COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC JOINT APPLICATION OF KENTUCKY UTILITIES COMPANY AND LOUISVILLE GAS AND ELECTRIC COMPANY FOR CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY AND SITE COMPATIBILITY CERTIFICATES AND APPROVAL OF A DEMAND SIDE MANAGEMENT PLAN	**)**	**CASE NO. 2022-00402**

DIRECT TESTIMONY OF
JOHN BEVINGTON
DIRECTOR, BUSINESS AND ECONOMIC DEVELOPMENT
KENTUCKY UTILITIES COMPANY AND
LOUISVILLE GAS AND ELECTRIC COMPANY

Filed: December 15, 2022

INTRODUCTION

Q. Please state your name, position, and business address.

A. My name is John Bevington. I am the Director of Business and Economic Development for Kentucky Utilities Company ("KU") and Louisville Gas and Electric Company ("LG&E") (collectively, "Companies") and an employee of LG&E and KU Services Company, which provides services to KU and LG&E. My business address is 220 West Main Street, Louisville, Kentucky 40202. A complete statement of my education and work experience is attached to this testimony as Appendix A.

Q. Have you previously testified before this Commission?

A. Yes. I testified before this Commission at the hearing in the Companies' 2021 Integrated Resource Plan proceeding, Case No. 2021-00393, and sponsored responses to numerous data requests in that proceeding.[1] I also submitted testimony before the Virginia State Corporation Commission in Case No. PUR-2021-00171.[2]

Q. What is the purpose of your direct testimony?

A. The purpose of my testimony is to describe the Companies' history of Demand Side Management and Energy Efficiency ("DSM-EE") and explain the Companies' process to develop the 2024-2030 Demand-Side Management and Energy Efficiency Program Plan ("Proposed DSM-EE Program Plan" or "Plan").

Q. Are you sponsoring any exhibits to your testimony?

A. Yes, I am sponsoring Exhibits JB-1, JB-2, and JB-3. Exhibit JB-1 is the Proposed DSM-EE Program Plan, which discusses the historical performance of the Companies'

[1] *Electronic 2021 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company*, Case No. 2021-00393 (Ky. PSC Application filed Oct. 19, 2021).
[2] *Application of Kentucky Utilities Company d/b/a Old Dominion Power Company For an adjustment of electric base rates*, Case No. PUR-2021-00171 (Va. SCC Application filed Aug. 31, 2021).

DSM-EE programming, describes the process by which the Companies developed the Proposed DSM-EE Program Plan, and presents the analyses supporting the plan. I am co-sponsoring this exhibit with Lana Isaacson. Exhibit JB-2 is the DSM-EE Advisory Group minutes and presentations from the 2022 meetings. Exhibit JB-3 is a memorandum detailing a cost effectiveness analysis of the Pay-As-You-Save Financing Program.

HISTORY OF COMPANIES' DSM-EE

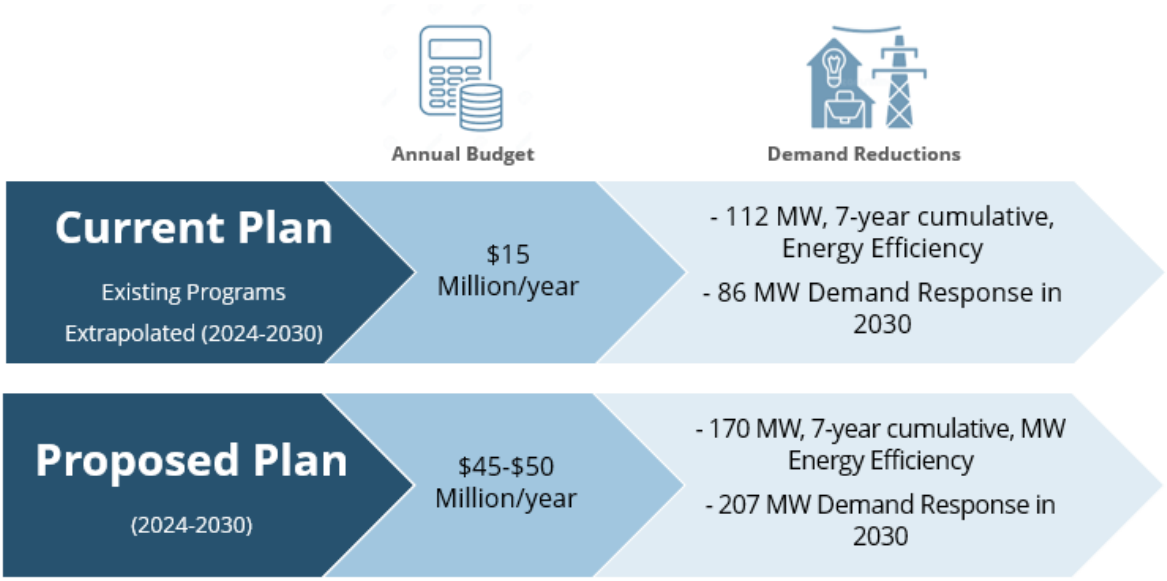
Q. Please provide a brief history of the Companies' DSM-EE programs.

A. The Companies have nearly 30 years of experience designing, implementing, and refining DSM-EE programs. In 1994, LG&E implemented its initial DSM-EE programs with input from its DSM-EE Advisory Group. Since then, the Companies have worked with their DSM-EE Advisory Group in connection with six subsequent DSM-EE filings. The Commission approved the Companies' previous DSM-EE proposals in 1994, 1996, 1998, 2008, 2011, 2014, and 2018.

The Commission approved the Companies' current DSM-EE Program Plan (the 2019-2025 DSM-EE Program Plan) in an Order dated October 5, 2018 in Case No. 2017-00441.[3] Prior to the approval of the current DSM suite of programs in 2018, the Companies had avoided capacity costs that were greater than $0, which contributed to more robust DSM programming because programs were cost-effective. The Companies proposed the current DSM-EE program suite, which represents a reduced offering, after the Commission indicated that a utility should eliminate DSM offerings

[3] *Electronic Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Review, Modification, and Continuation of Certain Existing Demand-Side Management and Energy Efficiency Programs*, Case No. 2017-00441, Order (Ky. PSC Oct. 5, 2018).

other than those targeting low-income customers until it had a need for capacity.[4] Now that the Companies have a capacity need, they are proposing an expanded DSM program suite. The Proposed DSM-EE Program Plan represents the Companies' most significant investment in DSM-EE over the Companies' nearly 30-year history of DSM-EE programming and is much larger than the current DSM-EE program portfolio:



Q. What are the Companies' current DSM-EE programs?

A. The Companies' current DSM-EE programs are:

- Nonresidential Rebates Program
- Low Income Weatherization Program ("WeCare")
- Residential and Small Nonresidential Demand Conservation Program

[4] *Electronic Investigation of the Reasonableness of the Demand Side Management Programs and Rates of Kentucky Power Company*, Case No. 2017-00097, Order (Ky. PSC Jan. 18, 2018) ("Kentucky Power should eliminate offering any DSM programs, other than those programs that target income-eligible residential customers, until there is a change in Kentucky Power's capacity position that indicates a need for additional generation to serve its load.").

- Nonresidential Demand Conservation Program
- Program Development and Administration
- Advanced Metering Systems ("AMS") Customer Offering

The Commission also recently approved an increased budget for the Companies' Nonresidential Rebates Program.[5]

Q. How have the Companies' current DSM-EE programs performed to date?

A. The Companies' DSM-EE programs have been highly successful. All programs are performing well and within plan parameters and forecasts with the exception of the Nonresidential Rebate Program, which is performing well beyond originally forecasted expectations. Through October 2022, the Companies' DSM-EE programs have produced cumulative energy and gas savings of approximately 1,566 GWh and 7.5 million Ccf, along with a cumulative demand reduction of 523 MW.

Q. Do the Companies review their DSM-EE programming on an ongoing basis?

A. Yes. The Companies have been diligent about their DSM-EE program portfolio and review it on an ongoing basis. First, the Companies have a team of dedicated individuals that not only manage current DSM-EE programs but also research other opportunities on an ongoing basis, not just when preparing to make a DSM-EE, IRP, or other relevant filing.

Second, the Companies meet with their DSM-EE Advisory Group to seek input about existing, proposed, and new programming concepts and review program performance. The DSM-EE Advisory Group consists of representatives from various

[5] *Electronic Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company to Enhance the Budget of an Existing Demand-Side Management and Energy Efficiency Program*, Case No. 2022-00123, Order (Ky. PSC May 20, 2022).

stakeholders, including representatives from the Kentucky Energy and Environment Cabinet's Office of Energy Policy, the Kentucky Attorney General, the Kentucky Industrial Utility Customers, Inc., the Kentucky School Boards Association, environmental advocacy groups, commercial customers, and low-income advocates. The Companies have met at least annually with the group since the current program portfolio took effect in 2019.

Third, the Companies, as evidenced by their recently obtained Commission approval to increase the budget for the Nonresidential Rebate Program, monitor customer interest in programs and modify budgets and plans if customer demand dictates the need. In short, the Companies do not obtain approval for a DSM-EE Program Plan and simply put program research and development on the back burner until the end of the plan's term; rather, they consistently review current programs, research new programs, meet with their DSM-EE Advisory Group, and seek mid-plan program adjustments as needed.

DEVELOPMENT OF PROPOSED DSM-EE PROGRAM PLAN

Q. Why is it now appropriate to seek approval for an expanded suite of DSM-EE programs?

A. As explained in the testimonies of David S. Sinclair, Stuart A. Wilson, and others, the Companies anticipate retiring large amounts of coal-fired generation capacity in the near future. As a result, the Companies' avoided cost of capacity has significantly increased since the Companies' most recent DSM-EE Program Plan filing. This avoided cost change positively impacts the cost-effectiveness of certain DSM-EE programs and allows the Companies to now seek approval for an expanded DSM-EE Program Plan that is cost-effective.

Q. When the Companies determined they would likely have a capacity need in the future, what actions did they take regarding their DSM-EE program planning process?

A. In late 2020, although the Companies were less than three years into a seven-year DSM-EE Program Plan, the Companies increased the pace of their DSM-EE Program Plan development due to an anticipated possible future capacity need and the evolving and increasing avoided cost of capacity, which can contribute to the cost-effectiveness of potential DSM programs. The Companies' asked their DSM-EE consultant, The Cadmus Group, Inc. ("Cadmus"), to perform a demand response potential study in the first quarter of 2021, and the Companies further retained Cadmus in July 2021 to conduct additional program reviews. Also, the Companies surveyed their DSM-EE Advisory Group in 2021 to solicit input for developing new and updated DSM-EE programs, and the Companies then met twice with their DSM-EE Advisory Group in 2021 as they began the DSM-EE program review and development process.

With the EPA's publication of its proposed Good Neighbor Plan in April 2022, it became increasingly clear that the Companies could have a capacity shortfall beginning in 2028. In 2022, the Companies met with the DSM-EE Advisory Group on five different occasions and updated their DSM-EE potential studies for residential, commercial, and industrial customers.

Q. Is DSM-EE an important part of the Companies' resource plan?

A. Absolutely. DSM-EE is a vital part of the Companies' overall resource mix now and into the future, and the Proposed DSM-EE Program Plan will provide significant reliability to the resource plan. As Mr. Wilson and Mr. Jones describe, the resource

plan will allow the Companies to continue providing cost-effective, safe, and reliable electric service and also support continued economic development in the Commonwealth. As Governor Beshear has stated in multiple press releases, Kentucky's economy is in the midst of a historically positive trajectory.[6] To further support that momentum, the Companies' resource plan, including the Proposed DSM-EE Program Plan, is critically important.

Q. Could dispatchable DSM alone economically avoid the need for the supply-side resources the Companies are proposing?

A. No. As Mr. Wilson discusses in his testimony and the 2022 Resource Assessment (Exhibit SAW-1), although the dispatchable DSM in the Proposed DSM-EE Program Plan is a resource for increasing the reliability of the total resource portfolio, it could not economically displace the need for the supply-side resources the Companies are proposing. But that does not diminish the importance of the Proposed DSM-EE Program Plan's dispatchable DSM as a reliability resource.[7]

Q. Describe the impact of the DSM-EE Advisory Group in developing the Proposed DSM-EE Program Plan.

A. The DSM-EE Advisory Group was an integral part of the development of the Proposed DSM-EE Program Plan. The group provided instrumental feedback on the types of programs that customers from different rate classes seek, which was particularly

[6] *See, e.g.*, Gov. Beshear: Nearly $2 Million in Funding, Credits Approved to Assist with Workforce Training for More Than 8,400 Kentucky Trainees, News Release (Nov. 10, 2022), *available at* https://ced.ky.gov/Newsroom/NewsPage/20221110_BSSC ("In 2021, the commonwealth shattered every economic development record in the books. Private-sector new-location and expansion announcements included a record $11.2 billion in total planned investment and commitments to create a record 18,000-plus full-time jobs across the coming years.").

[7] Mr. Wilson's analyses evaluated the economic reliability of the dispatchable DSM in the Plan and not the entire Proposed DSM-EE Program Plan.

helpful as the Companies plan to rely heavily on DSM-EE as a component of their resource plan. For that to be successful, the Companies need constructive participation from all customers. As I describe further below, the Companies considered several new programs at the request of the group. The collaborative process with the DSM-EE Advisory Group represented a significant time commitment for both the Companies and the participants, with the five meetings in 2022. I have attached the meeting minutes and presentations to my testimony as Exhibit JB-2.

Q. Describe the Companies' process for selecting the suite of DSM programs in the Proposed DSM-EE Program Plan.

A. Working with input from the DSM-EE Advisory Group, the Companies and Cadmus formulated the proposed 2024-2030 DSM-EE Program Plan by beginning with a pool of 39 possible programs that they developed by researching and reviewing successful programs other utilities across the nation have implemented. Using a scoring rubric, the Companies and Cadmus evaluated and scored all 39 possible programs to determine which warranted further consideration and detailed analysis. The Companies discussed this scoring rubric and filtering process with the DSM-EE Advisory Group, specifically soliciting input from the members about which programs they would like to see move on to the next step of the analysis. This process ultimately narrowed the pool to 14 possible programs for cost-benefit analysis by Cadmus. On the basis of preliminary cost-benefit results, the Companies combined certain programs that could have a synergistic effect and an enhanced customer experience prior to performing a second round of cost-benefit analysis. The Companies shared and discussed the results from the second round of cost-benefit analysis with the DSM-EE Advisory Group. Then,

based on the results of the final round of cost-benefit analyses and discussions with the DSM-EE Advisory Group, the Companies finalized their proposed 2024-2030 DSM-EE Program Plan, which includes every program for which the Companies performed the cost-benefit analyses except for energy efficiency financing. The programs in the Proposed DSM-EE Program Plan programs are described further in the Direct Testimony of Lana Isaacson.

Q. Please describe further the rubric process the Companies and Cadmus used to narrow the 39 possible programs to the programs that moved on to cost-benefit analysis.

A. The Companies developed a rubric of objectives and then weighted the objectives by priority. The Companies weighting certain objectives as "Low" does not mean that the Companies find these objectives unimportant, but instead view the objective as less significant in determining a program's overall value as part of the rubric process. Six program evaluators (three from the Companies and three from Cadmus) evaluated the 39 possible programs using the following rubric of objectives:

Objective	Priority
Is there evidence the program offers significant, firm demand reduction, including during (winter) peak periods?	High
Is there evidence the program offers significant energy savings?	High
Is there evidence the program could be cost-effective?	High
Does the program benefit disadvantaged customers/communities?	High
Does the program minimize complexity and maximize value?	Med
Can the program be successfully started without substantial DSM investment unrelated to saving energy/demand?	Med
Does the program prioritize market-ready technologies?	Med
Is the program easy for customers to participate in?	Med
Does the program provide energy education to customers?	Med
Is the program successful in any PPL territories?	Low
Does the program promote/rely on an established local workforce?	Low
Does the program intend to improve the comfort and indoor health of homes and buildings throughout the Companies' territories?	Low

Each evaluator then scored each program by objective, assigning a 0, 1, or 2 score based on whether the program did not meet the objective, partially met the objective, or fully met the objective, respectively. The Companies averaged the scores from all six evaluators. All programs with a final score of 70-100 moved on to the cost-benefit analysis stage. Certain programs with a final score between 50-69 moved on to the cost-benefit analysis based on input from stakeholders and indicated interest from the Commission. Programs scoring less than 50 did not proceed to the next phase of the cost-benefit analysis.

Q. Please describe the cost-benefit analysis of the programs.

A. The Companies analyzed the proposed DSM-EE programs using the four California Standard Practice Manual tests the Commission requires for DSM-EE programs.[8] The

[8] *See Joint Application of the Members of the Louisville Gas and Electric Company Demand-Side Management Collaborative for the Review, Modification, and Continuation of the Collaborative, DSM Programs, and Cost*

Proposed DSM-EE Program Portfolio is cost-effective taken as a whole based on the Total Resource Cost test, and the total portfolio scores are within ranges of other DSM-EE portfolios the Commission has previously approved with regard to the other three California Standard Practice Manual tests. Ms. Isaacson's testimony further discusses the details of the process and methodology for determining cost effectiveness.

Q. Did the Companies consider using the Societal Cost Test in their cost-benefit analysis for this proceeding?

After receiving input from their DSM-EE Advisory Group, the Companies considered whether it was feasible and appropriate to use the Societal Cost Test in evaluating DSM-EE programs and concluded that it was not. The Commission has repeatedly held that it does not have jurisdiction to consider the type of factors used in a Societal Cost Test.[9] Furthermore, unlike the four tests the Commission has endorsed that are clearly defined in the industry-standard California Standard Practice Manual, there is no clear definition of the Societal Cost Test in the Manual.[10] The Companies are

Recovery Mechanism, Case No. 1997-00083, Order at 20 (Ky. PSC Apr. 27, 1998) ("Any new DSM program or change to an existing DSM program shall be supported by … [t]he results of the four traditional DSM cost-benefit tests [Participant, Total Resource Cost, Ratepayer Impact, and Utility Cost tests].").

[9] *See, e.g., Electronic Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Review, Modification, and Continuation of Certain Existing Demand-Side Management and Energy Efficiency Programs,* Case No. 2017-00441, Order at 28 (Ky. PSC Oct. 5, 2018) ("The Commission has no jurisdiction over environmental impacts, health, or other non-energy factors that do not affect rates or service. Lacking jurisdiction over these non-energy factors, the Commission has no authority to require a utility to include such factors in benefit-cost analyses of DSM programs"); *The 2011 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company*, Case No. 2011-00140, Order at 4 (Ky. PSC July 8, 2011) ("[I]ssues of environmental externalities, such as air and water pollution from generating electricity and mining fuel to supply the generating plants, are all issues beyond the scope of the Commission's jurisdiction."); *The 2008 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company*, Case No. 2008-00148, Order at 5-6 (PSC Ky. July 18, 2008).

[10] Indeed, the California Standard Practice Manual's discussion of the Societal Cost Test (which it calls the Societal Test) includes a listing of *possible* externalities to include that it describes as "illustrative and by no means exhaustive." California Standard Practice Manual at 19-20 (Oct. 2001), available at https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/utilities_and_industries/energy_-_electricity_and_natural_gas/cpuc-standard-practice-manual.pdf.

unaware of a single, universally accepted set of externalities to include in the Societal Cost Test. The absence of a clear standard demonstrates the Commission's concern with using this particular test and supports the Commission's conclusion that absent further legislation it simply does not have the jurisdiction to weigh these issues that do not affect the rates and services the Companies provide to our customers.

Q. In sum, was the Companies' process to develop the Proposed DSM-EE Program Plan reasonable?

A. Yes. The Companies used outside expert judgment paired with the Companies' experience and engaged with the Advisory Group to develop a list of programs that the Companies then analyzed using the cost-benefit calculations the Commission requires for DSM-EE programs. This produced a Proposed DSM-EE Program Plan that is cost-effective taken as a whole based on the Total Resource Cost test. As described further in Ms. Isaacson's testimony, as evidence of the reasonableness of the process, the outcome of the Companies' process is projected to attain the program DSM-EE potential while remaining cost-effective at the portfolio level.

Q. What are the Companies' projections for the impacts of the Proposed DSM-EE Program Plan to peak demand and energy requirements?

A. The Companies project that the 2024-2030 DSM-EE Program Plan, if approved, will achieve peak cumulative demand savings of approximately 377 MW in 2030 from energy efficiency and demand response programs and energy savings of 878 GWh and 170 thousand Mcf by 2030 at a total cost of approximately $341 million. These savings are consistent with the numbers identified as achievable from the most recent potential studies and updates by Cadmus.

Q. Please briefly describe the proposed DSM-EE portfolio.

A. The Companies are proud of their Proposed DSM-EE Program Plan, which will allow the Companies to reach their DSM-EE program potential while remaining cost-effective at the portfolio level. The Companies are proposing to continue and expand upon the WeCare Program to serve the low-income population and to offer similar benefits to qualifying multi-family housing; indeed, the Companies are proposing to make their Income-Qualified Solutions one of the most highly funded DSM-EE programs. The Income-Qualified Solutions are designed to positively impact approximately 5,400 customers per year and nearly 38,000 customers over the program period. The Plan also proposes programs that, when fully implemented, will utilize the benefits of full advanced meter deployment. Ms. Isaacson's testimony describes the proposed programs in further detail.

Q. Please describe the Companies' consideration of a rooftop solar program in the Proposed DSM-EE Program Plan.

A. The Companies did not include rooftop solar in the original group of 39 programs that it considered for the Proposed DSM-EE Program Plan because they have not traditionally viewed rooftop solar as a demand-side resource. After inquiries from certain DSM-EE Advisory Group members who indicated interest in including a rooftop solar program as part of a DSM-EE portfolio plan, the Companies discussed with the DSM-EE Advisory Group the different ways rooftop solar could be part of a DSM-EE portfolio. The Companies' net metering installations are growing rapidly and the Companies considered whether future incentives from a DSM-based solar program are necessary and would possibly even cause further confusion.

Because different types of rooftop solar programs exist and because the topic is complex and important to stakeholders, the Companies will be undertaking further research including program feasibility, implementation methods, effect on DSM planning, and cost-effectiveness before determining whether to propose a rooftop solar program in a future DSM-EE Program Plan. Accordingly, the Companies increased the Market Research budget in DSM-EE Program Development and Administration to account for this research and potential pilot projects.

Q. Did the Companies consider proposing any other DSM programs that they ultimately decided not to propose at this time?

A. Yes. In the Companies' 2020 rate cases, the Companies agreed to engage in a stakeholder process through the DSM-EE Advisory Group to consider and evaluate an on-bill financing program for possible inclusion in their next DSM program plan. During the DSM-EE Advisory Group meetings, stakeholders encouraged the Companies to specifically consider a Pay-As-You-Save ("PAYS") financing model, which is a type of on-bill financing with strict conditions for consumer protection. The Companies and Cadmus thoroughly evaluated PAYS, and the cost effectiveness analysis is included in Exhibit JB-3. The Companies' analysis determined that the PAYS program model would not generate cost-effective savings. Additionally, the newly enacted Inflation Reduction Act creates the possible influx of financing options for customers. Therefore, the Companies concluded they should monitor these possible future financing programs, engage with the DSM-EE Advisory group to determine whether gaps may exist, and then potentially offer only programs that help fill gaps versus those that might be duplicative.

Q. Please describe the Companies' response to requests to share the Proposed DSM-EE Program Plan workpapers with the DSM-EE Advisory Group before filing.

A. On September 15, 2022, a spokesperson for seven DSM-EE stakeholders made several suggestions to me and my team regarding the DSM-EE Advisory Group process. Among those recommendations was a suggestion that the Companies provide underlying data used for their cost benefit modeling, which he stated would help their experts perform their own analysis. Because the underlying data is extensive, we followed up with the spokesperson to explain the types of data available and inquire what the group wanted. He indicated that, at that point in time, the group had not yet engaged experts and was not sure what level of specific information they would ultimately need. Therefore, my team thought the request was tabled until a later date. On November 10, 2022, the same day as a scheduled DSM-EE Advisory meeting, the spokesperson sent another communication on behalf of several stakeholders regarding the request for data. During the meeting on November 10, 2022, several members indicated that they wanted detailed cost-benefit input and output data. We quickly indicated that the Companies were willing to provide such data and explained that, due to the confidential nature of some of the underling information and because of the preliminary/pre-filing status, the Companies would provide the data pursuant to a standard Non-Disclosure Agreement ("NDA"). At the close of the meeting, we asked interested parties to contact one of my team members and to identify the level of specific information that they requested.

Q. Did any DSM-EE Advisory Group member contact your team after that?

A. No. After the meeting, my team met internally and determined that we should expedite delivery of this information to the stakeholders to put this issue to rest. Therefore, we advised the entire stakeholder group on November 11 that we would provide *all* the underlying data that Cadmus used to perform the cost benefit analyses on a file sharing site within one week, subject to execution of an NDA. The Companies fulfilled that commitment. No parties contacted us to request the data in advance of my email. To date, two DSM-EE Advisory Group members – the KIUC and the Attorney General's Office – have signed an NDA and received access to the data. Any assertion that the Companies deliberately withheld information requested by the DSM-EE Advisory Group is not accurate.

Q. Will the Companies continue to work with their DSM-EE Advisory Group and explore additional DSM programs?

A. Yes. It has been the Companies' practice for many years to continuously look at DSM programs as a resource which can also contribute to a great customer experience and deliver high customer value. The DSM-EE Advisory Group is an important part of that ongoing work. We absolutely remain committed to these processes which ensure that market best practices and a broad perspective of customer value is evaluated.

The Companies are excited about the comprehensive DSM-EE programming they are proposing in this case and seek to roll out the benefits to customers as soon as possible, which is another area where the DSM-EE Advisory Group is important. They are strong allies which can facilitate the delivery of programs to their various constituencies in order to maximize the programs' energy and demand savings potential.

The proposed DSM-EE offering in this case certainly does not forestall future DSM-EE proposals. The Companies review their existing DSM-EE programs and potential new programs on an ongoing basis. In fact, over the last 15 years, the Companies have filed a DSM-EE plan update every three to four years and have not completed a full seven-year program term without requesting changes. The Companies are planning to devote resources to certain research and development programs and will be monitoring other programs, such as those that may be developed under the IRA, alongside the DSM Advisory Group.

Q. How will the Companies implement the Proposed DSM-EE Program Plan?

A. Implementation of this DSM-EE Program Plan will require support of additional personnel within the Companies, such as procurement, IT, marketing, and communications staff. These staff will support necessary contract work as well as development of marketing and communications plans to encourage customers to participate in new and enhanced programs. While this case is pending with the Commission, the Companies intend to move forward with the Request for Proposals process to seek qualified contractors and third-party vendors for the programs. The Companies expect to contract with the successful bidders, which will be contingent upon the Commission's approval of the respective programs and corresponding cost recovery. Prior program planning periods have been as long as seven years. Changing economic conditions and technology advancements must be balanced against beneficial multiyear contract pricing. Although the Companies are proposing a seven-year plan, the Companies recognize the increased uncertainty in economic conditions

and will continue to review changing conditions on an annual basis and recommend changes as necessary through the Companies' regular November budgetary filings.

Q. Are the Companies providing revised tariffs and the monthly bill impacts associated with the Proposed DSM-EE Program Plan?

A. Yes. The proposed tariffs are attached to and described further in the Direct Testimony of Robert M. Conroy. The supporting calculations for the cost recovery mechanisms are attached to the Direct Testimony of Lana Isaacson. The Application details the bill impacts of the proposed DSM plan.

CONCLUSION

Q. What is your recommendation for the Commission?

A. I recommend the Commission approve the Proposed DSM-EE Program Plan set forth in the Companies' Application, which will allow important and beneficial DSM-EE programs and provide significant demand-side resources to help satisfy the Companies' projected load requirements.

Q. Does this conclude your testimony?

A. Yes.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **John Bevington**, being duly sworn, deposes and says he is the Director - Business and Economic Development for LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the foregoing testimony, and the answers contained therein are true and correct to the best of his information, knowledge, and belief.

John Bevington

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 9th day of December 2022.

Notary Public

Notary Public ID No. KYNP53381

My Commission Expires:

July 11, 2026

APPENDIX A

John Bevington
Director, Business and Economic Development
Kentucky Utilities Company
Louisville Gas and Electric Company
220 West Main Street
Louisville, Kentucky 40202
Telephone: (502) 627-4335

Previous Positions

LG&E and KU Services Company	
Director, Business & Economic Development	Oct. 2018 - Present
Kentucky Cabinet for Economic Development	
Commissioner, Dept. for Business Development	Oct. 2017 – Oct. 2018
Deputy Commissioner, Dept. for Business Development	July 2014 – Oct. 2017
Director of Business and Community Relations	Feb. 2014 – July 2014
Senior Project Manager	Aug. 2009 – Feb. 2014
Select Auto Sales and Leasing Inc.	
General Manager	Apr. 2001 – Aug. 2009
The Bankers' Bank of Kentucky Frankfort, KY	
Marketing Representative	June 2000 – Apr. 2001

Education

Bachelor of Science in Marketing and Finance, Western Kentucky University ("WKU"), May 2000

Civic Activities

Board Member, KET Regional Fund, 2022-Present
Board Member, Kentucky Association for Economic Development, September 2017-Present
Board Chair 2021
Board Member, Frankfort YMCA, 2015-Present
Board Member, YMCA of Central Kentucky 2017-Present
Volunteer coach for youth sports
WKU student mentoring program

Louisville Gas and Electric Company and Kentucky Utilities Company 2024-2030 Demand-Side Management and Energy Efficiency Program Plan

Exhibit JB-1

Table of Contents

1 Executive Summary

1.1 Introduction

Louisville Gas and Electric Company (LG&E) and Kentucky Utilities (KU), collectively "the Companies," are Kentucky's largest utilities. The Companies provide safe and reliable energy services to more than 1.3 million customers across more than 90 counties.

The Companies have offered demand-side management and energy efficiency (DSM/EE) programs since 1994. Through these programs, the Companies aim to:

- Provide customers with a range of tools and information on the benefits of energy efficiency and assist these customers in using energy wisely
- Collaborate with stakeholders (e.g., customers, federal or state officials, industry experts, low-income customer advocates, and utility associations) on matters related to energy efficiency and demand response
- Explore new program concepts in response to stakeholder and regulatory interest (e.g., expanded income-qualified offerings, peak time rebates, financing, and advanced metering infrastructure-related offerings)
- Provide energy efficiency education to encourage customers to take energy efficiency and demand reduction actions at their homes and businesses
- Provide best-in-class customer experience
- Make a long-term commitment to offset the need for additional capacity and save energy in a cost-effective manner
- Ensure a balanced approach to meeting the anticipated resource needs of the Companies and their customers
- Stimulate economic benefits in Kentucky
- Increase energy security for low-income customers
- Improve the comfort and indoor health of homes and buildings throughout the Companies' territories

The Companies are pleased to submit this 2024-2030 Demand-Side Management and Energy Efficiency (DSM/EE) Program Plan to the Kentucky Public Service Commission (Commission). The DSM/EE Program Plan proposes to substantially increase the Companies' investment in energy efficiency and demand reduction across every customer sector they serve.

To date, the Companies' DSM/EE programs have produced significant energy savings and ancillary benefits, including lower energy usage for customers in the Companies' territories and economic benefits for the state of Kentucky. The Companies are currently executing their 2019-2025 DSM/EE Program Plan. However, the limited remaining economic life of coal generation, combined with market-wide electric demand growth, indicates a significant increase in the Companies' baseload

demand projections over the next several years. In addition, through ongoing collaboration with stakeholders, the Companies recognize a growing need for solutions aimed at helping reduce customers' energy burden, improving indoor health and comfort, addressing environmental concerns, and contributing to workforce development and economic growth for the state of Kentucky. These factors have prompted the Companies to file a mid-plan adjustment to request approval for additional budget and programs to support a substantive increase in their portfolio offerings that will make more comprehensive energy efficiency and demand response opportunities available to a broader customer population. This portfolio will not only provide immediate benefits to the Companies' customers but will also lay the groundwork for the Companies to mitigate future capacity constraints and maintain grid stability over the longer term. This DSM/EE Program Plan and the accompanying application for Certificates of Public Convenience and Necessity (CPCN) filed with the Commission will ensure the Companies have the capacity needed to best serve its Kentucky customers.

In developing this DSM/EE Program Plan, the Companies sought to maximize the impacts DSM can provide to their Kentucky territories while ensuring that program benefits outweigh program costs. The relationship between DSM/EE budgets and savings is not always linear. The law of diminishing returns indicates the potential for saving energy through DSM/EE programming declines as economic and market factors are introduced. As such, there are four commonly defined types of DSM market potential:

- ***Technical potential*** represents all technically feasible energy efficiency and demand response measures being implemented, regardless of their costs or market barriers.
- ***Economic potential*** represents a subset of technical potential, comprising only measures meeting cost-effectiveness criteria based on the Companies' avoided supply costs for delivering electricity and natural gas and for avoided line losses.
- ***Achievable potential*** represents the portion of economic potential assumed to be reasonably achievable in the course of a planning horizon (typically 20 years), given market barriers that may impede customers' participation in utility programs.
- ***Program potential*** represents the portion of achievable potential that a utility may realize through DSM programs and accounts for spending on energy efficiency and demand response programs and for any program implementation barriers.

For DSM to serve as a reliable generation planning resource, it is imperative that DSM/EE programs and savings goals account for the realistic conditions of the market. DSM/EE savings goals cannot be developed based on technical potential; cost-effectiveness, market barriers, customer awareness, and willingness to participate have consequential implications that must be considered so that the Companies' expectations for DSM/EE as a reliable resource reflect market realities. At the outset of development of this DSM/EE Program Plan, the Companies sought to identify opportunities to curtail demand to compensate for planned fossil fuel generation retirements. However, the Companies'

residential and commercial potential study[1] conducted in 2017, industrial potential assessment[2] conducted in 2016, and demand response potential assessment conducted in 2021[3] reported not enough technical potential across all sectors combined to cover the Companies' need. In 2022, the Companies re-evaluated their energy efficiency potential studies to reflect current market conditions,[4] showing even further declines in technical potential. Although this DSM/EE Program Plan significantly increases the Companies' historical DSM/EE program spending and benefits, current market challenges[5] do not allow the Companies to fully offset their capacity constraints through DSM alone. This DSM/EE Program Plan, covering the period from 2024 to 2030, provides updated costs and benefits associated with the expanded portfolio.

1.2 DSM/EE History

In 1992, LG&E began negotiating with stakeholders about implementing DSM/EE programs that would benefit their customers and recovering the costs associated with such programs. This collaborative effort, then known as the DSM Collaborative (now called the DSM Advisory Group), resulted in a request to the Commission in November 1993 to approve "The Joint Application for the Approval of Demand-Side Management Programs, a DSM Cost Recovery Mechanism, and a Continuing Collaborative Process on DSM for Louisville Gas and Electric Company" (Case No. 93-150). LG&E implemented the initial DSM/EE programs in 1994 and the Companies continued to offer programs throughout the 1990s and 2000s. The Companies proposed and were granted approval by the Commission for DSM/EE offerings in 1996, 1998, 2001, 2008, 2011, 2014, 2018, and 2022.

With each DSM/EE Program Plan, the Companies aimed to improve efficiency programming, provide customers with appropriate tools and resources to make better use of energy resources, address changing market conditions, explore opportunities to manage peak loads, and ensure the overall cost-effectiveness of their programs.

In 2017, the Companies submitted a 2019-2025 DSM/EE Program Plan in Case No. 2017-00441. The portfolio expanded WeCare, the Companies' low-income weatherization program (with additional funds per residence and revised eligibility parameters to include multifamily dwellings), expanded the Nonresidential Rebates Program (by expanding eligibility to include industrial customers and revising incentive structures to emphasize energy savings), and extended the demand response programs (for all customer types). After guidance from the Commission indicated that a utility should eliminate DSM offerings other than those targeting low-income customers until it had a need for capacity, the

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1 Cadmus. *Demand Side Management Potential Study 2019-2038*. March 2017.

2 Cadmus. *Industrial Sector DSM Potential Assessment for 2016-2035.* April 2016.

3 Cadmus. *2023 LG&E and KU Demand Response Assessment.* April 2021.

4 The 2022 potential study projection is included in Appendix D.

5 Further explanation of the market challenges currently facing the Companies are detailed in External Market Considerations.

Companies took steps to reduce program expenditures and customer charges through the Demand-Side Management Cost Recovery Mechanism, which discontinued several programs that were not cost-effective. In October 2018, the Companies received approval from the Commission to implement all of the proposed programs in their 2019-2025 DSM/EE Program Plan except the School Energy Management Program.

A significant factor contributing to the Companies' non-cost-effective programs was a zero avoided capacity cost, which is a key input to the benefits portion of cost-effectiveness analysis. At that time, the Companies' avoided capacity cost was based in part on declining load growth projections, very low fuel costs, and, consequently, low production costs. These factors were compounded by an annual 30-year demand and energy forecast and resource plans that projected relatively flat demand and sufficient generating capacity. Furthermore, an updated residential and commercial potential study,[6] conducted in 2017, and an industrial potential assessment,[7] conducted in 2016, showed declining achievable potential. Thus, the Companies' 2019-2025 DSM/EE Program Plan, as originally proposed, reflected the considerable challenges, and limitations these challenges posed, for the design and delivery of conservation programs.

Following the initiation of their 2019-2025 DSM/EE Program Plan, the Companies' Nonresidential Rebates Program experienced substantially higher participation than forecasted, resulting in a more rapid distribution of program resources than expected. Therefore, in 2022, the Companies filed—and the Commission approved—an application proposing to update the Nonresidential Rebates Program budget and related Cost Recovery Mechanism (Case No. 2022-00123). This has allowed the Companies to continue to offer rebates for customer-sited energy efficiency projects and capture significant energy savings benefits.

Since 2018, several factors have converged, and it is now prudent for the Companies to file a new plan that will replace the current 2019-2025 DSM/EE Program Plan and provide a consistent portfolio of programs that will carry through 2030. These factors include the following:

- The Companies have retired or plan to retire several fossil fuel generation facilities, as detailed in the CPCN Application, and some of their capacity purchase agreements have expired. The Companies now project a capacity shortfall in 2028, which increases their avoided capacity costs and improves the cost-effectiveness of DSM in the Companies' territories.
- DSM provides reliability in uncertain times. The Companies assessed total resource needs and sought to balance generation needs with reliable DSM resources to comprehensively address the Companies' capacity needs during periods of peak demand. The Companies' need to manage system load during periods of peak demand pairs this DSM/EE Program Plan with the Companies' need for additional generation, as requested through the CPCN Application.

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6 Cadmus. *Demand Side Management Potential Study 2019-2038*. March 2017.

7 Cadmus. *Industrial Sector DSM Potential Assessment for 2016-2035.* April 2016.

- In the Commission Orders in Case No. 2020-00349 and 2020-00350, the Companies agreed to further evaluate additional programming options, including financing, peak time rebates, customer offerings related to advanced metering infrastructure (AMI), and other offerings that could be provided for low-income customers.
- The Commission's order provided approval for the Companies to initiate and recover costs for a proposed territory-wide deployment of AMI, which will give the Companies vastly greater flexibility to manage loads and give customers more-granular information on their energy consumption patterns.
- In ongoing engagement and collaboration with the DSM Advisory Group, the Companies recognized a significant interest in expanding their energy efficiency and demand response program offerings.

1.2.1 External Market Considerations

In recent years, a broad range of market disruptions has led to declining potential, and at higher acquisition costs, making it more challenging for utilities to capture cost-effective energy savings. The decline or elimination of low-cost energy savings (such as residential lighting), uncertain economic conditions, and an undefined future market all have an effect on the Companies' ability to rely on DSM alone to manage system load needs.

To meet customer needs and fulfill resource obligations, the Companies will need to offer a more comprehensive portfolio of energy efficiency and demand response programs that aim to capture a larger share of available energy savings potential and increase access to firm, dispatchable load reduction benefits. The Companies anticipate that in 2024 through 2030 they could face continued market disruptions that create uncertainty and potential risk to achieving the goals described in this DSM/EE Program Plan. Some of these market disruptions are explained below.

Declining Potential

The DSM/EE Program Plan is intended to continue to contribute significant energy savings while recognizing that known potential is forecasted to decline. A comparison of the results from the 2016 and 2017 Demand Side Management Potential Studies to a 2022 potential study projection shows that cumulative electric energy-savings technical potential has declined by approximately 12% over the 20-year study horizon in the five years since the previous studies were completed.[8] Though several factors contribute to this decline (such as the increasing market saturation of efficient technologies and new building codes), changes in federal equipment standards have caused the most significant decline in energy efficiency potential over the past several years.

[8] Cadmus. March 2017. *Demand Side Management Potential Study 2019-2038*.
Cadmus. April 2016. *Industrial Sector DSM Potential Assessment for 2016-2035*.
For more details about the 2022 potential study projection, see Appendix D..

Lighting is the most notable end use affected by new federal standards that will increase equipment baselines. For more than a decade, lighting has been a primary source for energy efficiency savings among utilities across the U.S. However, final rules adopted by the U.S. Department of Energy in May 2022 will update the definitions for general service lamps and general service incandescent lamps and will establish LEDs as the baseline technology for all screw-based lighting starting in July 2023. As a result, utilities will no longer be able to claim energy savings from the distribution of efficient, low-cost lighting measures for residential use, rather resource planners and forecasters will simply have to account for the future savings that will occur. Acquisition costs for electric energy savings will also increase as a result of this federal change in lighting standards. In the *Demand Side Management Potential Study 2019-2038,* LED lighting was the highest-saving residential measure and accounted for nearly one-third of all achievable potential in the sector.

At the same time, no viable new technologies have emerged to replace the impacts being lost due to these market changes. Many new and emerging electric energy-saving measures that initially showed promise, such as heat pumps and smart technologies, have been hindered by persistently high costs, inconsistent performance, and slow market adoption.[9]

Demand Growth

At the same time that energy efficiency potential is declining, demand is growing at a rapid pace. New technologies such as electric vehicles (EVs) including battery manufacturing of which Kentucky has already announced two major facilities; the environmental imperative to electrify buildings; the ubiquitous growth of indoor agriculture; and data-heavy digital devices, cryptocurrencies, and server farms have contributed to intensifying electric demand across the country. Economic development in Kentucky is progressing at a rapid pace, with a record level of announced investments and new jobs having been created in 2021. Most of this announced growth will occur in the companies' service territories and communities served by the companies are investing in new sites and buildings to attract employers of the future. The energy intensive manufacturing sector accounts for approximately 18% of Kentucky's gross domestic product (GDP) which is comparatively much higher than that of the nation's GDP (roughly 11%). All of this is compounded by the Companies' limited remaining economic life of fossil fuel generation facilities. The Companies have offered demand response programs for many years; however, the need to better manage demand and maintain grid stability means a new opportunity for demand reduction offerings that will require an enhanced focus.

Economic Conditions

The past 32 months have brought unforeseen challenges, continued uncertainty, and possible risk to achieving the Companies' DSM/EE goals. Though the immediate concerns surrounding the COVID-19 pandemic are receding, its effects persist in terms of continuing financial hardship, supply chain issues, labor shortages, and higher costs for raw materials and products. The cumulative near-term

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[9] *See, e.g.,* Slow adoption of smart thermostats in the US misses big potential energy savings: S&P, Utility Dive, *available at* https://www.utilitydive.com/news/smart-thermostats-us-slow-adoption-misses-energy-savings/630901/.

economic impacts affect both the Companies' costs and their customers' ability to invest in energy efficiency, but longer-term impacts are still evolving, and their potential effect on the Companies' ability to achieve their DSM/EE goals are unknown.

The pandemic has had a particularly outsized impact on residential customers who live in the economic margins. A large and growing population of Kentucky residents struggle to make ends meet, and their energy burden has increased. The need to serve these populations with robust income-qualified program offerings has grown substantially.

Inflation Reduction Act

On August 16, 2022, the Biden administration passed the Inflation Reduction Act (IRA, H.R. 5376),[10] a wide-ranging law that represents the largest U.S. investment to address climate change in history. The IRA will provide financial benefits to help decarbonize energy systems, improve the efficiency and comfort of homes and businesses, accelerate the adoption of renewable energy resources, and reduce the energy burden for lower-income Americans.

Though some portions of the IRA are expected to provide added benefits to customers who invest in energy-efficient upgrades, other portions could introduce new market disruptions, create customer confusion, spur demand for energy efficient equipment in a challenged supply chain, or even compete with the Companies' programs to claim savings.

During the duration of this DSM/EE Program Plan, the Companies will monitor federal and state program development under the IRA to maximize benefits for customers across all funding sources. The IRA relies on two primary mechanisms to achieve its goals: tax credits and grants for state energy offices.

- ***Tax Credits.*** IRA tax credits will be available to consumers who install a range of renewable energy systems, energy efficiency measures, electrical improvements, and commercial building efficiency improvements and who build new single-family and multifamily homes that meet ENERGY STAR or Zero Energy Ready Home program qualifications. Tax credits will be available beginning in 2023 and are expected to supplement utility program incentives for applicable projects and possibly boost utility program uptake.
- ***State Grants.*** The IRA includes $4.3 billion in grants for state energy offices to implement rebate programs for whole-home retrofits (single-family and multifamily), with the rebates doubled for qualifying low- and moderate-income residents. Grants are also earmarked for efficient home electrification measures in existing and new construction applications for low- and moderate-income residents and installers. It will require a full regulatory process to establish and promulgate state grant program rules before the states will be able to apply for grant funds, which is not anticipated until at least the second quarter of 2023. It remains

[10] The Inflation Reduction Act H.R. 5376 can be found online: https://www.congress.gov/117/bills/hr5376/BILLS-117hr5376enr.pdf

unknown if state grant programs will be designed to complement utility programs (possibly filling utility program gaps or allowing customers to "stack" rebates) or to operate alongside (possibly competing with) utility programs and if grant program administrators will be required to claim savings, conduct third-party evaluation, or adhere to state-level cost-effectiveness or other regulatory rules. Furthermore, this large influx of federal funds could further compound labor shortages and threaten the realization of utility savings goals if state agencies and community organizations do not have workforce capacity to effectively use all of the dollars flowing in from federal, state, and utility programs.

Although the U.S. Department of Energy is still developing the specific program details for the IRA funding, it is expected that a portion of IRA funding will be available to finance energy efficiency projects. The Companies researched and developed an energy efficiency financing program for inclusion in this DSM/EE Program Plan, including a robust analysis specifically on a Pay As You Save (PAYS) program; however, the Companies decided not to include the financing program in the final proposed portfolio in this filing because it was not cost-effective and the IRA funding is expected to cover that need for customers. Specifically, the Kentucky Energy and Environment Cabinet (EEC) expressed interest in developing a revolving loan fund with IRA funding and indicated the possibility of a nationwide "Green Bank" offering energy efficiency financing or expanding Louisville's Energy Project Assessment District (EPAD) program and other Property Assessed Clean Energy (PACE) programs to residential customers.

The Companies intend to collaborate and engage with Kentucky stakeholders while monitoring developments of energy efficiency financing options for customers offered by the state and the federal government. Discussing after-effects of the new financing opportunities with their constituents will allow the Companies to ensure that these offerings work for their most vulnerable customers. The Companies intend to take a data driven approach, based in research, to determine how/if a utility-sponsored energy efficiency financing program is necessary to, and can fill, any gaps experienced by customers. The Companies may file a mid-plan adjustment to offer energy efficiency financing, contingent upon the findings of this research and the outcome of IRA funding offerings in Kentucky.

Mitigation Activities

The Companies' DSM/EE Program Plan includes strategies to mitigate and address the challenges and uncertainties of the market disruptions described above, but the Companies acknowledge it may not be possible to mitigate them all or to anticipate others that may arise. Nevertheless, the Companies expect their new programs and integrated portfolio design, along with efforts to manage and administer the programs as efficiently as possible, will help offset the risks to achieving their energy efficiency and demand response program goals and maintaining cost-effectiveness while continuing to meet customers' needs.

During the DSM/EE Program Plan period, the Companies plan to take several actions:

- Significantly expand the portfolio with new programs that support customers in every sector to install energy-efficient technologies

- Provide new offerings to support business customers, including one program specifically designed to engage the hard-to-reach small business sector and one program that relies on midstream incentives to take advantage of business lighting retrofits as efficiently as possible
- Introduce several new demand response programs that give customers in all sectors an opportunity to receive ongoing incentives when they reduce energy use during peak periods and provide the Companies with predictable, dispatchable load.
- Offer integrated efficiency and demand response incentives and focused promotional campaigns for products, such as smart thermostats, that provide both energy savings and direct load management capabilities. For example, eligible customers who purchase a qualifying product from the Companies' Online Transactional Marketplace, a subcomponent of the Connected Solutions program, and receive an energy efficiency incentive in the form of an instant discount will also be able sign up for the Bring-Your-Own Device (BYOD) subcomponent of Connected Solutions at checkout.
- Expand demand response offerings to more customers by actively recruiting new participants and technologies and by adding offerings for EVs and other devices such as room air conditioners and water heaters (as well as smart thermostats).
- Increase their investment in Income-Qualified Solutions by introducing a new component that specifically addresses whole-building savings for low-income multifamily properties and expanding eligibility to include moderate-income customers who are at or below 300% of the federal poverty level for all income-qualified offerings. Provide consultation and support to income qualifying customers so that they can most easily access IRA incentives.
- Continue their longstanding commitment to investing in marketing, outreach, and education to inform customers about their programs and the benefits of energy efficiency and to solicit feedback and ideas from trade allies, equipment dealers, distributors, and external stakeholders through the DSM Advisory Group and program evaluation research.
- Offer new technical resources (including residential online audits and small business on-site audits) that help customers identify and prioritize energy-savings opportunities and encourage them to invest in deep building and home retrofits and comprehensive measure packages that increase savings-per-customer interaction.
- Work closely with the state energy office and other stakeholders to encourage development of a state grant program that takes advantage of IRA funds and complements the DSM/EE Program Plan to provide the greatest benefit for customers, stakeholders, ratepayers, the Companies, and the state of Kentucky.
- Develop a communications and education plan to encourage participation in the Companies' new offerings.

1.3 Plan Development Process

The Companies developed the DSM/EE Program Plan in the context of the significant changes to utility markets discussed above, the need to better manage peak demand, the opportunity to expand

the portfolio with cost-effective new programs, and the Commission's request to evaluate additional programming options. In developing this plan, the Companies sought to identify a portfolio of programs that meet their objectives, provide DSM/EE solutions for all customer sectors, and offer reliable system load management opportunities during periods of peak demand.

The Companies used the following nine-step process to develop the DSM/EE Program Plan and constituent programs:

- ***Step 1: Identify potential energy efficiency and demand reduction programs.*** Through ongoing research and consultation with Cadmus, who advises utilities across the country on DSM/EE plans, the Companies created a comprehensive list of 39 potential programs (not including the Companies' administrative program) covering a wide range of energy efficiency end uses, demand reduction strategies, behavioral conservation approaches, and other innovations based on reviews of best practice programs, successful strategies offered by utilities in other jurisdictions, and ideas generated by the Companies' internal and external stakeholders. The Companies compiled key elements of each program's design, target audience, relevant measures, and delivery strategy.
- ***Step 2: Score each program.*** The Companies worked with Cadmus to design a customized scoring rubric using 12 key objective criteria (outlined in Appendix C) such as the program's ability to generate energy savings and demand reduction, be cost-effective, and benefit disadvantaged communities. Each criterion was weighted according to its importance to the Companies. The Companies then assigned six individuals to score each potential program by its ability to meet each criterion, which resulted in total scores ranging from zero to 100. The Companies selected 14 programs for further analysis including some that did not score relatively high in the rubric process but were identified as high priority by the Companies, the Commission, and/or stakeholders.[11]
- ***Step 3: Compile a comprehensive list of energy efficiency and conservation measures and practices.*** The Companies identified appropriate measures for the 14 selected programs and compiled data on each measure's technical specifications, potential end-use energy and peak demand impacts, and costs. The Companies relied on their potential studies, evaluation results, technical reference manuals from other jurisdictions, and other secondary sources.
- ***Step 4: Collaborate with stakeholders.*** Throughout developing the DSM/EE Program Plan, the Companies informed stakeholders of progress and solicited input through frequent formal and informal communications with multiple parties. This process is explained in further detail in the Stakeholder Collaboration and Third-Party Input section below.[12]
- ***Step 5: Estimate participation for each measure.*** The Companies estimated participation (number of installations) for measures in the DSM/EE Program Plan using historical

[11] For more details about the scoring rubric and process, see *Appendix C*.

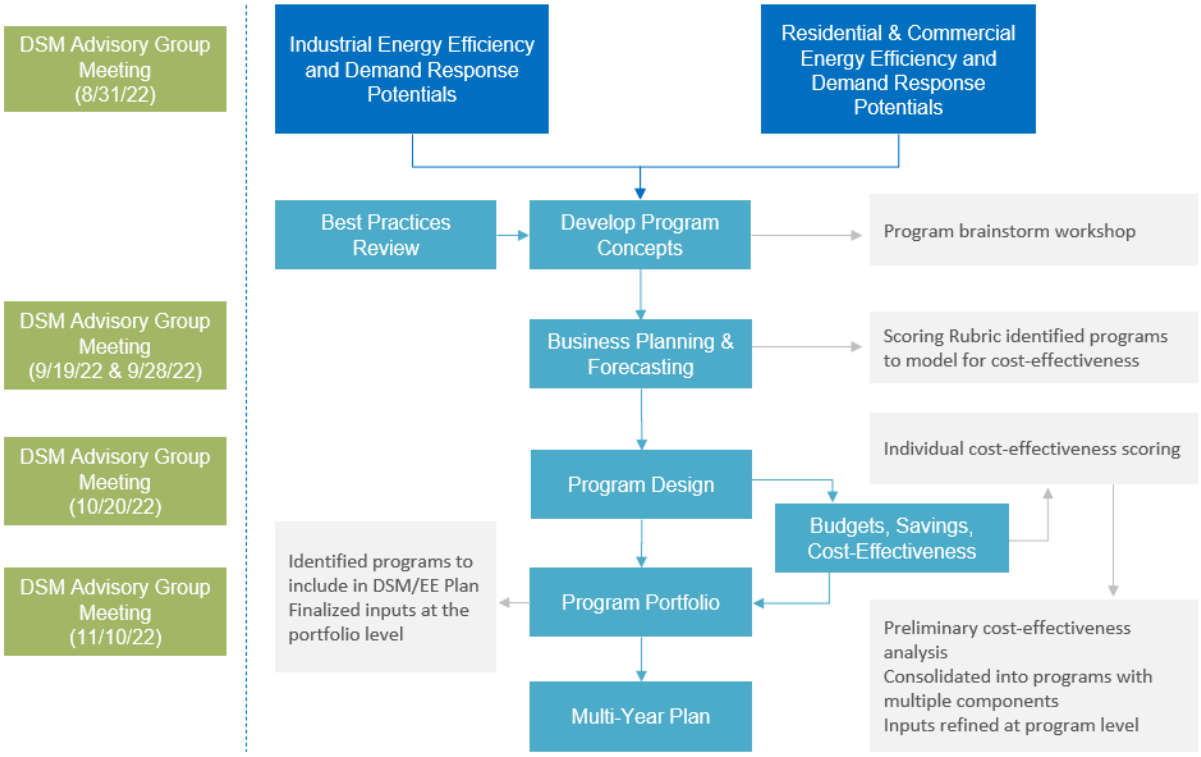
[12] The meeting minutes from these stakeholder meetings are available online: https://lge-ku.com/dsm

participation data (for measures currently offered), past potential studies, and secondary sources. The Companies then applied reasonable escalation (or de-escalation) rates that considered market trends, changing equipment standards, and other factors and projected those rates over the seven years of the plan.

- ***Step 6: Calculate savings for each program in the DSM/EE Program Plan.*** The Companies calculated program savings as the sum of each measure's annual energy-savings estimate and expected participation over the seven-year period. All savings in the plan are calculated at a gross level.
- ***Step 7: Determine cost-effectiveness.*** Using the costs, savings, and avoided benefits and costs estimates for each measure, the Companies computed the measure's cost-effectiveness from four benefit/cost test perspectives (as described in Program Benefit/Cost Calculations section below). The Companies analyzed cost-effectiveness at three stages:
  - Each of the 14 programs selected for further analysis in the Companies' scoring process was analyzed for cost-effectiveness.
  - Based on the results of the initial analysis, the Companies bundled some programs into more comprehensive offerings with multiple delivery components according to the program design, target customer population, or delivery strategy. This allowed the Companies to combine programs that could be communicated better as a package of solutions and provide more value to the customer. During this stage, the Companies analyzed the cost-effectiveness of all programs selected for cost-effectiveness analysis.
  - The Companies then selected a final set of conservation programs for the portfolio based on each program's ability to achieve or exceed the Total Resource Cost test cost-effectiveness threshold of 1.0 as well as each program's overall benefits to customers, priority for stakeholders, and contribution to the Companies' objectives. For example, although Income-Qualified Solutions does not pass the cost-effectiveness threshold, the Companies included it in the portfolio to address a critical need for energy efficiency services among their most vulnerable customers and because it was important to the DSM Advisory Group's stakeholders. The only program that was included in the cost-effectiveness analysis that was removed from the portfolio was energy efficiency financing. This program was cut by the Companies because they expect customers may have access to energy efficiency financing through Kentucky's allocation of federal IRA funding. This program also failed the Total Resource Cost test.
- ***Step 8: Balance the Plan.*** Finally, the Companies iteratively adjusted each program's expected participants and customer incentive levels as needed to balance the DSM/EE Program Plan. The goal was to provide a reasonable mix of programs that meet the Companies' objectives for a comprehensive plan with robust programmatic options for all customer sectors and segments.

Figure 1 illustrates the DSM/EE Program Plan development process described above.

Figure 1. DSM/EE Program Plan Development Process



1.4 Plan Overview

This DSM/EE Program Plan comprises demand-side management programs organized in two portfolio sections—energy efficiency and demand response. The plan also proposes a budget for Program Development and Administration.

Some programs that the Companies proposed in Case No. 2017-00441 (and that the Commission approved) will continue with modifications. However, because they are faced with a capacity shortfall during the plan period, the Companies are proposing new and modified program offerings to maximize the opportunity for cost-effective DSM/EE savings for customers across all sectors.

Figure 2 illustrates the proposed structure of the 2024-2030 DSM/EE Program Plan portfolio.

Figure 2. 2024-2030 DSM/EE Program Plan Proposed Portfolio Structure

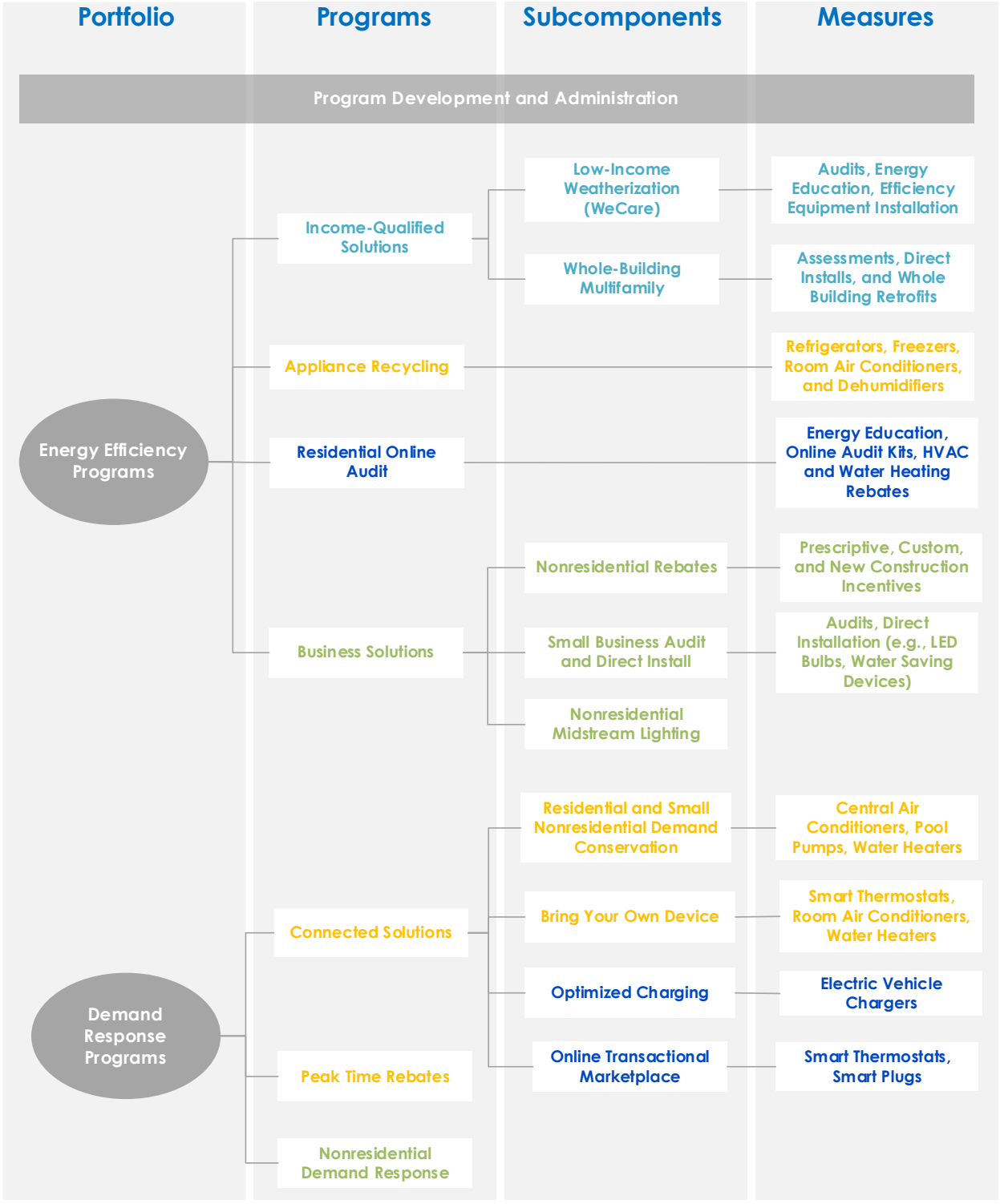


Table 1-1 provides a summary of proposed changes to the Companies' current DSM/EE portfolio.

Table 1-1. Proposed DSM/EE Program Plan Changes

Program	Modifications Proposed	New Programs Proposed	Changes/Details
Administrative Program			
Program Development and Administration	•		• Add 2.5 new full-time equivalent (FTE) staff to assist in program support, reporting, EM&V, pilot studies, and provide management support for the expanded portfolio • Increase research and development budget to explore customer preferences for solar and other distributed energy resource options through surveys and/or focus groups • Update DSM management, tracking, and reporting system to streamline administration
Energy Efficiency Programs			
Income-Qualified Solutions (formerly WeCare)	•		• Increase WeCare income eligibility to include customers who are at or below 300% of the federal poverty level (FPL) from 200% • Increase overall average allowable measure cost per single-family home from $1,500 to $1,650 plus an additional $200 per project for smart thermostats • Initiate direct enrollment into demand response offerings for smart thermostat recipients • Add whole-building program subcomponent for multifamily properties, which includes measures for tenant units as well as incentives for common area projects
Appliance Recycling Program		•	• Relaunch program that ended in 2018 to restart in 2026 • Offer free pick-up and $50 incentive for recycling functioning refrigerator and/or freezer • Offer free dehumidifier and room air conditioner pick-up when other equipment is picked up
Residential Online Audit Program		•	• Offer customers a free online audit questionnaire that collects data about their home in exchange for a customized report about how to lower their energy use • Send customers an online audit kit upon audit completion with energy efficiency measures to self-install and prescriptive rebates to encourage adoption of energy efficiency upgrades • Launch in 2025 to provide time to set up the program's necessary software infrastructure

Program	Modifications Proposed	New Programs Proposed	Changes/Details
Business Solutions (formerly Nonresidential Rebates)	•		• Redesign custom incentives to prioritize demand reduction • Remove incentive cap to encourage larger projects and larger businesses to participate (including industrial customers who may have previously opted out of DSM/EE); previous incentive cap was $50,000 annually and $100,000 in total • Remove look back allowances (allowing submission for incentives after project initiation) • Remove the small business kits • Add a small business audit and direct install program subcomponent • Add a midstream delivery mechanism for nonresidential lighting; ramp down prescriptive lighting rebates in 2026 and shift lighting incentives exclusively to midstream in 2027
Demand Response Programs			
Connected Solutions (formerly Residential and Small Nonresidential Demand Conservation Program)	•		• Continue direct load control (DLC) for current participants and increase incentives, expecting lower participation as the program matures due to switch failures • Add a BYOD program subcomponent for residential and small nonresidential customers to enroll in to participate in demand response events via smart thermostats, room air conditioners, and water heaters • Add an Optimized Charging program subcomponent to allow demand response and load shifting for EV charging • Expand existing Online Marketplace to include savings from measure transactions; allowing customers to receive instant discounts on purchases of smart thermostats and smart plugs directly from the Companies' marketplace (add BYOD enablement devices in 2026) • Add direct enrollment to demand response offerings for purchasers of applicable measures (i.e., smart thermostats) through the new Online Transactional Marketplace
Peak Time Rebates		•	• Educate customers and incent voluntary conservation of energy when a peak event is called by the Companies • Use advanced metering infrastructure data to monitor impacts of peak event reductions • Launch in 2025 to allow further advanced metering infrastructure deployment and provide time to set up the program's necessary software infrastructure

Program	Modifications Proposed	New Programs Proposed	Changes/Details
Nonresidential Demand Response Program (formerly Large Nonresidential Demand Conservation Program)	•		• • Redesign the incentive structure to increase participation and increase customer benefit • Increase event maximum from up to 80 to up to 100 hours and expand event season from summer only to year round

1.4.1 Stakeholder Collaboration and Third-Party Input

To inform the DSM/EE Program Plan, the Companies worked with their DSM Advisory Group, which provides a forum for open discussion and sharing of information that would benefit the customers served by the plan. The DSM Advisory Group comprises representatives of the Office of the Attorney General and various customer groups, including residential, commercial, industrial, and low-income, as well as representatives of environmental advocacy organizations and metro governments.[13]

Specific activities of the DSM Advisory Group include the following:

- Respond to survey requests to outline areas important to Advisory group constituencies
- Review the progress and performance of the current energy efficiency programs
- Offer suggestions to improve the programs' productivity and effectiveness
- Provide consultation for the development of potential future programs

In preparation for developing this DSM/EE Program Plan and future filings, the Companies convened five advisory group meetings during 2022 that focused on general program and portfolio planning. Table 1-2 lists the main topics covered in these stakeholder meetings.[14]

Table 1-2. Summary of Stakeholder Engagement

Date of Stakeholder Meeting	Number of Attendees	Topics Covered
August 31, 2022	17[1]	• Recap of DSM planning and development process
September 19, 2022	34	• DSM program concept overview • Explanation of program evaluation process • Program scoring results discussion
September 28, 2022	23	
October 20, 2022	29	• Preliminary cost-effectiveness results for potential programs
November 10, 2022	32	• Proposed DSM/EE Program Plan overview • Proposed market research and pilot funding discussion

[1] For the August meeting, this is the number of stakeholder groups represented rather than the total number of attendees.

1.5 Program Benefit/Cost Calculations

The Companies performed the benefit/cost ratio tests required by the Commission[15] for each proposed program in this DSM/EE Program Plan. The Companies used DSM PortfolioPro+, a PC-based software package, to conduct the benefit/cost analysis for this plan, as they have for previous plans.

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[13] More detailed information concerning the DSM Advisory Group and its activities, including recent attendee lists, presentations, and meeting minutes, are available on the Companies' website at https://lge-ku.com/dsm.

[14] The meeting minutes from these stakeholder meetings are available online at https://lge-ku.com/dsm

[15] *Electronic Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Review, Modification, and Continuation of Certain Existing, Demand-Side Management and Energy Efficiency Programs*, Case No. 2017-00441, Order at 28-29 (Ky. PSC Oct. 5, 2018)

The DSM PortfolioPro+ input summary reports for the programs are included in *Appendix A* and the output reports are included in *Appendix B.*

1.5.1 Benefit/Cost Ratios for California Standards Tests

The four benefit/cost tests the Commission currently employs are from the California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects. The tests consider a program's cost-effectiveness from four different perspectives.[16] The manual defines each test as follows:

- ***The Total Resource Cost (TRC) Test*** measures the net costs of a DSM/EE program as a resource option based on the total costs of the program, including both the participants' and the utility's costs. This test represents the combination of the effects of a program on the customers who participate as well as on those who do not. In a sense, it is the summation of the benefit and cost terms in the Participant Cost and the Ratepayer Impact Measure tests, where the revenue (bill) change and the incentive terms intuitively cancel (except for the differences in net and gross savings).
- ***The Participant Cost Test (PCT)*** is the measure of the quantifiable benefits and costs to the customer from participation in a program. Because many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.
- ***The Ratepayer Impact Measurement (RIM) Test*** measures what happens to customer bills or rates as a result of changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs (i.e., if the benefit/cost ratio is greater than 1.0). Conversely, rates or bills go up if revenues collected after program implementation are less than the total costs incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.
- ***The Program Administrator Cost (PAC) Test (or Utility Cost Test)*** measures the net costs of a DSM/EE program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits, but costs are defined more narrowly.

Table 1-3 summarizes the four tests' components.

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[16] California Public Utilities Commission and California Energy Commission. July 2002. *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects.* http://www.calmac.org/events/spm_9_20_02.pdf.

Table 1-3. Cost-Effectiveness Using Commission-Required Cost-Benefit Tests

Benefit/Cost		TRC	PCT	RIM	PAC
Benefits	Present value of electric avoided energy and capacity costs[1]	●		●	●
	Present value of gas avoided costs	●		●	●
	Present value of bill savings and incentives received		●		
Costs	Program administrative and marketing costs	●		●	●
	Incremental measure costs incurred by participants	●	●		
	Incentive costs			●	●
	Present value of utility lost revenues			●	
	Installation costs		●		

[1]The present value of electric avoided energy and capacity costs includes avoided line losses occurring from reductions in customer electric use. Present value also includes avoided transmission and distribution benefits.

The Companies have historically considered programs that pass the TRC test as cost-effective. The TRC test is the most comprehensive indicator of whether a potential DSM/EE program will create net benefits for customers and the utilities. A program is considered cost-effective if its total resource cost benefits are positive or, in other words, if the ratio of the net present value of the program's benefits compared with its costs is greater than 1.0

1.5.2 Portfolio Benefit/Cost Ratios

The Companies performed the benefit/cost tests described above for the proposed DSM/EE programs included in this filing, as shown in Table 1-4.

Table 1-4. Cost-Benefit Test Results

Program	TRC	PCT	RIM	PAC
Program Development and Administration	0.00	N/A	0.00	0.00
Income-Qualified Solutions	0.27	N/A	0.13	0.27
Appliance Recycling Program	1.02	N/A	0.20	0.81
Residential Online Audit Program	0.74	5.10	0.19	1.06
Business Solutions	1.84	7.40	0.27	7.93
Connected Solutions	3.52	12.65	0.94	1.17
Peak Time Rebates	2.62	N/A	0.40	0.40
Nonresidential Demand Response Program	1.68	1.36	1.34	1.37
Overall Portfolio	**1.54**	**7.53**	**0.32**	**1.83**

1.6 Implementation Plan and Timeline

Continued implementation of the DSM/EE Program Plan requires the support of procurement, marketing, IT, communications, and other staff at the Companies. These personnel will support necessary contract work and develop marketing and communications plans to encourage customers to participate in the new and enhanced programs. Particularly, IT personnel will facilitate the integration of specialized software applications that are vital to the programs in this DSM/EE Program Plan. While this filing is pending with the Commission, the Companies intend to continue implementation of their current 2019-2025 DSM/EE Program Plan with the third-party vendors currently contracted

for the plan period. The Companies will issue RFPs in 2023 to determine which third-party vendors will implement the programs and software in 2024 and beyond, if approved by the Commission.

1.7 Energy and Demand Reduction

Table 1-5, Table 1-6, and Table 1-7 illustrate the projected energy savings[17] and demand impacts expected to accrue from the programs contained in this filing.

Table 1-5. Annual Impacts (Energy Efficiency Portfolio)

	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Energy[1]	MWh	92,446	101,411	130,165	150,229	153,233	132,065	115,034	**874,584**
Demand	MW	18.2	20.0	25.7	29.3	29.4	25.3	22.0	**170.0**
Gas	CCF	149,125	171,196	204,251	260,979	314,589	300,442	299,101	**1,699,683**

[1] Annual energy efficiency savings associated with measures sold through the Online Transactional Marketplace subcomponent of Connected Solutions are also shown in this table.

Table 1-6. Cumulative Impacts (Energy Efficiency Portfolio)

	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Energy[1]	MWh	92,446	193,857	324,022	474,251	627,484	759,549	874,584
Demand	MW	18.2	38.2	63.9	93.2	122.6	147.9	170.0
Gas	CCF	149,125	320,321	524,572	785,551	1,100,140	1,400,582	1,699,683

[1] Annual energy efficiency savings associated with measures sold through the Online Transactional Marketplace subcomponent of Connected Solutions are also shown in this table.

Table 1-7. Annual Impacts (Demand Response Portfolio)

	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Energy	MWh	288	361	444	554	667	782	782
Demand[1]	MW	154.7	155.7	160.4	174.7	197.3	207.5	206.9
Gas	CCF	0	0	0	0	0	0	0

[1] Annual impacts represent summer demand only.

[17] Natural gas energy savings presented in one hundred cubic feet (CCF), where approximately 1.037 therms equals one CCF based on the U.S. annual average heat content of natural gas to consumers in 2020 (U.S. Energy Information Administration).

1.8 Program Budgets

Table 1-8 summarizes the proposed budget by program (including capital budget).

Table 1-8. Annual Program Budgets

Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Program Development and Administration	3,628	3,556	2,710	2,889	2,769	2,801	2,983	21,336
Income-Qualified Solutions	10,060	10,072	10,239	10,106	10,123	10,141	10,160	70,902
Appliance Recycling Program	0	0	1,671	1,723	1,926	1,778	1,781	8,880
Residential Online Audit Program	0	1,085	1,265	1,597	1,681	1,636	1,640	8,904
Business Solutions	5,290	5,795	7,820	8,078	8,400	7,502	7,014	49,899
Connected Solutions	5,817	5,922	7,185	11,236	21,955	23,386	25,237	100,739
Peak Time Rebates	250	2,745	2,959	5,682	9,922	10,075	9,929	41,562
Nonresidential Demand Response Program	3,469	4,134	4,650	5,579	6,452	7,329	6,908	38,520
Total Portfolio Budget	**28,514**	**33,309**	**38,499**	**46,890**	**63,228**	**64,649**	**65,653**	**340,742**

Table 1-9 summarizes only the capital budget by program. There are no capital budget costs in Year 7 because there are no new project set up costs projected that far into the plan period.

Table 1-9. Annual Capital Budget

Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Program Development and Administration	1,000	800	0	0	0	0	0	**1,800**
Connected Solutions	625	0	0	0	0	0	0	**625**
Peak Time Rebates	250	1,150	0	0	0	0	0	**1,400**
Nonresidential Demand Response Program	314	271	307	405	419	425	0	**2,142**
Total Portfolio Budget	**2,189**	**2,221**	**307**	**405**	**419**	**425**	**0**	**5,967**

2 Administrative Program

2.1 Program Development and Administration

2.1.1 Program Overview

The Companies established the Program Development and Administration to capture the following costs incurred in developing and administering the energy efficiency initiatives that are difficult to assign to an individual program:

- New program concept and initial design
- Market research related to new programming, for example, customer research (e.g., surveys, choice-based modeling analysis, focus groups) to understand market demand for customer-sited and community solar program options and other distributed energy resources[18]
- Research and technical evaluation of new technologies and programs, including potential studies
- Research and development for pilot programs
- Oversight and management of evaluation, measurement, and verification (EM&V) contractors
- Development of DSM rates in Companies' tariffs that are submitted to the Commission
- Overall program tracking and management
- Integration of company and vendor software
- Attendance at energy efficiency and DSM conferences and workshops
- Development of key personnel
- Membership in associated trade organizations
- Subscriptions to educational and trade publications
- Office supplies and equipment related to general management of the energy efficiency organization

As in previous budget cycles, the Companies will not be required to spend the full amount of the budget for these efforts. The Companies are seeking to increase the current head count of the Program Development and Administration infrastructure by approximately 2.5 full-time positions. In addition, to accommodate the expanded offerings of the proposed DSM/EE Program Plan, the Companies included budget for a centralized DSM tracking and reporting system to streamline the administration of the programs internally, with participating customers, and among the Companies' contracted implementation vendors.

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[18] The Companies' DSM/EE Program Plan does not currently include renewables, but stakeholders are eager for more information about renewable program options for customers. The Companies will collect data to inform program development and decision making in the future. The Companies' current renewable energy program offerings are detailed on their websites: https://lge-ku.com/residential-renewable-options and https://lge-ku.com/business-renewable-options

2.1.2 Rationale for Request

The Companies are proposing to expand the DSM/EE portfolio to maximize load reduction during the plan period. The Companies are proposing greater budgets, higher participation targets for many of the DSM/EE offerings, and a wider selection of program services for customers to participate in. The Companies require more staff and an updated DSM tracking and reporting system to support efforts associated with the proposed DSM/EE portfolio.

2.1.3 Implementation Plan

Program Development and Administration is an ongoing daily activity; there is no specific implementation strategy. Expenditure activity proposed in this filing will not commence until the filing is approved by the Commission.

2.1.4 Annual Program Budget

The annual budget for Program Development and Administration is presented in Table 2-1.

Table 2-1. Program Development and Administration Annual Budget

Program Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Administration	953	981	1,010	1,039	1,069	1,101	1,133	**7,286**
Implementation	525	775	400	400	400	400	400	**3,300**
Incentives	0	0	0	0	0	0	0	**0**
Miscellaneous	2,150	1,800	1,300	1,450	1,300	1,300	1,450	**10,750**
Total	**3,628**	**3,556**	**2,710**	**2,889**	**2,769**	**2,801**	**2,983**	**21,336**

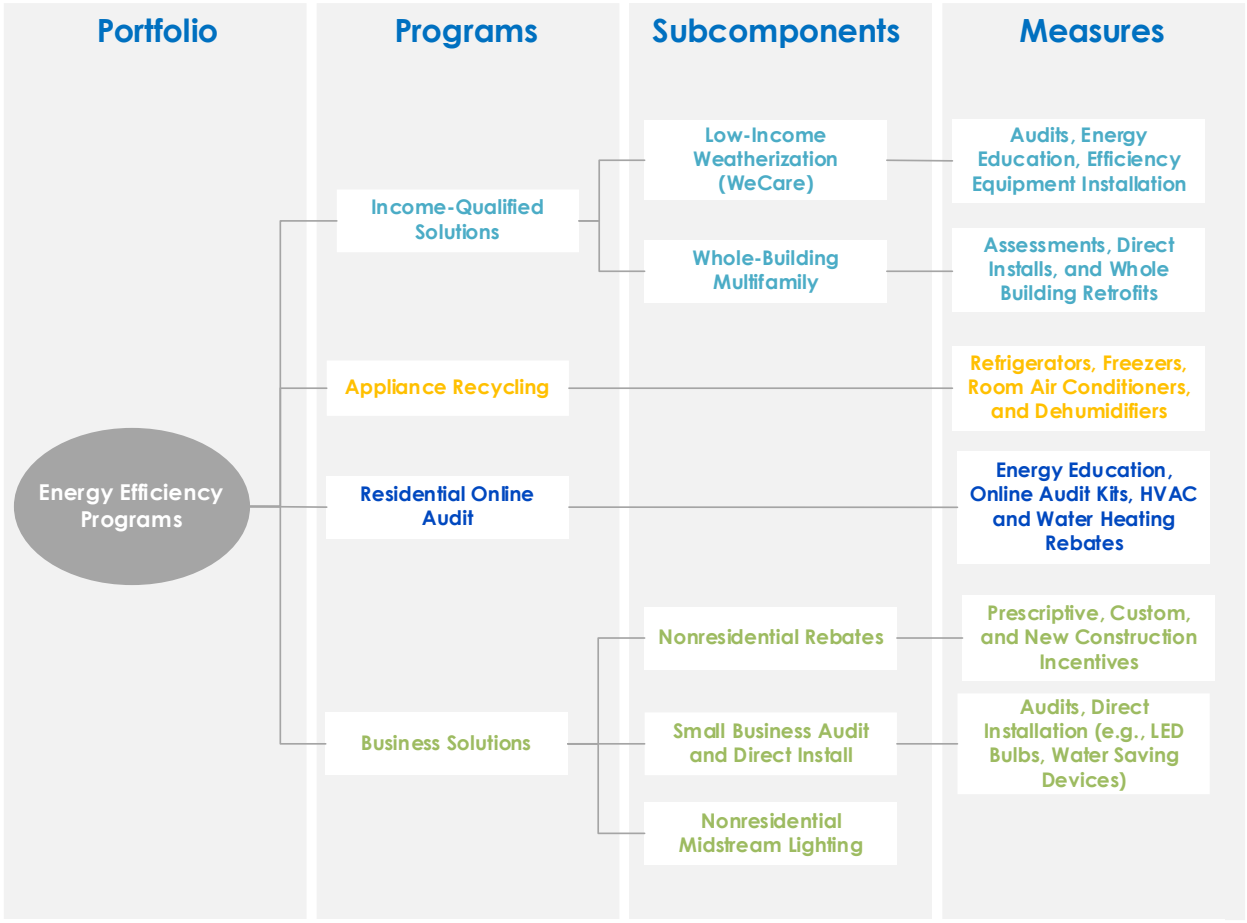
Program Budgetary Assumptions

The Companies are seeking to increase the current head count of the Program Development and Administration infrastructure to account for more DSM/EE offerings compared with previous program years. Program labor assumes a total of 4.3 FTE employees. The miscellaneous program cost includes the setup and maintenance costs of a digital DSM tracking and reporting system. The Companies planned $1,800,000 for the setup cost of a centralized, digital DSM tracking and reporting system as capital. The Program Development and Administration represents approximately 6% of total DSM/EE expenditures.

3 Energy Efficiency Programs

The Companies propose to offer a robust portfolio of energy efficiency programs, as outlined in Figure 3.

Figure 3. Energy Efficiency Portfolio Structure



3.1 Income-Qualified Solutions

3.1.1 Program Overview

Income-Qualified Solutions helps low- and moderate-income customers to lower their energy bills. To accomplish this, the Companies provide home weatherization assistance, installation of energy-efficient measures, and education about how to conserve energy and manage utility costs to income-qualified customers residing in single-family and multifamily homes.

The Low-Income Weatherization (WeCare) subcomponent is an education and weatherization program designed to reduce energy consumption of income-qualified customers. It provides energy audits, energy education, and installation of weatherization and energy conservation measures in qualified single-family homes.

The Whole-Building Multifamily subcomponent will expand upon the current WeCare offering by providing multifamily property managers and owners with a turnkey service for increasing the efficiency of their income-qualified properties' common areas and tenant units. The Companies will provide the following:

- Direct installation of various energy-saving devices to help reduce energy use in residents' living units and in common areas, free to both the property owners and tenants
- Incentives to property managers and owners who purchase high-efficiency equipment to retrofit the property as a whole, rather than as individual units
- Energy usage and conservation education

The Companies propose to modify the program in the following ways:

- Change the program name to Income-Qualified Solutions
- Expand eligibility to serve customers who are at or below 300% of the federal poverty level
- Use publicly available Census data to better target income-eligible customers for deeper energy savings opportunities by geotargeting households based on data metrics such as poverty level, heating fuel, and home age. Proactively promote program services directly to customers in identified high-need areas.
- Increase overall average allowable measure cost per single-family home from $1,500 to $1,650 (plus $200 per home for smart thermostats)
- Add smart thermostats as a program measure and direct enroll measure recipients into applicable demand conservation offerings (i.e., Bring-Your-Own Device subcomponent of Connected Solutions)
- Increase budget to include IRA consultation and education, so the Companies are aware of how federal funding can be leveraged to serve both the Companies and their income-eligible customers' energy needs most comprehensively
- Expand services to multifamily properties by encouraging whole-building (common area) retrofits and offer both residential and nonresidential measures; 50% of project incremental costs will be incented by the Companies

3.1.2 Rationale for Request

The Companies are proposing to expand eligibility to serve customers who are at or below 300% of the federal poverty level. Because the COVID-19 pandemic has had a major impact on Kentucky's economy, the income of customers within the territory may have changed recently, and the Companies want to make sure they provide program services to moderate-income customers as well as low-income customers. The current income eligibility for WeCare is 200% of the federal poverty level.

In an effort to uncover deeper energy savings, the Companies will invest in geotargeting to identify households with a high potential for whole-building retrofits. The Companies will work with a third party to analyze publicly available Census data to identify households with a higher propensity for

needing deeper retrofits such as HVAC and weatherization. In addition to the regular promotional efforts that will continue for WeCare, the Companies will proactively promote both single-family and multifamily offerings in areas of the territory identified by the data as needing program services. This targeted outreach will increase overall program savings while also providing larger energy bill reductions for vulnerable customers. Because of the focus on deeper energy savings, the Companies propose increasing the overall average allowable measure cost per single-family home from $1,500 to $1,650 to accommodate higher-cost energy-saving improvements.

The Companies propose adding smart thermostats as a program measure offering (the measure cost of $200 will be on top of the allowable measure cost per home). Smart thermostats provide not only year-round energy saving opportunities (which will be captured through Income Qualified Solutions), but also an automated mechanism for reliable demand reduction during load control events called during peak periods in winter and summer. Customers who receive smart thermostats through Income-Qualified Solutions will be directly enrolled in the Bring-Your-Own-Device subcomponent of Connected Solutions. Demand reduction resulting from load control events will be captured through Connected Solutions, and direct enrollment through Income Qualified Solutions will increase overall participation in the Companies' demand conservation offerings.

With the influx of federal funding to the income-qualified weatherization space at a national level, the Companies want to understand how to maximize potential funding sources and comprehensively serve customers. An IRA expert/consultant will provide education to customers about how to access available funding to better support customers' energy needs. Additional funding from the IRA is expected to increase the availability of funding for health and safety measures that the Companies may leverage to decrease deferral rates.

The Companies designed the Whole-Building Multifamily subcomponent to encourage property owners of both residential and commercial spaces to complete comprehensive energy improvements. The subcomponent follows a whole-property approach to address individual unit and common area energy savings that benefit the entire housing complex.

3.1.3 Program Audience

Depending on the building's utility meter structure, Income-Qualified Solutions will provide energy and demand savings for residential (e.g., individually metered units) and nonresidential (e.g., master-metered buildings) customers.

WeCare will target residential customers who qualify for Federal low-income Weatherization Assistance Program or Low Income Home Energy Assistance Program services as well as those who are at or below 300% of the federal poverty level.

The Whole-Building Multifamily subcomponent will target multifamily property managers and owners serving low-income tenants, including those in Section 8 housing. Eligible homes with fewer

than four units will qualify as single-family homes, while multifamily buildings will be defined as dwellings with four or more units.

3.1.4 Program Benefits

Through Income-Qualified Solutions, low-income customers receive energy efficiency education and benefit from increased comfort and savings on their monthly energy costs. The expanded income eligibility will allow energy-saving benefits to reach a wider share of the low- and moderate-income customer segment. The program will also provide necessary support to multifamily property managers and owners who serve low-income communities and who otherwise may not have the resources (e.g., capital budget, staffing, energy efficiency knowledge) to implement energy-saving improvements for their tenants. Through the program's educational component, customers gain a better understanding of how to keep utility bills as low as possible by improving energy-use habits. Over the long term, this education will continue to benefit customers in future homes or in new service territories.

3.1.5 Participation Goals

Projected annual participation goals for Income-Qualified Solutions are presented in Table 3-1.

Table 3-1. Income-Qualified Solutions Participation Goals

Measures	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
WeCare[1]								
Annual Participation								
LG&E	2,295	2,295	2,295	2,295	2,295	2,295	2,295	**16,065**
KU	2,295	2,295	2,295	2,295	2,295	2,295	2,295	**16,065**
Total	**4,590**	**4,590**	**4,590**	**4,590**	**4,590**	**4,590**	**4,590**	**32,130**
Cumulative Participation								
LG&E	2,295	4,590	6,885	9,180	11,475	13,770	16,065	**16,065**
KU	2,295	4,590	6,885	9,180	11,475	13,770	16,065	**16,065**
Total	**4,590**	**9,180**	**13,770**	**18,360**	**22,950**	**27,540**	**32,130**	**32,130**
Whole-Building Multifamily[2]								
Annual Participation								
LG&E	400	400	400	400	400	400	400	**2,800**
KU	400	400	400	400	400	400	400	**2,800**
Total	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**5,600**
Cumulative Participation								
LG&E	400	800	1,200	1,600	2,000	2,400	2,800	**2,800**
KU	400	800	1,200	1,600	2,000	2,400	2,800	**2,800**
Total	**800**	**1,600**	**2,400**	**3,200**	**4,000**	**4,800**	**5,600**	**5,600**

[1] WeCare participation targets represent the number of projected households served.

[2] Whole-Building Multifamily participation targets represent the number of projected tenant units served. The Companies forecast five custom projects will be completed in multifamily common areas per program year.

3.1.6 Energy and Demand Impacts

Projected annual and cumulative energy savings and demand reduction for Income-Qualified Solutions are presented in Table 3-2.

Table 3-2. Income-Qualified Solutions Annual and Cumulative Energy and Demand Impacts

Usage Reductions	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Reductions									
Energy	MWh	4,405	4,405	4,405	4,405	4,405	4,405	4,405	**30,833**
Demand	MW	0.37	0.37	0.37	0.37	0.37	0.37	0.37	**2.59**
Gas	CCF	132,439	132,439	132,439	132,439	132,439	132,439	132,439	**927,071**
Cumulative Reductions									
Energy	MWh	4,405	8,809	13,214	17,619	22,024	26,428	30,833	**30,833**
Demand	MW	0.37	0.74	1.11	1.48	1.85	2.22	2.59	**2.59**
Gas	CCF	132,439	264,878	397,316	529,755	662,194	794,633	927,071	**927,071**

3.1.7 Customer Incentives

Each Income-Qualified Solutions participant is provided with an audit, energy education, and home weatherization services at no cost. The incentive structure provides an average $1,650 in program services per single-family household and $750 per multifamily unit.

Participants will continue to receive a mix of these energy-savings measures (as appropriate for each home):

- Insulation
- Weatherstripping/caulking
- Water-saving devices
- Smart strips
- Refrigerator, window, and door replacements
- Water heater pipe and tank wrap
- HVAC system replacement/tune-up
- High-efficiency lighting (e.g., LEDs)
- Infiltration reduction
- Health, educational information on energy efficiency, safety, and repairs

The Companies propose adding smart thermostats to the program measure mix at no cost to the customer. The Companies' smart thermostat costs will be allowed in addition to the overall average allowable measure cost per home. The Companies will continue to pay up to $250 per home for health and safety measures (e.g., carbon monoxide detectors) and household repairs (if repairs are required to facilitate installation of the energy-saving measure). These measures and repairs will be accounted for within the overall average allowable measure cost per home. Where applicable, the Companies will work with nonprofit organizations to leverage state and federal funding to increase installation of health and safety measures, especially where home repairs may provide access to greater potential for energy-saving retrofits. The ultimate benefit received by customers is a more affordable and comfortable home.

Through the Whole-Building Multifamily subcomponent, the Companies offer property owners and tenants direct installation of energy efficiency measures to reduce energy use in units and common areas at no cost. Customers who participate receive a range of measures that provide instant energy savings (such as LED bulbs, low-flow showerheads, pipe wrap, and faucet aerators) along with educational materials on the benefits of energy efficiency and ways to save. In addition, the Companies propose to offer prescriptive and custom energy-saving measures for whole-building retrofits in

multifamily complexes. The Whole-Building Multifamily subcomponent will require property managers and owners to contribute to project costs. The Companies will offer an incentive that covers 50% of whole-building project incremental costs. Equipment upgrades are recommended by a program technician who conducts an energy assessment of the property. Installed measures must save on fuel supplied by the Companies.

3.1.8 Implementation Plan

The Companies will administer the program and contract with a third-party vendor (and community action agencies where feasible) to provide implementation services such as recruiting and verifying the eligibility of potential participants, conducting total property energy assessments, installing energy efficiency measures, ensuring production schedules are met, updating the program tracking database, managing installation contractor expectations and performance, and maintaining program expenditures within the annual budget. For multifamily participants, the vendor will provide property managers and owners with a comprehensive assessment report identifying cost-effective energy efficiency upgrades in tenant units and common areas and will coordinate installation efforts for whole-building retrofits.

The Companies will continue to collaborate with low-income advocates through their Customer Commitment Advisory Forum. The forum provides low-income agencies with a process to meet regularly with the Companies to discuss low-income customer issues.

3.1.9 Annual Program Budget

The annual budget for Income-Qualified Solutions is presented in Table 3-3. The Companies are proposing a 124% increase in their total seven-year Income-Qualified Solutions budget (compared with the previous 2019-2025 WeCare budget) to serve more income-qualified customers and provide opportunities for deeper retrofits and further bill reductions in households and buildings that need it the most.

Table 3-3. Income-Qualified Solutions Annual Budget

Program Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Administration	402	414	426	439	451	464	478	**3,075**
Implementation	9,268	9,418	9,423	9,427	9,432	9,437	9,442	**65,847**
Incentives	0	0	0	0	0	0	0	**0**
Miscellaneous	390	240	390	240	240	240	240	**1,980**
Total	**10,060**	**10,072**	**10,239**	**10,106**	**10,123**	**10,141**	**10,160**	**70,902**

Program Budgetary Assumptions

The Income-Qualified Solutions budget allocates funds equivalent to 1.75 full-time program manager, one full-time program associate, and 0.1 full-time operations manager. The budget assumes implementation contractors will provide intake services, audits, education, installation of measures including smart thermostats, and general program administration. The labor escalation rate is 3.0%,

with an EM&V expenditure occurring twice over the seven-year planning period (WeCare subcomponent in 2024 and Whole-Building Multifamily subcomponent in 2026). Income-Qualified Solutions represents approximately 4% of electric energy savings and 55% of CCF energy savings, accounting for 21% of total DSM/EE expenditures.

3.2 Appliance Recycling Program

3.2.1 Program Overview

The Appliance Recycling Program offers residential customers an opportunity to safely dispose of and recycle inefficient appliances and receive a one-time incentive for doing so. The Companies seek to work with an independent third-party vendor to collect and transport working but inefficient appliances to an appropriate recycling center that is responsible for adhering to local, state, and federal recycling ordinances. The program seeks to target removal and recycling of refrigerators, freezers, room air conditioners, and dehumidifiers.

3.2.2 Rationale for Request

Removal of inefficient appliances reduces energy consumption and demand as well as the burden on Kentucky landfills by enabling the safe disposal of hazardous chemicals.

Program administrators across the country consider appliance recycling to be an important customer service offering, and appliance recycling programs typically have high customer satisfaction ratings. According to previous process evaluations, participants reported high satisfaction with the Companies' 2016 Appliance Recycling Program overall, as well as specific components of the program. The Companies seek to offer this program again, starting in 2026 to allow time for program ramp up, because it is conducive to customer expectations and achieves cost-effective energy and demand savings.

3.2.3 Program Audience

The program is open to all residential electric customers. Small nonresidential customers with residential-size appliances may also qualify for the program. Because there is no upfront cost for program participation, the Appliance Recycling Program also benefits low-income customers.

3.2.4 Program Benefits

Removal of secondary refrigerator, freezer, room air conditioner, and dehumidifier units from the electric grid results in a reduction of energy consumption and demand. The program targets customers who are likely to own a secondary refrigerator or freezer that is typically stored in a garage or a basement and is not used to full capacity.

3.2.5 Participation Goals

Projected annual participation goals for the Appliance Recycling Program are presented in Table 3-4.

Table 3-4. Appliance Recycling Program Participation Goals[1]

Measures	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Participation								
LG&E	0	0	3,045	3,553	4,060	4,060	4,060	**18,778**
KU	0	0	3,045	3,553	4,060	4,060	4,060	**18,778**
Total	**0**	**0**	**6,090**	**7,105**	**8,120**	**8,120**	**8,120**	**37,555**
Cumulative Participation								
LG&E	0	0	3,045	6,598	10,658	14,718	18,778	**18,778**
KU	0	0	3,045	6,598	10,658	14,718	18,778	**18,778**
Total	**0**	**0**	**6,090**	**13,195**	**21,315**	**29,435**	**37,555**	**37,555**

[1] Appliance Recycling Program participation targets represent the projected number of appliances (secondary refrigerator, freezer, room air conditioner, and dehumidifier) removed through the program.

3.2.6 Energy and Demand Impacts

Projected annual and cumulative energy savings and demand reduction for the Appliance Recycling Program are presented in Table 3-5.

Table 3-5. Appliance Recycling Program Annual and Cumulative Energy and Demand Impacts

Usage Reductions	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Reductions									
Energy	MWh	0	0	4,543	5,300	6,057	6,057	6,057	**28,013**
Demand	MW	0	0	0.5	0.6	0.7	0.7	0.7	**3.3**
Gas	CCF	0	0	0	0	0	0	0	**0**
Cumulative Reductions									
Energy	MWh	0	0	4,543	9,842	15,899	21,956	28,013	**28,013**
Demand	MW	0	0	0.5	1.2	1.9	2.6	3.3	**3.3**
Gas	CCF	0	0	0	0	0	0	0	**0**

3.2.7 Customer Incentives

The purpose of the incentive is to offset the perceived customer convenience of keeping an inefficient secondary appliance. The Companies will offer free pick-up and $50 per eligible, recycled refrigerator or freezer. There is no incentive for room air conditioners or dehumidifiers, but units will be picked up and recycled at no cost to the participant when an incented appliance (i.e., refrigerator or freezer) is picked up.

3.2.8 Implementation Plan

The Companies will contract with a third-party vendor to implement day-to-day program operations. Through marketing efforts such as direct mail and bill inserts, the Companies will recruit customers to the program.

3.2.9 Annual Program Budget

The annual budget for the Appliance Recycling Program is presented in Table 3-6.

Table 3-6. Appliance Recycling Program Annual Budget

Program Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Administration	0	0	83	85	88	90	93	**440**
Implementation	0	0	988	988	988	988	988	**4,940**
Incentives	0	0	300	350	400	400	400	**1,850**
Miscellaneous	0	0	300	300	450	300	300	**1,650**
Total	**0**	**0**	**1,671**	**1,723**	**1,926**	**1,778**	**1,781**	**8,880**

Program Budgetary Assumptions

Starting in 2026 (year 3), the Appliance Recycling Program labor assumes 0.25 full-time program manager, 0.25 full-time program associate, and 0.05 full-time operations manager. The labor escalation rate is 3.0%, with an EM&V expenditure occurring once over the seven-year planning period (in 2028). The Appliance Recycling Program represents approximately 3% electric of energy savings and 3% of total DSM/EE expenditures.

3.3 Residential Online Audit Program

3.3.1 Program Overview

The Residential Online Audit Program is a web-based, self-guided assessment of a customer's home and includes information about the home's space and water heating, appliance and plug load, and other energy end uses. The audit pulls customer-specific interval data from the Companies' AMI to provide an accurate picture of the customer's disaggregated energy use. After completing the online audit, customers receive feedback on their energy-use behavior, energy-saving tips, and recommendations and are mailed a kit with energy efficiency measures for self-installation. In addition, customers who complete the audit gain access to prescriptive rebates for deeper energy efficiency retrofits. The purpose of the program is to provide education and savings concurrently.

3.3.2 Rationale for Request

The Companies' expanded portfolio in this proposed DSM/EE Program Plan seeks to offer energy and demand savings opportunities across all sectors. The Companies' current DSM/EE portfolio does not include energy efficiency offerings for market-rate residential customers (only income-qualified residential customers). Limited remaining economic life of fossil fuel generation required the Companies to propose a DSM/EE Program Plan that maximizes opportunities for DSM impacts. Through the Residential Online Audit Program, the Companies aim to introduce customers to energy efficiency and increase their awareness of its benefits; promote opportunities to conserve energy in their homes; provide no-cost online audit kits with energy efficiency measures; and offer HVAC and water heating incentives while also maintaining high satisfaction, increasing education, and capturing both short- and long-term energy savings.

3.3.3 Program Audience

The Residential Online Audit Program targets residential customers.

3.3.4 Program Benefits

Increasing customers' awareness of their energy consumption and providing feedback and energy-saving tips increases the likelihood that they will proactively seek out opportunities to increase the efficiency of their household. Providing access to HVAC and water heating incentives after audit completion encourages customers to take advantage of the available incentives and reduce their home energy use. For immediate energy savings, Residential Online Audit Program participants will be mailed an online audit kit that includes energy-saving measures at no cost to the customer.

3.3.5 Participation Goals

Projected annual participation goals for the Residential Online Audit Program are presented in Table 3-7. The Companies propose fully launching the program as a customer offering starting in 2025 (year 2) to give time for program ramp up.

Table 3-7. Residential Online Audit Program Participation Goals[1]

Measures	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Participation								
LG&E	0	1,417	1,721	2,027	2,409	2,209	2,209	**11,990**
KU	0	1,367	1,621	1,877	2,209	2,209	2,209	**11,490**
Total	**0**	**2,784**	**3,341**	**3,904**	**4,617**	**4,417**	**4,417**	**23,480**
Cumulative Participation								
LG&E	0	1,417	3,137	5,164	7,573	9,781	11,990	**11,990**
KU	0	1,367	2,987	4,864	7,073	9,281	11,490	**11,490**
Total	**0**	**2,784**	**6,125**	**10,029**	**14,646**	**19,063**	**23,480**	**23,480**

[1] Residential Online Audit Program participation targets represent the projected number of kits and rebated measures but not the number of audits.

3.3.6 Energy and Demand Impacts

Projected annual and cumulative energy savings and demand reduction for the Residential Online Audit Program are presented in Table 3-8.

Table 3-8. Residential Online Audit Program Annual and Cumulative Energy and Demand Impacts

Usage Reductions	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Reductions									
Energy	MWh	0	2,408	3,086	3,767	4,670	4,670	4,670	**23,270**
Demand	MW	0	0.2	0.3	0.3	0.4	0.4	0.4	**1.9**
Gas	CCF	0	7,683	11,518	15,363	19,219	4,689	4,689	**63,163**
Cumulative Reductions									
Energy	MWh	0	2,408	5,493	9,261	13,931	18,600	23,270	**23,270**
Demand	MW	0	0.2	0.5	0.8	1.1	1.5	1.9	**1.9**
Gas	CCF	0	7,683	19,202	34,565	53,784	58,474	63,163	**63,163**

3.3.7 Customer Incentives

Participating customers receive free information about their home energy use, energy-saving tips, an online audit kit, and access to prescriptive incentives for deeper retrofits. Upon completion of the online audit, participants will be mailed a kit at no cost that will include the following measures:

- Low-flow bathroom and kitchen faucet aerators
- Low-flow showerhead
- Water heater pipe insulation
- Weatherstripping, caulking, and spray foam
- Advanced power strip

Customers who complete the online audit will gain access to prescriptive rebates for ENERGY STAR–certified HVAC and water heating measures, including the following (incentive amounts vary by measure):

- Heat pump water heaters ($300)
- Central air conditioner ($300)
- Ductless heat pump ($400)
- Air source heat pump ($400)
- 95% AFUE furnace ($250)

3.3.8 Implementation Plan

The Companies will contract with a third-party vendor to offer the online audit questionnaire, source and mail online audit kits, and process rebate applications.

The Companies will advertise the Residential Online Audit Program through channels such as email and bill inserts. Customers will access the self-guided online audit through the Companies' website. To access the prescriptive rebates after completing the audits, customers will complete the applicable measure installation (with or without the assistance of a contractor), fill out a rebate application form, and submit it to the Companies.

3.3.9 Annual Program Budget

The annual budget for the Residential Online Audit Program is presented in Table 3-9.

Table 3-9. Residential Online Audit Program Annual Budget

Program Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Administration	0	143	147	152	156	160	165	924
Implementation	0	292	294	296	298	298	298	1,776
Incentives	0	550	724	899	1,127	1,077	1,077	5,454
Miscellaneous	0	100	100	250	100	100	100	750
Total	**0**	**1,085**	**1,265**	**1,597**	**1,681**	**1,636**	**1,640**	**8,904**

Program Budgetary Assumptions

The Residential Online Audit Program will launch as a customer offering in 2025. Starting in 2025, program labor assumes 0.5 full-time program manager, 0.5 full-time program associate, and 0.05 full-

time operations manager. The labor escalation rate is 3.0%, with an EM&V expenditure occurring once over the seven-year planning period (in 2027). The Residential Online Audit Program represents approximately 3% of electric energy savings and 4% of CCF energy savings, accounting for 3% of total DSM/EE expenditures.

3.4 Business Solutions

3.4.1 Program Overview

Business Solutions has three subcomponents: Nonresidential Rebates, Small Business Audit and Direct Install, and Nonresidential Midstream Lighting. Business Solutions seeks to reduce energy consumption in the commercial sector while providing easy participation options for businesses of any size.

Through the ***Nonresidential Rebates subcomponent***, the Companies provide nonresidential customers with financial incentives to help replace aging and inefficient equipment. The Companies provide the following offerings as part of the subcomponent:

- **Prescriptive incentives** are available for energy audits and high-efficiency equipment such as lighting, motors, pumps, variable frequency drives, and air conditioning retrofits installed in existing buildings.
- **Custom incentives** are available to eligible customers to implement energy-efficient technologies not currently covered in the prescriptive component of the program. Custom projects are offered for retrofit applications in existing buildings and are subject to preapproval by the Companies.
- **New construction incentives** are performance-based and intended for constructing new, efficient nonresidential facilities that exceed current state building energy code requirements. The Companies offer bonus incentives for LEED certification.

Small Business Audit and Direct Install subcomponent provides energy audits to small businesses and allows for direct installation of high-efficiency equipment. A third-party contractor will provide a complimentary energy audit of the customer's facility. The Companies will provide free direct installation of energy-saving products that may include nonresidential LED bulbs and fixtures, faucet aerators, low-flow showerheads, and pre-rinse spray valves.

Nonresidential Midstream Lighting subcomponent provides incentives to lighting distributors to stock and sell high-efficiency equipment. The bulk of the incentives will be passed through to customers. This incentive delivery mechanism is designed to encourage distributors to stock and sell high-efficiency equipment models and reduce participation barriers for customers and contractors (such as no rebate application submission burden).

The Companies propose to modify Business Solutions (formerly the Nonresidential Rebates Program) in the following ways:

- Bundle two new subcomponents—Small Business Audit and Direct Install and Nonresidential Midstream Lighting—with the current Nonresidential Rebates Program to provide additional participation options for nonresidential customers (and change the program name to Business Solutions)
- Remove the small business kit component of the current Nonresidential Rebates Program (offering Small Business Audit and Direct Install instead)
- Redesign incentives for the Nonresidential Rebates subcomponent to encourage a wider range of measure adoption, including revising the custom incentives to prioritize demand reduction
- Remove the Nonresidential Rebate Program's incentive cap (previously $50,000 annually and $100,000 in total) to encourage larger business to participate, specifically industrial customers who may have previously opted out of DSM
- Remove look-back allowances for Nonresidential Rebates, which would no longer allow submission for incentives after project initiation and would minimize free-ridership
- Increase advertising budget to allow for more data-driven targeting of nonresidential customers for participation, such as identifying energy intensive customers who can be proactively approached with ideas for saving energy to make participation more enticing

3.4.2 Rationale for Request

The current Nonresidential Rebates Program is one of the Companies' most successful DSM/EE programs. Due to higher-than-expected program participation from 2019 to 2021, the Companies requested additional budget for the Nonresidential Rebates Program in 2022 (Case No. 2022-00123) to sustain program activities through 2025. For this 2024-2030 DSM/EE Program Plan, the Companies seek to apply lessons learned from earlier phases of the Nonresidential Rebates Program to maximize energy and demand response offerings by modifying the current program and offering new participation options for nonresidential customers through Business Solutions.

The Companies propose redesigning the custom incentives for the Nonresidential Rebates subcomponent to prioritize demand reduction by offering incentives for both kWh and kW impacts (rather than just kWh). Because of planned fossil fuel generation retirements, the Companies are expecting peak load constraints in 2028 and aim to help nonresidential customers achieve baseload reductions (especially during peak periods) prior to this point. The Companies also propose removing the current program's incentive cap to encourage larger businesses to participate (specifically industrial customers who may have previously opted out of DSM) and allow for deeper retrofit projects and a wider array of conservation projects. The Nonresidential Rebates Program has historically achieved most of its impacts through lighting retrofits.

To further maximize opportunities for energy and demand reduction for the nonresidential sector, the Companies plan to use their advanced metering system data to identify and target energy intensive

customers who may benefit from energy-saving retrofits. The Companies will also remove look-back allowances from the Nonresidential Rebates subcomponent to minimize free-ridership.

Acknowledging that lighting has been a key component of success for the current Nonresidential Rebates Program, the Companies propose development of a Nonresidential Midstream Lighting subcomponent to remove the administration/application burden from contractors and customers and streamline access to lighting product incentives. Midstream programs encourage distributors to stock and sell high-efficiency equipment, so it is readily available when contractors and customers need it. Midstream programs also provide the benefit of immediate discounts to customers with no need to fill out or submit a rebate application form. The Companies will start building relationships and recruiting lighting distributors in their territory for participation in 2024 but will continue to offer prescriptive rebates for lighting through the Nonresidential Rebates subcomponent through 2026, as the midstream subcomponent will require some time to ramp up and become established. In 2027, the Companies plan to offer lighting incentives exclusively through the midstream channel.

Through the current Nonresidential Rebates Program, the Companies mail energy-saving kits to small business customers who have not yet participated in the program. The Companies propose removing the kits and instead offering the Small Business Audit and Direct Install subcomponent, which is designed to more proactively engage small business customers that are historically difficult to reach. Small businesses have constrained resources (e.g., staffing, capital, time), and this redesigned approach is intended to provide these businesses with a turnkey service, education, and immediate energy savings.

3.4.3 Program Audience

Business Solutions is available to all nonresidential customers as well as industrial customers who do not use their statutory opt-out. Specifically, the Small Business Audit and Direct Install subcomponent will be available to small business customers (i.e., with a General Service (GS) primary account).

3.4.4 Program Benefits

Customers benefit from energy savings that reduce their operating expenses and further reduce the Companies' generation requirements. Small business customers will also receive hands-on education through the Small Business and Direct Install subcomponent.

3.4.5 Participation Goals

Projected annual participation goals for Business Solutions are presented in Table 3-10.

Table 3-10. Business Solutions Participation Goals[1]

Measures	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Nonresidential Rebates[2]								
Annual Participation								
LG&E	5,345,601	8,345,602	12,228,718	12,191,806	12,191,807	12,191,807	12,191,806	**74,687,145**
KU	5,345,601	8,345,602	12,228,718	12,191,806	12,191,807	12,191,807	12,191,806	**74,687,145**
Total	**10,691,202**	**16,691,203**	**24,457,436**	**24,383,611**	**24,383,614**	**24,383,613**	**24,383,612**	**149,374,291**
Cumulative Participation								
LG&E	5,345,601	13,691,203	25,919,920	38,111,726	50,303,533	62,495,339	74,687,145	**74,687,145**
KU	5,345,601	13,691,203	25,919,920	38,111,726	50,303,533	62,495,339	74,687,145	**74,687,145**
Total	**10,691,202**	**27,382,405**	**51,839,841**	**76,223,452**	**100,607,066**	**124,990,679**	**149,374,291**	**149,374,291**
Small Business Audit and Direct Install[3]								
Annual Participation								
LG&E	1,415	2,831	2,831	2,831	2,831	2,831	2,831	**18,398**
KU	1,415	2,831	2,831	2,831	2,831	2,831	2,831	**18,398**
Total	**2,831**	**5,661**	**5,661**	**5,661**	**5,661**	**5,661**	**5,661**	**36,797**
Cumulative Participation								
LG&E	1,415	4,246	7,076	9,907	12,737	15,568	18,398	**18,398**
KU	1,415	4,246	7,076	9,907	12,737	15,568	18,398	**18,398**
Total	**2,831**	**8,492**	**14,153**	**19,814**	**25,475**	**31,136**	**36,797**	**36,797**
Nonresidential Midstream Lighting[4]								
Annual Participation								
LG&E	0	0	147,643	221,465	221,465	177,172	141,737	**909,482**
KU	0	0	147,643	221,465	221,465	177,172	141,737	**909,482**
Total	**0**	**0**	**295,286**	**442,930**	**442,930**	**354,344**	**283,475**	**1,818,964**
Cumulative Participation								
LG&E	0	0	147,643	369,108	590,573	767,745	909,482	**909,482**
KU	0	0	147,643	369,108	590,573	767,745	909,482	**909,482**
Total	**0**	**0**	**295,286**	**738,216**	**1,181,146**	**1,535,489**	**1,818,964**	**1,818,964**

[1] Totals may not sum due to rounding.

[2] Nonresidential Rebates participation targets represent the projected number of units installed. Unit type varies by measure category. One customer may receive more than one rebated unit.

[3] Small Business Audit and Direct Install participation targets represent the projected number of units installed. The Companies estimate 100 small business audits will be conducted in 2024 and 200 annually from 2025-2030.

[4] Nonresidential Midstream Lighting participation targets represent the projected number of units installed.

3.4.6 Energy and Demand Impacts

Projected annual and cumulative energy savings and demand reduction for Business Solutions are presented in Table 3-11.

Table 3-11. Business Solutions Annual and Cumulative Energy and Demand Impacts

Usage Reductions	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Reductions									
Energy	MWh	87,715	93,948	116,832	134,159	134,373	113,205	96,174	**776,406**
Demand	MW	17.8	19.5	24.6	28.0	28.0	23.8	20.6	**162.2**
Gas	CCF	2,843	3,387	4,919	2,429	3,961	4,345	3,003	**24,887**
Cumulative Reductions									
Energy	MWh	87,715	181,663	298,495	432,654	567,027	680,232	776,406	**776,406**
Demand	MW	17.8	37.3	61.8	89.8	117.8	141.6	162.2	**162.2**
Gas	CCF	2,843	6,230	11,149	13,578	17,539	21,884	24,887	**24,887**

3.4.7 Customer Incentives

Financial incentives will be available to nonresidential customers who install eligible energy-efficient equipment in new and existing buildings. The Companies propose the following incentives for the Nonresidential Rebates subcomponent:

- **Prescriptive incentives** will continue to vary based on measure type and efficiency level. End-use categories include lighting, motors, pumps, variable frequency drives, and HVAC measures.
- **Custom incentives** will be based upon achieved first-year kilowatt per hour (kWh) savings and demand (kW) reductions.
- **New construction incentives** will continue to be awarded to customers for constructing nonresidential facilities that exceed the current state building code. Incentives vary based on project size (i.e., square footage) and performance tier (ranging from 10% to 25% savings over code). Facilities that achieve LEED certification will continue to receive a bonus incentive in addition to the performance-based incentives for constructing the project above code.

Audits will be offered at no cost to the customer through the Small Business Audit and Direct Install subcomponent. Participants will also receive direct installation of energy efficiency equipment at the time of the audit, including the following measures (installed at no cost to the customer):

- LED bulbs and fixtures
- Faucet aerators
- Low-flow showerheads
- Pre-rinse sprayer valves

Financial incentives will also be available for high-efficiency lighting through the Nonresidential Midstream Lighting subcomponent. Incentives will be paid directly to distributors so they stock and sell high-efficiency lighting products, but the bulk of the incentives will be passed through to customers upon purchase. Incentive amounts will vary by product.

3.4.8 Implementation Plan

The Companies will provide oversight of Business Solutions operations. The Companies will continue to contract with a third-party vendor to promote the program within the Companies' service territories, monitor quality assurance, ensure customer incentive and vendor payment, and oversee program data

tracking. The Companies will also contract with third-party vendors to administer the new Business Solutions subcomponents: Small Business Audit and Direct Install and Nonresidential Midstream Lighting.

3.4.9 Annual Program Budget

The annual budget for Business Solutions is presented in Table 3-12.

Table 3-12. Business Solutions Annual Budget

Program Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Administration	431	289	698	461	474	488	502	3,345
Implementation	1,489	1,633	1,933	1,933	1,933	1,933	1,933	12,785
Incentives	3,169	3,673	4,789	5,284	5,293	4,681	4,179	31,069
Miscellaneous	200	200	400	400	700	400	400	2,700
Total	**5,290**	**5,795**	**7,820**	**8,078**	**8,400**	**7,502**	**7,014**	**49,899**

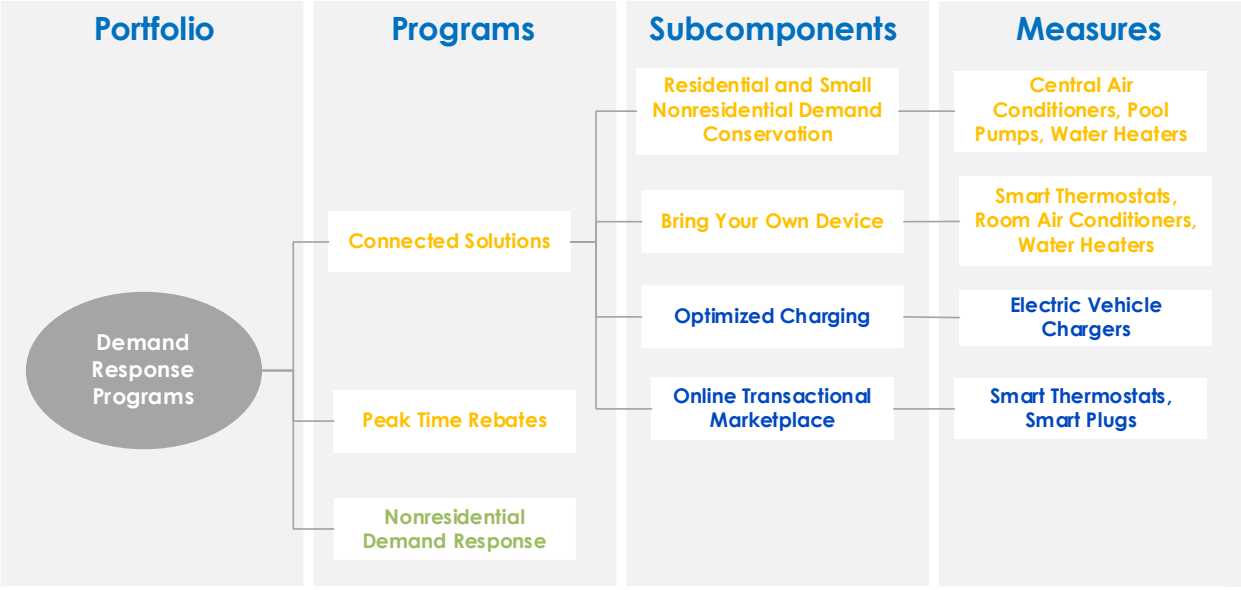
Program Budgetary Assumptions

Business Solutions labor assumes 2 full-time program manager, 0.5 full-time program associate, and 0.15 full-time operations manager. The labor escalation rate is 3.0%, with an EM&V expenditure occurring once over the seven-year planning period (in 2028). Business Solutions represents approximately 89% of electric energy savings and 1% of natural gas energy savings, accounting for 15% of total DSM/EE expenditures.

4 Demand Response Programs

The Companies propose to offer an expanded portfolio of the demand response programs, as described in Figure 4.

Figure 4. Demand Response Portfolio Structure



With limited exceptions, the Companies plan to allow customers to participate in multiple programs and will use software to manage enrollment, accurately calculate savings, and issue incentives to customers enrolled in multiple programs. The software must be capable of adjusting for customer participation in multiple programs to avoid compensating a customer more than once for the same demand reduction. The Companies have met with software vendors that have confirmed that such software is commercially available from multiple vendors. For instance, the software would ensure that customers participating in the Peak Time Rebates program and in the Demand Conservation subcomponent with air conditioners would have their Peak Time Rebate event energy savings reduced by any energy savings attributable to the air conditioner response during an overlapping Demand Conservation event. In the unlikely event that the Companies are unable to implement software with capabilities to accurately calculate savings, the Companies will limit customer participation between multiple programs for like equipment, as needed, to ensure savings and incentives are calculated accurately. Even with the implementation of software, there are limited circumstances when the Companies must restrict customer participation in multiple programs for like equipment to prevent double compensation. For instance, a customer enrolled in Demand Conservation for an air conditioning unit may not also enroll in BYOD to manage the same load through a smart thermostat. In those limited circumstances, the Companies' tariffs limit participation in multiple programs when software is unable to prevent compensating a customer more than once for the same demand reduction.

4.1 Connected Solutions

4.1.1 Program Overview

Through Connected Solutions, the Companies will provide opportunities for customers to reduce electric demand during summer and winter peak periods.[19] This new umbrella program (formerly the Residential and Small Nonresidential Demand Conservation Program) offers customers multiple participation options:

- Residential and Small Nonresidential Demand Conservation (the Companies' existing DLC switch program)
- BYOD
- Optimized Charging
- Online Transactional Marketplace

Residential and Small Nonresidential Demand Conservation subcomponent currently uses one-way and two-way load control switches installed on qualifying central air conditioners, heat pumps, water heaters, and pool pumps to achieve peak demand reduction. The switches cycle air conditioners and pool pumps off and on through a predetermined sequence during summer peaks. For heat pumps and water heaters, the switches cycle off and on through a predetermined sequence during peaks all year round.

BYOD subcomponent is an event-based, load control resource that enables the Companies to directly manage summer and winter loads during hours of peak demand through smart thermostats and other devices (without the need for switches). The Companies will pay customers an incentive for enrolling in the subcomponent and another incentive for each event their device participates in.

Optimized Charging subcomponent targets EV charging to provide demand response and load shifting. The subcomponent allows the Companies to issue signals to qualifying electric vehicles and qualifying electric vehicle supply equipment to affect the timing and level of charging for electric vehicles within parameters set by participants. The program requires no action from the customer after enrollment aside from plugging in the vehicle. The Companies will offer an incentive for enrolling in the subcomponent and a monthly incentive for continuing the Companies' access to optimize charging for the vehicle.

Online Transactional Marketplace subcomponent offers instant incentives through price markdowns to customers who purchase qualified products. This program expands the existing Online Marketplace, which focuses on consumer education, to accommodate transactions so the Companies can offer discounted products directly to customers. Residential customers can log into the marketplace by entering their name and home address and can purchase discounted smart thermostats and smart plugs.

[19] The Companies have been historically summer peaking, however, with planned fossil fuel generation retirements, the Companies expect to experience peak periods in both summer and winter.

Other measures will also be available through the Online Transactional Marketplace, but with no discount. Customers who purchase a new smart thermostat from the Online Transactional Marketplace will be automatically asked to enroll in the BYOD subcomponent.

4.1.2 Rationale for Request

Since the inception of the Residential and Small Nonresidential Demand Conservation Program in 2001, participating customers have volunteered to allow the Companies to control over 230,000 devices with one-way and two-way switches. However, as the switch technology has aged the failure rate of the switches has increased over time, thus making the program's load control capabilities less reliable. The Companies have not recruited new participants to enroll since 2018, as capacity has not been a concern. However, with planned coal generation retirements and the resulting expected capacity need, the Companies explored opportunities for more reliable peak demand reduction.

The Companies seek to keep the existing Residential and Small Nonresidential Demand Conservation Program (now proposed as a subcomponent of Connected Solutions) in maintenance mode until 2030 but will begin phasing out participants as more switches go offline and/or fail by transitioning participants to BYOD (through introduction of smart thermostats or other devices). However, to keep current participants engaged in demand response while their switches remain functioning, the Companies propose increasing incentives for the Residential and Small Nonresidential Demand Conservation subcomponent. The Companies do not propose to purchase or capitalize new switches for the Residential and Small Nonresidential Demand Conservation subcomponent for the duration of this proposed DSM/EE Program Plan. Many DLC switch programs across the country have transitioned to focus on automated technology-driven demand response programs. Controllable smart devices (such as smart thermostats, room air conditioners, and water heaters) provide automated and reliable demand reduction through a variety of major brands, technologies, and aggregators configured to work with demand response. The Companies will continue to monitor technologies for possible inclusion in BYOD in the future.

The growing market and rapid adoption of EVs is expected to create a significant amount of new electric load on the grid. According to the Companies' internal forecasting, it is expected that up to 30,000 EVs will be registered in the Companies' service territory by 2030. The Companies request to roll out the Optimized Charging subcomponent to optimize EV charging in a way that reduces the burden for customers while providing demand response and shifting load away from peak periods (even if peak periods shift over the course of the DSM/EE Program Plan period).

The Companies could not justify continued budget allocation for an education-only online marketplace. Instead, they identified a way to incorporate measure transactions so the Companies, and its customers, could capture energy savings. Through the Online Transactional Marketplace subcomponent, the Companies aim to produce long-term energy savings and demand reduction in the residential sector by promoting high-efficiency consumer products (such as smart thermostats and smart plugs) through a convenient online channel.

4.1.3 Program Audience

The BYOD subcomponent will be available to residential, multifamily residential, and small business customers with a Wi-Fi network and qualifying equipment (e.g., central air conditioners, heat pumps, water heaters, pool pumps, smart thermostats, and room air conditioners). The Optimized Charging subcomponent will be available to residential customers not on time-of-day rates that own qualifying electric vehicles or qualifying electric vehicle supply equipment. Customers currently enrolled in the existing Residential and Small Nonresidential Demand Conservation subcomponent will be allowed to continue to participate until their switch fails.[20] To verify eligibility for instant discounts through the Online Transactional Marketplace subcomponent, customers' utility account numbers will be verified upon purchase.

4.1.4 Program Benefits

Connected Solutions provides the Companies with firm demand response resources through multiple technologies. This provides the Companies with more-reliable, consistent, and repeatable event implementation and demand reduction results. Customer benefits include the ease and convenience of participation as load control is automated for the customer as well as incentives for participation (with no other action required).

4.1.5 Participation Goals

Projected annual participation goals for Connected Solutions are presented in Table 4-1. Participation in the Residential and Small Nonresidential Demand Conservation subcomponent is expected to decrease over time due to switch failures and participant opt-outs. To increase participation for BYOD, the Companies will direct-enroll customers who install a smart thermostat through Income-Qualified Solutions or the Online Transactional Marketplace.

[20] The Companies expect only a small percentage of switch devices on central air conditioners will remain online after 2030.

Table 4-1. Connected Solutions Participation Goals[1]

Measures	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Residential and Small Nonresidential Demand Conservation – Annual Participation[2]								
LG&E	88,530	79,614	71,500	64,200	57,650	51,800	46,550	**46,550**
KU	88,530	79,614	71,500	64,200	57,650	51,800	46,550	**46,550**
Total	**177,060**	**159,228**	**143,000**	**128,400**	**115,300**	**103,600**	**93,100**	**93,100**
BYOD – Annual Participation[3]								
LG&E	1,400	2,900	5,760	10,206	16,475	22,747	29,025	**29,025**
KU	1,400	2,900	5,760	10,206	16,475	22,747	29,025	**29,025**
Total	**2,800**	**5,800**	**11,520**	**20,412**	**32,949**	**45,494**	**58,049**	**58,049**
Optimized Charging – Annual Participation[4]								
LG&E	375	750	1,125	1,500	2,250	3,000	3,750	**3,750**
KU	375	750	1,125	1,500	2,250	3,000	3,750	**3,750**
Total	**750**	**1,500**	**2,250**	**3,000**	**4,500**	**6,000**	**7,500**	**7,500**
Online Transactional Marketplace – Annual Participation[5]								
LG&E	535	1,058	2,108	4,201	6,026	6,032	6,041	**26,001**
KU	535	1,058	2,108	4,201	6,026	6,032	6,041	**26,001**
Total	**1,069**	**2,115**	**4,216**	**8,403**	**12,052**	**12,064**	**12,083**	**52,002**

[1] Totals may not sum due to rounding.

[2] Residential and Small Nonresidential Demand Conservation participation targets represent projected number of equipment enrolled. Customers may have multiple pieces of equipment enrolled.

[3] BYOD participation targets represent projected number of devices enrolled. Customers may have multiple devices enrolled.

[4] Optimized Charging participation targets represent projected number of electric vehicles enrolled. Customers may have multiple vehicles enrolled.

[5] Online Transactional Marketplace participation targets represent projected number of units sold.

4.1.6 Energy and Demand Impacts

Projected annual demand reduction for Connected Solutions are presented in Table 4-2. This program is expected to achieve electric and gas energy efficiency savings through Online Transactional Marketplace subcomponent while electric demand savings are expected to be achieved through Residential and Small Nonresidential Demand Conservation, BYOD and Optimized Charging subcomponents.

Table 4-2. Connected Solutions Annual and Cumulative Energy and Demand Impacts

Usage Reductions	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Reductions									
Energy	MWh	326	651	1,300	2,598	3,729	3,729	3,729	**16,061**
Demand[1]	MW	125.8	115.0	107.0	101.7	99.4	98.0	97.5	**97.5**
Gas	CCF	13,844	27,687	55,374	110,749	158,969	158,969	158,969	**684,562**

[1] Demand savings represent summer peak demand reductions. Total shows final year demand reduction under peak conditions.

4.1.7 Customer Incentives

The Companies will offer the following incentives, customized for each program subcomponent:

- **Residential and Small Nonresidential Demand Conservation subcomponent.** The Companies will offer bill credit incentives for up to 20 events per year. Incentives vary by customer type (single-family, multifamily, or small business) and the device controlled (air conditioner, heat pump, water heater, pool pump), such as:
    - Single-family air conditioner and heat pump switches receive $5 per event per device.
    - Single-family water heater and pool pump switches receive $4 per event per device.
    - Multifamily air conditioner and heat pump switches receive $2 per event per device for tenants and $2 per event per device for property owners/managers.
    - Multifamily water heater and pool pump switches receive $4 per event per device for tenants and $4 per event per device for property owners/managers.
    - Small business air conditioner switches receive $5 per summer month (up $20 annually) per device for each central air conditioning unit or heat pump system weighing up to five tons, plus an additional $1 per month for every additional ton.
    - Small business water heater switches receive $4 per month (up to $16 annually) per device.
- **BYOD subcomponent.** Beginning in 2024, the Companies will offer customers an incentive of up to $50 for enrolling a smart thermostat and up to $10 for each event in which their device participates (up to 25 events per year). In 2026, the Companies will offer customers an incentive of up to $50 for enrolling a smart water heater and up to $10 for each event in which their device participates (up to 25 events per year). A maximum incentive of $300 per device in the first year of participation and $250 per device in each year thereafter.
- **Optimized Charging subcomponent.** The Companies will offer customers a one-time incentive upon enrollment of up to a $50 per vehicle and up to $5 per month for optimized charging per vehicle. A maximum incentive of $110 per vehicle in the first year of participation and $60 per vehicle in each year thereafter.
- **Online Transactional Marketplace subcomponent.** The Companies will offer a discount of up to $75 on smart thermostats and up to $10 on smart plugs. Beginning in 2026, the Companies will offer a discount of up to $50 on smart water heaters. The Companies will continue to monitor cost-effective opportunities for new measure offerings to be added to the Online Transactional Marketplace.

4.1.8 Implementation Plan

The Residential and Small Nonresidential Demand Conservation subcomponent will operate in maintenance mode and call events until the customer's switch fails.

The Companies will select a demand response software solution to support program delivery. Because the BYOD, Optimized Charging, and Online Transactional Marketplace subcomponents will be new, the Companies will oversee their development and operations by implementing as follows:

- Set up IT/data infrastructure and procedures to manage events and calculate savings in an accurate, timely, and secure manner
- Establish a customer enrollment website and create program marketing materials to recruit participants
- Create educational materials to keep customers informed about how the program works and to discourage event overrides
- Set up the event communications platform where the Companies can schedule events, track event performance, and run reports
- Upgrade the existing Online Marketplace, either through the existing third-party vendor or a new vendor, to accommodate transactions so customers can make purchases and receive discounts on the site rather than being directed to other vendors.
- Encourage customers to visit the Online Transactional Marketplace by advertising through channels such as email and bill inserts.

4.1.9 Annual Program Budget

The annual budget for Connected Solutions is presented in Table 4-3.

Table 4-3. Connected Solutions Annual Budget

Program Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Administration	1,042	429	441	453	466	479	493	3,803
Implementation	1,441	1,639	1,935	2,345	2,976	3,608	4,240	18,183
Incentives	3,085	3,455	4,520	7,998	18,073	19,009	20,064	76,204
Miscellaneous	250	400	290	440	440	290	440	2,550
Total	**5,817**	**5,922**	**7,185**	**11,236**	**21,955**	**23,386**	**25,237**	**100,739**

Program Budgetary Assumptions

Connected Solutions labor assumes 1.5 full-time program manager, 1.25 full-time program associate, and 0.20 full-time operations manager. The labor escalation rate is 3.0%, with an EM&V expenditure occurring once over the seven-year planning period for each subcomponent (once for Residential and Small Nonresidential Demand Conservation in 2025, for Online Transactional Marketplace in 2027, for BYOD in 2028 and for Optimized Charging in 2030). The Companies planned $625,000 of the total program budget as capital. Connected Solutions represents approximately 38% of total demand savings obtained through three demand response programs and 30% of total DSM/EE expenditures. It also represents approximately 2% of electric energy savings and 40% of natural gas energy savings.

4.2 Peak Time Rebates

4.2.1 Program Overview

The Companies seek to launch Peak Time Rebates as a voluntary behavioral, event-based demand response resource that pays customers to reduce their electric consumption during times of high demand all year round. The Companies would notify customers in advance of peak demand events and educate customers on ways to save and shift energy consumption during events. Customers' savings will be calculated by comparing their metered consumption with an estimate of their baseline consumption during events.

4.2.2 Rationale for Request

In Case Nos. 2020-00350 and 2020-00349, the Companies agreed to study and evaluate a Peak Time Rebates offering for customers. Connected Solutions will provide reliable, automated load control through a variety of devices, and Peak Time Rebates will provide manual demand reduction based on customers' voluntary behavior change during peak periods. Peak Time Rebates serves to educate participants on the shared benefits of reducing energy use during times of peak demand for their community as well as the utility.

In addition, Peak Time Rebates will be made available to all residential customers and will not require any smart equipment or Wi-Fi signals to achieve demand reduction (event communications can be delivered via mobile device or telephone through text, email, or voicemail). This means there is no customer cost for participation. This will allow lower-income customers, who do not have Wi-Fi internet in their home or who may not be able to afford smart devices[21] to participate in a demand response program. Peak Time Rebates will bridge an equity gap while offering all residential customers a choice in selecting the demand response program that best suits their needs and lifestyle.

Peak Time Rebates can be quickly implemented and cost-effectively scaled because no special equipment needs to be installed. In addition, the program does not require a new rate case, further expediting deployment. Peak Time Rebates requires the Companies' AMI data to enable the pay-for-performance incentive model and calculate customers' kWh savings during events. In the past, the Companies could not pursue Peak Time Rebates because they did not have AMI, but with the planned rollout completion of AMI during this portfolio period, Peak Time Rebates can be deployed to customers in 2025.

4.2.3 Program Audience

The program will be available to all residential and small commercial customers with a valid interval consumption meter (i.e., AMI). AMI is currently being deployed by the Companies to all customers.

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[21] The Companies intend to offer smart thermostats to low- and moderate-income customers through Income-Qualified Solutions. Smart thermostat recipients will also be direct-enrolled into BYOD.

4.2.4 Program Benefits

Customer benefits will include a reduction in energy bills, greater awareness of peak demand, and greater awareness of ways to shift and save on energy during peak periods. Specifically for low-income customers, the program will reduce enrollment barriers as no specific technology is required to participate.

4.2.5 Participation Goals

Projected annual participation goals for Peak Time Rebates are presented in Table 4-4.

Table 4-4. Peak Time Rebates Participation Goals[1]

Measures	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Participation								
LG&E	0	13,000	26,000	52,000	92,500	92,500	92,500	**92,500**
KU	0	13,000	26,000	52,000	92,500	92,500	92,500	**92,500**
Total	0	**26,000**	**52,000**	**104,000**	**185,000**	**185,000**	**185,000**	**185,000**

[1] Peak Time Rebates participation targets represent the number of customers enrolled.

4.2.6 Energy and Demand Impacts

Projected annual electric savings and demand reduction for Peak Time Rebates are presented in Table 4-5. The program is not expected to achieve natural gas savings.

Table 4-5. Peak Time Rebates Annual and Cumulative Energy and Demand Impacts

Usage Reductions	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Reductions									
Energy	MWh	0	0	0	0	0	0	0	**0**
Demand[1]	MW	0	4.3	8.7	17.3	30.8	30.8	30.8	**30.8**
Gas	CCF	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**

[1] Demand savings represent summer peak demand reductions. Total shows final year demand reduction.

4.2.7 Customer Incentives

The Companies will offer incentives based on a pay-for-performance model. Customers participating in Peak Time Rebates will earn up to $2 for every kWh of savings achieved during an event relative to their baseline energy consumption. Customers will be eligible for up to a $15 annual participation bonus for each year that they remain enrolled in the program and actively participate. The Companies anticipate up to 25 events per year.

4.2.8 Implementation Plan

The Companies will oversee development and operations of Peak Time Rebates and do the following to implement the program:

- Set up IT/data infrastructure and procedures to manage events, calculate savings, and process incentives in an accurate, timely, and secure manner

- Establish a customer enrollment website and program tracking database
- Create program marketing materials to recruit participants
- Work with a third-party vendor to create educational materials such as energy-saving/shifting tips and engagement materials to keep customers informed and encouraged
- Work with a third-party vendor to create customer-facing event communication pieces such as the event notifications and event performance results
- Set up the event communications platform where the Companies can schedule events, track event performance, and run reports

4.2.9 Annual Program Budget

The annual budget for Peak Time Rebates is presented in Table 4-6.

Table 4-6. Peak Time Rebates Annual Budget

Program Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Administration	250	873	127	131	134	138	142	1,796
Implementation	0	504	208	416	740	740	740	3,348
Incentives	0	1,256	2,512	5,023	8,935	8,935	8,935	35,596
Miscellaneous	0	112	112	112	112	262	112	822
Total	**250**	**2,745**	**2,959**	**5,682**	**9,922**	**10,075**	**9,929**	**41,562**

Program Budgetary Assumptions

Peak Time Rebates labor assumes 0.5 full-time program manager, 0.25 full-time program associate, and 0.05 full-time operations manager. The labor escalation rate is 3.0%, with an EM&V expenditure occurring once over the seven-year planning period (in 2029). As a new program, the budget includes the program set-up, software, and advertising costs. The Companies planned $1,400,000 of the total program budget as capital. Peak Time Rebates represents approximately 17% of total demand savings obtained through three demand response programs and 12% of total DSM/EE expenditures.

4.3 Nonresidential Demand Response Program

4.3.1 Program Overview

The Companies began offering the Large Nonresidential Demand Conservation Program as a voluntary program for large commercial customers in 2013. Through the program, the Companies provide load monitoring devices to help business customers make changes to their operational procedures that reduce the demand for electricity during peak times when energy consumption is at its

highest.[22] The Companies will notify customers in advance of peak demand events. Load monitoring devices provide real-time visibility into a customer's energy consumption, which the customer or the third-party implementation vendor can monitor through web-based software.

The Companies propose to modify the program in the following ways:

- Rename the program to Nonresidential Demand Response Program
- Increase marketing activities to recruit more customers
- Expand eligibility to include industrial customers
- Increase the incentive from $15 to up to $75 per kW curtailed
- Increase the number of test events and actual events called

4.3.2 Rationale for Request

The Companies seek to ramp up the Nonresidential Demand Response Program in the next few years. The low levelized cost (tipping point cost) of commercial customer curtailment relative to the Companies' projected avoided capacity cost suggests that additional target markets and incentives could be leveraged to promote and expand this program. Currently, no industrial customers are enrolled in the program. However, encouraging industrial customer participation will be important as industrial customers often have facilities with high load reduction capabilities and can provide the additional capacity that will be needed in the future. In the Companies' *2023 Demand Response Assessment*, Cadmus estimated that industrial participants could provide an additional 2.3 MW in 2025 and 13.6 MW in 2028.[23]

To maximize demand reduction potential from the program, the Companies propose increasing incentives, and the maximum number of event hours called each year. Currently, the Companies offer customers $15 per kW for reducing load. This incentive is low compared to similar programs across the country, which offer incentives ranging from $25 to $73 per kW. Through the same *2023 Demand Response Assessment*, Cadmus estimated, through a price elasticity of demand analysis, that increasing incentives from $15 to $30 per kW could increase potential by roughly 48% and increasing the incentives from $15 to $45 per kW could produce an increase of about 82% in the potential demand reduction. The Companies used this finding to conservatively estimate the demand reduction potential by increasing the incentive up to $75 per kW. This translates into 78.7 MW of demand reduction potential in the final year of this DSM/EE Program Plan.

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[22] The Companies' Kentucky service territory is traditionally summer peaking, so the program is used during summer periods. However, the Companies may choose to investigate opportunities to also curtail winter load as demand increases during peak heating season.

[23] Cadmus. *2023 LG&E and KU Demand Response Assessment.* April 2021.

4.3.3 Program Audience

The program is available to nonresidential customers with demand of at least 200 kW and minimum load reduction capability of at least 50 kW.[24]

4.3.4 Program Benefits

The Nonresidential Demand Response Program is designed to reduce peak load. In addition to the demand reduction benefits to the Companies, participating customers benefit from equipment installation and access to a web-based software application that allows them to monitor their day-to-day energy use and identify opportunities to use energy more efficiently.

4.3.5 Participation Goals

Projected annual participation goals for the Nonresidential Demand Response Program are presented in Table 4-7.

Table 4-7. Nonresidential Demand Response Program Participation Goals[1]

Measures	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Participation								
LG&E	106	134	164	205	247	289	289	289
KU	106	134	164	205	247	289	289	289
Total	**213**	**267**	**329**	**410**	**493**	**578**	**578**	**578**

[1] Nonresidential Demand Response Program participation targets represent projected number of customers enrolled.

4.3.6 Energy and Demand Impacts

Projected annual electric savings and demand reduction for the Nonresidential Demand Response Program are shown in Table 4-8. The program is not designed to achieve natural gas savings.

Table 4-8. Nonresidential Demand Response Program Annual and Cumulative Energy and Demand Impacts

Usage Reductions	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Annual Reductions									
Energy	MWh	288	361	444	554	667	782	782	**782**
Demand[1]	MW	29.0	36.3	44.7	55.7	67.1	78.7	78.7	**78.7**
Gas	CCF	0	0	0	0	0	0	0	**0**

[1] Demand savings represent summer peak demand reductions. Total shows final year demand reduction.

[24] Because of the minimum load reduction requirement, the Nonresidential Demand Response Program targets larger nonresidential customers. Smaller nonresidential customers are eligible to participate in load curtailment through Connected Solutions.

4.3.7 Customer Incentives

The Companies propose to adjust the incentive rate from $15 to up to $75 per kW curtailed. The incentive amount that a participant receives will continue to be calculated based on the actual demand reduction achieved by the participant over the entire year's events.

4.3.8 Implementation Plan

The Companies will maintain relationships with current participants and keep them engaged by calling events annually. The Companies will also increase marketing activities to recruit more customers, especially industrial customers.

4.3.9 Annual Program Budget

The annual budget for the Nonresidential Demand Response Program is presented in Table 4-9.

Table 4-9. Nonresidential Demand Response Program Annual Budget

Program Costs ($000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Administration	132	136	140	144	148	152	157	1,010
Implementation	1,064	1,021	1,057	1,155	1,169	1,175	750	7,392
Incentives	2,172	2,726	3,353	4,180	5,035	5,902	5,902	29,269
Miscellaneous	100	250	100	100	100	100	100	850
Total	**3,469**	**4,134**	**4,650**	**5,579**	**6,452**	**7,329**	**6,908**	**38,520**

Program Budgetary Assumptions

The Companies have allocated an equivalent of 0.5 full-time program manager, 0.25 full-time program associate, and 0.1 full-time operations manager to the Nonresidential Demand Response Program. The labor escalation rate is 3.0%, with an EM&V expenditure occurring once over the seven-year planning period (in 2025).[25] The Companies will increase the advertising budget to better target energy intensive industrial customers and increase participation. The Companies planned $2,142,000 of the total program budget as capital. The Nonresidential Demand Response Program represents approximately 44% of total demand savings obtained through three demand response programs and 11% of total DSM/EE expenditures.

[25] The Companies may decide to delay EM&V until later in the planning period to allow time for additional program ramp-up prior to evaluation.

Appendix A. PortfolioPro Plus Input Summary Reports

Table A-1. Program Development and Administration
Utility Program Costs by Year

Year	Annual Utility Program Costs
Year 1	3,628,000
Year 2	3,556,000
Year 3	2,710,000
Year 4	2,889,000
Year 5	2,769,000
Year 6	2,801,000
Year 7	2,983,000
Total	**21,336,000**

Table A-2. Income-Qualified Solutions Impacts and Costs by Year

Year	Annual Participants	Annual Participant Costs	Annual Incentives/ Rebates	Annual Energy Savings (MWh)	Annual Demand Savings (MW)	Annual Natural Gas Savings (CCF)	Annual Utility Program Costs
Year 1	5,390	0	0	4,405	0.37	132,439	10,060,000
Year 2	5,390	0	0	4,405	0.37	132,439	10,072,000
Year 3	5,390	0	0	4,405	0.37	132,439	10,239,000
Year 4	5,390	0	0	4,405	0.37	132,439	10,106,000
Year 5	5,390	0	0	4,405	0.37	132,439	10,123,000
Year 6	5,390	0	0	4,405	0.37	132,439	10,141,000
Year 7	5,390	0	0	4,405	0.37	132,439	10,160,000
Total	**37,730**	**0**	**0**	**30,833**	**2.59**	**927,071**	**70,902,000**

Table A-3. Appliance Recycling Impacts and Costs by Year

Year	Annual Participants	Annual Participant Costs	Annual Incentives/ Rebates	Annual Energy Savings (MWh)	Annual Demand Savings (MW)	Annual Natural Gas Savings (CCF)	Annual Utility Program Costs
Year 1	0	0	0	0	0	0	0
Year 2	0	0	0	0	0	0	0
Year 3	6,090	0	300,000	4,543	0.5	0	1,671,000
Year 4	7,105	0	350,000	5,300	0.6	0	1,723,000
Year 5	8,120	0	400,000	6,057	0.7	0	1,926,000
Year 6	8,120	0	400,000	6,057	0.7	0	1,778,000
Year 7	8,120	0	400,000	6,057	0.7	0	1,781,000
Total	**37,555**	**0**	**1,850,000**	**28,013**	**3.3**	**0**	**8,880,000**

Table A-4. Residential Online Audit Impacts and Costs by Year

Year	Annual Participants	Annual Participant Costs	Annual Incentives/ Rebates	Annual Energy Savings (MWh)	Annual Demand Savings (MW)	Annual Natural Gas Savings (CCF)	Annual Utility Program Costs
Year 1	0	0	0	0	0	0	0
Year 2	2,784	945,147	550,000	2,408	0.2	7,683	1,085,000
Year 3	3,341	1,262,638	724,000	3,086	0.3	11,518	1,265,000
Year 4	3,904	1,581,999	899,000	3,767	0.3	15,363	1,597,000
Year 5	4,617	1,989,726	1,127,000	4,670	0.4	19,219	1,681,000
Year 6	4,417	1,794,354	1,077,000	4,670	0.4	4,689	1,636,000
Year 7	4,417	1,794,354	1,077,000	4,670	0.4	4,689	1,640,000
Total	**23,480**	**9,368,218**	**5,454,000**	**23,270**	**1.9**	**63,163**	**8,904,000**

Table A-5. Business Solutions Impacts and Costs by Year

Year	Annual Participants	Annual Participant Costs	Annual Incentives/ Rebates	Annual Energy Savings (MWh)	Annual Demand Savings (MW)	Annual Natural Gas Savings (CCF)	Annual Utility Program Costs
Year 1	10,694,033	22,471,543	3,169,000	87,715	17.8	2,843	5,290,000
Year 2	16,696,864	23,793,446	3,673,000	93,948	19.5	3,387	5,795,000
Year 3	24,758,383	29,285,545	4,789,000	116,832	24.6	4,919	7,820,000
Year 4	24,832,202	33,608,972	5,284,000	134,159	28.0	2,429	8,078,000
Year 5	24,832,205	33,640,743	5,293,000	134,373	28.0	3,961	8,400,000
Year 6	24,743,618	28,387,867	4,681,000	113,205	23.8	4,345	7,502,000
Year 7	24,672,748	24,132,005	4,179,000	96,174	20.6	3,003	7,014,000
Total	**151,230,051**	**195,320,122**	**31,069,000**	**776,406**	**162.2**	**24,887**	**49,899,000**

Table A-6. Connected Solutions Impacts and Costs by Year

Year	Annual Participants	Annual Participant Costs	Annual Incentives/ Rebates	Annual Energy Savings (MWh)	Annual Demand Savings (MW)	Annual Natural Gas Savings (CCF)	Annual Utility Program Costs
Year 1	181,679	161,392	3,085,000	326	124.4	13,844	5,817,000
Year 2	168,643	322,345	3,455,000	651	112.2	27,687	5,922,000
Year 3	160,986	644,729	4,520,000	1,300	101.2	55,374	7,185,000
Year 4	160,215	1,288,725	7,998,000	2,598	91.2	110,749	11,236,000
Year 5	164,801	1,849,686	18,073,000	3,729	82.7	158,969	21,955,000
Year 6	167,158	1,850,277	19,009,000	3,729	75.1	158,969	23,386,000
Year 7	170,732	1,851,150	20,064,000	3,729	68.3	158,969	25,237,000
Total[1]	**210,652**	**7,968,303**	**76,204,000**	**16,061**	**68.3**	**684,562**	**100,739,000**

[1] Total participation in Residential and Small Nonresidential Demand Conservation, BYOD and Optimized Charging program subcomponents represent final year participation value. Total Online Transactional Marketplace participation is sum of each year's participation.

Table A-7. Peak Time Rebates Impacts and Costs by Year

Year	Annual Participants	Annual Participant Costs	Annual Incentives/ Rebates	Annual Energy Savings (MWh)	Annual Demand Savings (MW)	Annual Natural Gas Savings (CCF)	Annual Utility Program Costs
Year 1	0	0	0	0	0	0	250,000
Year 2	26,000	0	1,256,000	0	4.3	0	2,745,000
Year 3	52,000	0	2,512,000	0	8.7	0	2,959,000
Year 4	104,000	0	5,023,000	0	17.3	0	5,682,000
Year 5	185,000	0	8,935,000	0	30.8	0	9,922,000
Year 6	185,000	0	8,935,000	0	30.8	0	10,075,000
Year 7	185,000	0	8,935,000	0	30.8	0	9,929,000
Total	**185,000**	**0**	**35,596,000**	**0**	**30.8**	**0**	**41,562,000**

Table A-8. Nonresidential Demand Response Program Impacts and Costs by Year

Year	Annual Participants	Annual Participant Costs	Annual Incentives/ Rebates	Annual Energy Savings (MWh)	Annual Demand Savings (MW)	Annual Natural Gas Savings (CCF)	Annual Utility Program Costs
Year 1	213	1,629,115	2,172,000	288	29.0	0	3,469,000
Year 2	267	2,044,523	2,726,000	361	36.3	0	4,134,000
Year 3	329	2,514,878	3,353,000	444	44.7	0	4,650,000
Year 4	410	3,134,827	4,180,000	554	55.7	0	5,579,000
Year 5	493	3,776,006	5,035,000	667	67.1	0	6,452,000
Year 6	578	4,426,187	5,902,000	782	78.7	0	7,329,000
Year 7	578	4,426,187	5,902,000	782	78.7	0	6,908,000
Total	**578**	**21,951,722**	**29,269,000**	**782**	**78.7**	**0**	**38,520,000**

Table A-9. Total Portfolio Costs by Year

Year	Annual Utility Program Costs
Year 1	28,514,000
Year 2	33,309,000
Year 3	38,499,000
Year 4	46,890,000
Year 5	63,228,000
Year 6	64,649,000
Year 7	65,653,000
Total	**340,742,000**

Appendix B. PortfolioPro Plus Output Summary Reports

Table B-1. Program Development and Administration
Present Values (PVs) of Costs and Benefits per Test

Cost Test	Present Value of Costs	Present Value of Benefits	Benefits/Costs Ratio (Test Score)
TRC	$18,028,252	$0	0.00
PCT	$0	$0	N/A
RIM	$18,028,252	$0	0.00
PAC	$18,028,252	$0	0.00

Table B-2. Income-Qualified Solutions
Present Values (PVs) of Costs and Benefits per Test

Cost Test	Present Value of Costs	Present Value of Benefits	Benefits/Costs Ratio (Test Score)
TRC	$59,282,830	$16,297,108	0.27
PCT	$0	$66,610,674	N/A
RIM	$125,893,504	$16,297,108	0.13
PAC	$59,282,830	$16,297,108	0.27

Table B-3. Appliance Recycling Program
Present Values (PVs) of Costs and Benefits per Test

Cost Test	Present Value of Costs	Present Value of Benefits	Benefits/Costs Ratio (Test Score)
TRC	$5,502,464	$5,616,550	1.02
PCT	$0	$23,011,309	N/A
RIM	$28,522,172	$5,616,550	0.20
PAC	$6,938,583	$5,616,550	0.81

Table B-4. Residential Online Audit Program
Present Values (PVs) of Costs and Benefits per Test

Cost Test	Present Value of Costs	Present Value of Benefits	Benefits/Costs Ratio (Test Score)
TRC	$10,208,738	$7,557,709	0.74
PCT	$7,379,658	$37,668,077	5.10
RIM	$40,480,689	$7,557,709	0.19
PAC	$7,102,462	$7,557,709	1.06

Table B-5. Business Solutions
Present Values (PVs) of Costs and Benefits per Test

Cost Test	Present Value of Costs	Present Value of Benefits	Benefits/Costs Ratio (Test Score)
TRC	$177,810,144	$326,984,972	1.84
PCT	$161,577,333	$1,195,321,901	7.40
RIM	$1,210,798,702	$326,797,698	0.27
PAC	$41,227,802	$326,797,698	7.93

Table B-6. Connected Solutions
Present Values (PVs) of Costs and Benefits per Test

Cost Test	Present Value of Costs	Present Value of Benefits	Benefits/Costs Ratio (Test Score)
TRC	$26,069,219	$91,801,615	3.52
PCT[1]	$6,141,053	$77,656,197	12.65
RIM	$97,897,732	$91,801,615	0.94
PAC	$78,702,559	$91,801,615	1.17

[1] Present value of the PCT costs represent demand response enablement measures (e.g., smart thermostats, smart plug, etc.) and the present value of the PCT benefits represent the benefits from all program measures.

Table B-7. Peak Time Rebates
Present Values (PVs) of Costs and Benefits per Test

Cost Test	Present Value of Costs	Present Value of Benefits	Benefits/Costs Ratio (Test Score)
TRC	$4,880,949	$12,788,875	2.62
PCT	$0	$27,071,599	N/A
RIM	$32,120,951	$12,788,875	0.40
PAC	$32,120,951	$12,788,875	0.40

Table B-8. Nonresidential Demand Response Program
Present Values (PVs) of Costs and Benefits per Test

Cost Test	Present Value of Costs	Present Value of Benefits	Benefits/Costs Ratio (Test Score)
TRC	$25,382,413	$42,714,975	1.68
PCT	$17,523,352	$23,879,479	1.36
RIM	$31,767,886	$42,714,975	1.34
PAC	$31,252,877	$42,714,975	1.37

Appendix C. Scoring Rubric and Process

Through ongoing research and consultation with Cadmus, who advises utilities across the country on DSM/EE plans, the Companies created a comprehensive list of 39 potential programs covering a wide range of energy efficiency end uses, demand reduction strategies, behavioral conservation approaches, and other innovations based on reviews of best practice programs, successful strategies offered by utilities in other jurisdictions, and ideas generated by the Companies' internal and external stakeholders. The Companies compiled key elements of each program's design, target audience, relevant measures, and delivery strategy.

The Companies worked with their program planning consultant, Cadmus, to design a customized scoring rubric using 12 objective criteria. The scoring rubric is included as an attachment to this DSM/EE Program Plan. The Companies established high, medium, and low priority designations for each criterion that correspond to weights in the final scoring matrix. In other words, higher-priority evaluation criteria carry greater weight in a proposal's final scoring calculation. Table C-1 identifies the criteria in the scoring matrix and the priority assigned to each criterion.

The Companies assigned six stakeholders (three from the Companies and three from Cadmus) to score each potential program by its ability to meet each criterion, which resulted total scores ranging from zero to 100. The reviewers scored each program according to its ability to satisfy each criterion. Each criterion was scored as a 0, 1, or 2 in the matrix:

- 0 = the proposed program does not meet the indicated criterion
- 1 = the program partially meets the indicated criterion
- 2 = the program fully meets the indicated criterion

Finally, the reviewers met to discuss the scoring results and ensure scoring was based on a common understanding of the program concepts.

Table C-1. Scoring Process Objectives

Program Criteria	Does the Program…	Objective	Priority
Value: Demand Reduction	Reduce Demand?	Is there evidence the program offers significant firm demand reduction, including during (winter) peak periods?	High
Value: Energy Savings (Baseload Reduction)	Save Energy?	Is there evidence the program offers significant energy savings?	High
Value: Cost-Effectiveness	Have a History of Cost-Effectiveness?	Is there evidence that the program could be cost-effective?	High
Value: Disadvantaged Communities	Benefit Disadvantaged Communities?	Does the program benefit disadvantaged customers/ communities?	High
Complexity: Internal Resources	Require Few Cross-Departmental Resources to Deliver Higher Customer Value?	Does the program minimize complexity and maximize value?	Med
Complexity: Acquisition Cost	Have Minimal External and/or Software Start-Up Costs?	Can the program be successfully started without substantial DSM investment unrelated to saving energy/demand? (e.g., training and outreach investment that increases acquisition costs and negatively impacts cost-effectiveness)	Med
Value: Embracing Technology	Use Market-Proven Technology?	Does the program prioritize market-ready technologies?	Med
Complexity: Customer Burden	Allow for Easy Customer Participation?	Is the program easy for customers to participate in (i.e., minimizes barriers)?	Med
Value: Education	Educate Customers?	Does the program provide energy education to customers?	Med
Complexity: Parent Company (the Companies' parent utility is PPL)	Exist at PPL Companies?	Is the program successful in any PPL territories (PA, KY, RI, VA)?	Low
Value: Economic	Promote Local Workforce?	Does the program promote/rely on an established local workforce (thus stimulating economic benefits for Kentucky)?	Low
Value: Non-Energy Benefits	Improve Indoor Health and Comfort?	Does the program intend to improve the comfort and indoor health of homes and buildings throughout the Companies' territories?	Low

The Companies categorized each program based on the average score given by the six reviewers, as follows:

- Red (score 0-49) indicates the program has a high level of complexity for deployment or technology leading to lower overall customer value at present
- Yellow (score 50-69) indicates an expectation of firm demand reduction and high customer value but possibly requiring further review to justify deployment
- Green (score 70-100) indicates evidence of firm demand reduction, high customer value, and lower deployment complexity

Any green program (that scored a 70 or higher) was modeled for cost-effectiveness and considered for possible inclusion in the DSM/EE Program Plan. However, the Companies selected a total of 14 programs (not including the Companies' administrative program) for further analysis including some that did not score above a 70 in the rubric process but were identified as high-priority by the Companies, the Commission, and/or stakeholders. Yellow programs that were selected for further analysis include Peak Time Rebates, Energy Efficiency Financing, Optimized Charging (Managed EV Charging), Nonresidential Midstream Lighting, Nonresidential Demand Response, and Residential and Small Nonresidential Demand Conservation Program (Direct Load Control). An overview of the DSM/EE program scoring rubric results by program category are listed in Figure C-1. The programs with an asterisk (plus Program Development and Administration) were included in the Companies' preliminary cost-effectiveness analysis.

Figure C-1. DSM/EE Program Scoring Rubric Results[1]

Red (Score 0-49)	Yellow (Score 50-69)		Green (Score 70-100)
Shade Trees	WeCare with Shade Trees	**Direct Load Control***	**Limited Income WeCare with Demand Response Direct Enrollment***
Fuel Switching (Electric to Gas Conversion)	Midstream HVAC Rebates	**Nonresidential Demand Response***	**Whole Building Limited Income Multifamily***
Residential Online Energy Audit w/o Rebates	Downstream Rebates	**Peak Time Rebates ***	**Appliance Recycling***
Managed EV Charging for School Buses	**Energy Efficiency Financing***	**Managed EV Charging***	**Online Transactional Marketplace***
Green Roofs	Home Energy Reports	Small Business Energy Reports	**Residential Energy Audit Online w/ Rebates***
Bidirectional Flow on EVs	New Home Construction Rebates	Strategic Energy Management	**Smart Thermostat Rebate and Bring-Your-Own-Device Program***
Energy Storage	Student Education	**Nonresidential Midstream Lighting***	**Business Rebates***
	Load Disaggregation Alerts	LED Streetlight Retrofits	**Small Business Audit and Direct Install***

* indicates programs moving forward to cost-effectiveness modeling phase of planning

[1] Source: September 19, 2022, DSM Advisory Group Meeting Presentation

Appendix D. 2022 Potential Study Projection

CADMUS

Memorandum

To:	John Bevington, Lana Isaacson, John Hayden, and Justin Bencomo; Louisville Gas & Electric and Kentucky Utilities
From:	Jeana Swedenburg, Aquila Velonis, and Andrew Grant; Cadmus
Subject:	2022 Cross-Sector DSM Potential Study Projection
Date:	November 30, 2022

Louisville Gas and Electric and Kentucky Utilities (the Companies) contracted with Cadmus to conduct a 20-year industrial sector potential assessment in 2016 and a residential and commercial sector potential study in 2017.[1,2] The planning horizon for both potential assessments covers the Demand-Side/Energy Efficiency (DSM/EE) Program Plan filing period (2024-2030).

The current market landscape has shifted fairly dramatically since these two assessments were performed. Legislation and federal codes and standards updates have increased the baseline for many energy efficiency measures that previously represented much of the Companies' market potential. For example, the Energy Independence and Security Act of 2007 has increased the baseline for almost all residential lighting measures, which diminishes the savings for this end-use category.

The Companies commissioned this study in conjunction with their analysis of the 2024-2030 DSM/EE Program Plan. This potential study projection seeks to provide a realistic representation of the current DSM/EE energy and demand savings potential in the Companies' Kentucky territories. This study does not address demand response potential, which was the subject of the 2023 LG&E and KU Demand Response Assessment Cadmus provided to the Companies on April 1, 2021. Compared to the potential identified in the Companies' studies performed in 2016 and 2017, the 2022 potential study projection shows that cumulative electric energy-savings technical potential has declined by approximately 12% over the 20-year study horizon in the five years since the previous studies were completed.

[1] Cadmus. April 2016. *Industrial Sector DSM Potential Assessment for 2016-2035.*

[2] Cadmus. March 2017. *Demand Side Management Potential Study 2019-2038*.

Research Approach

This analysis addresses three commonly defined types of DSM market potential:

- ***Technical potential*** represents all technically feasible energy efficiency measures being implemented, regardless of their costs or market barriers.
- ***Economic potential*** represents a subset of technical potential, comprising only measures meeting cost-effectiveness criteria based on the Companies' avoided supply costs for delivering electricity and natural gas and for avoided line losses.
- ***Achievable potential*** represents the portion of economic potential assumed to be reasonably achievable in the course of a planning horizon (typically 20 years), given market barriers that may impede customers' participation in utility programs.[3]

Due to uncertainty created by the introduction of Inflation Reduction Act funding to the DSM landscape, Cadmus developed a methodology to adjust the previous 20-year sector potential assessments using calculations to adjust prior results based on new market data. This methodology follows these steps:

1. Adjust 20-year sales forecast to align with the new horizon (2024-2043)
2. Account for end-use equipment turnover since the original start years of the previous studies
3. Research current and upcoming approved federal standards and compare against federal standards that were current in the previous studies
4. Apply new federal standards impacts to potential annually using efficiency change ratios to adjust end-use equipment potential
5. Using the federal standard research applied to equipment measures, account for equipment annual turnover impacts to discretionary measures
6. Incorporate 2016 to 2021 program accomplishments, provided by the Companies, where possible, to account for already achieved potential
7. Apply market adjustments to specific measure technologies based on how the market has transformed since the previous studies
8. Summarize and conduct quality control (QC) on results against individual changes and compare to previous studies' results

Though Cadmus' analysis to update the previous potential assessments was robust, some limitations should be noted when reviewing the final 2024-2043 potential projections. The projections do not include a complete measure characterization review, so increases in high-efficiency equipment standards, such as changes in ENERGY STAR® specification requirements or the inclusion of new highest efficiency or emerging technologies since the 2016 and 2017 studies were not accounted for in this analysis. In addition, this analysis did not entail a measure or fuel cost update or cost-effectiveness model re-run, so the overall economic potential values reflect the same percentage changes applied to technical potential values (in other words, for this analysis Cadmus treated technical and economic

[3] This analysis does not consider Program potential because the Companies were not considering particular programs in this potential update.

potential adjustments the same). *However, it should be noted equipment cost and labor/installation cost have only increased since these studies due to inflation and other market drivers*.

This task was largely intended to identify the overall impact from new or upcoming federal standards and to capture recent market changes for select measures. The approach and methodology applied in the potential calculations follow similar logic from the 2016 and 2017 potential study models; therefore, the overall results produce realistic projections of the impact from these federal standards and market changes.

Market Landscape Review

To make an accurate account of changes to the market since the 2016 and 2017 studies, Cadmus made two specific updates to model inputs:

- **Equipment Efficiency Shares or Percent Incomplete updates** - The percentage of buildings where customers have not installed the measure, but where its installation is technically feasible, equal to 1.0 minus the measure's current saturation. For example, the Companies' program history (2016-2021) reduces the measure percent incomplete and the availability of new energy efficiency potential.
- **Adjustments to Technical Feasibility constraints** - The percentage of buildings where customers can install this measure, accounting for physical constraints. For example, newer smart thermostats on the market have reduced installation/wiring constraints for customers and increased the availability of adoption.

The equipment shares or percent incomplete updates account for equipment turnover, program accomplishments, and naturally occurring adoption of measures occurring since the previous studies. These types of updates drove down potential due to the shift in the market to more efficient equipment. As noted in the "Implications for DSM/EE Planning" section below, this is consistent with what Cadmus has observed regionally. In addition, these updates for end-use equipment efficiency shares also impact the overall potential for impacted discretionary measures.

Cadmus reviewed adjustments to technical feasibility constraints for specific products based on the current understanding of these measures in specific applications. These technical feasibility constraints increased potential but only for the specific measure rather than the entire end use.

Potential Adjustments

The eight steps in the potential update attempt to accurately adjust potential to reflect the new 20-year horizon (2024-2043) and account for changes to federal standards and for market impacts since the 2016 and 2017 studies.

Step one. Adjust the previous 20-year sales forecast to align with the new 2024-2043 horizon. The previous industrial study had a 2016-2035 horizon, whereas the residential and commercial study had a 2019-2038 horizon. Cadmus calculated an average annual percentage change for the last three years of each study sector by fuel type, building type, vintage, and end-use sales then used these calculations to forecast sales out to 2043.

Step two. Account for end-use equipment turnover since the starting year of the previous studies. This calculation involved taking the previous studies' equipment efficiency shares and calculating the percentage of all systems that have failed and turned over to new systems. To account for the percentage of units that have turned over, Cadmus calculated an annual percentage based on one divided by the estimated useful lifetime assigned to each efficiency level, where equipment that is below the federal standard is assumed to be half the lifetime of a new unit. Cadmus assumed new equipment installations would be at the current federal standard or better efficiency.

To account for the likelihood that the impacted site would install federal standard or better equipment, Cadmus calculated a distribution share based on the historical potential study distribution of federal standard or better equipment. This update impacted the potential for both equipment and discretionary (retrofit) measures.

Step three. Research new or upcoming federal standards against the federal standards present in the previous studies. Though the majority of federal standards already existed in the 2016 and 2017 studies, Cadmus identified and added the following federal standards to the analysis:

- Commercial Refrigeration Equipment – Federal Standard 2017
- Dehumidifiers – Federal Standard 2019
- Pre-rinse Spray Valves – Federal Standard 2019
- Residential Sized Central Air Conditioners – Federal Standard 2023
- Residential Sized Furnaces – Federal Standard 2029
- Residential Sized Heat Pumps – Federal Standard 2023
- Screw Based Lighting – Federal Standard 2022

Step four. To account for new federal standards, adjust annual potential of specific equipment. Cadmus calculated an efficiency equipment adjustment factor to account for changes in federal standards compared to the historical baseline efficiency in the 2016 and 2017 studies. The efficiency equipment adjustment factor was applied to the annual potential of impacted measures. For some measures, this meant that the new federal standard (current for 2022) was the highest efficiency in the 2016 and 2017 studies and, therefore, eliminated all potential for that end use moving forward. An example of that is residential screw base lighting which requires 45 lumens per watt and CFLs are largely no longer available on the market, which forces the baseline to be LEDs. The 2016 and 2017 studies included screw base lighting potential but prior to 2020. As a result, no screw base lighting potential was included in this analysis (2024-2043).

Step five. Apply equipment adjustments (step 4) annually to the discretionary (retrofit) measure potential because changes to end-use equipment consumption directly impact these measures. The impact was on two fronts—one from the change from equipment turnover between the previous potential study start years and this analysis, the other to account for new equipment unit turnover affected by a new federal standard that did not previously exist or did not reflect the year of the

previous studies. As a result, as equipment end-use consumption decreases there is less available potential from discretionary/retrofit measures (e.g., weatherization measures).

Step six. Apply program accomplishment impacts to potential estimates for both equipment and discretionary measures. Cadmus used program data based on the number of rebated units and compared these data to the previous studies' estimates of total number of measures. For example, Cadmus compared total rebated commercial horsepower of variable frequency drive (VFD) motors to total regional horsepower of VFD motors. Cadmus developed percentage improvements factors and applied them to the potential projections for these specific measures. Equipment measures, program accomplishments, and discretionary measures of the same end use were also impacted, and their potential was reduced.

Step seven. Review how the market landscape had changed since the previous studies were conducted. In other potential studies undertaken since 2016 and 2017 studies, Cadmus has identified specific technologies to review and benchmark against the input assumptions made in the 2016 and 2017 studies.

For example, Cadmus reviewed residential Wi-Fi thermostat technical feasibility constraints and adjusted the savings upward based on a less restrictive feasibility constraint. Another example of how the market landscape has changed since the 2016 and 2017 studies is LED linear lighting. Though the percentage of LED saturation in the 2016 and 2017 studies were small, the market has largely adopted LED linear lighting technologies. Cadmus projected that not all estimated installations went through the Companies' program, so Cadmus increased the overall saturation of LED linear lighting to align with site visit data collected in other jurisdictions to reflect a more realistic view of the available remaining lighting potential for the Companies.

Step eight. Develop reporting tables and benchmark against historical values to verify that changes made had the expected outcome. Though listed as the final task, Cadmus did this step first so that each subsequent change (steps one through seven) could be verified as implemented and had the expected impact. Overall, the changes had their expected impact on sector and end-use potential, with the overall market potential decreasing due to the impact from federal standards.

Potential Adjustments Results

The final results from the adjustments analysis are shown in Table 1 through Table 3. These tables show technical, economic, and achievable potential, along with the associated baseline sales for the final year and the associated percentage of potential for electric energy, electric demand, and natural gas energy, respectively. The 2043 values represent the adjusted market potential projection, whereas the 2035/2038 values represents the previous potential studies' results (2035 corresponds to the industrial

sector and the year 2038 to the residential/commercial sectors). The achievable potential results represent the adjusted achievable scenario[4] results as defined in the previous studies.

More detailed tables of potential results along with annual figures of the medium achievable scenario for electric and natural gas energy can be found in the *Potential Detailed Results - Appendix*.

In Table 1, the technical and economic cumulative electric energy efficiency potential reduced by approximately 12% and 19%, respectively, as a percentage of baseline sales after making the adjustments described above. As noted in the "Implications for DSM/EE Planning" section below, this is consistent with what Cadmus has observed regionally. Lighting and federal standards updates are the predominate drivers for the reduction in potential. The economic cumulative electric energy efficiency potential is reduced by more than the technical potential because the market adjustments impact was greater on the cost-effective measures (e.g., LED lighting).

The achievable potential is a subset of the economic potential and has a similar reduction in potential based on the adjustments.

Across all three categories of potential, the market landscape review saw an increase in potential, but the Companies' program accomplishments and federal standards changes decreased potential. Overall, there was a net reduction in potential relative to the 2016 and 2017 studies, as shown in Table 1. While the market landscape review identified an additional 131 GWh of new cumulative technical electric energy efficiency potential in 2043, there was also a reduction in potential contributed to program accomplishments and federal standards resulting in a net cumulative technical potential of 7,525 GWh. The associated new cumulative economic and achievable electric energy efficiency potential from the market landscape review was 47 GWh and 35 GWh, respectively, with the reduction in potential contributed to the program accomplishments and federal standards resulting in the net cumulative economic and achievable potential of 2,612 GWh and 1,471 GWh, respectively.

Table 1. Cumulative Electric Energy Efficiency Potential – Energy (GWh)

Potential Type	Baseline Sales		Cumulative Potential		Cumulative Potential Percentage of Baseline	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Technical	30,947	30,649	7,525	8,441	24.3%	27.5%
Economic			2,612	3,199	8.4%	10.4%
Achievable			1,471	1,861	4.8%	6.1%

Table 2 shows the cumulative demand reduction potential based on the adjustments and compared to the prior studies. The 2022 adjustments had a smaller impact on the demand reduction potential compared to energy potential relative to the baseline sales.

[4] Cadmus referenced the prior studies "medium" achievable potential scenario that represent customer adoption relative to utility's incentives that cover 50% of the measure incremental cost.

Table 2. Cumulative Electric Energy Efficiency Potential – Demand (MW)

Potential Type	Baseline Sales[1]		Cumulative Potential[2]		Cumulative Potential Percentage of Baseline	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Technical	7,056	6,997	2,020	2,237	28.6%	32.0%
Economic			390	452	5.5%	6.5%
Achievable			221	260	3.1%	3.7%

[1] Cadmus estimated the Companies' demand baseline forecast based on the potential study's end-use hourly profiles and peak demand definitions. This does not represent the Companies' actual demand forecast. These demand potential savings results use the same end-use hourly profiles and peak demand definitions, but do not rely on the estimated demand forecast to determine potential.
[2] These estimates represent cumulative potential (summer peak demand based on the Companies' peak period definitions from the prior studies), not annual or hourly estimates.

In Table 3, the technical and economic cumulative natural gas energy efficiency potential reduced by approximately 12% and 28%, respectively, as a percentage of baseline sales after making adjustments. For natural gas furnace, the pending federal standard in 2029 had an outsized impact on the decline in available potential. The economic cumulative natural gas energy efficiency potential reduces more than the technical potential because natural gas furnaces were cost-effective as well as were other measures associated with the space heating end use.

There was an overall reduction potential (in aggregate) resulting in 10,285,079 MCF of cumulative technical natural gas energy efficiency potential in 2043. However, these measures where not cost-effective and had no impact on the cumulative economic and achievable natural gas energy efficiency potential from the market landscape review.

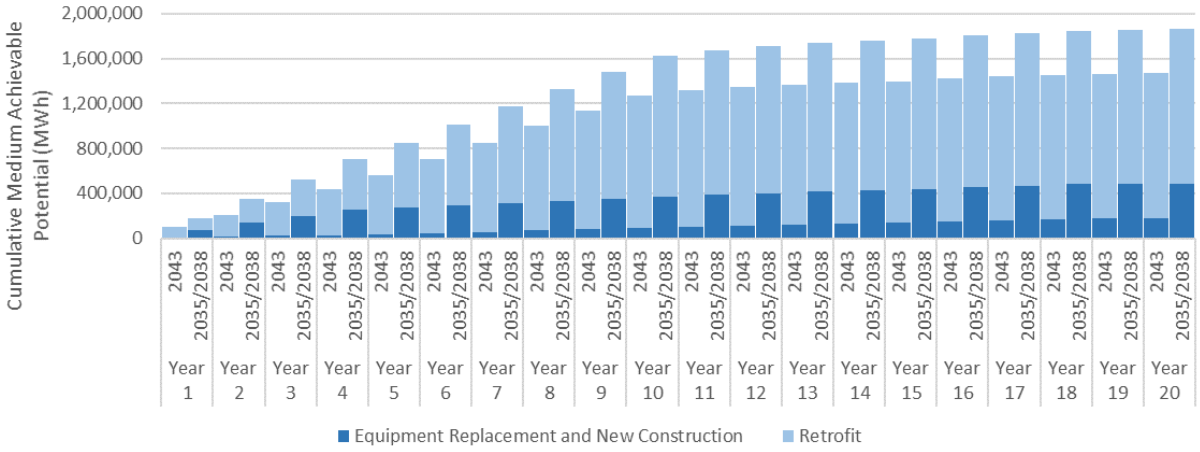
Table 3. Cumulative Natural Gas Energy Efficiency Potential – Energy (MCF)

Potential Type	Baseline Sales		Cumulative Potential		Cumulative Potential Percentage of Baseline	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Technical	27,693,139	28,401,121	10,285,079	11,997,216	37.1%	42.2%
Economic			2,993,976	4,246,480	10.8%	15.0%
Achievable			1,331,762	1,758,783	4.8%	6.2%

Cumulative Achievable Potential – Energy Result Figures

Figure 1 shows the impact from the updates made to the electric energy cumulative medium achievable scenario. The 2043 values represent the adjusted values, and the 2035/2038 values represent the historical values.

Figure 1. Cumulative Achievable Electric Potential for Medium Achievable Scenario



Though Cadmus made adjustments to account for the shift in timeline and changes in the market, as listed in the *Research Approach* section above, the largest change is the impact from the 2022 federal standard associated to screw base lighting and from the adoption of commercial LED linear and LED fixture lighting applications.

Similar to Figure 1, Figure 2 shows the impact from the updates for natural gas cumulative potential associated with the medium achievable scenario. Though various factors drive differences between the historical potential results and adjusted analysis, the largest delta starts to occur in year 6 for the 2043 adjusted results when the federal standard for residential-sized gas furnaces becomes effective in 2029. This causes a jump in the baseline efficiency requirement from 80% AFUE to 92% AFUE, which has around a 50% reduction for most high-efficiency technologies. In addition, after year 6 the turnover for residential-sized furnace equipment impacts the annual retrofit (discretionary) potential associated with the furnace end use. For example, the potential impact from installing a Wi-Fi thermostat decreases annually after year 6 as the overall market efficiency of residential-sized gas furnaces increases due to the new standard.

Figure 2. Cumulative Achievable Natural Gas Potential for Medium Achievable Scenario

Implications for DSM/EE Planning

The results from this study indicate that available potential is declining and aligns with regional trends. For example, in neighboring Virginia, Dominion Energy's recent energy efficiency potential studies (2014, 2017, and 2020 studies) have shown a steady decline in the available technical and economic potential.[5] These studies showed that technical potential as compared to baseline sales declined from 39% (2014) to 35% (2017) to 32% (2020). The economic potential as compared to baseline sales also showed a decline from 22% (2014) to 19% (2017) to 16% (2020). The Dominion Energy study results of the decline in potential are consistent with Cadmus' study findings.

These observations have several implications for the Companies' DSM/EE planning process. First, DSM/EE planning will need to account for the applicable changes in recent federal equipment standards. This will have an impact on the programmatic unit energy savings that can be claimed for individual measures within the DSM/EE plan, such as heat pumps and air conditioners. Second, low-cost energy efficiency potential is not available (e.g., screw-based lighting), resulting in less remaining potential and potential that is at higher costs to acquire (e.g., may require higher/more incentives to customers). Third, there is a decline in the long-term availability of potential from existing technologies on the market. To minimize this impact, DSM/EE planning may consider larger investments (in incentives and marketing) to acquire savings faster than in prior planning cycles. In addition, DSM/EE planning may need to consider monitoring changes in market and technologies, including emerging technologies, as well as conducting program pilots.

[5] Dominion Energy Efficiency Potential Study: 2020 to 2029 conducted by DNV. Presentation of results "2020-21 Potential Study Results" August 31, 2021, slide 17 "Trends in potential over time".

Potential Detailed Results - Appendix

More detailed results are shown below in the figures and tables below. These tables are broken into three sections:

- Electric Potential – Energy Result Tables
- Electric Potential – Demand Result Tables
- Natural Gas Potential – Energy Result Tables

Electric Potential – Energy Result Tables

Table 4. Technical Electric Energy Efficiency Potential – Energy (GWh)

Sector	Baseline Sales		Cumulative Technical		Cumulative Technical Percentage of Baseline	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Residential	11,605	11,453	3,699	4,143	31.9%	36.2%
Commercial	10,286	10,200	2,503	2,930	24.3%	28.7%
Industrial	9,056	8,997	1,322	1,369	14.6%	15.2%
Total	**30,947**	**30,649**	**7,525**	**8,441**	**24.3%**	**27.5%**

Table 5. Economic Electric Energy Efficiency Potential – Energy (GWh)

Sector	Cumulative Economic		Cumulative Economic Percentage of Baseline		Economic as a % of Technical	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Residential	649	1,093	5.6%	9.5%	17.5%	26.4%
Commercial	779	895	7.6%	8.8%	31.1%	30.5%
Industrial	1,184	1,211	13.1%	13.5%	89.5%	88.5%
Total	**2,612**	**3,199**	**8.4%**	**10.4%**	**34.7%**	**37.9%**

Table 6. Achievable Electric Energy Efficiency Potential – Energy (GWh)

Sector	Cumulative 2043			Cumulative 2035/2038		
	Low	Medium	High	Low	Medium	High
Residential	227	337	381	477	635	710
Commercial	338	542	603	387	620	689
Industrial	391	592	793	400	606	812
Total	**956**	**1,471**	**1,777**	**1,264**	**1,861**	**2,211**

Table 7. Achievable Electric Energy Efficiency Potential as a Percent of Sales – Energy (GWh)

Sector	Cumulative Achievable Percentage of Baseline 2043			Cumulative Achievable Percentage of Baseline 2035/2038		
	Low	Medium	High	Low	Medium	High
Residential	2.0%	2.9%	3.3%	4.2%	5.5%	6.2%
Commercial	3.3%	5.3%	5.9%	3.8%	6.1%	6.8%
Industrial	4.3%	6.5%	8.8%	4.4%	6.7%	9.0%
Total	**3.1%**	**4.8%**	**5.7%**	**4.1%**	**6.1%**	**7.2%**

Electric Potential – Demand Result Tables

Table 8. Technical Electric Energy Efficiency Potential – Demand (MW)

Sector	Baseline Sales[1]		Cumulative Technical[2]		Cumulative Technical Percentage of Baseline	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Residential	3,881	3,843	1,378	1,495	35.5%	38.9%
Commercial	2,082	2,069	480	574	23.0%	27.8%
Industrial	1,092	1,085	162	168	14.8%	15.5%
Total	**7,056**	**6,997**	**2,020**	**2,237**	**28.6%**	**32.0%**

[1] Cadmus estimated the Companies' demand baseline forecast based on the potential study's end-use hourly profiles and peak demand definitions. This does not represent the Companies' actual demand forecast. These demand potential savings results use the same end-use hourly profiles and peak demand definitions, but do not rely on the estimated demand forecast to determine potential.

[2] These estimates represent cumulative potential (summer peak demand based on the Companies' peak period definitions from the prior studies), not annual or hourly estimates.

Table 9. Economic Electric Energy Efficiency Potential – Demand (MW)

Sector	Cumulative Economic		Cumulative Economic Percentage of Baseline		Economic as a % of Technical	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Residential	105	138	2.7%	3.6%	7.6%	9.2%
Commercial	140	166	6.7%	8.0%	29.2%	28.9%
Industrial	145	149	13.3%	13.7%	89.7%	88.6%
Total	**390**	**452**	**5.5%**	**6.5%**	**19.3%**	**20.2%**

Table 10. Achievable Electric Energy Efficiency Potential – Demand (MW)

Sector	Cumulative 2043			Cumulative 2035/2038		
	Low	Medium	High	Low	Medium	High
Residential	36	54	61	51	74	83
Commercial	58	94	105	69	112	125
Industrial	48	73	97	49	74	100
Total	**142**	**221**	**263**	**169**	**260**	**307**

Table 11. Achievable Electric Energy Efficiency Potential as a Percent of Sales – Demand (MW)

Sector	Cumulative Achievable Percentage of Baseline 2043			Cumulative Achievable Percentage of Baseline 2035/2038		
	Low	Medium	High	Low	Medium	High
Residential	0.9%	1.4%	1.6%	1.3%	1.9%	2.2%
Commercial	2.8%	4.5%	5.1%	3.3%	5.4%	6.0%
Industrial	4.4%	6.7%	8.9%	4.5%	6.9%	9.2%
Total	**2.0%**	**3.1%**	**3.7%**	**2.4%**	**3.7%**	**4.4%**

Natural Gas Potential – Energy Result Tables

Table 12. Technical Natural Gas Energy Efficiency Potential - Energy (MCF)

Sector	Baseline Sales		Cumulative Technical		Cumulative Technical Percentage of Baseline	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Residential	17,361,742	17,872,105	7,802,412	8,794,324	44.9%	49.2%
Commercial	8,577,816	8,775,436	2,265,443	2,974,937	26.4%	33.9%
Industrial	1,753,580	1,753,580	217,225	227,955	12.4%	13.0%
Total	**27,693,139**	**28,401,121**	**10,285,079**	**11,997,216**	**37.1%**	**42.2%**

Table 13. Economic Natural Gas Energy Efficiency Potential - Energy (MCF)

Sector	Cumulative Economic		Cumulative Economic Percentage of Baseline		Economic as a % of Technical	
	2043	2035/2038	2043	2035/2038	2043	2035/2038
Residential	2,087,202	3,082,896	12.0%	17.2%	26.8%	35.1%
Commercial	691,609	937,691	8.1%	10.7%	30.5%	31.5%
Industrial	215,166	225,893	12.3%	12.9%	99.1%	99.1%
Total	**2,993,976**	**4,246,480**	**10.8%**	**15.0%**	**29.1%**	**35.4%**

Table 14. Achievable Natural Gas Energy Efficiency Potential - Energy (MCF)

Sector	Cumulative 2043			Cumulative 2035/2038		
	Low	Medium	High	Low	Medium	High
Residential	553,365	872,555	992,570	738,633	1,189,821	1,364,631
Commercial	200,945	351,624	397,331	249,711	456,015	515,945
Industrial	71,005	107,583	144,161	74,545	112,947	151,349
Total	**825,315**	**1,331,762**	**1,534,062**	**1,062,889**	**1,758,783**	**2,031,925**

Table 15. Achievable Natural Gas Energy Efficiency Potential as a Percent of Sales - Energy (MCF)

Sector	Cumulative Achievable Percentage of Baseline 2043			Cumulative Achievable Percentage of Baseline 2035/2038		
	Low	Medium	High	Low	Medium	High
Residential	3.2%	5.0%	5.7%	4.1%	6.7%	7.6%
Commercial	2.3%	4.1%	4.6%	2.8%	5.2%	5.9%
Industrial	4.0%	6.1%	8.2%	4.3%	6.4%	8.6%
Total	**3.0%**	**4.8%**	**5.5%**	**3.7%**	**6.2%**	**7.2%**

Louisville Gas and Electric Company and Kentucky Utilities Company
DSM Advisory Group
(2022 Minutes and Presentations)

Exhibit JB-2

MEETING RECORD

DSM Advisory Group Meeting Minutes

Date:	**August 31, 2022**
Location:	In Person at the Kentucky Chamber of Commerce and Online via Webex
Participants:	**LG&E /KU:** Representatives from: Business & Economic Development Energy Efficiency / Emerging Business Planning & Development Emerging Business Delivery Legal Department Regulatory Strategy / Policy **Stakeholders:** Representatives from: Kentucky Energy Solar Society Kentucky Interfaith Power and Light Kentuckians for the Commonwealth Mountain Association Oracle / Opower Louisville Energy Alliance Sierra Club Louisville Metro Virtual Peaker Copper Labs Apogee Climate Kentucky Solar Energy Society Midwest Energy Efficiency Alliance NEED (National Energy Education Development) Boehm, Kurtz & Lowry Kentucky Office of the Attorney General Solar Over Louisville
Date Issued:	09/16/2022
Issued by:	Justin Bencomo

The following meeting minutes have been prepared to summarize the conversations and issues discussed at the above referenced meeting.

Welcome / Introductions

John Bevington, the Director of LG&E and KU's Energy Efficiency Planning & Development Department, opened the meeting at 1:00 PM EDT.

Meeting Agenda

John Bevington thanked meeting participants for attending and asked that they state their preference for meeting location and in-person or virtual in the chat.
Of the responses provided, preferences were:
virtual: 4
in-person (Louisville): 3
in-person (Lexington): 1

He then presented an overview of the meeting agenda:

- Welcome / Introductions
- Background – updates since the meeting in December 2021
- Recap on DSM Planning and Development Process
- Next Steps and Closing

Meeting

John Bevington and John Hayden provided a summary of the DSM journey beginning in 2011 with the approval of the 2008 to 2014 plan and continuing through the KPSC's approval of the request for an increase to the Business Rebates program budget in 2022.

Next, John Hayden walked through a flow chart of the DSM planning process to highlight where LG&E and KU is in that process. This was followed by a slide listing various aspects of a DSM portfolio under consideration during this development process. John Bevington pointed out that, due to planned retirement of some generating units and load growth, there is opportunity to add more programs to the DSM portfolio but that those programs will need to provide a high certainty for reductions during peak times. Stakeholders provided the following questions and comments during this section.

- Is the 2021 demand response potential study available?
- What is the role of the advisory group?
- Will the advisory group be aware of the programs and be able to provide input before they are filed with the KPSC?
- How does natural gas fit into DSM?
- How do we address inefficient, historic-style, lighting?
- Could an element of DSM address streetlights with failed photocells?
- Do we foresee an option for residential customers to reduce demand through a time-of-day option?
- Don't be bound by the way DSM portfolios were done in the past.
- Consider using the total societal impact test.
- Consider offerings that incent deployment of building automation systems or improvement of existing systems.
- Consider offerings that incent energy storage.

John Bevington reminded the stakeholders that these meetings are the forum where feedback should be provided with the goal for the meetings to be collaborative during the time.

Following the questions and comments related to the DSM process and considerations, John Bevington opened the floor to the group to provide comment on the Inflation Reduction Act and asked whether there are opportunities for funds to be leveraged and what role LG&E and KU should play while avoiding overlap, confusion, and creating more DSM charges than necessary. Stakeholders provided the following comments:

- There is opportunity for LG&E and KU to help customers find the opportunities that can help cut their energy use and energy cost.
- An upfront discount may not be enough to enable low-income customers to make energy efficiency upgrades. Pay-as-you-save can provide value here.
- LG&E and KU analysis should reflect that customers have access to these rebates.
- The utility can help customers sort through the options to find what is the best fit for them.
- The utility can help the customer find a rebate, but also select a device or vehicle that can provide direct load control.
- The utility can leverage lobbyists to become a voice for building code changes.

Next Steps and Closing

John Bevington thanked the group for their participation and announced that the next meeting is tentatively scheduled for September 19th and will include a more in-depth discussion of the programs being evaluated. The meeting was closed at 2:46 PM EDT.

Additional Info / Links

(from Sumedha Rao to group):
IRA overview of the energy provisions from the Solar Energy Industries Association:
https://www.seia.org/sites/default/files/2022-08/Inflation%20Reduction%20Act%20Summary%20PDF%20FINAL.pdf

Action Item: Requested link to the 2021 LG&E/KU Demand Response Potential Study:
Report is posted to the Company site (https://lge-ku.com/dsm) alongside the meeting minutes and slides.

LG&E/KU DSM Advisory Group Meeting

August 31, 2022
Frankfort, KY

LG&E KU
PPL companies

Agenda

- Welcome / Introductions — 1:00 to 1:15
- Background — 1:15 to 2:00
  - *Updates from our last meeting in Dec 2021 ➔ Today*

******** *Break* ******** — 2:00 – 2:10

- Recap on DSM Planning & Development Process — 2:10 –2:45
- Next Steps / Closing — 2:45 – 3:00

Welcome & Intros

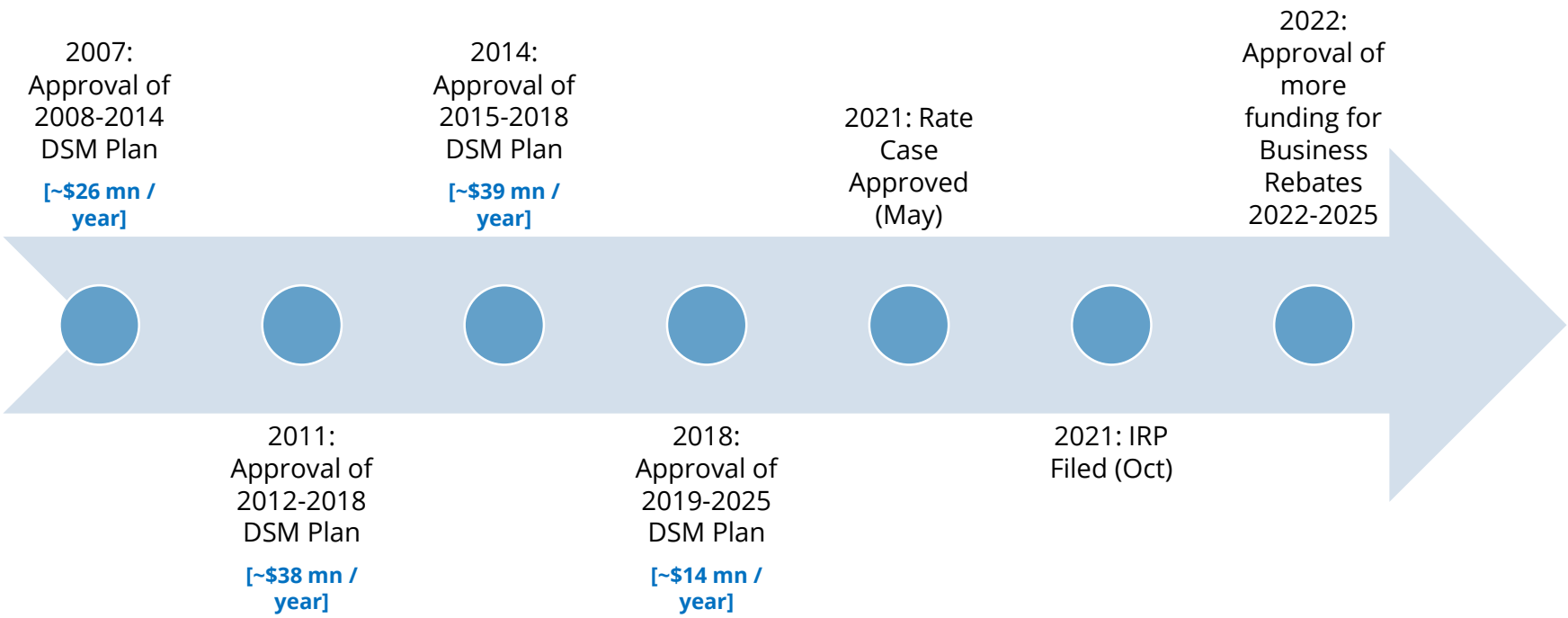
PPL companies

Background:

From our last meeting in Dec 2021 ➔ Today!

PPL companies

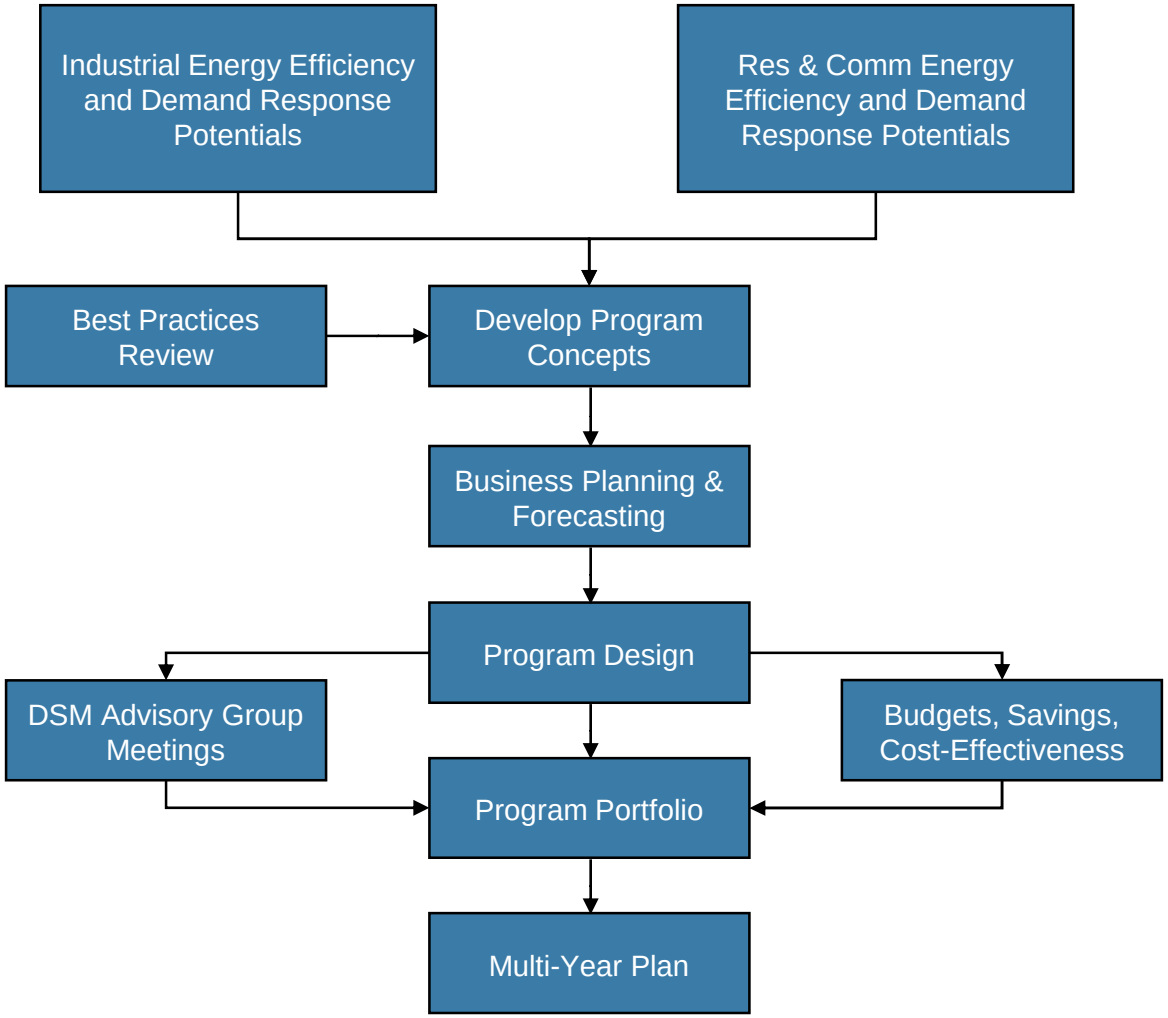
The DSM journey over the past decade…



BREAK

Recap on DSM Planning & Development Process

The DSM Planning Process...



Under Consideration…

Customers: Residential | Limited-Income | Commercial | Industrial

Types: Demand Response | Energy Efficiency | Conservation

Demand Response Types: Behavioral | Direct Load Control | Automated / Manual

Motivation:

Audits
- Virtual / On-line
- Self-Guided
- In-Person

Rebates/Credits
- Performance-Based
- Investment-Based
- Marketplace
- Mid-Stream
- After-Purchase

EE Financing
- On/Off Bill
- Pay-As You-Save
- Third-Party

Presentment Services
- Interval Data
- Next Best Action
- Load Disaggregation
- Usage Alerts, Forecasting
- Roadmap
- Reporting

Demand-Side Resources: Heat Pumps | Water Heating | Lighting | Thermostats | Building Envelope | Electric Vehicles | Shade Trees | Voice Assistants | Smart Home | Energy Storage | IoT Devices | Central Air Conditioners | Air Compressors | Dehumidifiers | Smart Devices | Electric Fleet Vehicles | Washers | Building Automation Systems | Electric Resistance Heat | Smart Circuit Breakers | Chillers | New Construction | Dryers | Pool Heaters | Smart Plugs | Pool Pumps | Commercial Kitchens | Energy Bridge | Faucet Aerators

Inflation Reduction Act

- $7,500 TAX CREDIT FOR NEW ELECTRIC VEHICLES
- $4,000 FOR USED ELECTRIC VEHICLES
- 30% TAX CREDIT FOR SOLAR PANELS, WIND ENERGY
- UP TO $2,000 A YEAR FOR HOME EFFICIENCY PROJECTS
- UP TO $8,000 OF HOME-ENERGY REBATES
- UP TO $14,000 IN REBATES FOR EFFICIENT APPLIANCES
- COMMERCIAL BUILDINGS ENERGY EFFICIENCY CREDIT
- ZERO BUILDING ENERGY CODE ADOPTION
- ENVIRONMENTAL AND CLIMATE JUSTICE BLOCK GRANTS

Next Steps / Closing

Next steps / Closing

August KY DSM Advisory Meeting
- Mobilize and gather ideas

Continue to work with Cadmus
- Examine EE potentials and needs, assess new offerings

2nd KY DSM Advisory Meeting
- Review findings with Cadmus; gather feedback; Plan for mid-to-late Sep 2022

3rd KY DSM Advisory Meeting
- Finalize plan and review offering specifics; Plan for Q4 2022

File DSM Plan

Questions or comments later?

Feel free to contact us at:

John Bevington
Phone #: (502) 627-4335
Email: john.bevington@lge-ku.com

Lana Isaacson
Phone #: (502) 627-2137
Email: lana.isaacson@lge-ku.com

John Hayden
Phone #: (502) 627-3978
Email: john.hayden@lge-ku.com

MEETING RECORD

DSM Advisory Group Meeting Minutes

Date:	**September 19, 2022, with 34 Attendees**
Location:	In Person at the Kentucky Chamber of Commerce and Online via Webex
Date:	**September 28, 2022, (continuation of 9-19 meeting) with 23 Attendees**
Location:	Online via Webex only
Participants:	**LG&E /KU:** Representatives from: Business & Economic Development Energy Efficiency / Emerging Business Planning & Development Emerging Business Delivery Legal Department / SKO *(as External Counsel)* Regulatory Strategy / Policy Cadmus *(as External Consultant)*
	Stakeholders: Representatives from: Apogee Bluegrass Greensource Kentucky Interfaith Power and Light Kentucky Conservation Committee Kentuckians for the Commonwealth Mountain Association Louisville Metro Air Pollution Control District Oracle Office of the Attorney General (OAG) Sierra Club NAACP KIUC (*as External Counsel*) Louisville Metro Virtual Peaker Copper Labs Kentucky Solar Energy Society Midwest Energy Efficiency Alliance (MEEA) Metropolitan Housing Coalition NEED (National Energy Education Development)
Date Issued:	10/5/2022
Issued by:	Justin Bencomo / John Hayden

The following meeting minutes have been prepared to summarize the conversations and issues discussed at the above referenced meeting.

Welcome / Introductions

John Bevington, the Director of LG&E and KU's Energy Efficiency Planning & Development Department, opened the meeting at 1:00 PM EDT and took attendance. He also confirmed with the group that, going forward, all attendees supported receiving "open" email meeting invitations that so all recipients could see the entire distribution list, which would help to ensure better awareness of upcoming meetings as well as attendance.

Meeting Agenda

John Bevington then presented an overview of the meeting agenda:

- Welcome *(from 9/19 meeting)*
- DSM Program Overviews *(from 9/19 meeting)*
- DSM Program Evaluation Process Discussion *(from 9/19 meeting)*
- DSM Program Scoring Results Discussion *(from 9/28 meeting)*
- Next Steps/Closing *(from 9/28 meeting)*

Meeting

To begin the meeting, John Bevington notified the group of an email that was received on 9/15 from Chris Woolery, on behalf of various stakeholders. that contained recommendations for the stakeholder process. It was confirmed that this letter could be shared with the entire group and will be posted alongside the minutes for the meeting on the website.

John Bevington then identified the steps of the DSM planning process currently underway: program design; DSM advisory group meetings; budgets, savings, and cost effectiveness; and program portfolio. He then covered the considerations and potential measures that informed initial program design.

Next, Justin Bencomo reviewed demand response programs that were considered. John Hayden followed with a review of education and efficiency programs.

Stakeholders provided the following questions and comments during this section.

- What is the incentive design for these programs?
- Attendee asserted that LG&E and KU should look at census tract information for customer participation.
- Will solar be in residential education since it reduces energy usage?
- Will education material include climate impact?
- The marketplace is good but a suggestion for improvement to make it an opportunity to transact with other DSM programs.
- Fuel switching customers is not common in the industry. It may provide a short electric gain but lead to more exposure to pricing volatility.
- Can solar be part of residential education program?
- Can rooftop solar be considered as part of a DSM/EE program plan?
- Do LG&E and KU collect data on homeowners and landlords vs. benefits for renters?
- Midstream HVAC rebates are another area where IRA funds can help.
- Why wouldn't LG&E and KU offer minimum efficiency standard and then offer rebate for anything over the minimum?
- Can LG&E and KU look at efficiency and affordability on a longer term?
- How can LG&E and KU be more thoughtful and proactive?

Jeana Swedenburg from Cadmus then reviewed the program identification, scoring process, and scoring objectives. At this point, the meeting was running over our scheduled time, so LG&E and KU determined we would need to schedule another meeting (9/28/2022) to cover the remaining important agenda items, which included the program scoring rubric, scoring results, and next steps.

Stakeholders provided the following questions and comments during this section.

- What is substantial investment that wouldn't result in a demand and energy savings?
- LG&E and KU should run the Societal Test, even though it's not required by the PSC.
- There may be overlap in the program criteria.
- Programming for different kinds of customers muddles the conversation. Circumstances for a family with income at 70% of the poverty line is different from program for multi-family at market rate.

After several participants indicated, via email, that they could not attend the follow-up meeting LG&E and KU scheduled for later that week, LG&E and KU sent the group two possible dates and times for the following week, asking the participants to vote on their preference. As a result of those votes, the follow-up meeting was held on Wednesday 9/28, at 2:02 PM.

John Bevington opened the meeting to continue the discussion and complete the agenda with Stakeholders. First order of business was to notify attendees of the next meeting tentatively set for the week of October 17th. A participant noted that the 2022 Governor's Conference on Energy and Climate is already set for October 16-18. So John Bevington indicated that the Companies would look for an alternative date. He explained that the next meeting would be scheduled for a half day to allow plenty of time for further discussion.

Jeana Swedenburg from Cadmus then picked up from the stopping point on 9/19 to continue the presentation on the rubric scoring overview process and results. This scoring process considered all initial thirty-nine (39) programs and then narrowed those down to fourteen (14) programs that would be modeled for cost-effectiveness.

Stakeholders provided the following questions and comments during this section.

- What is the difference between audits and reports?
- How many of the 14 programs are for residential customers?
- How are we reviewing midstream and downstream rebate offerings? Follow up comment added that their preference was for downstream rebate offerings to ensure dollars make it to target.
- Strategic Energy Management (SEM) may have a lot of potential.
- LED Streetlights would be of interest to customers.
- What would an Appliance Recycling program entail?
- Programs should be able to engage customers and trade allies/contractors.
- Can prior cost-effectiveness review of PAYS program be shared? ****ACTION ITEM****

ACTION ITEM #1*: Company to share analysis with group.*

- Did rubric scoring include IRA impacts?
- Opportunity to leverage both local and state credits, not just federal credits. ****ACTION ITEM****

ACTION ITEM #2*: Stakeholder to provide contact info to John Bevington on other entities with credit opportunities.*

- Will programs be individually cost-effectiveness scored or by portfolio?
- Why not run the Societal Test to see how programs score?

Next Steps and Closing

John Bevington then presented a recap of the next steps of the process, which would entail a meeting in mid-October to review the results from the cost-effectiveness scoring analysis and for the attendees to be on the lookout for an email with the specific date, time, and location option. The meeting was then closed at 3:03 pm ET.

Additional Info / Links

Action item #1 to be provided via the website link: https://lge-ku.com/dsm under the meeting date.

LG&E/KU DSM Advisory Group Meeting

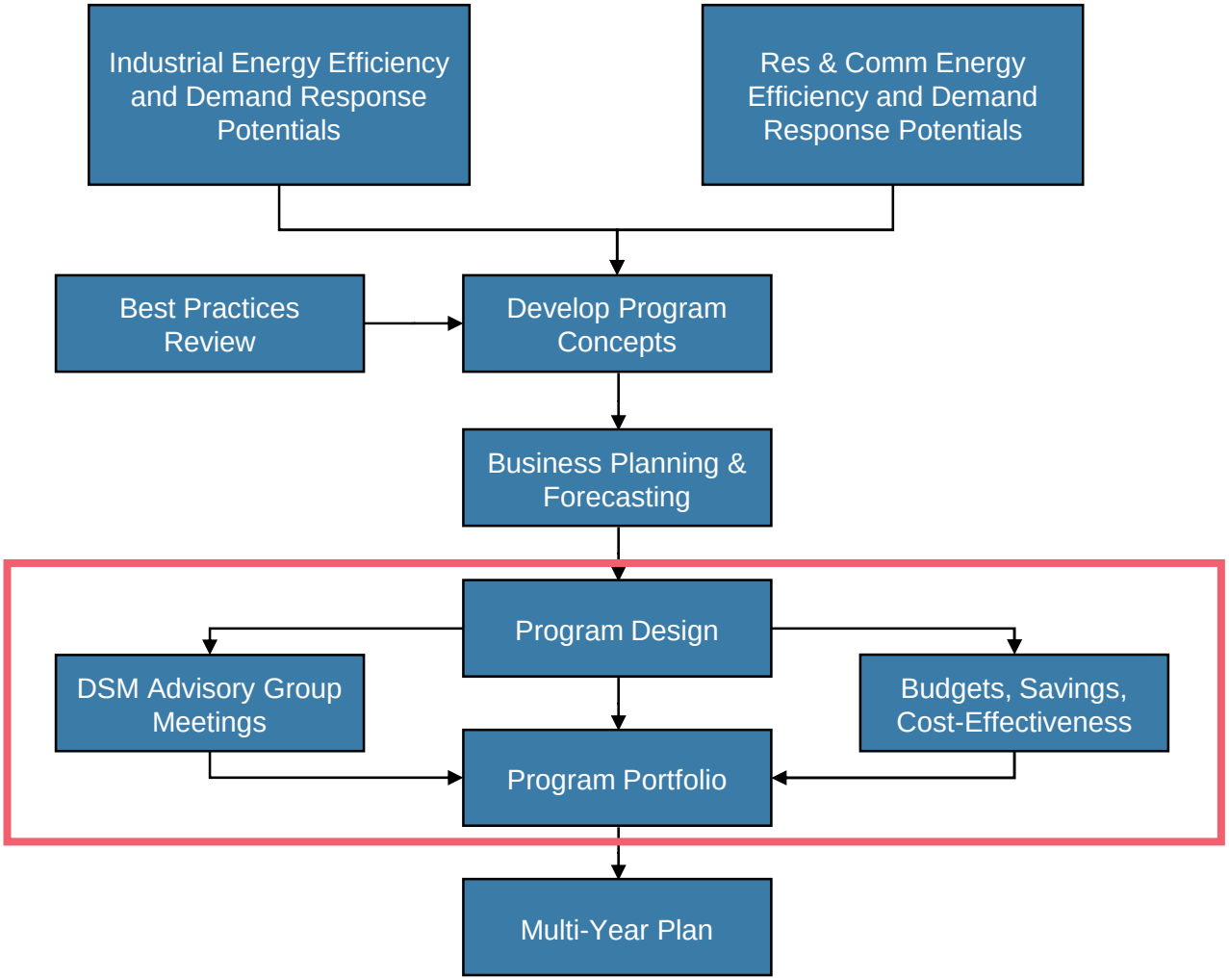
September 19, 2022
Frankfort, KY

LG&E KU
PPL companies

Agenda

• Welcome	1:00 to 1:10
• DSM Program Overviews	1:10 to 1:45
• DSM Program Evaluation Process Discussion	1:45 to 2:20
******** *Break* ********	2:20 – 2:30
• DSM Program Scoring Results Discussion	2:30 –3:20
• Next Steps / Closing	3:20 – 3:30

The DSM Planning Process...



DSM Program Overviews

Considerations and Potential Measures

Customers: Residential | Limited-Income | Commercial | Industrial

Types: Demand Response | Energy Efficiency | Conservation

Demand Response Types: Behavioral | Direct Load Control | Automated / Manual

Motivation:

Audits
- Virtual / On-line
- Self-Guided
- In-Person

Rebates/Credits
- Performance-Based
- Investment-Based
- Marketplace
- Mid-Stream
- After-Purchase

EE Financing
- On/Off Bill
- Pay-As You-Save
- Third-Party

Presentment Services
- Interval Data
- Next Best Action
- Load Disaggregation
- Usage Alerts, Forecasting
- Roadmap
- Reporting

Demand-Side Resources: Heat Pumps | Water Heating | Lighting | Thermostats | Building Envelope | Electric Vehicles | Shade Trees | Voice Assistants | Smart Home | Energy Storage | IoT Devices | Central Air Conditioners | Air Compressors | Dehumidifiers | Smart Devices | Electric Fleet Vehicles | Washers | Building Automation Systems | Electric Resistance Heat | Smart Circuit Breakers | Chillers | New Construction | Dryers | Pool Heaters | Smart Plugs | Pool Pumps | Commercial Kitchens | Energy Bridge | Faucet Aerators

Demand Response Program Overview

All Customers

- Bidirectional flow on EVs (Fleets, School Buses and Passenger)

All Residential

- Managed EV charging (Residential Passenger)

Low-to-Moderate Income Residential

- WeCare audit with direct enrollment to peak-time-rebates (PTR)
- WeCare audit with direct enrollment to bring-your-own-thermostat (BYOT)

All Residential & Small Commercial

- Bring-your-own-device (BYOD)
- DLC – current program with replacement of ~15,000 CSV devices
- DLC – current program
- Peak-time-rebates (PTR)
- Smart thermostat rebate and managed program (BYOT)

All Nonresidential

- Energy storage
- Managed EV charging (School Buses)

Large Nonresidential

- Demand response – current program
- Demand response – modified program

Education Program Overview

Large Nonresidential

- Strategic energy management

Small Nonresidential

- Small business energy reports

Residential

- Home energy reports
- Load disaggregation software
- Online energy audit without rebates
- Online energy audit with rebates
- Student education w/ Marketplace coupons

Efficiency Program Overview

All Residential

- Fuel switching: electric to gas
- Appliance recycling
- Downstream rebates
- Energy financing options
- Online transactional Marketplace
- New construction rebates

Low-to-Moderate Income Residential

- WeCare – current program with income level adjustment & Inflation Reduction Act (IRA) education
- WeCare – modified program
- WeCare – current program with shade tree
- Shade trees

Low-to-Moderate Income Multi-family

- Whole building direct install measures

All Residential & Small Commercial

- Midstream HVAC rebates – dual fuel

All Nonresidential

- Green roofs
- Midstream lighting incentive
- LED streetlight conversion
- Energy financing options

DSM Program Evaluation Process

DSM/EE Program Identification and Scoring Process

- **August 25-26 program identification workshop**
  - Pre-planning to brainstorm programs for discussion (39 programs)
  - Finalized LG&E/KU's program scoring objectives
- **Six individual program scoring evaluators**
  - 3 from LG&E/KU; 3 from Cadmus
- **Scoring based on response to objective criteria**
  - 0: Program does not meet criteria
  - 1: Program partially meets criteria
  - 2: Program fully meets criteria
- **Scoring weighted by objective priority**
  - High: 6 points
  - Medium: 4 points
  - Low: 2 points

DSM/EE Program Scoring Objectives

Objective	Priority
Is there evidence the program offers significant, firm demand reduction, including during (winter) peak periods?	High
Is there evidence the program offers significant energy savings?	High
Is there evidence the program could be cost-effective?	High
Does the program benefit disadvantaged customers/communities?	High
Does the program minimize complexity and maximize value?	Med
Can the program be successfully started without substantial DSM investment unrelated to saving energy/demand?	Med
Does the program prioritize market-ready technologies?	Med
Is the program easy for customers to participate in?	Med
Does the program provide energy education to customers?	Med
Is the program successful in any PPL territories?	Low
Does the program promote/rely on an established local workforce?	Low
Does the program intend to improve the comfort and indoor health of homes and buildings throughout the Companies' territories?	Low

Rubric Background and Example

- Max score potential = 100
- 3 groups
  - **Green:** Evidence of firm demand reduction, high customer value, and lower deployment complexity
  - **Yellow:** Expectation of firm demand reduction and high customer value yet further review necessary
  - **Red:** Higher level of complexity for deployment or technology leading to lower overall customer value currently
- Green and some yellow moving forward for cost-effectiveness modeling

Demand Response Program Name	Program Type	Applicable Customer Segment	Score - Average
Appliance Recycling	Efficiency	Market Rate Residential Sector	77.67
Bidirectional Flow on EVs (Fleets, School Buses and Passenger)	Demand Response	All customers	37.67
Bring-Your-Own-Device (BYOD) Program	Demand Response	All residential and small nonresidential	70.00
Business Rebates - Current Program	Efficiency	All Nonresidential	71.83
Business Rebates - Modified	Efficiency	All Nonresidential	75.17
DLC-A/C and Water Heaters and pool pumps (device replacement for ~15,000 CSV devices)	Demand Response	All residential and small nonresidential	57.83
DLC-A/C, Water Heaters and Pool Pumps (Current Program)	Demand Response	All residential and small nonresidential	56.83
Downstream Rebates	Efficiency	Market Rate Residential Sector	65.33
Energy Financing	Efficiency	All Nonresidential	51.50
Energy Financing	Efficiency	Market Rate Residential Sector	52.00

DSM/EE Program Scoring Results

Red (Score 0-49)	Yellow (Score 50-69)		Green (Score 70-100)
Shade Trees	WeCare with Shade Trees	**Direct Load Control***	**Limited Income WeCare with Demand Response Direct Enrollment***
Fuel Switching (Electric to Gas Conversion)	Midstream HVAC Rebates	**Nonresidential Demand Response***	**Whole Building Limited Income Multifamily***
Residential Online Energy Audit w/o Rebates	Downstream Rebates	**Peak Time Rebates ***	**Appliance Recycling***
Managed EV Charging for School Buses	**Energy Efficiency Financing***	**Managed EV Charging***	**Online Transactional Marketplace***
Green Roofs	Home Energy Reports	Small Business Energy Reports	**Residential Energy Audit Online w/ Rebates***
Bidirectional Flow on EVs	New Home Construction Rebates	Strategic Energy Management	**Smart Thermostat Rebate and Bring-Your-Own-Device Program***
Energy Storage	Student Education	**Nonresidential Midstream Lighting***	**Business Rebates***
	Load Disaggregation Alerts	LED Streetlight Retrofits	**Small Business Audit and Direct Install***

* indicates programs moving forward to cost-effectiveness modeling phase of planning

Next Steps

DSM/EE Program Planning Next Steps

Cadmus to develop inputs and assumptions for programs moving forward to cost-effectiveness (CE) modeling

Cadmus to share preliminary CE results with LG&E/KU

DSM Advisory Group Meeting in Oct/Nov for CE reviews

LG&E/KU to work with Cadmus to refine program inputs and finalize CE modeling

MEETING RECORD

DSM Advisory Group Meeting Minutes

Date: **October 20, 2022, with 29Attendees**
Location: In Person at Greater Louisville Inc. and Online via Webex

Participants: **LG&E /KU:**
Representatives from:
Business & Economic Development
Energy Efficiency / Emerging Business Planning & Development
Emerging Business Delivery
Legal Department / SKO *(as External Counsel)*
Regulatory Strategy / Policy
Cadmus *(as External Consultant)*

Stakeholders:
Representatives from:
Apogee
Copper Labs
EFI
Franklin Energy
Kentuckians for the Commonwealth
Kentucky Interfaith Power and Light
Kentucky Solar Energy Society
Louisville Metro Government
Mountain Association
Office of the Attorney General (OAG)
Oracle
Sierra Club
Transition Louisville
Virtual Peaker

Date Issued: 10/25/2022

Issued by: Justin Bencomo

The following meeting minutes have been prepared to summarize the conversations and issues discussed at the above referenced meeting.

Welcome / Introductions John Bevington, the Director of LG&E and KU's Energy Efficiency Planning & Development Department, opened the meeting at 12:45 PM EDT. He provided a recap of historic DSM, existing programs, and the opportunity for an expanded portfolio.
Meeting Agenda John Bevington then presented an overview of the meeting agenda: • Cost Effectiveness Overview

- Cost Effectiveness Results and Discussion
- Next Steps/Closing

Meeting

Aquila Velonis from Cadmus provided an overview of the purpose of cost-effectiveness scoring, the allocation of scarce resources, and a review of the different tests of the California Standard Practice Manual.

Amy Ellsworth from Cadmus then reviewed the portfolio development process: 39 programs were initially created through brainstorming, progressing to 14 programs identified by the scoring rubric as candidates for cost-effectiveness scoring. The 14 programs were modeled individually leading to consolidation into 9 programs with multiple components. Modeling of these 9 programs is ongoing and involves input refinement. During this section, a stakeholder asked if all tests were weighted equally and if a low score in one test might eliminate a program that scored higher in other tests. John Bevington answered that all four tests are run by Cadmus but that the Kentucky Public Service Commission primarily relies on the Total Resource Cost (TRC) test and that a low score would not eliminate a program with a high TRC score. Another stakeholder asked if it was standard to budget for programs and spread the costs upfront. John Bevington explained the true up process would return money if LG&E and KU underspent and that LG&E and KU would and have filed requests for additional funds where customer take has been higher than expected.

John Bevington then covered the individual program bundling strategy for programs that progressed to cost-effectiveness testing. Grouping was performed to help programs save cost and to help some programs get through that wouldn't move forward if they were evaluated separately. John emphasized that LG&E and KU do not want to have programs that increase costs and create redundancy with the Inflation Reduction Act (IRA). John shared that Kenya Stump, Executive Director of the Kentucky Office of Energy Policy, has expressed that there is a very real need for multi-family housing energy efficiency programs.

Preliminary program modeling for cost-effectiveness was then reviewed at the sector, program, component, and measure level. A stakeholder commented that there may be synergies between programs that were not grouped but those synergies might be less significant than among the grouped programs. A second stakeholder asked which parties were involved with the rubric scoring. John Bevington specified that Cadmus and LG&E and KU staff participated in the rubric scoring process. A third stakeholder asked where appliance rebates resided. Lana Isaacson responded that those rebates were part of the residential online audits. John Bevington distinguished between investments in energy efficiency and demand response. Investments in energy efficiency accelerate adoption of energy efficiency and, in some cases, enable energy efficiency that would not otherwise be available. Demand response provides resources the company can call on when the system is working the hardest. A fourth stakeholder asked for an overview of midstream lighting rebates which John Bevington explained involved providing rebates to distributors to streamline the process, achieve the same cost reductions, and eliminate a task for consumers.

John Bevington then introduced the preliminary seven-year costs and savings results and covered how the numbers should be interpreted. A stakeholder asked why gas savings was 0 for energy efficiency financing which John clarified was likely rounding to zero. After further review, there were no natural gas-related projected included in the projections. John Bevington mentioned that Kenya Stump believes utilities do not need to offer energy efficiency financing to customers because the state intends to open $10 million revolving loan program and the Federal green bank established by the IRA.

ACTION ITEM: LGE-KU representatives to schedule a meeting with Kenya Stump and interested DSM Advisory Group members to further discuss energy efficiency financing options.

A stakeholder asked how many people would benefit from income-qualified programs at a cost of approximately $10 million per year. Lisa Keels specified that under our existing programs, approximately 4,000 customers

benefit from $6 million annually with a spend of $1,500 to $1,700 per home. A second stakeholder asked about PD&A which John Bevington explained stands for program development and administration and includes the cost of LG&E and KU staff needed to execute programs. Sumedha Rao, Louisville Metro Government, offered to keep the stakeholders updated on the results of their exploration of green banks as part of the Communities Local Energy Action Program. A third stakeholder asked if WeCare falls under income qualified solutions. John Bevington confirmed that WeCare 2.0 along with the multifamily whole building retrofit, which is a program that doesn't exist today. At this point, a stakeholder asked if there was a way to estimate and evaluate the costs and energy savings for each low- or moderate-income customer. Aquila Velonis stated that an average of energy and bill savings could be provided at the customer level rather than the program level. Amy Ellsworth emphasized that these savings are only forecasts of what is likely to happen based on past participation and examples from other jurisdictions. The group took a break starting at 2:00 PM

During the break, one stakeholder used the chat feature to clarify that most advocates are asking for inclusive utility investments with robust consumer protections based on the PAYS program, which opens access to EE and renters who don't qualify for a loan. Another stakeholder used the chat feature to ask for further clarification on whether non-energy benefits including environmental compliance costs, reduced credit and collection costs were included in the cost-effectiveness scoring. Aquila Velonis stated that non-energy impacts are excluded from the cost-effectiveness scoring.

Preliminary cost-effectiveness results were then reviewed with the group. John Bevington explained that TRC scores are averaged and influenced by when the program is started. Program start dates will be shared in the next stakeholder meeting. A stakeholder asked which variables contributed to the low score for income qualified solutions. Aquila explained that low-income programs are expected to fail the TRC test in part because TRC accounts for more expensive measures (weatherization and HVAC upgrades) and program deployment costs all borne by the utility. As long as they are aggregated in a portfolio with a TRC above one, then there is no reason for concern. A stakeholder than asked if IRA impacts should be noted in relation to the cost-effectiveness scoring. Amy Ellsworth explained that the rule making is ongoing and that it would be some time before there is enough information to know the specific impacts of the IRA. Two stakeholders then asked whether reductions in unpaid bills among low- and moderate-income customers was factored into the scoring. John Bevington emphasized that LG&E and KU are putting the income qualified programs forward despite having a TRC less than one. John then specified that LG&E and KU anticipate filing in December 2022 and reemphasized that a TRC score below one does not mean a program won't be proposed and that a score above one does not guarantee a program will be proposed. A stakeholder asked whether it was better to file in December or to delay filing until the IRA rules and impacts were better understood. John Bevington stated the plan is to file in December based on the forecasted benefits the portfolio can provide customers. Lana Isaacson reminded the group that LG&E and KU have the opportunity to refile mid-plan to adjust for the IRA. A stakeholder expressed disappointment that the residential online audit program didn't score higher with the potential to provide educational elements. The stakeholder suggested directing customers to proven tools, hubs, and other resources that provide energy education. Another stakeholder asked if the nine programs would be proposed to the Public Service Commission. John Bevington said the companies are hopeful that these will be proposed. Kirsten Millar, Virtual Peaker, shared several examples of transaction marketplaces to the group. One stakeholder shared that the EKPC integrated resource plan found online energy audits to have low participation but high cost. Lana Isaacson pointed out that online audits lower the incremental costs to reach each home, allows customers to engage at their leisure, and may be a better fit given issues with entering customer homes created by the pandemic.

A stakeholder asked whether LG&E and KU were familiar with the National Standard Practice Manual for Distributed Energy Resources and whether they could use items from that manual to improve cost-benefit scores. Counsel for LG&E and KU noted that the four California Standard Practice Manual tests Cadmus performed have been prescribed and required by the Kentucky Public Service Commission for more than 20 years, which does not necessarily preclude running other tests but does not permit altering the required tests.

Next Steps and Closing

John Bevington then presented the next steps of the process which includes refining inputs, verifying that program scoring stabilizes, and determining what LG&E and KU can successfully execute on. Another meeting will be scheduled for the first week of November to discuss what the programs and portfolio look like as the evaluation concludes. Two stakeholders expressed concern that the end of the process was approaching without a specific evaluation of the Pay-as-you-save (PAYS) energy efficiency financing model. Aquila Velonis clarified that PAYS is indeed being modeled with new information. Amy Ellsworth mentioned that one challenge to modeling PAYS is a lack of publicly accessible data. John Bevington made a request for any data stakeholders could provide on PAYS and one stakeholder expressed that they would provide any data they could find. One stakeholder referenced possible PAYS programs approved for utility companies in Missouri.

The meeting concluded at 3:40 p.m.

LG&E/KU DSM Advisory Group Meeting

October 20, 2022

LG&E KU
PPL companies

Cost-Effectiveness Overview

The Basics of Benefits and Costs

Benefits: Cost Avoidance

- Fixed Costs (Capacity) (Avoid or Defer Expansion)
  - Generation
  - T&D
- Variable Costs (Energy)
- Operating Losses

Costs: Incurred

- Measure Costs
- Incentives
- Utility Costs
- Lost Revenue

$$\frac{Benefits_{npv}}{Costs_{npv}} = {}^{B}/_{C}\ Ratio$$

Benefit/Cost Allocation by Test

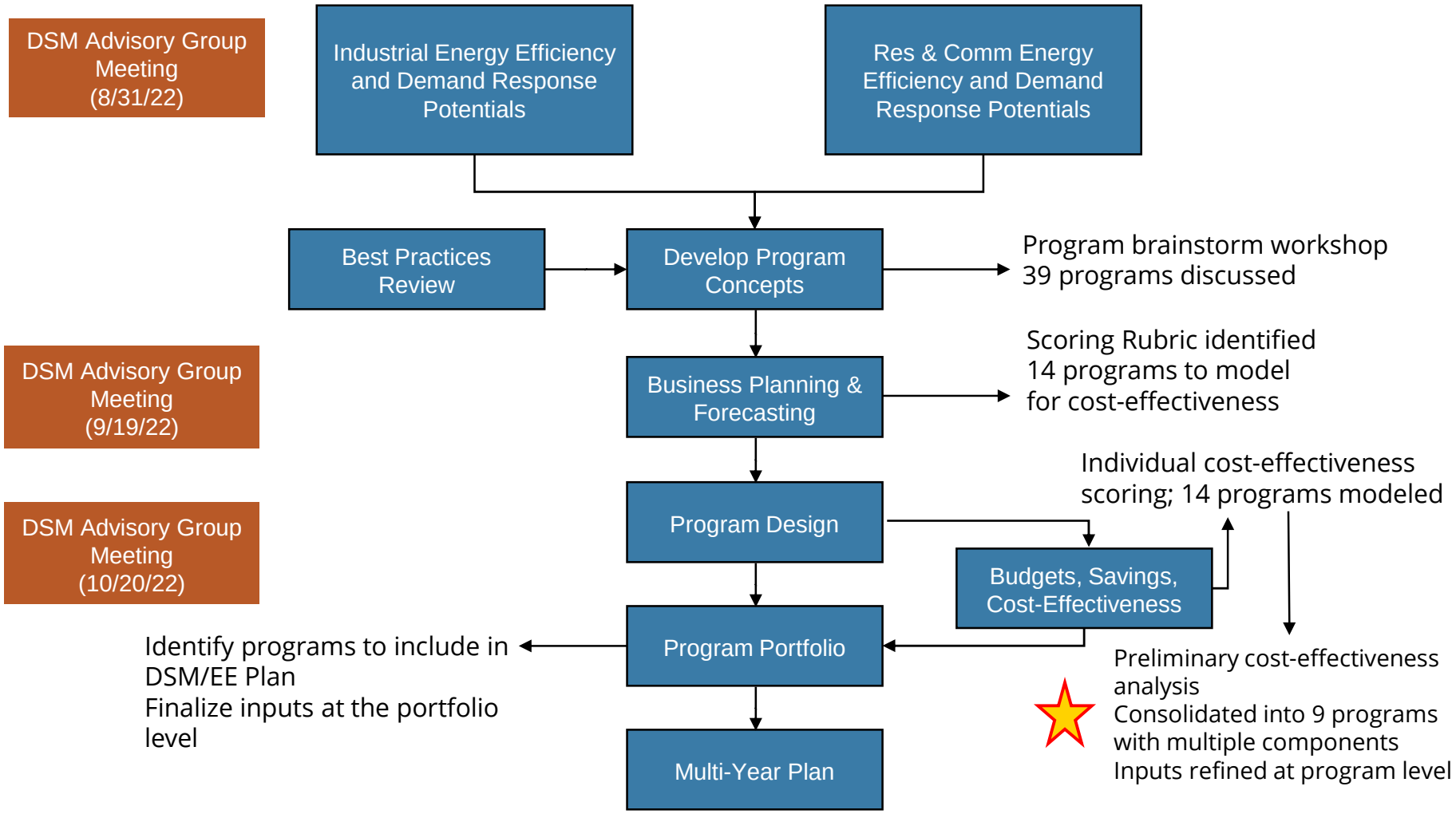
		Perspectives			
	Benefit/Cost Components	Total Resource Cost (TRC)	Program Administrator (PAC)	Participant (PTC)	Rate Impact Measure (RIM)
Benefits	Avoided Energy Supply[1]	o	o		o
	Bill Reduction			o	
	Incentives			o	
	Other Benefits (O&M and water savings)	o		o	
Costs	Measure Costs[2]				
	Participant	o		o	
	Program Administrator	o	o		o
	Transaction Costs				
	Participant	o		o	
	Program Administrator	o	o		o
	Incentives		o		o
	Lost Revenues				o

1. Includes avoided energy, capacity, transmission and distribution costs, avoided line losses, and can include avoided secondary fuel costs.
2. May be incremental or full costs, depending on whether the measure is normal replacement or retrofit.

Looking Forward: 2024-2030 Draft DSM/EE Cost-Effectiveness

PPL companies

Portfolio Development Process



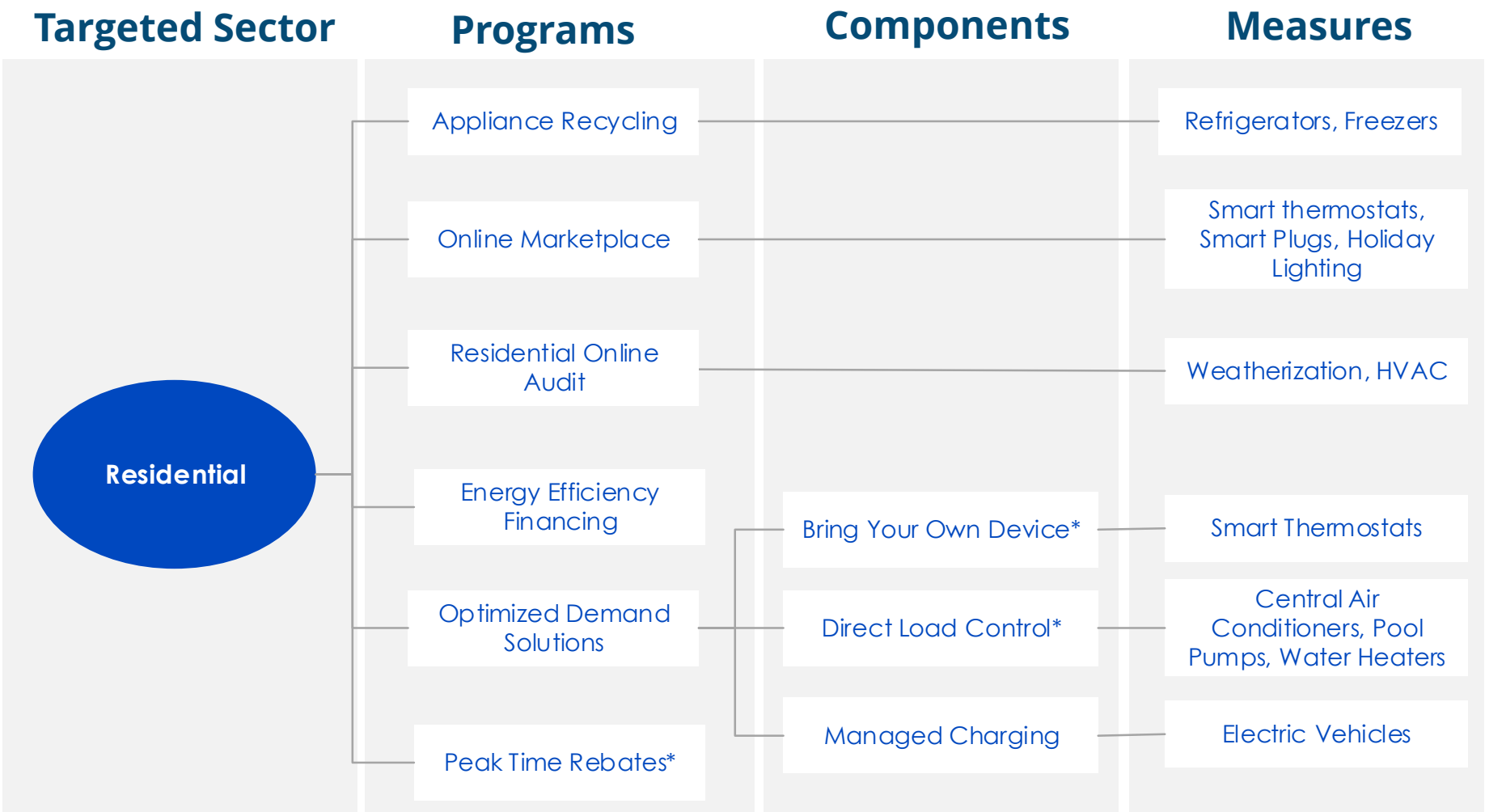
Individual Program Bundling

WeCare 2.0, with IRA guidance
LMI Multi-family
Biz Rebates 2.0
Non-res Midstream Lighting
Small Biz Audit and Direct Install
Bring-your-own-thermostat
Res Direct Load Control
Res Managed EV Charging
Appliance Recycling
Energy Efficiency Financing
Large Nonresidential Demand Conservation (DR)
Online (Transactional) Marketplace
Peak Time Rebates (DR)
Res Online Audit and Wx/HVAC/Water Heat

Consolidated Program Components:

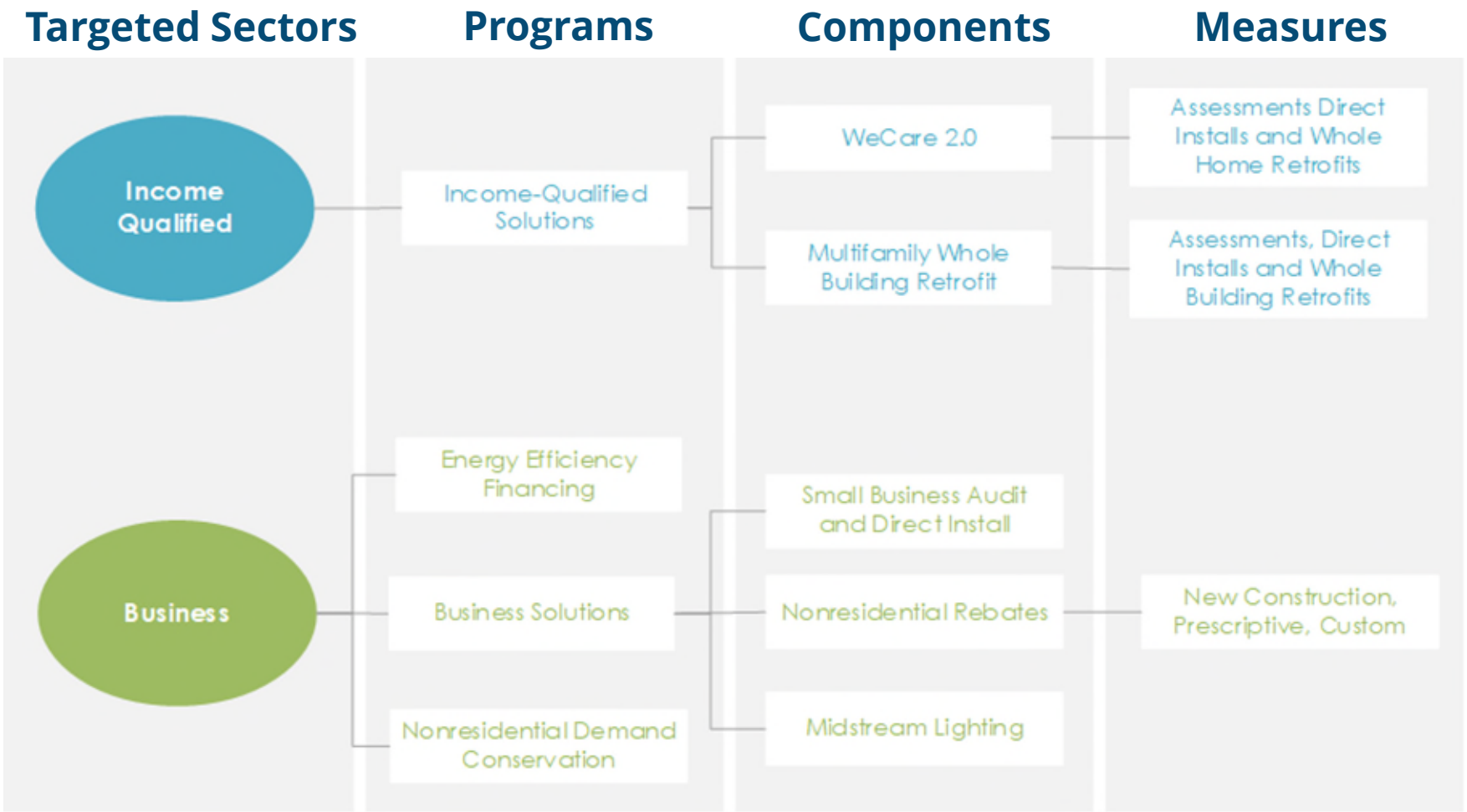
- **Income-Qualified Solutions:**
  - Single Program that includes 2 components: single-family WeCare and whole-building multi-family
- **Business Solutions:**
  - Single Program that includes 3 components: rebates, midstream lighting, and small biz audit
- **Optimized Demand Solutions**
  - Customer chooses the various smart devices or appliances to enroll into the program
  - Managed via software package and AMI data

Preliminary Programs Modeled for C/E



* Denotes other sectors can participate, such as small nonresidential.

Preliminary Programs Modeled for C/E



Preliminary Seven-Year Costs & Savings

Program	Budget ($1,000s)	Electric Savings (MWh)	Gas Savings (CCF)	Demand Savings (MW)
PD&A	$19,436	N/A	N/A	N/A
Income-Qualified Solutions	$70,915	31,002	932,244	2.6
Appliance Recycling	$8,880	28,013	N/A	3.3
Online (Transactional) Marketplace	$7,279	16,074	684,562	N/A
Res Online Audit and Wx/HVAC/Water Heat	$6,449	10,298	98,222	2.5
Business Solutions	$49,666	776,406	24,887	162.2
Energy Efficiency Financing	$3,355	13,008	0	2.7
Optimized Residential and Small Nonresidential Demand Solutions (DR)	$80,614	N/A	N/A	68.3*
Peak Time Rebates (DR)	$14,686	762	N/A	38.1*
Large Nonresidential Demand Conservation (DR)	$38,426	782	N/A	78.7*

*Final year (2030) summer peak

Preliminary Cost-Effectiveness Results

Program	TRC	PCT	RIM	PAC
PD&A	0.00	N/A	0.00	0.00
Income-Qualified Solutions	0.24	N/A	0.11	0.24
Appliance Recycling	1.02	N/A	0.19	0.81
Online (Transactional) Marketplace	0.35	9.04	0.12	0.54
Res Online Audit and Wx/HVAC/Water Heat	0.57	3.50	0.25	1.04
Business Solutions	1.84	6.25	0.26	7.96
Energy Efficiency Financing	0.48	3.31	0.25	2.15
Optimized Residential and Small Nonresidential Demand Solutions (DR)	4.81	0.00	3.06	3.06
Peak Time Rebates (DR)	4.00	N/A	1.35	1.39
Large Nonresidential Demand Conservation (DR)	1.69	0.14	1.35	1.37

Next Steps

- Finalize cost-effectiveness inputs and results (final refinement)
- Finalize DSM/EE programs included in portfolio
- Draft DSM/EE Plan
- Hold final stakeholder meeting to review the plan
- File DSM/EE Plan with KPSC before end of year

MEETING RECORD

DSM Advisory Group Meeting Minutes

Date:	**November 10, 2022, with 32 Attendees**
Location:	Online via Zoom
Participants:	**LG&E /KU:** Representatives from: Business & Economic Development Energy Efficiency / Emerging Business Planning & Development Emerging Business Delivery Legal Department / SKO *(as External Counsel)* Regulatory Strategy / Policy
	Stakeholders: Representatives from: Apogee Copper Labs Earthjustice/Clean Energy Program Energy Federation Incorporated (EFI) Greater Louisville Sierra Club Kentuckians for the Commonwealth Kentucky Interfaith Power and Light Kentucky Conservation Committee Kentucky Energy and Environment Cabinet Kentucky Solar Energy Society Louisville Climate Action Network Louisville Metro Government Metro Housing Coalition Midwest Energy Efficiency Alliance Mountain Association Office of the Attorney General (OAG) Oracle Transition Louisville Virtual Peaker
Date Issued:	11/15/2022
Issued by:	Justin Bencomo

The following meeting minutes have been prepared to summarize the conversations and issues discussed at the above referenced meeting.

Welcome / Introductions John Bevington, Director of LG&E and KU's Energy Efficiency Planning & Development Department, opened the meeting at 2:00 PM EST. The meeting was held via Zoom, so a roll call was not conducted.

Meeting Agenda

John Bevington then presented the meeting agenda:

- Recap
- Proposed DSM Plan Overview
- Proposed Market Research/Pilots Funding
- Next Steps

Meeting

John Bevington provided a recap of how the Companies arrived at the programs in the draft DSM/EE plan. The Companies continuously evaluate programs and technologies looking for new opportunities for energy and demand savings that add real value to customers. From a field of 39 programs, 14 were selected by the scoring rubric process to move forward into cost-effectiveness evaluation. Some programs with Total Resource Cost (TRC) scores <1.0 that were identified by DSM Advisory Group Members as being highly valuable to customers were combined with other similar programs to allow inclusion in the plan (such as Zach Tyler's suggestion to include an audit program in this group's last meeting). The result of this process is an expanded portfolio that offers more opportunities to all customer types.

John Bevington then reviewed the program offerings by customer types; All Residential, Income Qualified, and Non-Residential. A stakeholder asked why Peak Time Rebates (PTR) program wouldn't be an opt-out program where every customer would participate by default. The stakeholder also asked if a customer could participate in both PTR and Bring-your-own-device (BYOD). John Bevington responded to the first question by explaining that it is a voluntary, opt-in program. He also explained that including everyone would increase the cost and would not be expected to proportionally increase the value. John Hayden explained that PTR is available for everyone, has no barriers to entry, only offers rewards with no penalty for failing to reduce energy consumption during an event. It is the goal of LG&E/KU to identify technologies that allow for customer participation in both PTR and BYOD, however, ensuring that savings are not counted twice for the same device.

Another stakeholder expressed interest in seeing the underlying data and analysis performed to support the programs design. A third stakeholder asked whether the online appliance Marketplace would continue to remain available for all customers as it is currently. The Companies confirmed that it will be. The stakeholder also asked if local merchants would be excluded from online purchasing options. Bevington explained that the intent is to continue to promote local retailers and offer programs that encourage local purchasing.

John Bevington then reviewed the proposed DSM/EE plan budgets and demand reductions. The Companies are offering all programs discussed with one exception. The annual budget is in the $45 million to $50 million range, tripling the current budget while maintaining a portfolio cost effectiveness > 1.0. The forecasted 7-year cumulative demand reduction for energy efficiency measures is expected to be approximately 168 MW of demand savings and 220 MW for the demand response measures in 2030. A stakeholder asked if the numbers were additive, and John Bevington clarified that the energy efficiency numbers are cumulative while the demand response MW are event-based.

John Bevington covered energy efficiency financing next, acknowledging that it was something that had been advocated for by the DSM Advisory Group and recognized by the LG&E and KU team. He indicated that we need to monitor actions and financing options that may become available through the Inflation Reduction Act (IRA), federal green bank, expanded PACE or EPAD to residential customers, or other resources. He expressed that implementing a utility financing program would not be prudent at this point, due to the cost impact to customers if it is available via other resources. The impacts of the IRA will be monitored and, if necessary, the Companies will work to fill any gaps that might be created. A stakeholder asked if energy efficiency financing or other programs would need to wait until the next filing. John Bevington explained that the Companies can always make interim filings before the current portfolio expires. He referenced a filing earlier this year to request

more budget for the non-residential rebates program, which is a mid-plan filing. He also stated other examples of filings made during an existing 7-year plan. LG&E/KU will file within a DSM/EE plan period, as necessary, to discontinue, modify, or add programs.

John Bevington led the group through an overview of the proposed market research and pilot funding which includes budgeting for market research on several topics including, but not limited to, low-income solar programs, smart technology and connected solutions, data disaggregation and customer engagement, and other emerging technologies. At this time the meeting went into a question-and-answer session summarized here:

- How can the Companies proceed with these programs and still stay open to adjusting for the IRA?
    - John Bevington: There is nothing preventing the Companies from making a mid-plan filing and pointed out that the Companies have a history of mid-plan filings, including this one.
- Will the Companies adjust net metering through DSM to allow more rooftop solar?
    - John Bevington: The message will be passed along to the appropriate staff, but net metering is outside of DSM and EE scope of these meetings.
- Will the Companies run these programs in house, via contractor, or some combination thereof?
    - John Bevington: There will be a mix of direct employees and contractors like the structure that exists today.
- Multiple stakeholders expressed appreciation for the company that previously conducted residential home energy audits during a prior Plan period.
- Several stakeholders stated a desire to delay filing for further analysis and review, including possible program or measure additions. Why not wait a few months to file the new DSM/EE Plan and avoid having to come back and make changes?
    - John Bevington: The Companies have been comprehensive in their resources review. The Companies would prefer to be aggressive and offer what looks to be cost effective DSM programs sooner than later and cut back if programs prove to be under-utilized or less valuable. The Companies do not want to charge customers for programs they don't need.
- What is the timeline for the new power plants to be proposed in the upcoming filing?
    - John Bevington: This falls outside the area of this DSM/EE group's responsibilities.
- Has the plan for new generation been filed?
    - John Bevington: No.
- Will there be additional meetings between now and the filing date?
    - John Bevington: This is the last advisory group meeting before the public filing will be issued.

Several stakeholders expressed interest in getting access to the underlying data used for cost effectiveness modeling such as the input assumptions and incentives. There was a brief discussion regarding an apparent miscommunication on this point from earlier meetings where the Companies had inquired what level of data would be useful and had understood from subsequent telephone communications with a stakeholder representative that they did not want the data at this time because they had not yet engaged experts. Other participants clearly stated that they did now want granular level detail to support the Companies' cost/benefit analysis. Duncan Crosby of SKO, outside legal counsel for the Companies, pointed out that the data can be made available but that the sensitive and proprietary nature of the data requires that a Non-Disclosure Agreement (NDA) be signed for access. Alternatively, once a filing has been made with the Kentucky Public Service Commission (KPSC), the data can be requested during discovery and confidentiality agreements would be required at that time. John Bevington asked stakeholders interested in discussing access to data and analysis to email John Hayden.

Next Steps and Closing

Action Item – John Hayden will connect with Sarah Lynn Cunningham to learn about the building operator certification.

The Companies will finish quality checking of the analysis and finalize the DSM/EE plan for filing. The public notifications of the potential tariff impacts will be issued. The DSM/EE plan will be filed with the KPSC.

The meeting concluded at 3:42 p.m.

LG&E/KU DSM Advisory Group Meeting

November 10, 2022

LG&E KU
PPL companies

Agenda

Recap

Presentation and Discussion:

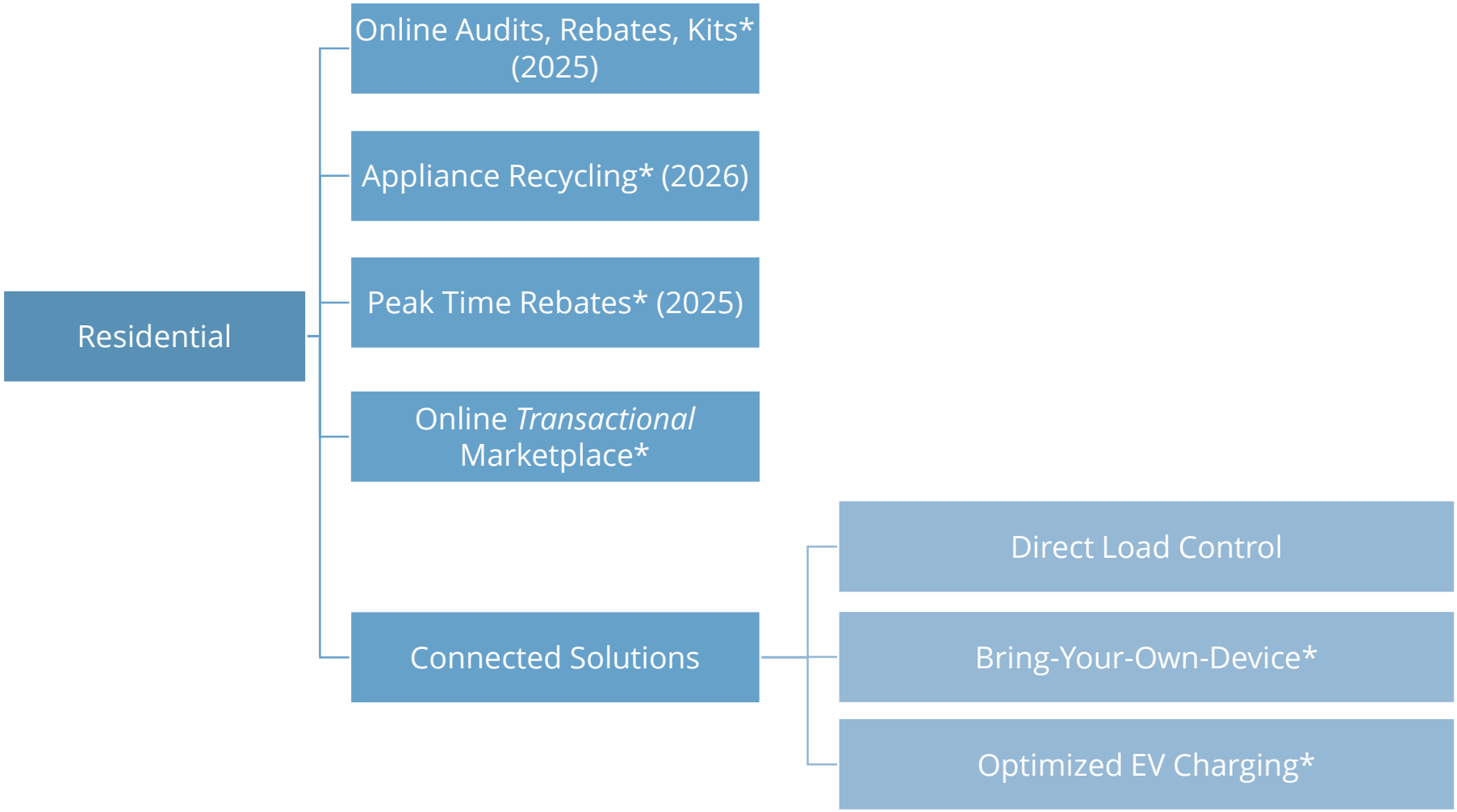
- Proposed DSM Plan Overview
- Proposed Market Research/Pilots Funding

Next Steps

Recap

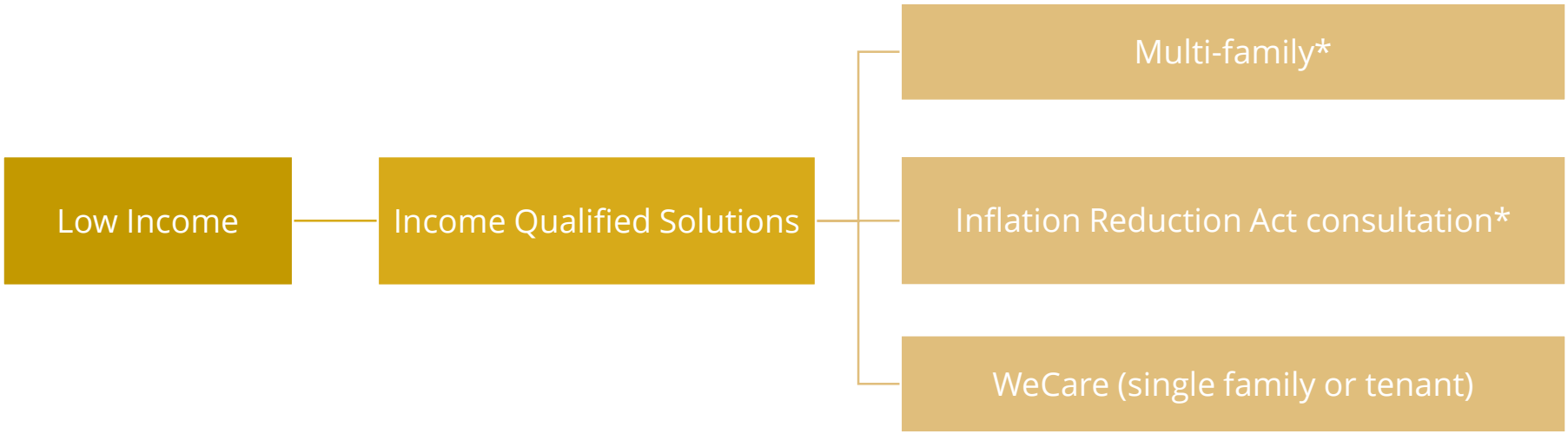

Market research: 39 potential options
Rubric ranking: modeled 14 options, grouped to 9
Advisory Group input and updates
Result: Recommend **expanded** plan allowing **all customers** to participate through various measures leading to **high participation & savings**

Proposed DSM/EE Plan & Programs



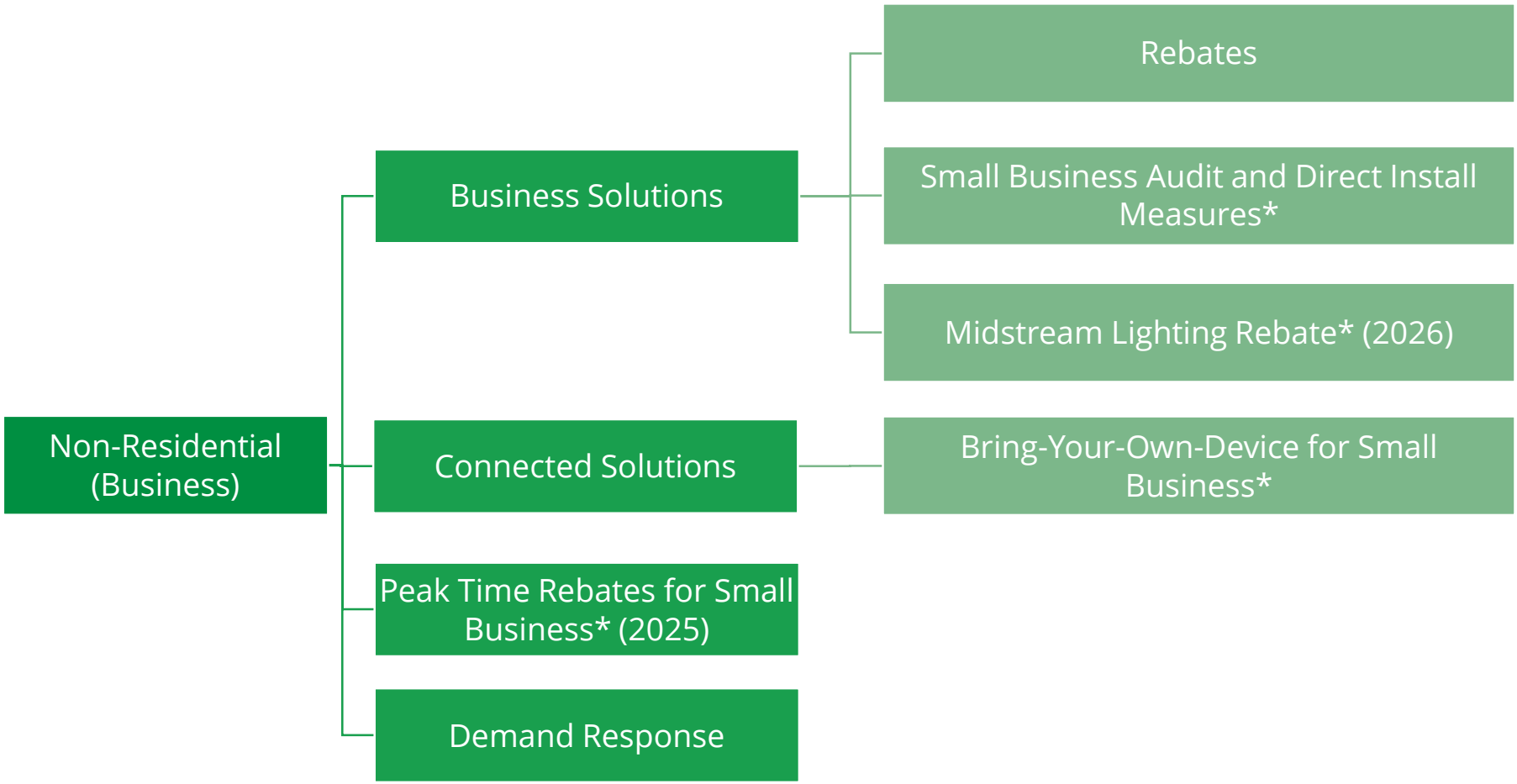
* new program or measure

Proposed DSM/EE Plan & Programs



* new program or measure

Proposed DSM/EE Plan & Programs



* new program or measure

Proposed Budgets & Demand Reductions

Annual Budget

Demand Reductions

Current Plan **Existing Programs Extrapolated (2024-2030)**	~$15 Million/year	~112 MW, 7-year cumulative, Energy Efficiency ~86 MW Demand Response in 2030
Proposed Plan **(2024-2030)**	~$45-$50 Million/year	~168 MW, 7-year cumulative, MW Energy Efficiency ~220 MW Demand Response in 2030

Energy Efficiency Financing

- Monitor, Engage, Collaborate, Decide
  - —Monitor
    - EEC has expressed the possibility of a revolving loan fund
    - EEC has indicated the possibility of a nationwide “Green Bank”
    - EPAD and PACE could be expanded to residential customers
  - —Engage
    - We need to learn how those tactics play out, and if they’re working for our most vulnerable customers
  - —Collaborate
    - Discuss “before and after” effects from new financing opportunities and learn from your constituents whether these new opportunities are working
  - —Decide
    - Take a data driven approach to determine how/if we can fill a gap

Proposed Market Research/Pilot Funding

- Low-income solar projects
- Smart technologies and connected solutions
- Data disaggregation and customer engagement
- Other emerging technologies, as available and applicable

Next Steps

- Finalize DSM/EE Plan for filing
- Public notifications issued
- File DSM/EE Plan with KPSC

Louisville Gas and Electric Company and Kentucky Utilities Company
Pay-As-You-Save Financing Program

Exhibit JB-3

CADMUS

Memorandum

To:	John Hayden, Lana Isaacson; Louisville Gas and Electric and Kentucky Utilities
From:	Jeana Swedenburg, Amy Ellsworth, Gamze Gungor Demirci, Aquila Velonis, and Matthew Wisnefske; Cadmus
Subject:	Pay-As-You-Save Financing Program Cost Effectiveness Analysis
Date:	November 11, 2022

Introduction

In Case Nos. 2020-00349 and 2020-00350 Louisville Gas & Electric Company (LG&E) and Kentucky Utilities (KU) (collectively, the Companies) agreed to engage in a stakeholder process through their existing Demand Side Management (DSM) Advisory Group to consider and evaluate an on-bill financing program for possible inclusion in their next DSM Program Plan. During the DSM Advisory Group meetings held in 2022, stakeholders encouraged LG&E/KU to specifically consider a Pay-As-You-Save® (PAYS) financing model. PAYS is a specific type of on-bill financing (between zero and three percent) with strict conditions for consumer protection: [1]

- Payments no more than 80% of savings, and term is no more than 80% of measure life
- A fixed monthly tariff paid through the utility bill and assigned to the location (i.e., tied to the meter), not to an individual customer
- PAYS upgrades and the associated monthly charge must not entail new debt or liens for the participant
- PAYS offers will not be forced to compete with other utility offers, such as rebates

Research Approach

Cadmus analyzed the above program design using the dedicated Cost Effectiveness analysis platform, Portfolio Pro Plus. Cadmus used avoided costs for electricity and demand provided by the Companies to support an Energy Efficiency Plan update and therm savings from Henry Hub. Other program information was gathered from several different sources, which are described in detail in

Table 1 below:

[1] Further details on PAYS financing can be found here: PAYS® Essential Elements & Minimum Program Requirements – Energy Efficiency Institute, Inc. (eeivt.com)

Table 1. Cost-Effectiveness Analysis Data Source Summary

Input	Value	Source
Bank of America, North America, Prime Rate	7%	https://newsroom.bankofamerica.com/content/newsroom/home/prime-rate-information.html
Full Project Cost	$7,592	Email from Mountain Association (Chris Woolery), 10/20/22, based on How$martKY program data from 2020.
Incremental Project Cost	$4,555	Assumes that 50% of customer measures are full cost measures (such as weatherization) and 10% are incremental cost upgrades from baseline measures (such as HVAC).
Customer co-payment	40% of total costs ($3,037)	Estimate of customer upfront investment, project cost reduction from a utility rebate program, or a combination needed to ensure repayment would meet program requirements.
Maximum Project EUL	15 years	Email from Mountain Association (Chris Woolery), 10/20/22, based on How$martKY program data from 2020.
Inflation Rate	2.53%	10 year average – St. Louis Federal Reserve
Discount Rate	6.41%	LG&E/KU Planning Value
Deployment year	2025	LG&E/KU assumption
kWh Savings per project	5,514	Email from Mountain Association (Chris Woolery), 10/20/22, based on How$martKY program data from 2020.
kW Savings per project	0.47	kW savings based on WeCare kWh/kW ratio since likely similar weatherization/HVAC measures will be installed.
Therm Savings per project	25.40	ENERGY STAR Furnace - 95% AFUE, found in Mid-Atlantic Technical Reference Manual v9.0 for qualifying furnace measures.
Per-Project Utility Implementation Costs	$10.94	Sum total of per project utility costs associated with tariff transfers and unrecoverable costs allowable under program rules.
Per Project Audit Costs	$575	LG&E/KU On-Bill Tariff Analysis, 2019
Total First Year Program Admin Costs	$356,000	Includes $250,000 for program set-up, office supplies and expenses, and advertising; all assumptions based on LGE/KU budget parameters.
First Year Labor Costs	$202,510	Assumes 1 full-time program manager dedicated to program oversight, 0.25 full-time program associate, and 0.05 full-time operations manager. The annual labor escalation rate is 3.0%. All assumptions based on LGE/KU budget parameters.

Cadmus calculated cost-effectiveness results for PAYS using the four benefit/cost tests from the California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects.[2] The manual defines each test as follows:

- ***The Total Resource Cost (TRC) Test*** measures the net costs of a DSM/energy efficiency (EE) program as a resource option based on the total costs of the program, including both the

[2] California Public Utilities Commission and California Energy Commission. July 2002. *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects.* http://www.calmac.org/events/spm_9_20_02.pdf.

participants' and the utility's costs. This test represents the combination of the effects of a program on the customers who participate as well as those who do not. In a sense, it is the summation of the benefit and cost terms in the Participant Cost and the Ratepayer Impact Measure tests, where the revenue (bill) change and the incentive terms intuitively cancel (except for the differences in net and gross savings).

- ***The Participant Cost Test (PCT)*** is the measure of the quantifiable benefits and costs to the customer from participation in a program. Because many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.
- ***The Ratepayer Impact Measurement (RIM) Test*** measures what happens to customer bills or rates as a result of changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs (i.e., if the benefit/cost ratio is greater than 1.0). Conversely, rates or bills go up if revenues collected after program implementation are less than the total costs incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.
- ***The Program Administrator Cost (PAC) Test (or Utility Cost Test)*** measures the net costs of a DSM/EE program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the Total Resource Cost benefits. Costs are defined more narrowly.

The Kentucky Public Service Commission has designated the TRC as the threshold test for determining program cost-effectiveness in Kentucky. The TRC test is the most comprehensive indicator of whether a potential DSM/EE program will create net benefits for customers and the utilities. A program is considered cost-effective if its total resource cost benefits are positive or, in other words, if the ratio of the net present value of the program's benefits compared with its costs is greater than 1.0. To provide a comprehensive analysis, Cadmus calculated PAYS program cost-effectiveness results using all four tests.

Results

Cadmus calculated cost-effectiveness for eight different PAYS program scenarios. These scenarios tested three different program variables.

- Number of Program Participants: We tested the program assuming either 100 or 1,000 statewide participants per year.
- PAYS program interest rate: We tested scenarios in which PAYS financing interest rates differ between 0% and 3%.
- Modeled Project Cost: We tested the program under two project cost assumptions: 1) the full project cost represented incremental measure cost, and 2) with a somewhat more conservative incremental measure cost, assuming several measures (such as HVAC) would be best compared to market baselines.

Cadmus assumed that participant financing savings should be treated as incentives, per the National

Standard Practice Manual.[3] Detailed conditions of each scenario are listed in Table 2.

Table 2: Scenario Variables

Scenario	Number of Participants	PAYS program interest rate	Modeled Project Cost
Scenario 1	100	0%	Full Project Cost
Scenario 2	1,000	0%	Full Project Cost
Scenario 3	100	3%	Full Project Cost
Scenario 4	1,000	3%	Full Project Cost
Scenario 5	100	0%	Incremental Measure Cost
Scenario 6	1,000	0%	Incremental Measure Cost
Scenario 7	100	3%	Incremental Measure Cost
Scenario 8	1,000	3%	Incremental Measure Cost

As shown in Table 3 and Table 4 below, the PAYS financing option did not pass the TRC (Total Resource Cost Test), or RIM (Ratepayer Impact Measurement Test) for either LG&E or KU in any of the eight scenarios and passed the PAC (Program Administrator Cost Test) in only two scenarios. However, all scenarios did pass the PCT (Participant Cost Test) as these projects tend to produce greater bill savings over the lifetime of the measures than total project costs paid by the customer. LG&E's results were slightly higher than KU's in most tests due to the inclusion of marginal gas savings from some eligible measures.

Table 3. Cost-Effectiveness Analysis Results (LG&E)

Scenario	Total Resource Cost (TRC) Test	Participant Cost Test (PCT)	Ratepayer Impact Measurement (RIM) Test	Program Administrator Cost (PAC) Test*
Scenario 1	0.18	1.46	0.14	0.34
Scenario 2	0.25	1.46	0.18	0.78
Scenario 3	0.18	1.37	0.15	0.38
Scenario 4	0.25	1.37	0.19	1.05
Scenario 5	0.24	2.44	0.14	0.34
Scenario 6	0.39	2.44	0.18	0.78
Scenario 7	0.24	2.28	0.15	0.38
Scenario 8	0.39	2.28	0.19	1.05

*Results assume that PAYS is financed by the utility and those costs are treated as a utility cost for the PAC test

[3] National Standard Practice Manual: For Benefit-Cost Analysis of Distributed Energy Resources. August 2020.

Table 4. Cost-Effectiveness Analysis Results (KU)

Scenario	Total Resource Cost (TRC) Test	Participant Cost Test (PCT)	Ratepayer Impact Measurement (RIM) Test	Program Administrator Cost (PAC) Test*
Scenario 1	0.17	1.34	0.14	0.32
Scenario 2	0.24	1.34	0.18	0.73
Scenario 3	0.17	1.25	0.14	0.36
Scenario 4	0.24	1.25	0.19	0.98
Scenario 5	0.22	2.24	0.14	0.32
Scenario 6	0.37	2.24	0.18	0.73
Scenario 7	0.22	2.08	0.14	0.36
Scenario 8	0.37	2.08	0.19	0.98

*Results assume that PAYS is financed by the utility and those costs are treated as a utility cost for the PAC test

Conclusions and Recommendations

Cadmus' investigation of multiple program scenarios found that the PAYS program consistently failed the TRC and RIM tests, while only passing the PAC test under ideal conditions. Based on the systemic failure of PAYS to pass the TRC or PAC tests, we conclude the PAYS program model would not generate cost-effective savings for the Companies.

Recommendation: If the Companies wish to offer an energy efficiency financing program as part of their expanded DSM portfolio, they should consider an alternative to the PAYS financing model at this time.