope and energy savings?
- 6) What type of documentation is required to support the purchase and installation of the measure?
  - <Note: the 2019 Operations Manual states: Signed application; Itemized invoices; Proof of payment; Equipment specification sheets (e.g. AHRI certificate); Larger projects— Include a completed LG&E and KU Commercial Rebate Workbook for quicker processing; Additional materials as outlined in the application with more specific data depending on type of project.>

### D. Evaluation

- 1) What are your needs from this evaluation?
- 2) What do you hope to learn from the evaluation? (Probe: Do you have any specific issues you want to make sure we investigate through discussion with Franklin and/or participant or nonparticipant surveys?)
- 3) Are there any changes you are considering that we should follow-up on?
- 4) Is there anything else we should discuss related to program operations or opportunities that we have not discussed?