COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE ELECTRONIC APPLICATION OF DUKE ENERGY KENTUCKY, INC. TO AMEND ITS DEMAND SIDE MANAGEMENT PROGRAMS	)))	CASE NO. 2026-00222

APPLICATION OF DUKE ENERGY KENTUCKY, INC. TO AMEND ITS DEMAND SIDE MANAGEMENT PROGRAMS

Comes now Duke Energy Kentucky, Inc. (Duke Energy Kentucky or the Company), pursuant to KRS 278.285, and other applicable law, and does hereby request the Commission to approve an amendment of the Demand Side Management (DSM) programs as ordered by this Kentucky Public Service Commission ("Commission").[1] In support of its Application, Duke Energy Kentucky respectfully states as follows:

I. INTRODUCTION

1. Pursuant to 807 KAR 5:001, Section 14(2), Duke Energy Kentucky is a Kentucky corporation that was originally incorporated on March 20, 1901, is in good standing and, as a public utility as that term is defined in KRS 278.010(3), is subject to the Commission's jurisdiction. The Company attests that it is currently in good standing and is subject to the Commission's jurisdiction. A certified copy of Duke Energy Kentucky's certificate of good standing from the Kentucky Secretary of State and a certificate for the following assumed name: "Duke Energy" is on file with the Kentucky Secretary of State

[1] *In the Matter of the Application of Duke Energy Kentucky, Inc. for the Annual Cost Recovery Filing for Demand Side Management,* Case No. 2012-00495, Order (Ky. P.S.C. Apr. 11, 2013).

and on file with the Commission in Case No. 2024-00354.[2] In addition, the Company has attached, as Appendix A, a certified Certificate of Existence dated August 12, 2026. Duke Energy Kentucky is engaged in the business of furnishing natural gas and electric services to various municipalities and unincorporated areas in Boone, Bracken, Campbell, Gallatin, Grant, Kenton, and Pendleton Counties in the Commonwealth of Kentucky.

2. Duke Energy Kentucky's business address is 139 East Fourth Street, Cincinnati, Ohio 45202. The Company's local office in Kentucky is Duke Energy Erlanger Ops Center, 1262 Cox Road, Erlanger, Kentucky 41018. Duke Energy Kentucky's email address is: KYfilings@duke-energy.com.

3. On November 15, 2012, Duke Energy Kentucky filed an application for the cost recovery of DSM programs. The Company's application was docketed as Case No. 2012-00495. On April 11, 2013, this Commission approved that Application and ordered Duke Energy Kentucky to file, by August 15, annually, an application requesting any program expansion(s) and to include: (1) an Appendix B, setting forth the Cost Effectiveness Test Results of DSM programs,[3] (2) an Appendix C, setting forth the recovery of program costs, lost revenues, and shared savings that are used in determining the true-up of proposed DSM factors; and (3) a signed and dated proposed Rider DSMR,

[2] *In the Matter of the Electronic Application of Duke Energy Kentucky, Inc. for: 1) An Adjustment of the Electric Rates; 2) Approval of New Tariffs; 3) Approval of Accounting Practices to Establish Regulatory Assets and Liabilities; and 4) All Other Required Approvals and Relief*, Case No. 2024-00354, Application (Dec. 2, 2024).

[3] The Company provides Cost Effectiveness Test Results for all its programs in its November filings, with the most recent available results being available in Case No. 2025-00359, Application, Appendix B (Nov. 3, 2025), for all programs except for the recently added Energy Efficiency in Education Program, whose score will be provided in the upcoming November 2026 filing. Appendix B to this Application contains the projected Cost Effectiveness Test Results for the only program proposed to be added, Power Manager® for Business, and the program proposed to be modified, Income Qualified Neighborhood Energy Saver Program. Other programs' results remain unchanged.

DSM rate, for electric customers, Appendix D.[4]

II. CURRENT DSM PROGRAMS

4. Duke Energy Kentucky has a long history of successful DSM implementation and has been a leader in the industry with respect to Energy Efficiency (EE) and peak Demand Response (DR) programs, having offered such programs since the mid-90's. Its existing portfolio of DSM programs was approved by the Commission in Case No. 2025-00359, by Order dated March 23, 2026.[5] This current portfolio of programs is as follows:

- Program 1: Income Qualified Services Program
- Program 2: Residential Energy Assessments Program
- Program 3: Residential Smart $aver® Efficient Residences Program
- Program 4: Residential Smart $aver® Energy Efficient Products Program
- Program 5: Non-Residential Smart $aver® Program
- Program 6: Power Manager® Program
- Program 7: PowerShare®
- Program 8: Income Qualified Neighborhood Energy Saver Program
- Program 9: Home Energy Report
- Program 10: Non-Residential Business Energy Saver Program
- Program 11: Non-Residential Pay for Performance[6]
- Program 12: Peak Time Rebate Pilot Program

[4] *See* Order, para. 4. No update is proposed to be made to the natural gas DSMR rate.

[5] *In the Matter of the Electronic Application of Duke Energy Kentucky, Inc. to Amend Its Demand Side Management Programs,* Case No. 2025-00359, Order (Ky. P.S.C. Mar. 23, 2026).

[6] Marketed as Smart $aver® Performance.

- Program 13: Energy Efficiency in Education Program

5. Consistent with the Commission's previous Orders, the Company is proposing programmatic changes in this year's annual amendment filing, and budgetary management proposals to allocate funding more effectively among programs based upon customer interest mid-stream, which will then be reflected in the financial true-ups and forecasts to be included in the annual cost recovery filing for DSM:

- This Application proposes:
  - to respond to market conditions for the Income Qualified Neighborhood Energy Saver Program (IQNES Program); and
  - to re-establish a previously offered non-residential program: Power Manager® for Business, with a new product offering.
- This Application provides an update on the following program:
  - Energy Efficiency in Education Program

6. The Residential Collaborative[7] and the Commercial and Industrial Collaborative[8] (The Collaborative) have received the Company's proposed changes and had the opportunity to provide comments. A Collaborative meeting was held on July 15, 2026, and all changes were sent in a follow-up email for members unable to attend, reviewing the proposed changes requested within this Application.

[7] The Residential Collaborative members receiving the information: John Horne, Michael West, Thomas T. Lacy, and Lawrence Cook (Office of the Kentucky Attorney General), Jock Pitts (People Working Cooperatively), Catrena Bowman-Thomas (Northern Kentucky Community Action Commission), Laura Pleiman (Boone County), Kenya Stump (Kentucky Office of Energy Policy), and Lesley Quick and Trisha Haemmerle (Duke Energy Kentucky).

[8] The Commercial & Industrial Collaborative members receiving the information: John Horne, Michael West, Thomsas T. Lacy, and Lawrence Cook (Office of the Kentucky Attorney General), Jock Pitts (People Working Cooperatively), Kenya Stump (Kentucky Office of Energy Policy), Christine Baker (Kenton County Schools), and Lesley Quick and Trisha Haemmerle (Duke Energy Kentucky).

III. AMENDMENTS TO EXISTING PROGRAMS

7. Duke Energy Kentucky is seeking approval to request additional budget for the IQNES Program.

Duke Energy Kentucky is requesting additional funding of $163,800 to ensure continued delivery of the IQNES Program at its intended scale and effectiveness considering sustained cost increases. While the Company will continue to closely monitor participation levels and overall program spend and adjust as needed as we approach year-end, current market conditions have created upward pressure on material and implementation costs. Program activities in Kentucky will resume at the start of the new fiscal year in July, at which time the newly selected vendor has committed to maintaining strong cost controls, particularly for higher-cost 2.0 measures delivered through subcontractors. Despite these proactive measures, material costs have increased significantly over time and have directly impacted overall program delivery costs. Multiple contract negotiations and a transition to new vendors have been undertaken to mitigate these increases and maintain cost discipline. However, these efforts have not been sufficient to fully offset market-driven price escalation, resulting in additional amounts being necessary to sustain current program performance.

This request reflects the Company's commitment to maintaining program continuity and delivering equitable access to both 1.0 and 2.0 measures[9] for eligible customers, which are critical to achieving deep and lasting energy savings. The IQNES

[9] The program offers the following measures: LEDs, Water Heater Insulation Wrap, Water Heater Pipe Insulation, Water Heater Temperature Check and Adjustment, Faucet Aerators, Low Flow Showerheads, Refrigerator Thermometers, Switch Plate Wall Thermometer, Cover for Wall/Window Air Conditioner Unit-Installed, Cover for Wall/Window Air Conditioner Unit-Left behind and not installed, HVAC Filters (1-year supply for each HVAC system), Weather-Stripping, Door Sweep, Poly Tape , Caulking Foam Insulation, Insulation, Air Sealing, Duct Sealing, and Smart Thermostats.

Program is designed to serve a consistent level of participation while delivering meaningful energy efficiency improvements, and reduced funding could require scaling back measures or limiting customer reach. Such reductions would adversely impact overall program outcomes and diminish the long-term benefits realized by participating households. At the same time, the Company will continue to pursue operational efficiencies and work collaboratively with vendors to identify cost-saving opportunities without compromising program quality or impact. Providing additional funding will allow the IQNES Program to maintain its current trajectory, uphold performance expectations, and continue delivering measurable energy savings in alignment with regulatory objectives.

The projected IQNES Program cost effectiveness scores are provided in Appendix B and the updated program costs, lost revenues and shared savings ($967,425 in 2026-2027) are included in Appendix C.

IV. REQUEST TO RE-ESTABLISH A PREVIOUSLY OFFERED PROGRAM

8. The Company is requesting to re-establish a previously offered program, which would be an additional program to the current EE/DSM portfolio in response to comments referencing the 807 KAR 5:058, Section 8(2)(b) requirement that Duke Energy Kentucky evaluate potential DSM programs.[10] The Company conducts a review on an annual basis and proposes measures and programs that meet Kentucky standards of passing the Total Resource Cost test (TRC) at a 1.0 or higher when applicable.

The Company regularly reviews potential programs and measures to benefit customers. Additional cost-effective options may be proposed in the annual demand side

[10] *In the Matter of the Electronic 2024 Integrated Resource Plan of Duke Energy Kentucky, Inc.*, Case No. 2024-00197, Joint Intervenors' Initial Comments at 6-7 (Nov. 6, 2024); Joint Intervenors Post-Hearing Comments at 5-6 (Feb. 20, 2025).

management filing by November 1, 2026, if they become available during the year.

Accordingly, Duke Energy Kentucky seeks approval to resume offering the Power Manager® for Business, which the Company had previously offered. The program will currently have one measure: Bring Your Own KW option. The original Power Manager® for Business was a non-residential program that provided business customers with the opportunity to participate in demand response, earn incentives, and realize optional energy efficiency benefits. This program was designed as a flexible offer that provides small-to-medium size business customers with options of device types as well as level of demand response participation. Customers were able to select the type of device from two available options: thermostat or switch. Due to minimal savings at the time, the Company elected to discontinue the program after 2018.

The currently proposed Power Manager® for Business Program, however, has been improved to generate higher participation levels. The proposed program will be available on a voluntary basis, solely at the Company's option, to non-residential customers receiving electric service under a non-residential rate schedule who elect to receive a signal from the Company or other communications from the Company and agree to shed load in response to said signal or communication during the months of May through September, as determined by the Company.

The Bring Your Own KW Option is an option within the proposed Power Manager® for Business Program which provides customers the opportunity to participate in a demand response program during the summer peaking season where the customer decides how much electrical load to reduce during a peaking event. Customers will receive advance notice of a scheduled demand reduction event no later than four (4) hours before the start

of the event. Customers will receive notifications for emergency events as far in advance of the event's start time as possible. During the designated event, customers may choose the extent to which they reduce the energy demand (kW) of their facility. The response can be automated or completed manually by the customer making changes at their facility. Service under the Bring Your Own KW option is contingent upon the Company having interval load data sufficient to establish the Customer's Baseline Demand.

Following the load control season, each participating customer in the Power Manager® for Business Program will be compensated for the average load reduction during the demand reduction events where a load capacity reduction is measured. Participating customers will not be penalized for events where reduction cannot be measured. The load reduction will be measured against the baseline demand profile (kW demand) for the facility. The facility baseline demand profile will be calculated using five (5) representative days from the 10 days prior to the event, excluding weekends, holidays[11] or other event days. The baseline can be weather adjusted if the Company determines the facility demand is weather-sensitive or if the event day is not consistent with the baseline demand profile. The compensation will be $30 per average kW reduced during the events. The incentive will be provided via check and mailed directly to all participating customers at the conclusion of the summer season once full seasonal analysis has been completed, generally mailed to customers by November of that year.

The Company shall be allowed, at its sole discretion, to send an event signal or communication at any time to Power Manager® for Business Program customers. The control period under the Bring Your Own KW option will not exceed four (4) hours each

[11] Holidays are proposed to include New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Day after Thanksgiving Day, Christmas Eve, and Christmas Day.

day during the months of May through September. The control periods shall be limited to 40 hours total during any one control season. There will be a minimum of one (1) event per control season to determine the available load reduction.

The Company, at its sole discretion, may limit requests for service to geographic regions. Also, in addition to the control period for cycling purposes, the Company reserves the right to control the Customer's equipment for additional periods in the event the Company has capacity problems.

The Company requests approval to re-establish the Power Manager® for Business Program by December 31, 2026, in order to implement the changes as soon as possible. The Company includes a new program tariff (Appendix E) to reflect the program offerings. The Company will true-up the costs and include the cost effectiveness scores within the Annual Cost Recovery Filing for DSM to be filed by November 1, 2027, recovering the July 1, 2026 – June 30, 2027, costs within that timeframe.

The projected Power Manager® for Business Program cost effectiveness scores in Appendix B and the updated program costs, lost revenues and shared savings ($91,065 in 2026-2027) are included in Appendix C.

V. PROGRAM UPDATE

9. Duke Energy's Energy Efficiency Education Program (EEE Program) has recently expanded in Kentucky, offering schools a new opportunity to engage students through hands-on energy education. The program combines free, live theatrical performances with access to no-cost energy efficiency kits, helping students and families learn practical ways to save energy at home.

The EEE Program features engaging, age-appropriate live performances delivered

by professional actors. These interactive shows introduce students to energy efficiency concepts such as how energy is used, how it can be wasted, and simple actions families can take to reduce energy use. Performances are provided at no cost to participating schools and are designed to complement classroom learning while reaching students in a fun, memorable way.

In addition to the performances, eligible families can request free energy efficiency kits. Kits include energy-saving measures intended for installation in the home and are offered at no cost to qualifying Duke Energy Kentucky residential customers. Information on how to request a kit is shared during the performances and through take-home materials provided to students and teachers.

In Kentucky, the EEE Program began booking performances in March, 2026. Kentucky's first theatrical performance took place on April 10, 2026. From that date through the end of the school year, Bright Star Touring Theatre performed at seven schools, delivering 13 performances and reaching an estimated 1,850 students.

As the EEE Program continues to grow in Kentucky, the focus remains on increasing awareness of energy efficiency among students, supporting families with practical energy-saving resources, and building long-term engagement with schools and communities.

Since April, 2026, Duke Energy has provided 239 energy efficiency kits to eligible Duke Energy customers in Kentucky through the EEE Program, helping families reduce home energy use and lower utility bills. Bright Star continues to follow up with participating schools to remind the school and families that kits remain available, and the Company is optimistic that additional schools will enroll to participate over the summer.

Bright Star is actively supporting marketing and outreach efforts across Duke Energy Kentucky territory to enroll additional schools for future performances. Through direct school outreach, engagement with education-focused organizations such as the Department of Education, and other partner channels, the Company aims to grow participation during the 2026–2027 program year. Expanding the program will allow more students to learn about energy efficiency, encourage lasting behavior changes that reduce energy consumption, and increase kit orders and installations in homes across the state.

The Company will provide another update about program performance in the annual cost recovery filing for demand side management to be filed by November 2, 2026.

10. Pursuant to KRS 278.285(1)(b) and the Commission's Order, Appendix B includes the projected Cost Effectiveness Test Results for the proposed new program.

11. Pursuant to KRS 278.285(1)(c) and the Commission's Order, Appendix C includes the calculations to recover program costs, lost revenues, and shared shavings, that are used in determining the true-up of proposed DSM factor(s).

12. A signed and dated proposed Rider DSMR, Sheet No. 78 Demand Side Management Rider, for electric customers, is attached hereto as Appendix D. No update is proposed to be made to the natural gas DSMR rate.

13. Pursuant to KRS 278.285(1)(c) and the Commission's Order in Case No. 2012-00495, the Company is filing an evaluation schedule and program evaluations within this application. The following evaluations are included in Appendices F – H:

Appendix F: Evaluation, Measurement, and Verification Schedule

Appendix G: PowerShare® Program 2019 - 2024

Appendix H: Residential Energy Assessment Program Evaluation Report

14. The Company includes a program tariff (Appendix I) to reflect the program updates to the Peak Time Rebate Pilot. These updates reflect the removal of the participation limit and the Commission's direction in Case No. 2022-00272, to implement a tiered incentive.[12] These changes were implemented after the Commission's February 21, 2024 Order in Case No. 2022-00272, but the Company inadvertently did not update the tariff at that time.

15. Finally, Duke Energy Kentucky respectfully requests that the Commission's Order in this proceeding approve any tariff modifications to be effective so to align with the Company's first billing cycle in the month following the Commission's Order. The Company is unable to implement tariff changes immediately upon approval and outside of a billing cycle under its current billing system. The Company needs at least five business days from the issuance of an Order to implement rate changes and appropriately test the calculations.

WHEREFORE, Duke Energy Kentucky respectfully requests that the Commission approve this Application as filed.

[12] *In the Matter of the Electronic Application of Duke Energy Kentucky, Inc. for (1) An Adjustment of Electric Rates; (2) Approval of New Tariffs; (3) Approval of Accounting Practices to Establish Regulatory Assets and Liabilities; and (4) All Other Required Approvals and Relief,* Case No. 2022-00272, Order, p. 4 (Feb. 21, 2024).

Respectfully submitted,

DUKE ENERGY KENTUCKY, INC.

/s/ Larisa M. Vaysman

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Counsel for Duke Energy Kentucky, Inc.

CERTIFICATE OF SERVICE

This is to certify that the foregoing electronic filing is a true and accurate copy of the document in paper medium; that the electronic filing was transmitted to the Commission on August 14, 2026; that there are currently no parties that the Commission has excused from participation by electronic means in this proceeding; and that submitting the original filing to the Commission in paper medium is no longer required as it has been granted a permanent deviation.[13]

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/s/ Larisa M. Vaysman
Counsel for Duke Energy Kentucky, Inc.

[13] *In the Matter of Electronic Emergency Docket Related to the Novel Coronavirus COVID-19,* Case No. 2020-00085, Order (July 22, 2021).

Commonwealth of Kentucky
Michael G. Adams, Secretary of State

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Secretary of State
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Certificate of Existence

Authentication number: 376021
Visit https://web.sos.ky.gov/ftshow/certvalidate.aspx to authenticate this certificate.

I, Michael G. Adams, Secretary of State of the Commonwealth of Kentucky, do hereby certify that according to the records in the Office of the Secretary of State,

DUKE ENERGY KENTUCKY, INC.

DUKE ENERGY KENTUCKY, INC. is a corporation duly incorporated and existing under KRS Chapter 14A and KRS Chapter 271B, whose date of incorporation is March 20, 1901 and whose period of duration is perpetual.

I further certify that all fees and penalties owed to the Secretary of State have been paid; that Articles of Dissolution have not been filed; that the most recent annual report required by KRS 14A.6-010 has been delivered to the Secretary of State; and is therefore in good standing.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal at Frankfort, Kentucky, this 12th day of August, 2026, in the 235th year of the Commonwealth.

Michael G. Adams
Secretary of State
Commonwealth of Kentucky
376021/0052929

Appendix B
Cost Effectiveness Test Results - 2026-27 Forecast
as amended 8/15/26 for modified programs

Program Name	UCT	TRC	RIM	PCT
Residential Programs				
Income Qualified Neighborhood	1.38	1.38	0.88	n /a
Non-Residential Programs				
Power Manager® for Business	1.61	1.68	1.61	n /a

Kentucky DSM Rider
Comparison of Revenue Requirement to Rider Recovery
2024-2025 Status Update

Residential Programs	(1) Projected Program Costs 7/2024 to 6/2025 (A)	(2) Projected Lost Revenues 7/2024 to 6/2025 (A)	(3) Projected Shared Savings 7/2024 to 6/2025 (A)	(4) Program Expenditures 7/2024 to 6/2025 (B)	(5) Program Expenditures (C) Gas	(6) Program Expenditures (C) Electric	(7) Lost Revenues 7/2024 to 6/2025 (B)	(8) Shared Savings 7/2024 to 6/2025 (B)	(9) 2024 Reconciliation Gas (D)	(10) 2024 Reconciliation Electric (D)	(11) Rider Collection (E) Gas	(12) Rider Collection (E) Electric	(13) (Over)/Under Collection Gas (F)	(14) (Over)/Under Collection Electric (G)
Income Qualified Neighborhood	$ 534,292	$ 31,541	$ (20,759)	$ 456,409	$ -	$ 456,409	$ 34,637	$ (17,478)						
Income Qualified Services	$ 748,255	$ 12,001	$ (40,116)	$ 788,557	$ 333,524	$ 455,032	$ 14,682	$ (37,434)						
Home Energy Report	$ 442,331	$ 741,075	$ 65,215	$ 359,658	$ -	$ 359,658	$ 959,137	$ 68,157						
Residential Energy Assessments	$ 322,136	$ 50,042	$ 24,047	$ 207,160	$ -	$ 207,160	$ 56,034	$ 24,592						
Residential Smart $aver®	$ 648,458	$ 88,164	$ 22,748	$ 569,094	$ -	$ 569,094	$ 87,606	$ 28,496						
Power Manager®	$ 2,038,578	$ -	$ 46,463	$ 1,853,640	$ -	$ 1,853,640	$ -	$ 76,506						
Peak Time Rebate Pilot Program	$ 428,999	$ -	$ -	$ 156,768	$ -	$ 156,768	$ -							
Revenues collected											($401,907)	$2,553,900		
Total	$ 5,163,049	$ 922,822	$ 97,599	$ 4,391,286	$ 333,524	$ 4,057,762	$ 1,152,096	$ 142,838	$ (242,159)	$ (4,196,402)	$ (401,907)	$ 2,553,900	$ 493,272	$ (1,397,605)

(A) Amounts identified in report filed in Case No. 2024-00264
(B) Actual program expenditures, lost revenues (for this period and from prior period DSM measure installations), and shared savings for the period July 1, 2024 through June 30, 2025
(C) Allocation of program expenditures to gas and electric in accordance with the Commission's Order in Case No. 2014-00388
(D) Recovery allowed in accordance with the Commission's Order in Case No. 2024-00352
(E) Revenues collected through the DSM Rider between July 1, 2024 and June 30, 2025
(F) Column (5) + Column (9) - Column(11)
(G) Column (6) + Column (7) + Column (8) + Column (10) - Column(12)

Commercial Programs	(1) Projected Program Costs 7/2024 to 6/2025 (A)	(2) Projected Lost Revenues 7/2024 to 6/2025 (A)	(3) Projected Shared Savings 7/2024 to 6/2025 (A)	(4) Program Expenditures 7/2024 to 6/2025 (B)	(5) Lost Revenues 7/2024 to 6/2025 (B)	(6) Shared Savings 7/2024 to 6/2025 (B)	(7) 2024 Reconciliation (C)	(8) Rider Collection (D)	(9) (Over)/Under Collection (E)
Business Energy Saver	$ 1,070,184	$ 128,985	$ 175,543	$ 1,922,887	$ 217,667	$ 732,813			
Smart $aver® Non-Residential	$ 2,286,676	$ 330,875	$ 339,287	$ 1,117,757	$ 216,548	$ 228,426			
Total	$ 3,356,859	$ 459,860	$ 514,830	$ 3,040,644	$ 434,214	$ 961,239	$ (93,896)	$ 6,955,814	$ (2,613,613)
PowerShare®	$ 801,600	$ -	$ 77,572	$ 660,457	$ -	$ 84,060	$ 115,873	$ 1,544,077	$ (683,687)
Total All Programs	$ 9,321,509	$ 1,382,683	$ 690,001	$ 8,092,387	$ 1,586,311	$ 1,188,138			

(A) Amounts identified in report filed in Case No. 2024-00264
(B) Actual program expenditures, lost revenues (for this period and from prior period DSM measure installations), and shared savings for the period July 1, 2024 through June 30, 2025
(C) Recovery allowed in accordance with the Commission's Order in Case No. 2024-00352
(D) Revenues collected through the DSM Rider between July 1, 2024 and June 30, 2025
(E) Column (4) + Column (5) + Column (6) + Column (7) - Column(8)

2026-2027 Projected Program Costs, Lost Revenues, and Shared Savings
*as amended 8/14/2026

Residential Program Summary (A)

	Costs	Lost Revenues	Shared Savings	Total	Allocation of Costs (B) Electric	Allocation of Costs (B) Gas	Budget (Costs, Lost Revenues, & Shared Savings) Electric Costs	Budget (Costs, Lost Revenues, & Shared Savings) Electric	Budget (Costs, Lost Revenues, & Shared Savings) Gas Costs
Energy Efficiency in Education Program	$ 153,493	$ 30,039	$ 101,731	$ 285,263	100.0%	0.0%	$ 153,493	$ 285,263	$ -
Income Qualified Neighborhood	$ 818,478	$ 121,220	$ 27,727	$ 967,425	100.0%	0.0%	$ 818,478	$ 967,425	$ -
Income Qualified Services	$ 737,986	$ 39,499	$ (5,108)	$ 772,377	49.6%	50.4%	$ 366,039	$ 400,430	$ 371,947
Home Energy Report	$ 497,961	$ 881,540	$ 315,208	$ 1,694,708	100.0%	0.0%	$ 497,961	$ 1,694,708	$ -
Residential Energy Assessments	$ 348,650	$ 208,617	$ 116,042	$ 673,310	100.0%	0.0%	$ 348,650	$ 673,310	$ -
Residential Smart $aver®	$ 965,796	$ 261,982	$ 192,191	$ 1,419,969	100.0%	0.0%	$ 965,796	$ 1,419,969	$ -
Power Manager®	$ 2,501,926	$ -	$ 1,806,549	$ 4,308,475	100.0%	0.0%	$ 2,501,926	$ 4,308,475	$ -
Peak Time Rebate Pilot Program	$ 201,913	$ -	$ -	$ 201,913	100.0%	0.0%	$ 201,913	$ 201,913	$ -
Total Costs, Net Lost Revenues, Shared Savings	$ 6,226,204	$ 1,542,897	$ 2,554,340	$ 10,323,440			$ 5,854,257	$ 9,951,493	$ 371,947

NonResidential Program Summary (A)

	Costs	Lost Revenues	Shared Savings	Total	Allocation of Costs (B) Electric	Allocation of Costs (B) Gas	Budget (Costs, Lost Revenues, & Shared Savings) Electric Costs	Budget (Costs, Lost Revenues, & Shared Savings) Electric	Budget (Costs, Lost Revenues, & Shared Savings) Gas
Business Energy Saver (C)	$ 1,187,273	$ 783,885	$ 588,133	$ 2,559,291	100.0%	0.0%	$ 1,187,273	$ 2,559,291	NA
Smart $aver® Non-Residential	$ 1,241,196	$ 518,838	$ 889,288	$ 2,649,322	100.0%	0.0%	$ 1,241,196	$ 2,649,322	NA
Power Manager® for Business	$ 85,864	$ -	$ 5,201	$ 91,065	100.0%	0.0%	$ 85,864	$ 91,065	NA
PowerShare®	$ 630,681	$ -	$ 212,731	$ 843,411	100.0%	0.0%	$ 630,681	$ 843,411	NA
Total Costs, Net Lost Revenues, Shared Savings	$ 3,145,013	$ 1,302,723	$ 1,695,353	$ 6,143,089			$ 3,145,013	$ 6,143,089	NA
Total Program	$ 9,371,217	$ 2,845,620	$ 4,249,692	$ 16,466,529					

(A) Costs, Lost Revenues (for this period and from prior period DSM measure installations), and Shared Savings for the portfolio.
(B) Allocation of program expenditures to gas and electric in accordance with the Commission's Order in Case No. 2014-00388.
(C) Small Business Energy Saver and SmartPath are indiviual sets of measures that are part of a single and larger program referred to as Business Energy Saver beginning July 1, 2023.

Duke Energy Kentucky
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Calculations for Programs

July 2026 to June 2027

		Program Costs (A)
Electric Rider DSM		
Residential Rate RS	$	9,951,493
Distribution Level Rates Part A		
DS, DP, DT, GS-FL, EH & SP	$	5,299,678
Transmission Level Rates & Distribution Level Rates Part B	$	843,411
Gas Rider DSM		
Residential Rate RS	$	371,947

(A) See Appendix C, page 2 of 7

Duke Energy Kentucky
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Billing Determinants

Year	July 2026 - June 2027
Projected Annual Electric Sales kWH	
Rate RS	1,512,856,770
Rates DS, DP, DT, GS-FL, EH, & SP	2,248,044,740
Rates DS, DP, DT, GS-FL, EH, SP, & TT	2,433,827,740
Projected Annual Gas Sales CCF	
Rate RS	61,478,656

Duke Energy Kentucky
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Calculations

July 2024 to June 2025

Rate Schedule Riders	True-Up Amount (A)	Expected Program Costs (B)	Total DSM Revenue Requirements	Estimated Billing Determinants (C)		DSM Cost Recovery Rider (DSMR)	
Electric Rider DSM							
Residential Rate RS	$ (1,461,476)	$ 9,951,493	$ 8,490,017	1,512,856,770	kWh	$ 0.005612	$/kWh
Distribution Level Rates Part A							
DS, DP, DT, GS-FL, EH & SP	$ (2,733,055)	$ 5,299,678	$ 2,566,623	2,248,044,740	kWh	$ 0.001142	$/kWh
Transmission Level Rates & Distribution Level Rates Part B							
TT	$ (714,931)	$ 843,411	$ 128,480	2,433,827,740	kWh	$ 0.000053	$/kWh
Distribution Level Rates Total							
DS, DP, DT, GS-FL, EH & SP						$ 0.001195	$/kWh
Gas Rider DSM							
Residential Rate RS	$ 515,814	$ 371,947	$ 887,761	61,478,656	CCF	$ 0.014440	$/CCF
Total Rider Recovery			$ 12,072,882				

(A) (Over)/Under of Appendix C page 1 multiplied by the average three-month commercial paper rate for 2025 to include interest on over or under-recovery in accordance with the Commission's order in Case No. 95-312. Value is: **1.045700**
(B) Appendix C, page 2
(C) Appendix C, page 4

Summary of Load Impacts July 2024 Through June 2025 (1)

Allocation Factors based on July 2024-June 2025

Residential Programs	kWh	% of Total Res Sales	ccf	% of Total Res Sales	Elec % of Total % of Sales	Gas % of Total % of Sales
Income Qualified Neighborhood	625,676	0.0409%	-	0.0000%	100%	0%
Income Qualified Services	222,494	0.0146%	5,640	0.0107%	57.70%	42.30%
Home Energy Report	12,138,294	0.7942%	-	0.0000%	100%	0%
Residential Energy Assessments	1,040,625	0.0681%	-	0.0000%	100%	0%
Residential Smart $aver®	1,243,683	0.0814%	-	0.0000%	100%	0%
Power Manager®	-	0.0000%	-	0.0000%	100%	0%
Peak Time Rebate Pilot Program	-	0.0000%	-	0.0000%	100%	0%
Total Residential	15,270,772	0.9991%	5,640	0.0107%		
Total Residential (Rate RS) Sales For July 2024 Through June 2025	1,528,435,329	100%	52,858,356	100%		

(1) Load Impacts Net of Free Riders at Meter

Summary of Load Impacts July 2026 Through June 2027 (1)

Residential Programs	kWh	% of Total Res Sales	ccf	% of Total Res Sales	Allocation Factors Projected Elec % of Total % of Sales	Gas % of Total % of Sales
Energy Efficiency in Education Program	739,116	0.0489%	-	0.0000%	100%	0%
Income Qualified Neighborhood	655,428	0.0433%	-	0.0000%	100%	0%
Income Qualified Services	139,616	0.0092%	5,765	0.0094%	49.6%	50.4%
Home Energy Report	11,771,223	0.7781%	-	0.0000%	100%	0%
Residential Energy Assessments	851,773	0.0563%	-	0.0000%	100%	0%
Residential Smart $aver®	1,271,740	0.0841%	-	0.0000%	100%	0%
Power Manager®	-	0.0000%	-	0.0000%	0%	0%
Total Residential	15,428,897	0.9710%	5,765	0.0094%		
Total Residential (Rate RS) Sales Projected	1,512,856,770	100%	61,478,656	100%		

(1)Load Impacts Net of Free Riders at Meter

Duke Energy Kentucky
1262 Cox Road
Erlanger, KY 41018

KY.P.S.C. Electric No. 2
Forty-~~Second~~ Third Revised Sheet No. 78
Cancels and Supersedes
Forty-~~First~~ Second Revised Sheet No. 78
Page 1 of 1

RIDER DSMR

DEMAND SIDE MANAGEMENT RATE

The Demand Side Management Rate (DSMR) shall be determined in accordance with the provisions of Rider DSM, Demand Side Management Cost Recovery Rider, Sheet No. 75 of this Tariff.

The DSMR to be applied to residential customer bills is $0.~~005514~~ 005612 per kilowatt-hour. (I)

A Home Energy Assistance Program (HEA) charge of $0.30 will be applied monthly to residential customer bills.

The DSMR to be applied to non-residential distribution service customer bills is $0.~~001154~~ 001195 per (~~R~~I)

kilowatt-hour. The DSMR to be applied for transmission service customer bills is $0.000053 per kilowatt- ~~(R)~~

hour.

Issued by authority of an Order by the Kentucky Public Service Commission dated _____ ~~March 23, 2026~~ in Case No. ~~2025~~2026-~~00359~~00222

Issued: ~~March 24~~August 14, 2026
Effective: ~~April 1~~September 14, 2026
Issued by Amy B. Spiller, President /s/ Amy B. Spiller

Duke Energy Kentucky
1262 Cox Road
Erlanger, KY 41018

KY.P.S.C. Electric No. 2
Forty-Third Revised Sheet No. 78
Cancels and Supersedes
Forty-Second Revised Sheet No. 78
Page 1 of 1

RIDER DSMR

DEMAND SIDE MANAGEMENT RATE

The Demand Side Management Rate (DSMR) shall be determined in accordance with the provisions of Rider DSM, Demand Side Management Cost Recovery Rider, Sheet No. 75 of this Tariff.

The DSMR to be applied to residential customer bills is $0.005612 per kilowatt-hour. (I)

A Home Energy Assistance Program (HEA) charge of $0.30 will be applied monthly to residential customer bills.

The DSMR to be applied to non-residential distribution service customer bills is $0.001195 per kilowatt-hour. (I)

The DSMR to be applied for transmission service customer bills is $0.000053 per kilowatt-hour.

Issued by authority of an Order by the Kentucky Public Service Commission dated _____in Case No. 2026-00222

Issued: August 14, 2026
Effective: September 14, 2026
Issued by Amy B. Spiller, President /s/ Amy B. Spiller

Duke Energy Kentucky, Inc.
1262 Cox Road
Erlanger, Kentucky 41018

KY.P.S.C. Electric No. 2
Original Sheet No. 127
Page 1 of 2

POWER MANAGER® FOR BUSINESS

APPLICABILITY

This Power Manager® for Business Program is available on a voluntary basis, solely at the Company's option, to nonresidential customers receiving electric service under a nonresidential rate schedule and the customer elects to receive a signal from the Company or communications from the Company and agrees to shed load in response to said signal or communication during the months of May through September, as determined by the Company.

Bring Your Own KW is an option under the Power Manager® for Business Program. Service under the Bring Your Own KW option is contingent upon the Company having interval load data sufficient to establish the Customer's Baseline Demand.

PROGRAM DESCRIPTION

The Bring Your Own KW Option provides customers the opportunity to participate in a demand response program during the summer peaking season where the customer decides how much electrical load to reduce during a peaking event. Customers will receive advance notice of a scheduled demand reduction event no later than four (4) hours before the start of the event. Customers will receive notifications for emergency events as far in advance of the event start time as possible. During the designated event, customers may choose the extent to which they reduce the energy demand (kW) of their facility. The response can be automated or completed manually by the customer making changes at their facility.

CONTROL CREDITS

Following the load control season, each participating customer will be compensated for the average load reduction during the demand reduction events where a load capacity reduction is measured. Participating customers will not be penalized for events where reduction cannot be measured. The load reduction will be measured against the baseline demand profile (kW demand) for the facility. The facility baseline demand profile will be calculated using five (5) representative days from the 10 days prior to the event, excluding weekends, holidays* or other event days. The baseline can be weather adjusted if the Company determines the facility demand is weather-sensitive or if the event day is not consistent with the baseline demand profile. The compensation will be $30 per average kW reduced during the events. The incentive will be provided via check and mailed directly to all participating customers at the conclusion of the summer season once full seasonal analysis has been completed, generally mailed to customers by November of that year.

*Holidays include New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Day after Thanksgiving Day, Christmas Eve and Christmas Day.

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Kentucky Public Service Commission
Case No. 2026-____ dated _____.

Issued: August 14, 2026
Effective: September 14, 2026
Issued by Amy B. Spiller, President /s/ Amy B. Spiller

Duke Energy Kentucky, Inc.
1262 Cox Road
Erlanger, Kentucky 41018

INTERRUPTION PERIODS

The Company shall be allowed, at its sole discretion, to send an event signal or communication at any time. The control period under the Bring Your Own KW option will not exceed four (4) hours each day during the months of May through September. The control periods shall be limited to 40 hours total during any one control season. There will be a minimum of one (1) event per control season to determine the available load reduction.

The Company, at its sole discretion, may limit requests for service to geographic regions. Also, in addition to the control period for cycling purposes, the Company reserves the right to control the Customer's equipment for additional periods in the event the Company has capacity problems.

SERVICE REGULATIONS

The provisions contained in this tariff sheet do not supersede or replace any of the charges and terms contained in the standard base rate and rider tariff sheets. The standard base rate and rider charges apply to all customers.

The supplying of, and billing for, service and all conditions applying thereto, are subject to the jurisdiction of the Kentucky Public Service Commission, and to the Company's Service Regulations currently in effect, as filed with the Kentucky Public Service Commission, as approved by law.

Issued by authority of an Order by the
Kentucky Public Service Commission
Case No. 2026-____ dated _____.

Issued: August 14, 2026
Effective: September 14, 2026
Issued by Amy B. Spiller, President /s/ Amy B. Spiller

Status Update for Duke Energy Kentucky Energy Efficiency and Demand Response Programs; 2026-2028

Planned[1] Evaluation, Measurement and Verification Activities and Evaluation Reports

Residential Customer Programs	Program/Measure	Last Evaluation completion	Next Evaluation ==>	Q1 2026	Q2 2026	Q3 2026	Q4 2026	Q1 2027	Q2 2027	Q3 2027	Q4 2027	Q1 2028	Q2 2028	Q3 2028	Q4 2028
Low Income Neighborhood	Neighborhood	12/20/2022				M&V	M&V	M&V	M&V	M&V	Report				
Low Income Services	Refrigerator Replace	7/31/2013	TBD												
	Weatherization/Payment Plus	7/31/2013													
	Pay For Performance	N/A													
My Home Energy Report	MyHER	12/12/2024								M&V	M&V	M&V	Report		
Residential Energy Assessments	HEHC	6/5/2026													
Residential Smart Saver®	HVAC	9/26/2023					M&V	M&V	M&V	M&V	M&V	M&V	Report		
	Water Measures	7/19/2024		M&V	M&V	M&V	M&V	M&V	M&V	Report					
	Multi-Family	1/30/2024							M&V	M&V	M&V	Report			
Power Manager		2/1/2025							M&V	M&V	M&V	M&V	Report		
Peak Time Rebate Pilot	Peak Time Rebate	5/18/2023						M&V	M&V	M&V	M&V	Report			
EE Education	K-12 EE Education	7/30/2015					M&V	M&V	M&V	M&V	M&V	M&V	Report		

Non-Residential Customer Programs	Program/Measure	Last Evaluation completion	Next Evaluation ==>	Q1 2026	Q2 2026	Q3 2026	Q4 2026	Q1 2027	Q2 2027	Q3 2027	Q4 2027	Q1 2028	Q2 2028	Q3 2028	Q4 2028
Business Energy Saver	Small Business Energy Saver	11/10/2022						M&V	M&V	M&V	Report				
	SmartPath	N/A						M&V	M&V	M&V	Report				
Smart $aver® Non-Res, Custom		1/18/2022		M&V	M&V	M&V	Report								
Smart $aver® Non-Res, Prescriptive		6/13/2025													
PowerShare		10/13/2025													

[1] Future Evaluation Report dates are projections only. Actual report dates will vary depending on program participation, time to achieve a significant sample and the time needed to collect adequate data.

LEGEND	
M&V	Data collection (surveys, interviews, onsite visits, billing data) and analysis
Report	Evaluation Report

EM&V Report for the PowerShare® Program 2019-2024

Prepared for:

Duke Energy Kentucky

FINAL

October 13, 2025

Prepared by:

Ethan Young
Guidehouse Inc.

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Submitted to:

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Executive Summary

Duke Energy Kentucky's (DEK) PowerShare program is a demand response (DR) program offered to commercial and industrial customers that compensates businesses for reducing demand during periods of the PJM Interconnection LLC (PJM) or Duke Energy system capacity constraints. This report includes the methodology and results of the evaluation performed by Guidehouse Inc. (Guidehouse) for the period of June 1, 2019, through May 31, 2024. The evaluation included an impact assessment to quantify participant load curtailment during DR events.

The PowerShare program offers customers two options for participation:[1]

- **CallOption**: The CallOption program requires participating customers to reduce and maintain a predetermined load during Emergency Curtailment Periods. Participants may either opt to participate in events for (1) the entire calendar year or (2) only during the summer months spanning May through October. Participants receive a monthly credit on their energy bill, and additional Load Reduction Credits are paid for load curtailed during events. Monthly credits for summer-only (May through October) participants total $36 per enrolled kW per year, and for year-round participants the monthly credit totals to $54 per enrolled kW per year. All CallOption participants must participate in an annual test event to remain in the program.
- **QuoteOption**: By enrolling in the QuoteOption program, participants can take part in voluntary program events on a per-event basis. If a participant elects to participate in an event, they should reduce and maintain load to a level they specify prior to the event. A QuoteOption event is initiated at Duke Energy's discretion and participants are typically provided with event notification on the morning of the event. When possible, an advisory is sent out a day in advance. Unlike CallOption participants, QuoteOption participants are not paid monthly credits and are only eligible for Load Reduction Credits for their performance during voluntary program events. All QuoteOption participants must participate in an annual test event to remain in the program.

Duke Energy contracts with Schneider Electric, a firm that provides energy management services, to calculate monthly customer settlements for the PowerShare program. The PowerShare settlements are calculated with the use of Schneider Electric's Energy Profiler Online (EPO), a third-party hosted software application. EPO uses participant interval data, participant baselines,[2] and a set of program option-specific calculations to determine the event energy (kWh) and monthly capacity (kW) values that determine participant settlement payments.

Between 2019 and 2024, the PowerShare program called nine CallOption Test/Retest events, one QuoteOption event, and two CallOption Emergency Events across seventeen customers.[3] Both Emergency events were called during Winter 2022-2023 (December 23 and December 24, 2022).

For the impact evaluation, Guidehouse utilized hourly interval data (kWh) from Schneider Electric's EPO platform for DEK participants to estimate demand response impacts on event days.

[1] This summary of participation options was drawn directly from the Kentucky PowerShare program's 2025-2026 program brochure.

[2] Baselines are calculated in accordance with PJM guidance for customer baseline load estimation for economic load response participants. For more information, please see Section 3.3A in the Amended and Restated Operating Agreement of PJM Interconnection, LLC (PJM): **https://www.pjm.com/pjmfiles/directory/merged-tariffs/oa.pdf**

[3] A customer is defined as the parent account that is called to curtail during a demand response event and whose demand is the sum of all associated children and parent accounts' demand.

Guidehouse selected a baseline approach that minimized the root mean squared error (RMSE) between actual and predicted loads on specific event-like non-event days across all participants for the Summer (May through October) and Winter (November through April) seasons. For each event, Guidehouse estimated a baseline using the "winning" baseline approach for each event participant. Subsequently, Guidehouse estimated the demand response impacts for each participant by calculating the difference between the estimated baseline demand and the actual observed demand during event hours.

Key Findings and Recommendations

Impact Findings

Table ES-1 illustrates the average reported and estimated demand reductions for the curtailment events called between June 1, 2019, and May 31, 2024, that Guidehouse had sufficient data to evaluate.

Table ES-1. Total Estimated Load Reductions for 2019-2024 DEK PowerShare Events

Season	Date	Customers Evaluated	Reported Demand Reduction (MW)	Estimated Total Impacts (MW)	Margin of Error (± MW, 90% CI)	Relative Precision (± %, 90% CI)	Realization Rate (%)**
Summer	2019-09-10	15	17.70	12.72	2.14	17%	72%
	2019-09-26	1	0.92	0.19	0.07	36%	21%
	2019-10-02	1	0.35	0.05	0.02	38%	13%
	2020-09-03	13	17.11	13.69	1.95	14%	80%
	2020-09-17	1	0.89	0.11	0.02	20%	13%
	2020-09-29	1	0.11	0.04	0.05	126%	33%
	2021-09-02	11	17.10	12.94	2.05	16%	76%
	2022-09-01	10	14.66	11.18	2.02	18%	76%
	2023-06-29	5	9.14	7.15	1.31	18%	78%
	2023-08-04	2	2.20	2.46	1.27	52%	112%
	Average* **	**6.00**	**14.58**	**11.07**	**0.86**	**14%**	**75%**
Winter	2022-12-23*	1	0.24	0.27	0.07	24%	113%
	2022-12-24*	2	3.00	2.76	0.40	15%	92%
	Average* **	**1.50**	**2.08**	**1.93**	**0.27**	**18%**	**94%**
Overall Average* **		**5.25**	**12.08**	**9.24**	**0.90**	**24%**	**84%**

*The events on December 23 and December 24, 2022, were the only Emergency Events called between June 1, 2019, and May 31, 2024.

**Realization rate is the ratio of Guidehouse's estimated total impacts to Duke Energy's reported demand reduction calculated via the PJM methodology for calculating customer baseline load.

***Averages are weighed by the average number of customers evaluated during each event.

Source: Guidehouse analysis of participant EPO interval data and event settlement data

The key findings of Guidehouse's impact evaluation of the DEK PowerShare program for 2019-2024 are:

- **Guidehouse estimated an average total weighted curtailment of 11.07 MW across all Summer Test events, and 1.93 MW across both Winter Emergency events. Summer Test events yielded an average weighted realization rate of 75%, and Winter Emergency events yielded an average weighted realization rate of 94%.** Realization rate is defined as Guidehouse's average weighted per-season impact estimate divided by the average weighted per-season reported event impacts provided by Duke Energy, derived using the PJM

methodology for calculating customer baseline load. These results indicate that the PJM-supplied approach used to calculate customer baseline load is relatively well-aligned with Guidehouse's verified baseline methodology.

- **Across both summer and winter program events, Guidehouse estimated that the majority of the DEK PowerShare program's curtailment capability is tied to a small number of large customers participating in the program.** During Summer Test events, four of the sixteen evaluated customers accounted for 74% of the observed demand response impact. During Winter Emergency events, one of the two evaluated customers accounted for 92% of the observed demand response impacts. Continued monitoring of these key customers during and after the program's mandatory test events will be important in ensuring the curtailment capability can be relied upon during system emergencies.

Based on the findings above, Guidehouse developed the following recommendations:

- **Guidehouse recommends that Duke Energy continue to monitor program performance across the mandatory test events and continue to retest customers, as needed.** While Guidehouse's estimate of curtailment is relatively well-aligned with Duke Energy's, heterogeneity across participants and the natural evolution of the PowerShare participant pool warrants a periodic review of this alignment to ensure Duke Energy's curtailment capability estimates reflect load that may be relied upon during system emergencies.
- **For participants enrolled in the program for several contract periods,[4] Guidehouse recommends that Duke Energy examine current contract year test event performance relative to prior contract year test events.** If there are substantial declines in test event performance for some participants, this may warrant a follow-up with the participants to understand how their curtailment plan may have changed and to identify whether an adjustment to their contract or plan is needed. Adopting this recommendation should give Duke Energy a more robust indication of load that may be relied upon during system emergencies.

[4] A contract period is defined as the yearly period between June 1 to May 31 for each customer.

1. Program Description

Duke Energy Kentucky's (DEK) PowerShare program is a demand response (DR) program offered to commercial and industrial customers that compensates businesses for reducing demand during periods of the PJM Interconnection LLC (PJM) or Duke Energy system capacity constraints. The PowerShare program offers customers several options for participation:[5]

- **CallOption**: The CallOption program requires participating customers to reduce and maintain a predetermined load during Emergency Curtailment Periods. Participants may either opt to participate in events for (1) the entire calendar year or (2) only during the summer months spanning May through October. Participants receive a monthly credit on their energy bill, and additional Load Reduction Credits are paid for load curtailed during events. Monthly credits for summer-only (May through October) participants total $36 per enrolled kW per year, and for year-round participants the monthly credit totals to $54 per enrolled kW per year. All CallOption participants must participate in an annual test event to remain in the program.
- **QuoteOption**: By enrolling in the QuoteOption program, participants can take part in voluntary program events on a per-event basis. If a participant elects to participate in an event, they should reduce and maintain load to a level they specify prior to the event. A QuoteOption event is initiated at Duke Energy's discretion and participants are typically provided with event notification on the morning of the event. When possible, an advisory is sent out a day in advance. Unlike CallOption participants, QuoteOption participants are not paid monthly credits and are only eligible for Load Reduction Credits for their performance during voluntary program events. All QuoteOption participants must participate in an annual test event to remain in the program.

The table below provides additional details for the program participation options that are available in the DEK PowerShare Program.

Table 1-1. DEK PowerShare Participation Options

Program Option	Dates of Potential Interruption	Conditions Triggering Curtailment Periods	Timing of Curtailment Periods	Maximum Duration of Curtailment Periods
CallOption Emergency (Summer Only)	June 1 – October 31; May 1 – May 31	PJM capacity constraints	10am-10pm	Unlimited
CallOption Emergency (Annual)	June 1 – May 31	PJM capacity constraints	Summer: 10am-10pm Winter: 6am – 9pm	Unlimited
QuoteOption	June 1 – May 31	Duke Energy capacity constraints or mutual economic opportunity	Anytime, as needed	Unlimited

Source: Guidehouse analysis of Duke Energy program brochure

[5] This summary of participation options was drawn directly from the Kentucky PowerShare program's 2025-2026 program brochure.

Duke Energy contracts with Schneider Electric, a firm that provides energy management services, to calculate monthly customer settlements for the PowerShare program. The PowerShare settlements are calculated with the use of Schneider Electric's Energy Profiler Online (EPO), a third-party hosted software application. EPO uses participant interval data, participant baselines,[6] and a set of program option-specific calculations to determine the event energy (kWh) and monthly capacity (kW) values that determine participant settlement payments.

The following two subsections provide additional detail on program enrollment, as well as events called between June 1, 2019, and May 31, 2024.

1.1 Program Enrollment and Program Events

For the 2019 through 2024 contract periods,[7] Guidehouse estimated load curtailment for sixteen parent accounts (hereinafter referred to as "customers") that were called to participate in PowerShare events. Of the participating customers, the vast majority were participating in the PowerShare program events during the summer months spanning May through the end of October, with a small number of remaining customers enrolled in the PowerShare program year-round. Table 1-2 provides an overview of PowerShare program enrollment and participation by contract period between 2019 and 2024.

Table 1-2. DEK PowerShare Participation: June 1, 2019 – May 31, 2024

Contract Period	Enrolled Customers*	
	Summer-Only	Year-Round
2019-2020	14	3
2020-2021	13	4
2021-2022	10	2
2022-2023	10	2
2023-2024	7	1

*The number of enrolled customers is defined as the number of enrolled parent accounts. Guidehouse was not able to produce impact estimates for all customers due to missing or incomplete EPO interval data for some customers who were enrolled in the PowerShare program.

Source: Guidehouse analysis of Duke Energy event settlement and program participation data

Between the 2019 and 2024 program years, DEK called twelve PowerShare events (ten in Summer and two in Winter), which are listed in Table 1-3. Nine events called during the Summer season were Test/Retest events, and one event in 2019 was a QuoteOption event. The two Winter season events were CallOption Emergency events called on December 23 and December 24, 2022 for participants enrolled in the program year-round. Figure 1-1 illustrates that these two Winter events were called during the two coldest Winter days between June 2019 and May 2024.

[6] Baselines are calculated in accordance with PJM guidance for customer baseline load estimation for economic load response participants. For more information, please see Section 3.3A in the Amended and Restated Operating Agreement of PJM Interconnection, LLC (PJM): **https://www.pjm.com/pjmfiles/directory/merged-tariffs/oa.pdf**

[7] A contract period is defined as the yearly period between June 1 to May 31 for each customer.

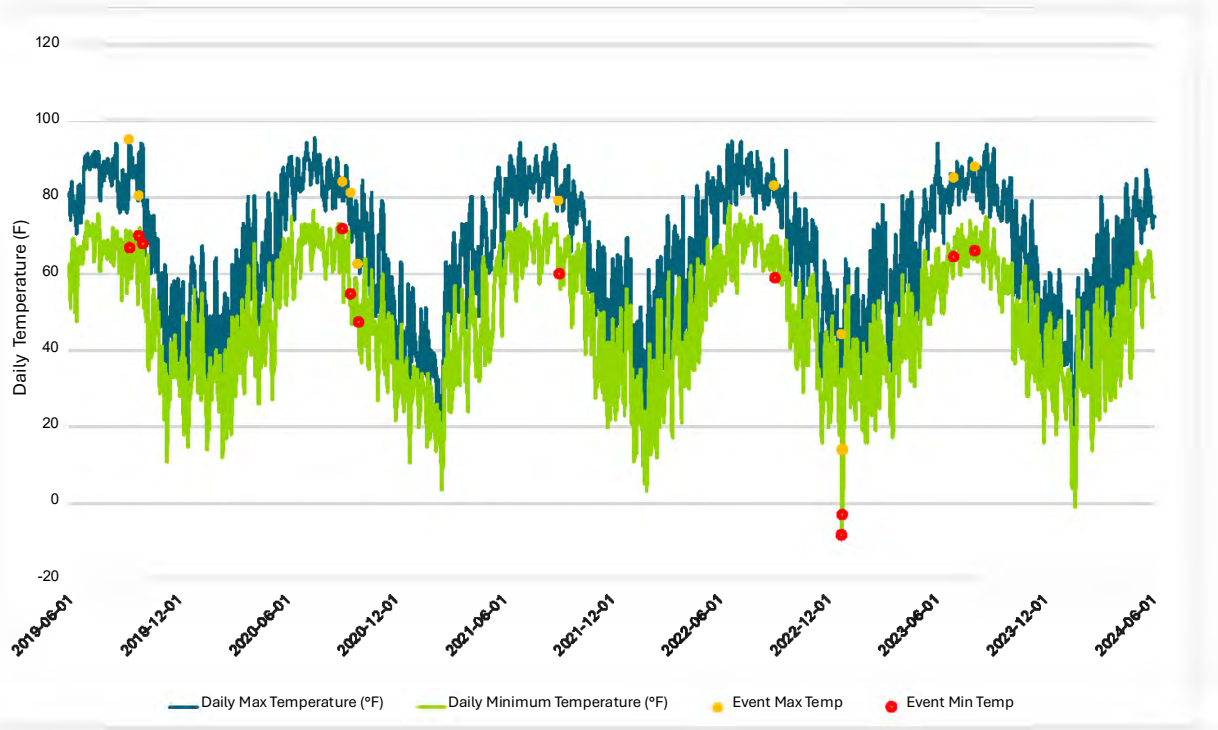
Table 1-3. DEK PowerShare Events: June 1, 2019 – May 31, 2024

Season	Event Date	Event Time (Hour Ending)	Event Type	Customers Called to Curtail
Summer	9/10/2019	17:00	Test	16
	9/26/2019	17:00	Retest	1
	10/2/2019	16:00 – 19:00	QuoteOption	1
	9/3/2020	17:00	Test	14
	9/17/2020	17:00	Retest	1
	9/29/2020	17:00	Retest	1
	9/2/2021	17:00	Test	12
	9/1/2022	17:00	Test	12
	6/29/2023	17:00	Test	6
	8/4/2023	17:00	Retest	2
Winter	12/23/2022*	19:00 – 21:00	CallOption Emergency	1
	12/24/2022*	07:00 – 20:00	CallOption Emergency	2

*The events on December 23 and December 24, 2022, were the only Emergency Events called between June 1, 2019, and May 31, 2024.

Source: Guidehouse analysis of Duke Energy event settlement data

Figure 1-1. Time Series of Weather and Event Temperature – June 1, 2019 – May 31, 2024



Source: Guidehouse analysis of Duke Energy event settlement data and NOAA weather data

2. Impact Evaluation

This section summarizes the research objectives, the data collection, and the impact evaluation methodology utilized to estimate curtailment across the events called for the PowerShare program.

2.1 Key Research Objectives

The primary research objective of this evaluation was to estimate the load curtailment (kW) delivered by PowerShare participants on all event days from June 1, 2019, through May 31, 2024. Specifically:

1. Estimate verified demand (kW) impacts using a baseline testing approach (described in Section 2.3 and Appendix A. Detailed Impact Evaluation Methodology) across seven regression-based baseline and 23 non-regression-based customer baseline (CBL) estimation methods. These impacts include:
    a. Average kW demand impact per customer for each event, and on average across all events.
    b. Total program kW demand impact for each event, and on average across all events.

2.2 Data Sources

To estimate demand impacts for PowerShare program events, Guidehouse utilized a blend of hourly Duke Energy customer consumption (kWh) data, weather data, and program tracking data. More specifically, the data sources used for the impact evaluation include:

- **Participant Metering Data from Schneider Electric's EPO Platform:** All available hourly consumption (kWh) data for all participants for the entire evaluation period (i.e., June 1, 2019 through May 31, 2024).
- **Participant Cross-Sectional Data:** This data includes the program enrollment option (i.e., CallOption or QuoteOption) and other firmographic information.
- **Event Settlement Data:** This data includes information on the type and timing of each PowerShare event called, as well as performance data for each participant for each event, including contracted curtailment and reported curtailment (measured in kW) during each of the events called between June 1, 2019, and May 31, 2024.
- **National Oceanic and Atmospheric Administration (NOAA) Weather Data:** Guidehouse collected data for three weather stations from NOAA, which includes hourly dry bulb temperature and relative humidity. After collecting data from weather stations, Guidehouse assigned weather data to each participant by selecting the most proximate weather station for each participant site.

2.3 Estimating Verified Impacts Using a Baseline Testing Approach

Once all data was compiled, Guidehouse conducted baseline testing to inform the estimation of program impacts. The objective of this task was to select the most accurate method to construct baseline (i.e., counterfactual) load profiles for each participant, which are compared to actual in-event load to estimate total load curtailment. Guidehouse selected a baseline approach by assessing a variety of baseline estimation methods and selecting the best performing method that had the smallest calculated root mean squared error (RMSE) between actual and predicted load on specific event-like non-event days[8] across all participants for the Summer and Winter seasons. This process is detailed in Appendix A.1 Estimating Verified Impacts Using a Baseline Testing Approach and involved:

- **Testing of Candidate Baseline Methods.** Guidehouse tested a set of non-regression-based customer baseline (CBLs) and regression-based baseline methodologies to determine the approach to be used for estimating verified impacts. Guidehouse then selected the best performing method that had the smallest calculated root mean squared error (RMSE) between actual and predicted load on specific event-like non-event days across all participants for the Summer and Winter seasons.
- **Estimating Verified Impacts.** Guidehouse estimated baseline demand using the best-performing baseline approach for each season. Guidehouse then estimated verified impacts by calculating the difference between observed in-event demand and estimated baseline demand for each participant. Guidehouse estimated verified impacts for each event in the evaluation period, as well as the average across all events, for each customer and for all customers in aggregate (i.e., the program total).

Guidehouse tested 23 non-regression-based CBL methods and seven regression-based baseline methods, using three event-like non-event days for each season between June 1, 2019 and May 31, 2024.[9] Table 2-1 provides a description of the best-performing baseline method for the Summer and Winter seasons. For each event called in each season, the best-performing baseline method was then used to estimate baseline demand for each customer for each event in which they were called to participate.

[8] Event-like non-event days are defined on the basis of the day's temperature profile. For each event, a test day is selected from the pool of non-event days which has a temperature profile most similar to that of the given event day.

[9] Three event-like non-event days were selected for each customer for each season based on similarity of observed weather with the event days the participant was called to participate in. Different event-like non-event days were selected for each customer, as weather data were matched to each customer based on proximity of the customer to a specific NOAA weather station.

Table 2-1. Winning Baseline Methods for Estimating Verified Impacts

Season	Winning Method	Method Description
Summer (May – October)	7-of-7 CBL	Baseline (i.e., counterfactual) demand for each event day's hour is the average of each respective hour's demand observed over the seven non-holiday, non-event weekdays immediately preceding the event day.
Winter (November – April)	2-of-2 CBL	Baseline (i.e., counterfactual) demand for each event day's hour is the average of each respective hour's demand observed over the two non-holiday, non-event weekdays immediately preceding the event day.

Note: Apart from the December 24 emergency event, Guidehouse removed weekend days from the analysis dataset, as all but one event was called on weekdays, and demand on weekend days were a departure from typical weekday demand for most participants. Therefore, for baseline accuracy, the two winning CBL methods used data looking back across a set of preceding weekdays.

Source: Guidehouse

3. Impact Findings

In this section, Guidehouse presents impact evaluation estimates for 12 program events called between June 1, 2019, and May 31, 2024. The discussion of program impacts is divided into the following sections:

1. **Demand Response Impacts – Overall.** This section provides the estimated *aggregate* demand response impacts during the 12 evaluated demand response events called from June 1, 2019, through May 31, 2024. These events are listed in Table 3-2.
2. **Demand Response Impacts – Per Participant.** This section provides the estimated *per participant* demand response impacts during the 12 evaluated demand response events called from June 1, 2019, through May 31, 2024. These events are listed in Table 3-4.
3. **Net-to-Gross.** This section outlines why the appropriate net-to-gross factor for this program should be 1.0.

Table 3-1. DEK PowerShare Events: June 1, 2019 – May 31, 2024

Season	Date	Event Type	Event Time (Hour Ending)	Avg. Event Temp. (°F)	Customers Called to Curtail	Customers Evaluated*
Summer	2019-09-10	Test	17:00	87.58	16	15
	2019-09-26	Retest	17:00	74.32	1	1
	2019-10-02	QuoteOption	16:00 – 19:00	89.31	1	1
	2020-09-03	Test	17:00	78.77	14	13
	2020-09-17	Retest	17:00	76.08	1	1
	2020-09-29	Retest	17:00	56.88	1	1
	2021-09-02	Test	17:00	74.87	12	11
	2022-09-01	Test	17:00	81.25	12	10
	2023-06-29	Test	17:00	77.74	6	5
	2023-08-04	Retest	17:00	83.91	2	2
Winter	2022-12-23	CallOption Emergency	19:00 – 21:00	-3.09	1	1
	2022-12-24	CallOption Emergency	07:00 – 20:00	3.18	2	2

* Guidehouse was not able to produce impact estimates for customers on all events due to missing or incomplete EPO interval data for certain customers.

Source: Guidehouse analysis of Duke Energy event settlement data and NOAA weather data

3.1 Demand Response Impacts – Overall

Guidehouse selected a baseline approach by testing a variety of potential methods and determining the best performing model across all customers per season, as detailed in Appendix A.1 Estimating Verified Impacts Using a Baseline Testing Approach. Previously summarized in Section 2.3, the winning method for Summer events was 7-of-7 CBL, while the winning method for Winter events was a 2-of-2 CBL. These winning methods were used to estimate impacts for each customer individually per season. Guidehouse aggregated the per-participant impacts for each event to estimate total load reduction by event. Per-event and per-season average impacts can be found below in Table 3-2, along with a visual representation of the same data found in Figure 3-1.

Table 3-2. Summary of Estimated Load Reduction by Event and Season

Season	Date	Customers Evaluated	Reported Demand Reduction (MW)	Estimated Total Impacts (MW)	Margin of Error (± MW, 90% CI)	Relative Precision (± %, 90% CI)	Realization Rate (%)**
Summer	2019-09-10	15	17.70	12.72	2.14	17%	72%
	2019-09-26	1	0.92	0.19	0.07	36%	21%
	2019-10-02	1	0.35	0.05	0.02	38%	13%
	2020-09-03	13	17.11	13.69	1.95	14%	80%
	2020-09-17	1	0.89	0.11	0.02	20%	13%
	2020-09-29	1	0.11	0.04	0.05	126%	33%
	2021-09-02	11	17.10	12.94	2.05	16%	76%
	2022-09-01	10	14.66	11.18	2.02	18%	76%
	2023-06-29	5	9.14	7.15	1.31	18%	78%
	2023-08-04	2	2.20	2.46	1.27	52%	112%
	Average* **	**6.00**	**14.58**	**11.07**	**0.86**	**14%**	**75%**
Winter	2022-12-23*	1	0.24	0.27	0.07	24%	113%
	2022-12-24*	2	3.00	2.76	0.40	15%	92%
	Average* **	**1.50**	**2.08**	**1.93**	**0.27**	**18%**	**94%**
Overall Average* **		**5.25**	**12.08**	**9.24**	**0.90**	**24%**	**84%**

*The events on December 23 and December 24, 2022, were the only Emergency Events called between June 1, 2019, and May 31, 2024.

** Realization rate is the ratio of Guidehouse's estimated total event impact to the demand reduction calculated via PJM's settlement methodology.

***The averages presented are weighted by the average number of customers evaluated during each event.

Source: Guidehouse analysis of participant EPO interval data and Duke Energy event settlement data

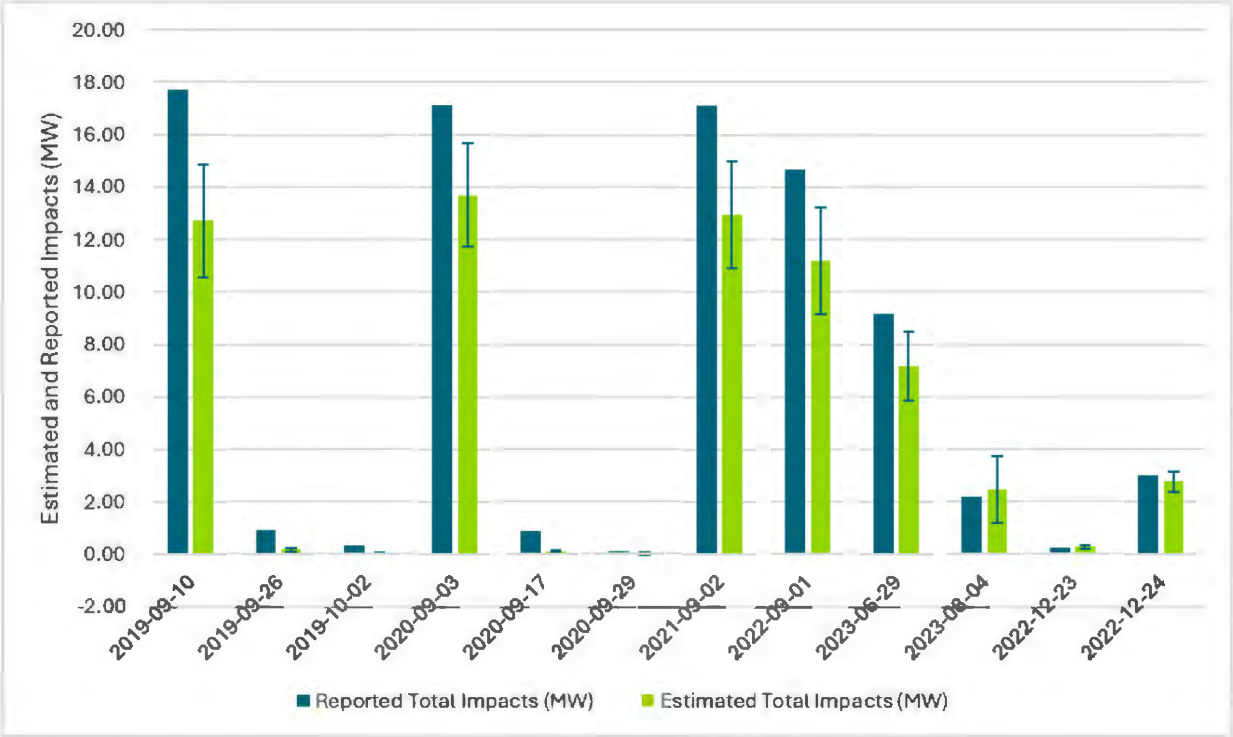
Guidehouse estimated that Duke Energy achieved a weighted realization rate of 75% for Summer Test events and 94% for Winter Emergency events. Four program events (2019-09-26, 2019-10-02, 2020-09-17, and 2020-09-29) have realization rates much lower than the average. However, these events featured one customer each. Moreover, three of these events (2019-09-26, 2020-09-17, and 2020-09-29) were retest events for one customer each that had previously failed to meet curtailment expectations, so low realization rates for these events is not entirely unexpected. Overall, Guidehouse findings suggest that the PJM methodology for calculating customer baseline load used by DEK to estimate curtailment is relatively well-aligned with Guidehouse's estimates derived by the "winning" baseline estimation approach.

Figure 3-1 shows the average estimated event impacts compared to reported event impacts. The reported event impacts presented in the blue bars represent the total reported load curtailment provided by Duke Energy, derived using the PJM methodology for calculating customer baseline load.[10] The estimated impacts presented in the green bars represent the Guidehouse-estimated

[10] For more information on the PJM methodology, please see Section 3.3A in the Amended and Restated Operating Agreement of PJM Interconnection, LLC (PJM): **https://www.pjm.com/pjmfiles/directory/merged-tariffs/oa.pdf**

amount of curtailment that occurred during the event. In addition to showing the aggregate impact on each date, this plot shows 90 percent confidence intervals, represented by the whiskers straddling the top of the blue bars.

Figure 3-1. Reported vs. Estimated Demand Response Impacts: June 1, 2019 – May 31, 2024



Source: Guidehouse analysis of participant EPO interval data and Duke Energy event settlement data

The summary of reported versus estimated demand response impacts provides a further understanding of alignment between the two estimates. Overall, Guidehouse estimates are most well-aligned for the two Winter Emergency events called in December 2022, which had realization rates of 113% and 92%, respectively. For the Summer Test events, Guidehouse estimates are relatively well-aligned with Duke Energy's estimates when more than one customer was called to curtail, with the average estimated realization rate of events with more than one customer being 82%. As noted previously, three events (2019-09-26, 2020-09-17, and 2020-09-29) were retest events called for one customer each.

In addition to demand response impacts per event, Guidehouse also summarizes Duke Energy-reported and Guidehouse-estimated demand response impacts per contract period below in Table 3-3.[11] Consistent with the event-specific findings, when summarizing impacts per contract period, there is similar alignment between Duke Energy-reported and Guidehouse-estimated impacts.

[11] A contract period is defined as the yearly period between June 1 to May 31 for each customer. For example, the 2019-2020 Contract Period spanned June 1, 2019, through May 31, 2020.

Table 3-3. Average Estimated Demand Response Impacts by Contract Period

Contract Period*	Event Types	Average Number of Customers Evaluated	Average Total Reported Demand Reduction (MW)**	Average Total Estimated Impact (MW)**	Realization Rate (%)***
2019-2020	Test	6	15.69	11.23	72%
2020-2021	Test	5	14.89	11.88	80%
2021-2022	Test	11	17.10	12.94	76%
2022-2023	Test	4	2.08	1.93	93%
2023-2024	Test	10	14.66	11.18	76%
2022-2023	Emergency	2	7.16	5.81	81%

* A contract period is defined as the yearly period between June 1st to May 31st for each customer.

** Average Total Reported Curtailment (MW) and Average Total Estimated Impact (MW) are weighted by the number of customers evaluated per event within each contract period.

*** Realization rate is the ratio of Guidehouse's average total estimated impact to the demand reduction calculated via the PJM methodology for calculating customer baseline load.

Source: Guidehouse analysis of participant EPO interval data and event settlement data

3.2 Demand Response Impacts – Per Participant

In the previous section, Guidehouse aggregated the per-participant impacts for each event to provide total estimated load reduction by event, by season, and by contract period. This section provides the estimated per-participant impacts for the demand response events called between 2019 and 2024. Table 3-4 shows per-participant estimated impacts by event. Consistent with aggregate demand response impacts presented in the preceding figure and tables, per-participant impacts are relatively well-aligned across all but four program events that treated a single customer each.

Table 3-4. Summary of Estimated Load Reduction by Event – Per Participant

Season	Date	Customers Evaluated	Per-Participant Reported Demand Reduction (MW)	Per-Participant Estimated Demand Reduction (MW)	Per-Participant Margin of Error (± MW, 90% CI)	Relative Precision (± %, 90% CI)	Realization Rate (%)**
Summer	2019-09-10	15	1.18	0.85	0.14	17%	72%
	2019-09-26	1	0.92	0.19	0.07	36%	21%
	2019-10-02	1	0.35	0.05	0.02	38%	13%
	2020-09-03	13	1.32	1.05	0.15	14%	80%
	2020-09-17	1	0.89	0.11	0.02	20%	13%
	2020-09-29	1	0.11	0.04	0.05	126%	33%
	2021-09-02	11	1.55	1.18	0.19	16%	76%
	2022-09-01	10	1.47	1.12	0.20	18%	76%
	2023-06-29	5	1.83	1.43	0.26	18%	78%
	2023-08-04	2	1.10	1.23	0.64	52%	112%
	Average* **	**6.00**	**1.34**	**1.01**	**0.07**	**7%**	**75%**
Winter	2022-12-23*	1	0.24	0.27	0.07	24%	113%
	2022-12-24*	2	1.50	1.38	0.20	15%	92%
	Average* **	**1.50**	**1.08**	**1.01**	**0.14**	**13%**	**94%**
Overall Average* **		**3.75**	**1.21**	**1.01**	**0.16**	**15%**	**84%**

* Events on 2022-12-23 and 2022-12-24 were Emergency events

**Realization rate is the ratio of Guidehouse's estimated total event impact to the demand reduction calculated via PJM's settlement methodology.

***Averages presented are weighed by the average number of customers evaluated.

Source: Guidehouse analysis of participant EPO interval data and event settlement data

Figure 3-2 shows the distribution of average estimated demand impacts by customer across the evaluated program Summer events during the June 1, 2019, through May 31, 2024, evaluation period.[12] A small number of customers (four out of the sixteen evaluated) provided more than 70% of the curtailed load across Summer events. Overall, most of the program capacity is drawn from a small number of participating customers. As such, Duke Energy should continue to monitor event performance for these larger customers to ensure that their relatively large committed loads may be relied upon during system emergencies.

[12] Due to low participation in PowerShare winter events, Guidehouse has omitted information from the December 23 and December 24, 2022, events from the figure.

Figure 3-2. Distribution of Average Load Reduction by Customer – Summer Events

Source: Guidehouse analysis of participant EPO interval data and event settlement data.

After reviewing overall and per-participant program impacts, Guidehouse findings suggest that the PJM methodology for calculating customer baseline load used by DEK to estimate curtailment is relatively well-aligned with Guidehouse's estimates derived by the "winning" baseline estimation approach. While Guidehouse's estimate of curtailment is relatively well-aligned with the PJM methodology, heterogeneity across participants and the natural evolution of the PowerShare participant pool warrants a periodic review of this alignment to ensure Duke Energy's curtailment capability estimates reflect load that may be relied upon during system emergencies.

Based on the above findings, Guidehouse recommends that Duke Energy continue to monitor program performance across the mandatory test events and continue to retest customers, as needed. In addition, for participants enrolled in the program for several contract periods, Guidehouse recommends that Duke Energy examine test event performance relative to prior-year test events. If there are substantial declines in test event performance for some participants, this may warrant a follow-up with the participants to understand how their curtailment plan may have changed and to identify whether an adjustment to their contract is needed. Adopting both recommendations should give Duke Energy a more robust indication of load that may be relied upon during system emergencies.

3.3 Net-to-Gross

Evaluations of demand-side management programs typically estimate both net and gross savings and often present a net-to-gross (NTG) ratio based on the evaluated percentage of demand reductions that may be ascribed either to free ridership (which decreases the NTG ratio) or to program spillover (which increases it). Free ridership is typically defined as the percentage of savings that would have occurred absent the presence of the program. Spillover is typically defined as incremental savings actions undertaken by a program's participants not directly claimed by the program.

Since demand reductions are estimated in contrast to an estimated baseline that captures expected participant behavior absent an event, Guidehouse can confidently state that the free ridership is zero. Absent the program, none of the demand reductions observed across the

program's participants would have taken place. In addition, there is no reason to assume that non-participants would curtail in absence of the incentives and structure of the program, so spillover is zero. With both free ridership and spillover at zero, the NTG ratio is 1.0 and all estimated impacts presented in this report should be considered net and gross.

4. Key Findings and Recommendations

This section includes a summary of the key findings presented throughout this report, along with some recommendations for DEK to consider.

4.1 Key Findings

The key findings of Guidehouse's impact evaluation of the DEK PowerShare program for this evaluation period are:

- **Guidehouse estimated an average total weighted curtailment of 11.07 MW across all Summer Test events, and 1.93 MW across both Winter Emergency events. Summer Test events yielded an average weighted realization rate of 75%, and Winter Emergency events yielded an average weighted realization rate of 94%.** Realization rate is defined as Guidehouse's average weighted per-season impact estimate divided by the average weighted per-season reported event impacts provided by Duke Energy, derived using the PJM methodology for calculating customer baseline load. These results indicate that the PJM-supplied approach used to calculate customer baseline load is relatively well-aligned with Guidehouse's verified baseline methodology.
- **Across both summer and winter program events, Guidehouse estimated that the majority of the DEK PowerShare program's curtailment capability is tied to a small number of large customers participating in the program.** During Summer Test events, four of the sixteen evaluated customers accounted for 74% of the observed demand response impact. During Winter Emergency events, one of the two evaluated customers accounted for 92% of the observed demand response impacts. Continued monitoring of these key customers during and after the program's mandatory test events will be important in ensuring the curtailment capability can be relied upon during system emergencies.

4.2 Recommendations

Based on the findings above, Guidehouse developed the following recommendations:

- **Guidehouse recommends that Duke Energy continue to monitor program performance across the mandatory test events and continue to retest customers, as needed.** While Guidehouse's estimate of curtailment is relatively well-aligned with Duke Energy's, heterogeneity across participants and the natural evolution of the PowerShare participant pool warrants a periodic review of this alignment to ensure Duke Energy's curtailment capability estimates reflect load that may be relied upon during system emergencies.
- **For participants enrolled in the program for several contract periods, Guidehouse recommends that Duke Energy examine current contract year test event performance relative to prior contract year test events.** If there are substantial declines in test event performance for some participants, this may warrant a follow-up with the participants to understand how their curtailment plan may have changed and to identify whether an adjustment to their contract or plan is needed. Adopting this recommendation should give Duke Energy a more robust indication of load that may be relied upon during system emergencies.

5. Summary Form

PowerShare®

2019-2024

Completed EMV Fact Sheet

Description of Program

Duke Energy Kentucky's (DEK) PowerShare program is a demand response (DR) program offered to commercial and industrial customers that compensates businesses for reducing demand during periods of PJM or Duke Energy system capacity constraints.

The PowerShare program offers customers two participation options to choose from:

- **CallOption:** The CallOption program requires participating customers to reduce and maintain a predetermined load during Emergency Curtailment Periods. Participants receive a monthly credit on their energy bill, and additional Load Reduction Credits are paid for load curtailed during events. Monthly credits for summer-only participants total to $36 per enrolled kW per year, and for year-round participants the monthly credit totals to $54 per enrolled kW per year. All CallOption participants must participate in an annual test event to remain in the program.
- **Voluntary Curtailment:** QuoteOption program participants can take part in voluntary Curtailment Periods on a per-event basis. If a participant elects to participate in an event, they should reduce and maintain load to a level they specify prior to the event. A QuoteOption event is initiated at Duke Energy's discretion and participants are typically provided with event notification on the morning of the event. When possible, an advisory is sent out a day in advance. Unlike CallOption participants, QuoteOption participants are not paid monthly credits and are only eligible for Load Reduction Credits for their performance during voluntary program events. All QuoteOption participants must participate in an annual test event to remain in the program.

Evaluation Methods

Customers enrolled in the CallOption and QuoteOption options of the PowerShare program were called to participate in two Emergency events, nine Test events, and one QuoteOption event called by DEK. Guidehouse estimated demand response impacts of 12 of these events using a baseline testing approach applied to called customers' consumption data collected during the 2019-2024 evaluation period spanning June 1, 2019, through May 31, 2024.

Evaluation Findings

- **Guidehouse estimated an average total weighted curtailment of 11.07 MW across all Summer Test events, and 1.93 MW across both Winter Emergency events. Summer Test events yielded an average weighted realization rate of 75%, and Winter Emergency events yielded an average weighted realization rate of 94%.** Realization rate is defined as Guidehouse's average weighted per-season impact estimate divided by the average weighted per-season reported event impacts provided by Duke Energy, derived using the PJM methodology for calculating customer baseline load. These results indicate that the PJM-supplied approach used to calculate customer baseline load and is relatively well aligned with Guidehouse's verified baseline methodology.
- **DEK's estimate of curtailment capability during Winter Emergency events is closely aligned with Guidehouse's estimate of Winter Emergency curtailment capability.** The close alignment with Guidehouse's estimate of Winter Emergency curtailment may suggest that the PJM customer baseline load estimation approach may be used to reliably estimate curtailment during similar winter system events. However, a periodic review of this approach is recommended to verify robustness across a wider range of event days and customers.
- **Most of the demand response impacts came from a small number of participating customers.** During Summer Test events, four of the sixteen evaluated customers accounted for 74% of the observed demand response impact. During Winter Emergency events, one of the two evaluated customers accounted for 92% of the observed demand response impacts.

Date:	2025-10-13
Region:	DEK
Evaluation Period	June 1, 2019 – May 31, 2024
Average DR Event Program Impact (MW)	
Load Reduction Impacts (Program total, averaged across all events)	Summer: 11.07 MW Winter: 1.93 MW
Net-to-Gross Ratio	1.0

Appendix A. Detailed Impact Evaluation Methodology

This section details the methods used for estimating impacts using the baseline testing approach, as well as the PJM baseline method.

A.1 Estimating Verified Impacts Using a Baseline Testing Approach

A.1.1 Testing of Candidate Baseline Methods

Guidehouse performed the following steps to test candidate baselines and select the approach to be used for verifying DR impacts:

1. **Identify Test Days.** Guidehouse identified three test days for each season (Summer and Winter) and participant. Test days are non-holiday, non-event weekdays with a temperature profile as similar as possible to that of the actual event days. Guidehouse selected test days as the three non-event, non-holiday weekdays with the highest average temperature for the Summer season, and the three coldest such days for the Winter season.
2. **Estimate Baselines**. Based on the test days selected, Guidehouse estimated demand during periods where curtailment events were called in each season. Summer events occurred between May and October, hour-ending 16:00 to hour-ending 19:00, and the Winter events occurred between November and April, hour-ending 07:00 to hour-ending 20:00.
3. **Quantify Accuracy and Select Approaches.** Each customer's baseline generated by each approach tested was assigned a metric of accuracy as the root mean squared error between predicted and actual demand. These metrics were aggregated across customers[13] by approach to determine the overall accuracy rank (for the entire program) of each approach in each season. Guidehouse selected the most accurate approach in aggregate to calculate verified impacts in each season.

A.1.2 CBL Specifications

Guidehouse tested the 23 CBLs listed in Table A-1. These included CBLs split across two categories:

- **X-of-Y day CBLs**. In this case the baseline is delivered by the average event window demand on the X days in which that demand was highest within a Y-day window preceding the event; and,
- **X-of-Y days of the same day-of-week CBLs.** In this case, the baseline delivered by the average event window demand on the X number of prior days in which demand was highest within the Y number of days that fall on the same day of the week as the event.

Only non-event days may qualify for inclusion in the baseline. A day may qualify for inclusion in the baseline if and only if it is a non-holiday, non-event weekday.

[13] Aggregation of metrics will explicitly account for customer loads to ensure that the baseline selected is the one that is most accurate for the program overall.

Qualifying non-event days are eligible for inclusion in the look-back window (the period of Y days) in the baseline only if the participant's average demand during the event period on that day is 50 percent or more of the average demand across all Y days.

Days that fail to meet the eligibility criteria (i.e., days where the average demand during the event window are less than half of the average demand in that window across the Y days of the look-back period) are replaced by next most proximate preceding qualifying and eligible day. If there are not three qualifying days out of the ten non-excluded days preceding the event, the algorithm reverts to using the three most-immediate non-excluded days prior to the event.

Table A-1. CBLs to be Tested

CBL Number	CBL
1	2-of-2
2	2-of-3
3	3-of-3
4	2-of-4
5	3-of-4
6	4-of-4
7	3-of-5
8	4-of-5
9	5-of-5
10	3-of-6
11	4-of-6
12	5-of-6
13	6-of-6
14	4-of-7
15	5-of-7
16	6-of-7
17	7-of-7
18	2-of-2 of same day-of-week
19	2-of-3 of same day-of-week
20	3-of-3 of same day-of-week
21	2-of-4 of same day-of-week
22	3-of-4 of same day-of-week
23	4-of-4 of same day-of-week

Source: Guidehouse

A.1.3 Regression Based Baselines

All regression specifications discussed below are variants of a core model that accounts for a base set of demand patterns. The base, or core, model specification of the regression model is presented below in Equation A-1.

Equation A-1. Core Regression Model

$$y_t = \sum_{i=1}^{96} \beta_{1,i} qhour_{t,i} + \sum_{i=1}^{96} \beta_{2,i} qhour_{t,i} DQH_t + \sum_{d=1}^{D} \gamma_d C_{t,d} + \epsilon_t$$

Where:

$\beta_{1,i}$ = Intercept term that represents the quarter-hourly average demand for each quarter-hour *i*.

$\beta_{2,i}$ = Regression-estimated impact of cooling (in Summer) or heating (in Winter) degree quarter-hours (base 65 degrees Fahrenheit) on average demand during quarter-hour *i*.

γ_d = Regression-estimated reduction in average quarter-hourly demand for each quarter-hour *d* in which a curtailment event took place.

y_t = The average demand (kW) observed at the given meter in the quarter-hour of sample *t*.

$qhour_{t,i}$ = A set of 96 dummy variables, one for each quarter-hour of the day. The given dummy takes a value of 1 when the quarter-hour of sample is the i-th quarter-hour of that day. For example: if quarter-hour t is between 00:00 and 00:15, $qhour_{t,i=1}$ is equal to one and zero otherwise.

DQH_t = The cooling (in Summer) or heating (in Winter) degree quarter-hours (base 65 degrees Fahrenheit) in quarter-hour of sample t. This variable accounts for the heating or cooling demand influences on energy consumption.

$C_{t,d}$ = A set of D dummy variables identifying each quarter-hour in which a curtailment event took place. Each event is given its own index – for example if there are two events of one hour each, quarter-hours across all events are indexed from 1 to 4. These variables capture the impact of curtailment.

ϵ_t = Error term at quarter-hour *t* that captures unexplained variation in demand.

Guidehouse also tested specifications that include the following additional variables.

$EMA6dh_t$ = An exponential moving average of DQH_t observed in the six-hour period leading up to, and including, hour *t*. This variable captures any effect of temperature in previous hours on the current hours demand (e.g., if it has been hot for a while, cooling demand may be higher)

$EMA24dh_t$ = Identical to $EMA6dh_t$, except for 24, instead of six hours. This variable captures any effects of temperature in previous hours on the current hours demand (e.g., if it has been hot for a while, cooling demand may be higher)

hbu_t or cbu_t = "Heat index build-up" (for Summer) or "cold build up" (for Winter) observed in quarter-hour of sample t. This variable captures the effect of heat or cold "build up" in previous hours on the current hours demand (e.g., if it has been hot and

humid for a while, cooling demand may be higher). This is a 72-hour geometrically decaying average of the NOAA-defined heat index[14] (for Summer) and of heating degree quarter-hours (for Winter). It is calculated in the following manner (note that t in this equation refers to hour):

$$hbu = \frac{\sum_{h=1}^{72} 0.96^{h} \cdot heatindex_{t-h}}{1000} \text{ or } cbu = \frac{\sum_{h=1}^{72} 0.96^{h} \cdot HDHH_{t-h}}{1000}$$

In total, Guidehouse tested seven different regression specifications: the core model and six models consisting of the core model with additional variables as listed in Table A-2. The HBU variable was used for the Summer season and the CBU variable was used for the Winter season.

Table A-2. Additional Variables Included in Regression Specifications Tested

Model	Var1	Var2	Var3
1	ema6dh		
2	ema24dh		
3	hbu or cbu		
4	hbu or cbu	ema6dh	
5	hbu or cbu	ema24dh	
6	hbu or cbu	ema6dh	ema24dh

Source: Guidehouse

A.1.4 Estimating Verified Impacts

Guidehouse estimated baseline demand using the best-performing baseline approach, then estimated verified impacts by comparing observed in-event demand to estimated baseline demand. Guidehouse estimated verified impacts for each event in the evaluation period, as well as the average across all events, for each customer and for all customers in aggregate (i.e., the program total).

[14] National Oceanic and Atmospheric Administration, National Weather Service – Weather Prediction Center, *The Heat Index Equation*, accessed April 2025. **http://www.wpc.ncep.noaa.gov/html/heatindex_equation.shtml**. There are additional adjustments that are applied within certain temperature and humidity ranges.

Appendix B. Impact Output Summary Workbook

Please see the accompanying workbook for Appendix B.

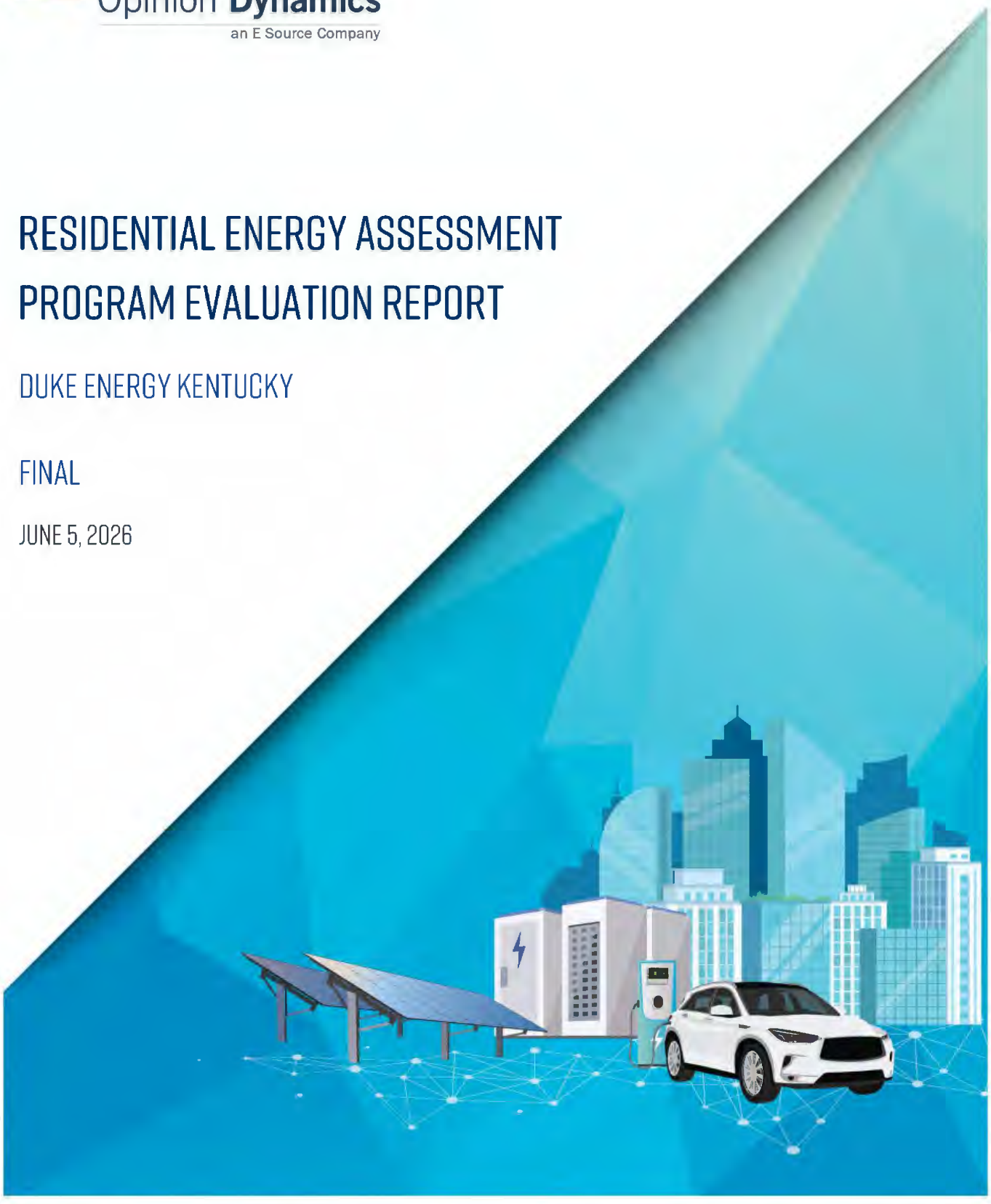
Opinion Dynamics
an E Source Company

RESIDENTIAL ENERGY ASSESSMENT PROGRAM EVALUATION REPORT

DUKE ENERGY KENTUCKY

FINAL

JUNE 5, 2026



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1. EXECUTIVE SUMMARY

1.1 PROGRAM SUMMARY

The Duke Energy Kentucky (DEK) Residential Energy Assessments (REA) Program provides residential customers with an energy audit report, a free energy efficiency starter kit, and the option to purchase additional discounted energy savings measures. Following a home assessment by an energy specialist (auditor), program participants receive an audit report that includes low- and no-cost energy savings recommendations and suggestions for higher-cost investments. Program participants also receive an energy efficiency starter kit. At the beginning of the evaluation period, the kit contained two candelabra LED bulbs, one low-flow showerhead, one kitchen faucet aerator, one bathroom faucet aerator, six outlet and switch gaskets, and weatherstripping. Outlet and switch gaskets were removed from the kit in July 2022, and LEDs were removed as of July 2023. The assessing auditor is responsible for installing all applicable kit measures free of charge. Auditors can also provide program participants with pipe wrap and additional bathroom faucet aerator(s) at no cost if the customer has an electric water heater. At the time of the assessment, participants can purchase additional energy-saving measures, including handheld low-flow showerheads, smart thermostats, and a blower door test, at a discounted price.[1] Specialty LEDs were also offered at a discount up until July 2023. The auditor must install additional no-cost and discounted measures during the audit.

The program targets owner-occupied, single-family residences with an electric water heater, electric heat, or central air conditioning that use 1,000 kWh or more per month. Our evaluation includes 1,271 households that participated in the program between January 1, 2022, and January 31, 2024 (the evaluation period).

1.2 EVALUATION OBJECTIVES

This evaluation included an analysis of gross and net impacts as well as an assessment of program processes.

1.2.1 IMPACT EVALUATION

The impact evaluation addressed the following key objectives:

- Estimate program energy (kWh) and summer and winter peak demand (kW) savings using consumption and engineering analyses
  - Conduct an update of deemed savings values, leveraging the 2024 Duke Energy Indiana (DEI) REA Program Evaluation
  - Review and update, as necessary, measure useful life assumptions
  - Assess spillover among program participants
- Develop DSMore inputs for the energy efficiency kit and additional measures (specialty LED bulbs, smart thermostats, handheld low-flow showerheads, bathroom faucet aerators, and pipe wrap)

To achieve these research objectives, Opinion Dynamics completed several data collection and analytic activities, including an interview with the program manager, a participant survey, an analysis of program tracking data, a

[1] Customers typically express interest in smart thermostats and/or blower door tests as part of the application process, so the program implementation team is aware that these measures will be provided during the energy audit.

consumption analysis, and an engineering analysis (including a deemed savings review). For this evaluation, measure-level in-service rates (ISRs) and free ridership (FR) values were carried over from the 2024 DEI REA Program Evaluation.[2] The participant survey conducted for this evaluation focused on participant spillover (PSO) and process evaluation questions.

1.2.2 PROCESS EVALUATION

The process evaluation addressed the following research questions:

- What proportion of participants install additional measures available through the program but not provided in the starter kit?
- Were participants able to easily schedule an energy audit upon expressing interest in the program? How much time passed between the participants' initial outreach to the program and the completion of the energy audit?
- Do participants find the assessment recommendations valuable and actionable?
- How satisfied are customers with the participation process and program measures?
- What are the challenges associated with program participation?
- What are the most successful components of the program? What improvements can be made to the program's design and implementation?
- Does the REA Program inform eligible customers of other energy-saving opportunities, and are they channeled into other Duke Energy programs?

1.3 KEY FINDINGS

1.3.1 IMPACT FINDINGS

Table 1 presents the savings results of our impact analysis on a per-household basis and for the program overall. We estimate that participants realized an average of 629 kWh of net savings per year. Overall, the program generated 799,207 kWh of energy savings, 162 kW of summer coincident demand savings, and 190 kW of winter coincident demand savings during the evaluation period. Results reflect all savings attributable to the program, including savings from the starter kit and additional free and discounted measures, as well as PSO savings from additional installed equipment and behavioral changes based on the assessment recommendations.

Table 1. Per Household and Program Energy and Demand Savings

Per Participant Savings			Program Savings		
Energy (kWh)	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)	Energy (kWh)	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)
629	0.1281	0.1497	799,207	162.86	190.31

Table 2 presents the gross program and per household impacts for the kits, additional free measures, and discounted measures. Savings associated with kit measures account for over two-thirds of the program savings (68%), followed by

[2] Opinion Dynamics. Duke Energy Indiana Residential Energy Assessment Program. Evaluation Period: July 1, 2021 – December 31, 2022. Evaluation Report dated March 8, 2025.

free measures (25%), and additional discounted measures (7%). Based on the engineering analysis, the average annual gross energy savings per participating household is 292 kWh (including savings from program-provided measures only).

Table 2. Ex Post Gross Impact Results from Engineering Analysis

Measure	Energy Savings (kWh)	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)
Program Savings			
Kit Measures	252,820	59.14	69.93
Additional Free Measures	90,855	11.30	12.36
Additional Discounted Measures	27,068	5.11	5.99
Total Program Savings	**370,743**	**75.55**	**88.28**
Per Household Savings			
Kit Measures	198.91	0.0465	0.0550
Additional Free Measures	71.48	0.0089	0.0097
Additional Discounted Measures	21.30	0.0040	0.0047
Total per Household Savings	**291.69**	**0.0594**	**0.0695**

Note: Individual values may not sum to totals due to independent rounding.

For this evaluation, measure-level FR values were carried over from the 2024 DEI REA Program Evaluation, while PSO was estimated based on responses to the DEK participant survey. We found a high PSO rate of 85%, driven primarily by duct sealing and insulation measures. This high spillover rate demonstrates the effectiveness of the program's comprehensive energy assessment in motivating participants to implement additional efficiency measures, without program incentives, beyond those directly provided by the program. When combined with the FR values, the net-to-gross ratios (NTGRs) for all measures exceed 100%. Table 3 presents the NTGR results.

Table 3. Measure-Level FR, PSO, and NTGR Results

NTGR Component	Sample Size (n)	FR	PSO	NTGR
LEDs	116	57.1%	84.8%	127.8%
Faucet Aerator	120	12.2%		172.7%
Showerhead	85	19.6%		165.3%
Weatherstripping	118	34.5%		150.3%
Water Heater Pipe Wrap	42	10.1%		174.7%
Smart Thermostat (Gas or Electric Heat)	27	24.9%		160.0%
Outlet and Switch Gasket	N/A	17.0%		167.8%

Note: FR scores are carried over from the 2024 DEI Evaluation.

When we apply the measure-level NTGRs to ex post gross impacts, we arrive at engineering analysis-based ex post net impact results. During the evaluation period, the REA Program generated 594,376 kWh of net energy savings, 121kW of summer coincident demand savings, and 145 kW of winter coincident demand savings (Table 4). Annual net energy savings per household are 468 kWh.

Table 4. Net Impact Results from Engineering Analysis

Measure	Weighted NTGR	kWh	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)
Program Savings				
Kit Measures	156.7%	396,121	93.26	113.99
Additional Free Measures	174.7%	158,694	19.71	21.55
Additional Discounted Measures	146.2%	39,561	7.91	9.13
Total Program Savings	**160.3%**	**594,376**	**120.88**	**144.66**
Per Household Savings				
Kit Measures	156.7%	311.66	0.0734	0.0897
Additional Free Measures	174.7%	124.86	0.0155	0.0170
Additional Discounted Measures	146.2%	31.13	0.0062	0.0072
Total per Household Savings	**160.3%**	**467.64**	**0.0951**	**0.1138**

Note: Individual values may not sum to totals due to independent rounding.

1.3.2 PROCESS FINDINGS

The following are key findings from the process analysis.

- **Program Satisfaction and Perception**
  - Overall, participants reported moderate satisfaction with the REA Program (an average rating of 7.5 on a 0 to 10 scale) and high satisfaction with the auditor professionalism (8.7) and assessment completion time (8.5).
  - More than half of respondents (56%) had a more favorable view of Duke Energy following program participation, while 8% felt less favorable and just over a third (35%) felt about the same.
  - Some participants expressed concerns about assessment quality, with 21% of respondents indicating the energy assessment was not helpful or specific enough to their homes. Additionally, some participants felt auditors rushed through assessments without taking adequate time for proper recommendations, and a few did not recall receiving assessment reports.
- **Program Recommendations and Participant Action**
  - Program recommendations are highly effective in driving participant behavior, with 75% of respondents recalling receiving recommendations and 100% of those acting on at least one recommendation.
  - Nearly all participants (94%) who recalled receiving recommendations also recalled auditors explaining those recommendations and associated savings, indicating strong communication during assessments.
  - Low-cost actions such as turning off lights, performing cold water washes, and furnace filter maintenance were completed most often, while high-cost measures like insulation installation and HVAC system replacement had lower completion rates.
- **Discounted Measures**
  - Although few participants received discounted measures (9%), most non-recipients (70%) were aware these measures were offered, suggesting awareness is not the primary barrier.
  - The primary barrier is lack of need rather than cost, with 43% of aware non-recipients reporting they already owned the discounted products. In addition, 23% stated the measures were not offered to them, and 17% cited cost as too expensive, even with the discount.

- **Cross-Program Awareness and Participation**
  - Nearly half (44%) of respondents recalled receiving information about other Duke Energy programs, with the Home Energy Report being most recognized (75%), followed by Smart $aver (56%) and Usage Alerts (50%).
  - Cross-program participation data found that only 14% of respondents participated in another Duke Energy program, most commonly Smart $aver, after REA participation. This indicates an opportunity to strengthen program channeling strategies and leverage the positive REA experience to drive participation in other offerings.

1.4 EVALUATION RECOMMENDATIONS

Based on our evaluation activities, we present the following recommendations for Duke Energy's consideration.

- **Enhance Assessment Impact:** Maximize the energy assessment experience as the core program offering, focusing primarily on audit quality and effectiveness as well as strengthening cross-program channeling. The evaluation found that recommendations are highly effective, as all participants who recalled receiving them acted on at least one. Duke Energy should strengthen protocols to ensure auditors consistently identify and communicate the most impactful energy-saving opportunities, enhance follow-up support and guidance for implementing higher-cost recommendations, and improve systematic channeling of participants to relevant complementary Duke Energy programs. With only 44% of participants recalling receiving information about other Duke Energy programs and just 14% participating in other programs, there is an opportunity to enhance auditor training that addresses both comprehensive assessment techniques and cross-program promotion. This integrated approach to auditor development, combined with structured follow-up communications, could substantially improve both participant outcomes and program channeling effectiveness.
- **Expand Discount Strategy:** Discounted measure uptake remained low (9%) primarily because non-recipients were either not aware of discounted measures or were aware but already owned the offered products (30% each of non-recipients). Interviewed non-recipients who were aware of the discounted measures also reported that the products were not offered to them (16% of non-recipients), or that the products were too expensive or unwanted (12% each of non-recipients). The program should ensure that all REA participants are aware of the available discounted measures and explore the feasibility of adding new products, based on observations of opportunities during the home assessment.

2. PROGRAM DESCRIPTION

The Duke Energy Kentucky (DEK) Residential Energy Assessments (REA) Program provides residential customers with an energy audit report, a free energy efficiency starter kit, and the option to purchase additional discounted energy savings measures. Following a home assessment by an energy specialist (auditor), program participants receive an audit report that includes low- and no-cost energy savings recommendations and suggestions for higher-cost investments. Program participants also receive an energy efficiency starter kit. At the beginning of the evaluation period, the kit contained two candelabra LED bulbs, one low-flow showerhead, one kitchen faucet aerator, one bathroom faucet aerator, six outlet and switch gaskets, and weatherstripping. Outlet and switch gaskets were removed from the kit in July 2022, and LEDs were removed as of July 2023. The assessing auditor is responsible for installing all applicable kit measures free of charge. Auditors can also provide program participants with pipe wrap and additional bathroom faucet aerator(s) at no cost if the customer has an electric water heater. At the time of the assessment, participants can purchase additional energy-saving measures, including handheld low-flow showerheads, smart thermostats, and a blower door test, at a discounted price.[3] Specialty LEDs were also offered at a discount up until July 2023. The auditor must install additional no-cost and discounted measures during the audit.

The program targets owner-occupied, single-family residences with an electric water heater, electric heat, or central air conditioning that use 1,000 kWh or more per month. Our evaluation includes 1,271 households that participated in the program between January 1, 2022, and January 31, 2024 (the evaluation period).

2.1 PROGRAM DESIGN

The program targets owner-occupied, single-family residences with an electric water heater and/or electric heat or central air conditioning. The REA Program has three main components.

- The first component is the home energy assessment, branded to customers as the "Home Energy House Call." During the assessment, auditors enter participants' homes to inspect and assess energy-using equipment, including their heating and cooling equipment and the state of duct and home insulation. Auditors also look for places where customers could improve equipment (e.g., replacing older appliances) or adjust how they use their current equipment (e.g., adjusting the setting for their furnace fan or using window shades in the summer). These recommendations are meant to steer customers toward home improvements that will help them save energy.
- The second component is an energy efficiency starter kit that, at the beginning of the evaluation period, contained two candelabra LEDs, an efficient showerhead, one kitchen faucet aerator, one bathroom faucet aerator, and six outlets and switch gaskets. In addition to the kit, participants can receive additional bathroom faucet aerators and a 17-foot roll of weatherstripping that the auditor is tasked with installing free of charge, where applicable. The starter kit has undergone several changes over time:
  - Outlet and switch gaskets were removed from the kit in July 2022.
  - The two candelabra LEDs were removed from the kit in July 2023.
  - Going forward, Duke will adopt an à la carte approach to kit measures, where measures will only be provided if needed and no measures will be left behind for later installation.

[3] Customers typically express interest in smart thermostats and/or blower door tests as part of the application process, so the program implementation team is aware that these measures will be provided during the energy audit.

- The third component is the option to purchase certain energy-efficient measures at a discount and have them installed. Discounted measures include handheld efficient showerheads and smart thermostats. Specialty LED bulbs (globe, candelabra, and recessed lighting) were provided at a discounted price until July 2023.

Duke Energy relies on a variety of marketing channels to inform customers about the REA Program. In addition to direct mailings and emails, Duke Energy provides bill inserts, social media promotion, and cross-promotion through other Duke Energy programs, such as the Home Energy Report.

2.2 PROGRAM PERFORMANCE

During the evaluation period, January 1, 2022, to January 31, 2024, the program served 1,271 unique households. Based on the impact analysis, the program achieved average annual energy savings of 628.8 kWh per household and 0.125 kW and 0.150 kW of net summer and winter coincident demand savings, respectively.

3. OVERVIEW OF EVALUATION ACTIVITIES

3.1 PROGRAM STAFF INTERVIEWS

In February 2025, we conducted an in-depth interview with the REA Program manager. The purpose of the interview was to gauge the current environment of, and expectations for, the REA Program, including the program's goals, successes, and challenges during the evaluation period.

3.2 PARTICIPANT SURVEY

In May 2025, Opinion Dynamics conducted a web survey with REA participants. The survey gathered data to examine program spillover and to support our process evaluation. During the evaluation period, 1,271 customers participated in the program. However, 552 participants from 2022 were excluded from the sample due to the significant time lapse between their participation and this evaluation and 132 participants were excluded because of invalid or missing email addresses. We sent an email invitation to complete the survey to the remaining 587 participants. A total of 48 participants completed the web survey.

All respondents were asked PSO, process, and household characteristic questions. The average survey length was approximately 14 minutes; the response rate was 8.6%. Table 5 contains a summary of the sample and survey completes.

Table 5. Participant Population and Sample Summary

Program Measure Category	Population	Sample Frame		Completes	
	Number in Population (N)	Number of Participants	Percent of Population	Number of Participants (n)	Percent of Population
Participant Count	1,271	587	46%	48	4%

3.3 CONSUMPTION ANALYSIS

Opinion Dynamics conducted a consumption analysis using advanced metering infrastructure (AMI) data to determine ex post energy savings of participating households. The evaluation team utilized a linear two-way fixed effects difference-in-differences regression model with future participants as the comparison group. The model incorporates account-specific and time-specific fixed effects to control for unobserved household and time-period-specific differences in electricity consumption.

3.4 ENGINEERING ANALYSIS

The engineering analysis consisted of three components:

- **Application of measure-specific ISRs**: We applied measure-specific ISRs from the 2024 DEI REA Program Evaluation. ISRs were not re-developed for this evaluation as the number of participants that could be included in the survey was too small to achieve enough completed responses to conduct this measure-level analysis. Given that program design and implementation remained consistent between the DEI and DEK territories, the DEI estimates provide a reasonable proxy for DEK participants.

- **Update of deemed savings values**: We leveraged the 2024 DEI REA Program Evaluation's deemed savings review and customized the ex post inputs with DEK program tracking and survey data where possible. This approach allowed us to develop DEK-specific per-unit kWh and kW savings for all REA measures. We also updated the Technical Reference Manual (TRM) assumptions to align with the Illinois TRM V13.0 or Indiana TRM V1.0. Additionally, we reviewed useful life assumptions for program measures and updated them, as necessary.
- **Calculation of program-level savings:** We calculated program-level savings by applying ISRs and ex post deemed savings values to the measure quantities tracked in the program tracking database.

3.5 NET-TO-GROSS ANALYSIS

Our NTG analysis includes consideration of measure-level FR and program-level PSO. FR estimates for this evaluation were carried over from the 2024 DEI REA Program Evaluation, while PSO was calculated based on responses to the participant survey.

4. IMPACT EVALUATION

4.1 IMPACT METHODOLOGY

The impact analysis included a consumption analysis as well as an engineering analysis. The consumption analysis estimates the net evaluated energy (kWh) impacts for the program. The engineering analysis supplemented the consumption analysis by providing (1) kW-to-kWh savings ratios, which we applied to the consumption analysis energy savings to estimate summer and winter demand savings, and (2) insights into the relative contribution of each measure to overall savings.

4.1.1 CONSUMPTION ANALYSIS

Opinion Dynamics conducted a consumption analysis using AMI data to determine the overall ex post program energy savings. Consumption analysis is a statistical analysis of energy consumption recorded in utility interval data. Because interval data reflects whole-building energy use, the method is well-suited for studying the combined impact of the REA Program's mix of energy efficiency measures (and any behavioral changes) per home. Program savings are estimated as a difference-in-differences by comparing participants' daily electricity consumption in the pre- and post-program periods to a comparison group's electricity consumption during those periods.

DATA CLEANING AND PREPARATION

Prior to specifying the models, we thoroughly cleaned the consumption and participation data. We checked data for gaps and inconsistencies as well as for sufficiency. Among other checks, we performed the following key checks:

- Confirmed that the REA participants participated in the program between January 1, 2022, and January 31, 2024, defined as the evaluation period. These participants are referred to as the "ever-treated" participants.
- Ensured that all participants in the analysis sample have at least nine months of pre-participation and post-participation data.
- Ensured that the consumption data was free of outliers, defined as exceeding five standard deviations from the mean for each account and the entire dataset.
- Identified and removed accounts with extreme changes in electricity consumption between pre- and post-intervention (increase or decrease greater than 75%).

COMPARISON GROUP SELECTION

Incorporating a comparison group into the consumption analysis allows evaluators to control for changes in economic conditions and other non-program factors that might affect energy use during the evaluation period. Like many other energy efficiency programs, the REA Program was not designed or implemented as a randomized experiment. As such, we leveraged a quasi-experimental approach to the evaluation by developing a comparison group of participants. There are multiple approaches to selecting a comparison group, including the use of future participants, past participants, or similar non-participants. When possible, it is preferable to use future program participants as a comparison group. Using future participants—presumed to be most similar to the evaluated participants—as the comparison group allows us to effectively control for self-selection biases.

For this evaluation, we used two types of future participants:

- Future participants who received treatment during the evaluation period from January 1, 2022, to January 31, 2024. These customers serve as comparison group customers before they receive treatment and treatment group customers after receiving treatment.
- Future participants who did not receive treatment during the evaluation period. These participants, referred to as "never-treated" participants, participated in the REA Program between February 1, 2024, and January 31, 2025 (i.e., following the evaluation period), and served as comparison customers for the whole treatment period.

We performed equivalency checks to assess the similarity of "ever-treated" participants and "never-treated" participants in terms of energy consumption and weather during the common pre-period (January 1, 2021, to December 31, 2021) to ensure the comparison group could provide a valid baseline. We also estimated event study models to assess the validity of the future participants in the context of staggered two-way fixed effects (TWFE) Difference-in-Differences (D-in-D) regression.[4] These models estimate impacts before and after the start of treatment and test for trend differences in consumption before the start of treatment that would suggest future participants do not provide a valid baseline.

PROGRAM CROSS-PARTICIPATION

Some customers participated in other Duke Energy programs immediately after participating in the REA Program. Including those customers in the consumption analysis would result in double-counting of savings from other programs. To obtain the most accurate estimate of the effects of the REA Program, we dropped customers who cross-participated in other Duke Energy programs—including Smart $aver, Marketplace Smart Thermostats, and Income Qualified Weatherization, among others—from the model. This approach avoids double-counting savings across programs but may underestimate the REA Program's influence in cases where participants acted on assessment recommendations by enrolling in other Duke Energy programs to implement those measures.

MODELING

We used a linear TWFE D-in-D model to estimate program savings. This is the industry-standard specification for estimating energy impacts for efficiency programs where the start of treatment varies between participants. The dependent variable is a customer's daily electricity consumption. The model compares participants to future participants during the evaluation period, as well as never-treated future participants (who are treated after the evaluation period ends), while controlling for weather, differences in average consumption between participants (using participant fixed effects), and differences in average consumption over time unrelated to weather (using date-of-sample fixed effects).

Appendix A contains a detailed discussion of the consumption analysis methodology, including data cleaning steps, comparison group selection, and assessment of equivalency, the modeling process, and the final model specification and outputs.

4.1.2 ENGINEERING ANALYSIS

The engineering analysis consisted of three distinct steps: (1) development of ISRs, (2) review and update of per-unit deemed savings values for program measures, and (3) application of ISRs and deemed savings values to quantities in the program tracking data to calculate total energy and demand savings.

[4] The two-way fixed-effect D-in-D regression model is the standard approach for estimating energy impacts when the timing of intervention varies between participants. "Two-way" refers to the inclusion of customer and time-period fixed effects in the model.

MEASURE VERIFICATION

This evaluation leveraged ISR values from the 2024 DEI REA Program Evaluation rather than conducting new primary data collection. This approach was necessary due to small annual participation numbers and appropriate given the consistent program design and implementation across Duke Energy territories. The DEI evaluation included comprehensive measure verification through a participant survey, resulting in measure-level ISR estimates. We used the ISRs presented in Table 6 in this evaluation.

Table 6. Measure-Level ISRs

Measure	In-Service Rate
Starter Kit	
Candelabra LED	70%
Kitchen Faucet Aerator	61%
Bathroom Aerator	55%
Wall Mount Showerhead	49%
Weatherstripping	72%
Additional Free Measures	
Water Heater Pipe Wrap	100%
Bathroom Aerator	57%
Additional Discounted Measures	
Specialty Candelabra LED	98%
Specialty Globe LED	84%
Specialty Recessed LED	59%
Handheld Showerhead	100%
Smart Thermostat (Gas or Electric Heat)	88%

DEEMED SAVINGS REVIEW

This evaluation included an update of deemed savings values, building upon the comprehensive deemed savings review completed for the 2024 DEI REA Program Evaluation. We reviewed the ex post inputs from that evaluation and customized them with DEK program tracking and survey data, where possible, to develop DEK-specific per-unit kWh and kW savings for all REA measures. We also updated the TRM assumptions. We leveraged the following sources in our review:

- **Program tracking data:** We used program tracking data, which is the most reliable and evaluation-specific source of information, to update household characteristics such as the percentage of homes with electric heat, central cooling, electric water heating, and other details about each participant's home.
- **Participant survey data:** Where not available from program tracking data, we used survey data to update household characteristics, such as the number of people per household. Survey data are specific to the program's participants and, therefore, preferable as a source over deemed assumptions from TRMs.
- **TRM assumptions:** We updated TRM assumptions to align with the Illinois TRM V13.0 or Indiana TRM V1.0, representing the most current available technical reference materials.

Where measure savings vary based on the presence of electric heating equipment, electric water heating equipment, or central cooling equipment, the deemed values represent the weighted average of savings realized by participants with different equipment types based on the program tracking database or survey responses. For example, natural gas water

heating participants do not realize any electric savings from water savings measures (faucet aerators, efficient showerheads, and pipe wrap). As such, the deemed savings values for these measures incorporate zero electric savings for the share of participants who received those measures but do not have electric water heating.

TOTAL GROSS ENGINEERING SAVINGS

We developed total program gross engineering savings by applying the measure-specific ISRs and ex post deemed values to the measure quantities provided in the program tracking database, using Equation 1:

Equation 1. Total Program Gross Savings Formula

$$Sav = \sum_{i=1}^{n} Q_{dbi} \times ISR_i \times EST_i$$

Where:

i	=	Program measures 1…n, where n = number of program measures
Sav	=	Total program savings
Q_{dbi}	=	Database quantity of measure i
ISR_i	=	In-service rate for measure i
EST_i	=	Per unit deemed savings estimate for measure i (kWh or kW)

We calculated per-household savings by dividing total program savings by the number of participating households.

4.2 IMPACT RESULTS

The following subsections provide detailed results from the consumption and engineering analyses.

4.2.1 CONSUMPTION ANALYSIS

This section reports estimates of the REA Program's average daily savings per participant from the meter consumption analysis. Our analysis estimates the savings from the kit and additional free and discounted measures as well as participant spillover and savings from any behavioral changes made following REA participation. We use these estimates to develop the annual program savings.

Table 7 summarizes final model results and presents key model fit statistics. The model demonstrates statistically significant energy savings from program participation (1.72 kWh, $p < 0.05$), indicating that participants consumed significantly less energy than non-participants.

Table 7. Summary of Modeling Results

Input	Result
Average Daily Savings Estimate (kWh)	1.72
Average Daily Modeled Baseline (kWh)	39.13
Standard Error	0.31
t-statistic	5.4
P>[t]	0.00
90% Confidence Interval – Lower Bound (kWh)	1.20
90% Confidence Interval – Upper Bound (kWh)	2.24
Adjusted R-Squared	0.63
Total Modeled Participants	1,482
Total Modeled Observations	2,096,036

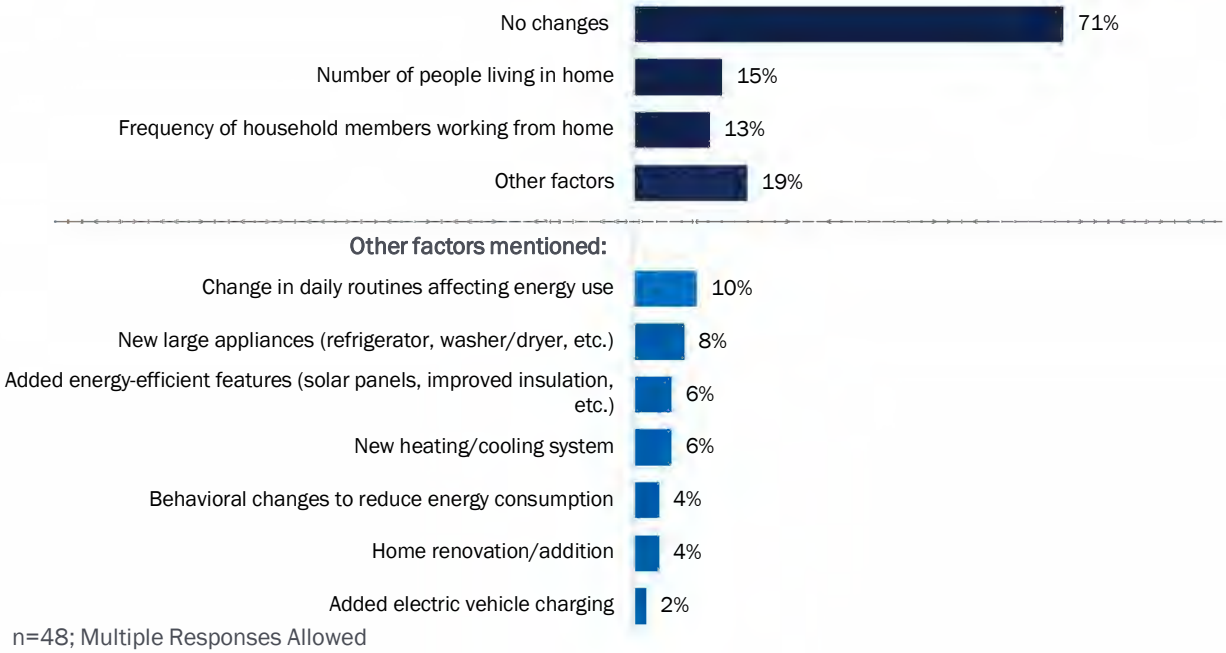
Table 8 shows the annual savings estimate with associated confidence bounds. The average annual per-household energy savings for REA participants was 629 kWh, or 4.4% of baseline consumption.

Table 8. Estimate of Average Annual Savings Per REA Participant

Modeled Treatment Participants	Average Annual Baseline Energy Consumption per Participant (kWh)	Average Per Participant Ex Post Net Annual Savings (kWh)	Average Per Participant Savings Percentage	90% Confidence Interval	
				Lower	Upper
1,025	14,282	628.80	4.4%	440 (3.0%)	818 (5.7%)

To provide context for interpreting consumption analysis results, the participant survey collected information about household changes since 2022 that might have affected energy usage independent of program participation. The majority of participants (71%) reported no household changes – supporting the validity of the consumption analysis results and indicating that measured energy savings are primarily attributable to program participation – while 15% reported household size changes, 13% reported work-from-home frequency changes, and 19% reported changes in other energy-affecting factors. The most common other factors included changes in daily routines (10%), followed by the purchase of new large appliances (8%; see Figure 1). The relatively low incidence of household changes that would increase energy consumption supports the robustness of the consumption analysis results.

Figure 1. Factors that Affect Home Energy Usage



n=48; Multiple Responses Allowed

Based on the consumption analysis results and the coincident peak demand kW-to-consumption kWh ratio from the engineering analysis discussed in Section 4.2.3, we developed the average per participant demand savings. We then multiplied the per participant savings by the total number of participants to develop program-level energy and demand savings (Table 9).

Table 9. Impact Results from Consumption Analysis

Participant Savings			Program Savings		
Energy (kWh)	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)	Energy (kWh)	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)
628.80	0.1281	0.1497	799,207	162.86	190.31

4.2.2 ENGINEERING ANALYSIS

EX POST DEEMED SAVINGS ESTIMATES

Table 10 provides the estimated gross per-unit energy and demand savings for all measures installed through the program. The values in the table below represent the DEK-specific deemed values developed through the deemed savings update, which leveraged the 2024 DEI REA Program Evaluation and incorporated DEK program tracking and survey data as well as updates to TRM assumptions.

Table 10. Ex Post Deemed Energy Savings and Peak Demand Reduction Values (Exclusive of ISRs)

Measure	EUL	Per Unit Energy Savings (kWh)	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)
Kit Measures				
Candelabra LED	2	20.94	0.0015	0.0026
Kitchen Aerator	10	72.67	0.0140	0.0280
Bathroom Aerator	10	7.12	0.0098	0.0196
Wall Mount Showerhead	10	83.77	0.0085	0.0171
Weatherstripping	20	124.98	0.0376	0.0225
Outlet and Switch Gasket	20	0.80	0.0001	0.0003
Free Additional Measures				
Water Heater Pipe Wrap (per one linear foot)	12	46.67	0.0053	0.0053
Bathroom Aerator	10	16.33	0.0225	0.0449
Discounted Measures				
Specialty Candelabra LED	2	20.94	0.0015	0.0026
Specialty Globe LED	2	35.60	0.0026	0.0044
Specialty Recessed LED	2	46.07	0.0033	0.0057
Handheld Showerhead	10	181.38	0.0185	0.0369
Smart Thermostat – Electric Heat	11	577.37	0.0678	0.3360
Smart Thermostat – Gas Heat	11	130.57	0.0678	0.0000

TOTAL PROGRAM SAVINGS

The evaluation team calculated total program savings by applying the deemed savings values and ISRs summarized above to measure quantities tracked in the program database. Table 11 presents total gross program energy and demand savings by measure for the evaluation period. Based on the engineering analysis, the average gross annual savings per participating household is 292 kWh. The table shows that the starter kit accounted for approximately 68% of program savings (199 kWh per household), while free and discounted measures accounted for 25% and 7%, respectively.

Table 11. Engineering Analysis Gross Impact Results (Inclusive of ISRs)

Measure	Quantity Provided	kWh	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)
Kit Measures				
Candelabra LED	1,680	24,606	1.76	3.06
Kitchen Aerator	1,271	56,415	10.87	21.74
Bathroom Aerator	1,271	4,959	6.83	13.65
Wall Mount Showerhead	1,271	51,784	5.25	10.57
Weatherstripping	1,271	113,994	34.30	20.52
Outlet and Switch Gasket	2,358	1,061	0.13	0.40
Subtotal Kit Measures		**252,820**	**59.14**	**69.93**
Per Household Kit Measures		**198.91**	**0.0465**	**0.0550**
Free Additional Measures				
Water Heater Pipe Wrap (per one linear foot)	1,930	90,081	10.23	10.23
Bathroom Aerator	83	775	1.07	2.13
Subtotal Additional Free Measures		**90,855**	**11.30**	**12.36**
Per Household Additional Free Measures		**71.48**	**0.0089**	**0.0097**
Discounted Measures				
Specialty Candelabra LED	90	1,318	0.09	0.16
Specialty Globe LED	194	5,805	0.42	0.72
Specialty Recessed LED	177	4,777	0.34	0.59
Handheld Showerhead	10	1,814	0.19	0.37
Smart Thermostat – Electric Heat	14	7,132	0.84	4.15
Smart Thermostat – Gas Heat	54	6,221	3.23	-
Subtotal Discounted Measures		**27,068**	**5.11**	**5.99**
Per Household Discounted Measures		**21.30**	**0.0040**	**0.0047**
Total for Evaluation Period		**370,743**	**75.55**	**88.28**
Per Household		**291.69**	**0.0594**	**0.0695**

Note: Individual values may not sum to totals due to independent rounding.

4.2.3 DEMAND-TO-ENERGY RATIOS

Using the estimated energy and demand savings from the engineering analysis (Table 11), we calculated overall kW-per-kWh savings ratios (Table 12). These ratios were used to derive the per-household demand savings values shown in Table 11. The average per-participant consumption analysis savings (629 kWh) was multiplied by the summer ratio (0.0002038) and winter ratio (0.0002381) to calculate the per-household summer coincident peak demand savings of 0.1281 kW and winter coincident peak demand savings of 0.1497 kW, respectively.

Table 12. Engineering Demand-to-Energy Ratios

Total Gross Energy Savings (kWh)	Summer Coincident Peak Savings (kW)	Winter Coincident Peak Savings (kW)	Summer Ratio Multiplier (Summer Demand /Energy Savings)	Winter Ratio Multiplier (Winter Demand /Energy Savings)
370,743	75.55	88.28	0.0002038	0.0002381

5. NET-TO-GROSS ANALYSIS

5.1 METHODOLOGY

Our NTG analysis includes consideration of measure-level FR and PSO. The NTGR is calculated as shown in Equation 2:

Equation 2. NTGR Formula

$$NTGR_{measure} = 1 - FR_{measure} + PSO$$

The NTGR represents the portion of the gross energy savings associated with a program-supported measure that would not have been realized in the absence of the program. In other words, the NTGR represents the share of verified savings attributable to the program.

To develop NTGRs for the various program measures, measure-level FR values were carried over from the 2024 DEI REA Program Evaluation, while a program-level PSO module was included in the participant survey. A detailed description of the FR methodology can be found in Appendix C of the DEI Residential Assessment Program Evaluation Report (March 28. 2025).

5.1.1 FREE-RIDERSHIP

Measure-level FR estimates for this evaluation were carried over from the 2024 DEI REA Program Evaluation. The methodology described below reflects the approach used in the DEI evaluation to develop the FR values applied in this study. Free riders are program participants who would have paid for an assessment or installed energy efficiency products independently without the program. FR scores represent the percentage of savings that would have been achieved in the absence of the program. Participants who reported that they **would not** have installed a measure without the program received a FR score of 0%, while participants who **would** have installed the measure without the program received a FR score of 100%. Partial FR scores were assigned to customers who had plans to install the measure, but the program had at least some influence over that decision, including in terms of timing (i.e., the program accelerated the installation) or quantity (i.e., the program led to the installation of additional measures).

The 2024 DEI REA Participant survey measured the following areas of program influence:

- **Influence on installation:** We asked participants about the likelihood that they would have installed each measure if they had not received it with the assessment.
- **Influence on timing:** We asked participants when they would have installed the measure on their own, whether that would have been around the same time, within six months, within a year, or longer.
- **Influence on quantity:** We asked participants whether they would have purchased the same quantity, more, or fewer on their own if they had not received them free through the program.

5.1.2 PARTICIPANT SPILLOVER

PSO represents energy savings from additional actions that resulted from program participation but did not receive program financial support and are not tracked in program databases. For this evaluation, we define PSO as savings from equipment or upgrades to participants' homes.

The participant survey included a series of questions to assess PSO among program participants. While PSO can result from a variety of measures, it is not possible to ask about all potential PSO measures in a survey due to the need to limit its length. Thus, we chose to focus on actions that participants would reasonably take following their program participation and would do so without additional program support. To qualify for program-induced PSO, we asked two main questions:

- Did the respondent make any additional improvements to reduce household energy consumption since participating in the program?
- If the respondent indicated having made additional improvements, how would they rate (on a scale from 0 to 10) the influence their experience with the program had on their decision to make these improvements?

We also asked respondents who gave a program influence score of seven or higher to explain how their program participation influenced their decision to make additional improvements. We attributed PSO to all respondents who gave a program influence score of seven or higher and whose follow-up explanation did not contradict program influence. These respondents were asked a series of follow-up questions to assess the efficiency of measures.

To develop the PSO rate, we estimated savings for each PSO measure using engineering algorithms and assumptions. We determined the PSO rate by dividing the sum of measure-level PSO savings by the evaluated gross savings achieved by the sample of participants who provided a valid response to the PSO questions (Equation 3).

Equation 3. Spillover Formula

$$Participant\ Spillover\ Rate = \frac{Participant\ Spillover\ Savings}{Evaluated\ Gross\ Savings\ in\ the\ Respondent\ Sample}$$

5.2 NET-TO-GROSS RESULTS

Table 13 summarizes the measure-level FR, PSO, and NTGR estimates for measures provided through the program. FR values were carried over from the 2024 DEI REA Program Evaluation, while PSO was estimated based on the DEK participant survey conducted for this evaluation. All measure NTGRs are greater than 100%.

Table 13. Measure-Level FR, PSO, and NTGR Results

NTGR Component	Sample Size (n)	FR	PSO	NTGR
LEDs	116	57.1%	84.8%	127.8%
Faucet Aerator	120	12.2%		172.7%
Showerhead	85	19.6%		165.3%
Weatherstripping	118	34.5%		150.3%
Water Heater Pipe Wrap	42	10.1%		174.7%
Smart Thermostat (Gas or Electric Heat)	27	24.9%		160.0%
Outlet and Switch Gasket	N/A	17.0%		167.8%

Note: FR scores are carried over from the 2024 DEI Evaluation.

Based on the individual component NTGRs, we developed a weighted average NTGR for all kit measures (156.7%). The weighted average is calculated by dividing the total kit net savings by the total kit gross savings.

The following subsections provide additional detail on the FR and PSO results.

5.2.1 FREE-RIDERSHIP

FR scores for this evaluation were carried over from the 2024 DEI REA Program Evaluation, which calculated measure-level FR based on participant survey responses. As shown in Table 14, FR is low (10%–35%) for all measures except for lighting (57%). This means that most of the verified gross savings would not have occurred without the program.

Table 14. FR Results

Measures	Sample Size (n)	FR Estimate [A]
LEDs	116	57.1%
Faucet Aerator	120	12.2%
Showerhead	85	19.6%
Weatherstripping	118	34.5%
Water Heater Pipe Wrap	42	10.1%
Smart Thermostat (Gas or Electric Heat)	27	24.9%
Outlet and Switch Gasket	N/A	17.0%

[A] FR scores are carried over from the 2024 DEI REA Program Evaluation.

5.2.2 PARTICIPANT SPILLOVER

Based on responses to the participant survey, 34% of participants (14 out of 41 respondents with valid responses) installed qualifying spillover measures influenced by their program participation. Table 15 summarizes reported PSO measure types, quantities, and estimated energy and demand savings.

The notably high spillover rate of 85% is primarily driven by duct sealing and insulation measures, which account for 56% of total spillover savings, followed by air source heat pump and central air conditioner upgrades, which account for 28% of savings. Ducts were included as a survey option for the first time in this evaluation, and all participants with duct-related spillover had received duct recommendations in their assessment reports or installed new HVAC systems (making duct sealing as a spillover action plausible). Without duct-related PSO, the rate would be approximately 38%, consistent with other program evaluations. This finding demonstrates the effectiveness of the REA Program's comprehensive energy assessment and recommendations in motivating participants to implement additional energy efficiency measures beyond those directly provided by the program.

Based on these findings, we estimated a program-level PSO rate of 85%, which is the quotient of the total spillover savings estimated for survey respondents (9,912 kWh) and the total ex post gross engineering savings of all survey respondents (11,684 kWh).

Table 15. Engineering Spillover Summary

Measure Type	Measure Quantity	Energy Savings (kWh)	Source of per Unit Savings
Duct Sealing + Insulation (HP)	2	3,245	Combination of DEK REA Deemed Savings Review (2025), IN TRM V2.2, and IL TRM V13.0
Air Source Heat Pump (TOS)	4	1,412	IN TRM V1.0
Duct Sealing (HP)	1	1,354	Combination of DEK REA Deemed Savings Review (2025), IN TRM V2.2, and IL TRM V13.0
Central Air Conditioner (TOS)	2	739	Combination of DEK REA Deemed Savings Review (2025) and IN TRM V1.0
Duct Sealing + Insulation (Clg w/ Gas Htg)	2	656	Combination of DEK REA Deemed Savings Review (2025), IN TRM V2.2, and IL TRM V13.0
ES Refrigerator	5	598	IN TRM V2.2
Room Air Conditioner	3	280	IN TRM V1.0
Duct Sealing (Clg w/ Gas Htg)	1	274	Combination of DEK REA Deemed Savings Review (2025), IN TRM V2.2, and IL TRM V13.0
Dryer	2	170	IL TRM V13.0
Clothes Washer (Gas WH)	2	157	IL TRM V13.0
Dishwasher (Gas WH)	2	154	IN TRM V1.0
Clothes Washer (Electric WH)	1	111	IL TRM V13.0
Freezer	3	100	IL TRM V13.0
Duct Insulation (Clg w/ Gas Htg)	1	54	Combination of DEK REA Deemed Savings Review (2025), IN TRM V2.2, and IL TRM V13.0
Outlet Gasket Seal (HP)	1	19	DEK REA Deemed Savings Review (2025)
Spillover Savings		**9,912**	
Ex Post Gross Program Savings		**11,684**	
Spillover %		**85%**	

5.3 NET IMPACT RESULTS

To determine net impacts, we multiplied the measure-level NTGRs (shown in Table 13) by the measure-level gross impact results (shown in Table 11). Table 16 shows estimated net energy and demand savings for each measure offered by the REA Program. Based on the engineering analysis, the average net savings per participating household is 468 kWh. The table shows that kit measures accounted for 67% of net savings (312 kWh per household), while free and discounted measures accounted for nearly 27% and 7%, respectively. Weatherstripping, kitchen aerators, and efficient showerheads accounted for the most savings among the kit measures.

Table 16. Engineering Analysis Net Impact Results

Measure	kWh	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)
Kit Measures			
Candelabra LED	31,436	2.25	3.90
Kitchen Aerator	97,409	18.77	37.53
Bathroom Aerator	8,563	11.78	23.57
Wall Mount Showerhead	85,579	8.68	17.47
Weatherstripping	171,354	51.55	30.85
Outlet and Switch Gasket	1,781	0.22	0.67
Subtotal Kit Measures	**396,121**	**90.79**	**114.26**
Per Household Kit Measures	**311.66**	**0.0734**	**0.0897**
Free Additional Measures			
Water Heater Pipe Wrap	157,356	17.87	17.87
Bathroom Aerator	1,337	1.84	3.68
Subtotal Additional Free Measures	**158,694**	**19.71**	**21.55**
Per Household Additional Free Measures	**124.86**	**0.0155**	**0.0170**
Discounted Measures			
Specialty Candelabra LED	1,684	0.12	0.21
Specialty Globe LED	7,417	0.54	0.92
Specialty Recessed LED	6,103	0.44	0.76
Handheld Showerhead	2,998	0.31	0.61
Smart Thermostat – Electric Heat	11,408	1.34	6.64
Smart Thermostat – Gas Heat	9,951	5.17	0.00
Subtotal Discounted Measures	**39,561**	**7.91**	**9.13**
Per Household Discounted Measures	**31.13**	**0.0062**	**0.0072**
Total for Evaluation Period	**594,376**	**120.88**	**144.66**
Per Household	**467.64**	**0.0951**	**0.1138**

Note: Due to rounding, (1) values in this table may not equal the product of values shown in Tables 11 and 13; and (2) individual values may not sum to subtotals and totals.

6. PROCESS ANALYSIS

As part of the evaluation, the evaluation team conducted a web survey to gather information from REA Program participants regarding their experience with the program. The web survey gathered information used to answer the following research questions:

- What proportion of participants install additional measures available through the program but not provided in the starter kit?
- Were participants able to easily schedule an energy audit upon expressing interest in the program? How much time passed between participants' initial outreach to the program and having the energy audit completed?
- Do participants find the assessment recommendations valuable and actionable?
- How satisfied are customers with the participation process and program measures?
- What are the challenges associated with program participation?
- What are the most successful components of the program? What improvements can be made to the program's design and implementation?
- Does the REA Program inform eligible customers of other energy-saving opportunities, and are they channeled into other Duke Energy programs?

This section details the findings from the participant survey.

6.1 PROGRAM PARTICIPATION

During the evaluation period (January 2022–January 2024), 1,271 unique households participated in the REA Program. Each participating household received one starter kit. In addition, close to one-third (29%) of participating households received one or more additional free or discounted measures: 271 households (21%) received additional free measures (19% pipe wrap and 4% bathroom aerators), while 119 households (9%) purchased discounted measures (4% specialty LEDs, 5% smart thermostats, and 1% handheld showerheads; see Table 17).

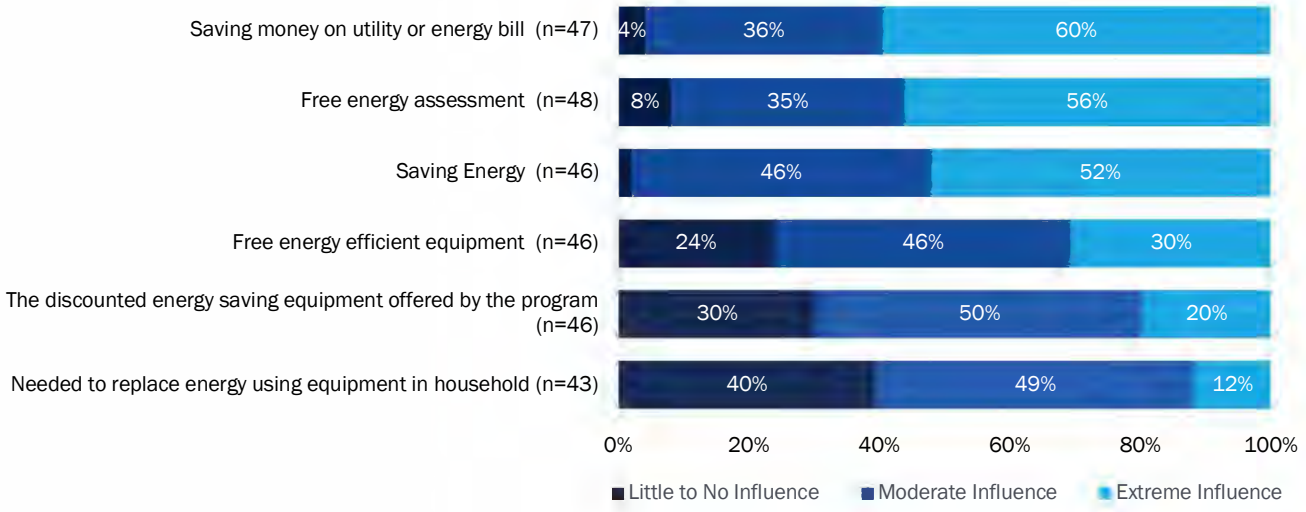
Table 17. Participants with Additional Free and Discounted Measures

Measure	Total	Percent
Any Additional Measure	**369**	**29%**
Any Additional Free Measure	**271**	**21%**
Water Heater Pipe Wrap	244	19%
Bathroom Aerator	51	4%
Any Additional Discounted Measure	**119**	**9%**
LEDs	51	4%
Specialty Globe LED	*21*	2%
Specialty Candelabra LED	*19*	1%
Specialty Recessed LED	*26*	2%
Smart Thermostat (Gas or Electric Heat)	66	5%
Handheld Showerhead	8	1%

6.2 DRIVERS AND BARRIERS TO PARTICIPATION

The top three drivers and most influential reasons for program participation are saving money on utility or energy bills (60%), the free energy assessment (56%), and saving energy (52%), as shown in Figure 2. Fewer participants were strongly influenced by the free or discounted equipment (30% and 20%, respectively). The results indicate that besides the cost and energy savings provided by the REA Program, the program's education strongly drives participation.

Figure 2. Drivers of Program Participation

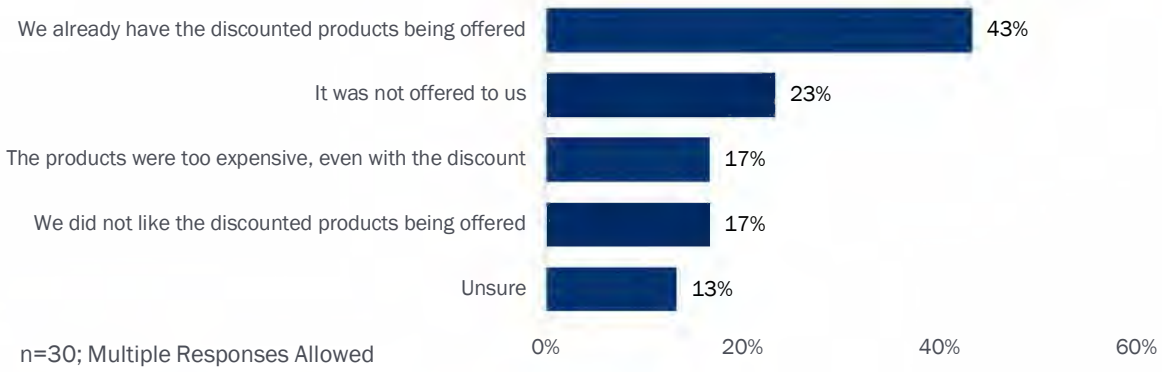


Note: Responses of "Unsure" were removed from the analysis.

Although few participants (9%) received discounted measures, most of those who did not (70%) reported being aware they were offered through the program. Participants were most commonly aware of discounted smart thermostats (67%), followed by handheld shower heads (49%). Fewer (12%) were aware that discounted blower door tests were available.

Respondents who were aware of the discounted measures but did not purchase any most often reported not doing so because they already have the discounted products being offered (43%) or because it was not offered to them (23%; Figure 3). Cost was only a barrier to 17% of aware non-recipients.

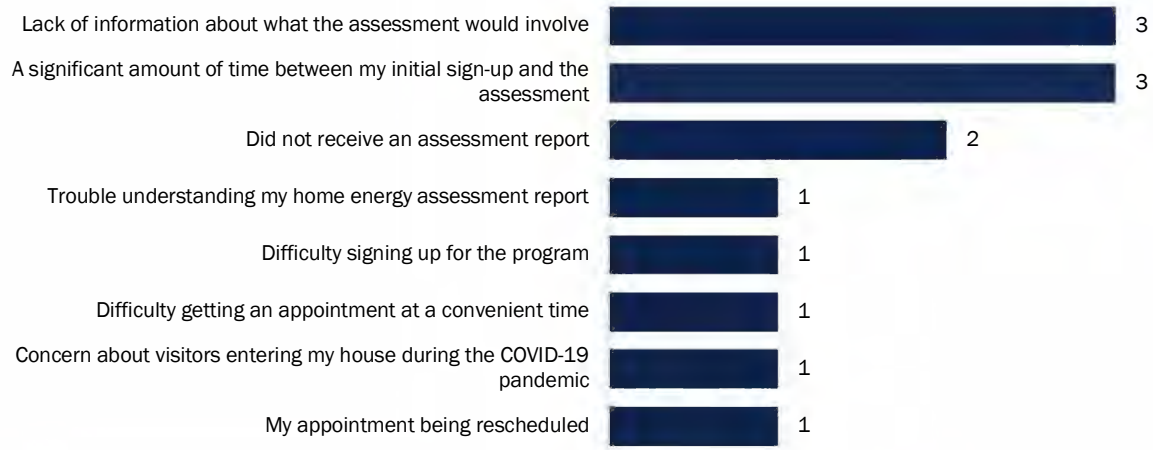
Figure 3. Reasons for Not Purchasing Discounted Equipment



6.3 PROGRAM PROCESS CHALLENGES

Respondents were asked about challenges with signing up, scheduling, and completing the assessment. The vast majority (77%) experienced no challenges, indicating strong program delivery. Among the few respondents who did report challenges (7 of 48 respondents), the most common issues were lack of upfront information about the assessment process and long wait times between signup and assessment completion (3 mentions each) and not recalling receiving an audit report (2 mentions; Figure 4). While these represent a small number of participants, addressing report clarity and process transparency could further enhance the participant experience.

Figure 4. Challenges Experienced with Signing Up, Scheduling, and Completing the Assessment



n=48; Multiple Responses Allowed

6.4 PROGRAM ASSESSMENT RECOMMENDATIONS

Participants generally recall receiving recommendations through their assessment report and receiving explanations from their auditor: Three-quarters (75%) of respondents remembered receiving recommendations, and almost all of

those (94%) recalled the auditor discussing the recommendations with them. Few were either uncertain (3%) or did not recall having the recommendations explained to them (3%). Survey results further suggest that the REA Program recommendations provided to participants following the assessment were both useful and actionable, as all respondents who recall receiving them report acting on at least one of them.

Table 18 provides a summary of recommendations most commonly received by participants (col. A, based on the program tracking data) and the percentage of respondents who completed the recommendation (col. B; each respondent was only asked about the recommendations they received). Table 18 also provides the percentage of all participants who completed recommendations (calculated as the product of col. A and col. B). Survey results show the following:

- Participants most commonly received no-cost or low-cost recommendations, including performing preventative maintenance on HVAC units (80%) or air sealing (76%).
- No-cost or low-cost recommendations were also the most likely to have been completed by those who received them, including turning out lights (76%) or performing furnace filter maintenance (70%). Fewer respondents reported following through with more in-depth recommendations, such as installing upgraded equipment or upgrading envelope/shell measures.
- Considering the incidence of both, the recommendation being *provided* and *acted upon*, survey results suggest that about half of all participants (49%) performed preventative maintenance for their HVAC units following their REA Program participation, and about one-third began doing cold water washes (31%) or performing furnace filter maintenance (27%).

Table 18. Program Recommendations Received and Completed

Program Recommendations	(A) % Who Received Recommendation (from Tracking Data)	% Who Completed Recommendations	
		(B) Of Those Receiving Recommendations	(C) Of All Participants
Perform Preventative HVAC Maintenance (n=41)	80%	61%	49%
Do Cold Water Washes (n=35)	61%	51%	31%
Perform Furnace Filter Maintenance (n=27)	39%	70%	27%
Unplug Electrical Devices (n=23)	40%	57%	23%
Turn Out the Lights (n=21)	25%	76%	19%
Install Air Sealing (n=43)	76%	25%	19%
Install Carbon Monoxide Detector (n=28)	41%	46%	19%
Seal Duct Work (n=31)	56%	25%	14%
Install Energy Efficient Lighting (n=13)	25%	54%	13%
Replace Existing HVAC System (n=24)	41%	17%	7%
Install Heat Pump Water Heater (n=13)	30%	23%	7%
Install Attic Hatch Stairway Insulation (n=28)	51%	10%	5%

Cost was the primary reason respondents did not follow through with the program recommendations, particularly for higher-cost equipment like HVAC systems (Table 19). Recommendations like sealing ductwork and air sealing were deemed too inconvenient, presenting an additional hurdle for respondents in implementing these recommendations. Participants also provided additional reasons for not completing the recommended measures, highlighting several trends. Eight respondents felt that the recommendations they received were not yet necessary. For instance, four individuals mentioned that their HVAC systems did not need to be replaced at this time.

Table 19. Primary Reason for Not Completing Recommendation

Program Recommendations	Too Expensive	Too Inconvenient	Too Busy	Other Reasons
Replace Existing HVAC System (n=14)	64%	0%	0%	36%
Install Attic Hatch Stairway Insulation (n=12)	58%	8%	17%	17%
Install Air Sealing (n=10)	40%	30%	20%	10%
Seal Duct Work (n=10)	20%	30%	30%	20%

Note: Responses of "Unsure" were removed from the analysis. Recommendations with fewer than 10 responses were excluded from the table.

6.5 PARTICIPANT SATISFACTION

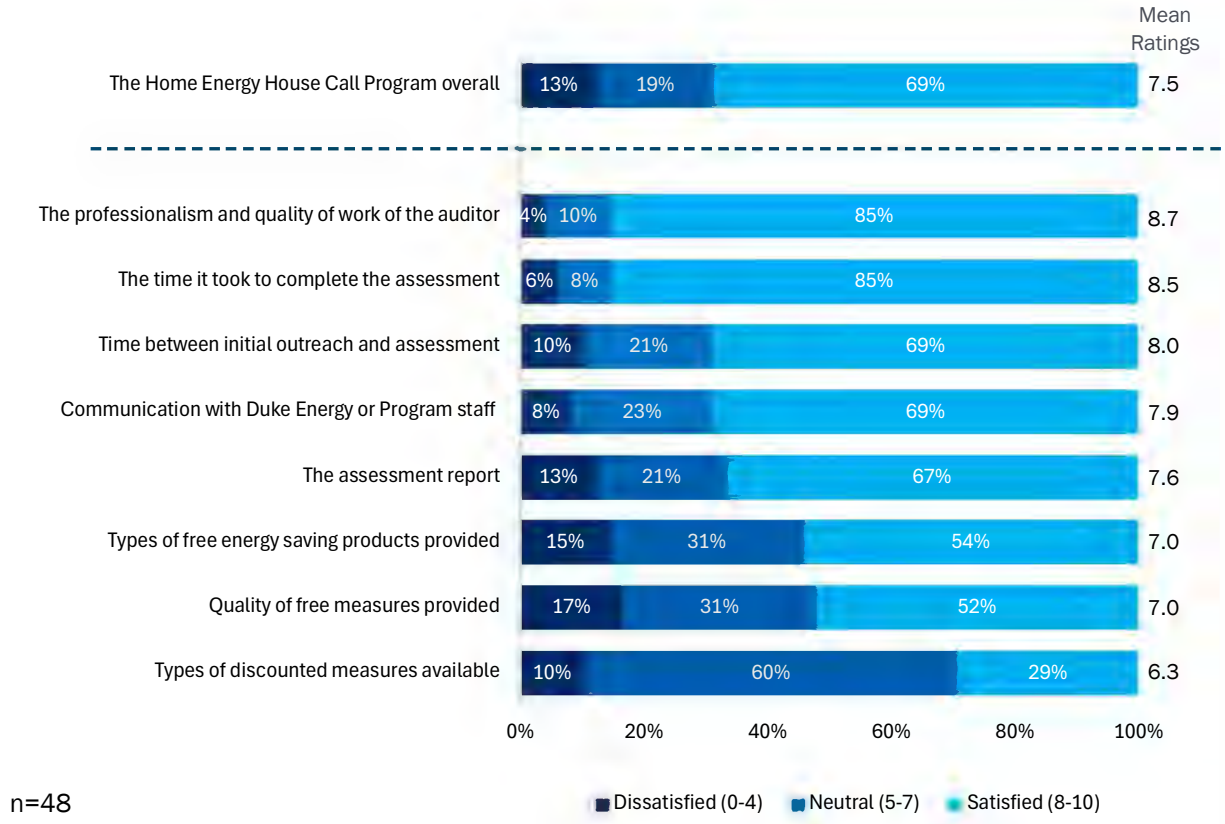
The participant survey explored satisfaction with the REA Program overall, as well as individual program components. All satisfaction questions asked respondents to rate their satisfaction on a scale of 0 to 10, where 0 meant "extremely dissatisfied" and 10 meant "extremely satisfied." Consistent with Duke Energy's practices, we categorized numeric responses as follows:

- 0 to 4 = "Dissatisfied"
- 5 to 7 = "Neutral"
- 8 to 10 = "Satisfied"

Respondents who provided a rating below eight were asked an open-ended follow-up question to provide more information about their lack of satisfaction.

Participants are moderately satisfied with the REA Program overall (providing a mean satisfaction rating of 7.5) and with the various program components (see Figure 5). The highest average satisfaction rating (8.7) was reported for the professionalism and quality of work of the auditor. Following behind were the time it took to complete the assessment (8.5) and the time between initial outreach and assessment (8.0). Only a few respondents expressed dissatisfaction with any program components. The lowest average satisfaction rating was reported for the types of discounted measures available (6.3).

Figure 5. Average Satisfaction with Aspects of the REA Program



Surveyed participants who gave ratings below 8 were asked to provide additional feedback on their lack of satisfaction with the REA Program. This feedback included the following:

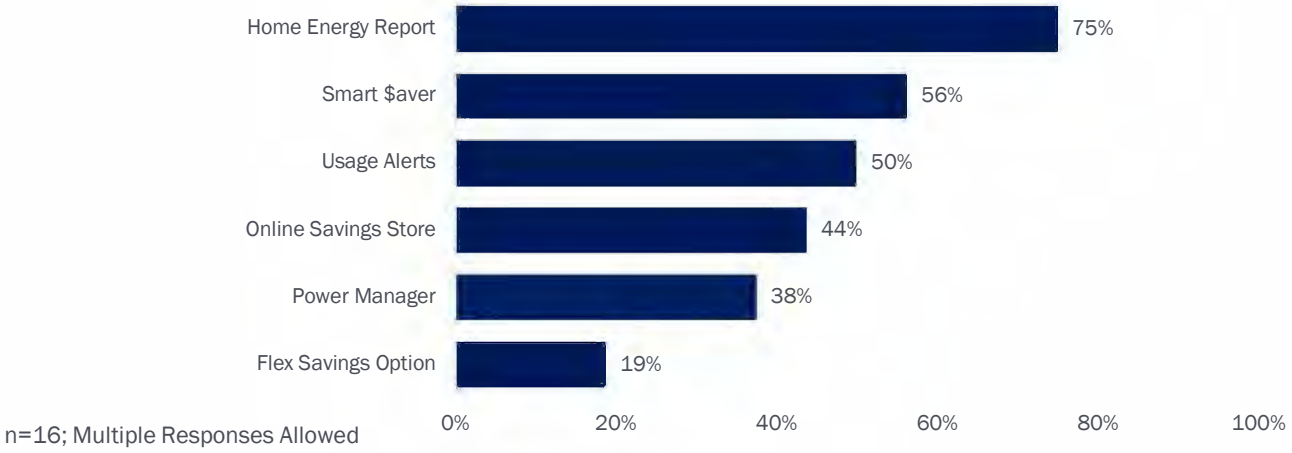
- Finding the energy assessment not helpful or specific enough (10 mentions). Participants indicated they felt they did not receive new information or that the information was not specific enough to their homes. One respondent mentioned that they did not receive sufficient information to help them lower their energy costs. Customers also mentioned feeling the auditor rushed through the assessment without taking the time to make proper recommendations (3 mentions), with two mentioning not receiving an assessment report.
- Wanting additional measures or services offered through the program (6 mentions). While 75% of survey respondents were not satisfied with either the free or the discounted measures available through the program, few were able to name products they would have liked to receive. The few specific recommendations included big-ticket items such as insulation, HVAC, and solar, as well as smaller items such as tank wrap and light timers.
- Challenges scheduling the assessment appointment (5 mentions). Two respondents indicated it was hard to find a time slot that fit their schedule, while one reported waiting two to three months for an appointment. Another respondent reported that no one showed up for their first appointment, and they had to reschedule.
- Dissatisfaction that their bills did not decrease after participating in the program (4 mentions). Two respondents noted that they did not see any cost reductions, even after changing their energy usage habits and installing new products.

In addition to providing moderate to high satisfaction scores for the various program components, over half (56%) of respondents felt more favorable towards Duke Energy following participation in the REA Program, and over one-third (35%) felt the same. Fewer than one in ten (8%) respondents felt less favorable about Duke Energy.

6.6 INFORMATION ABOUT OTHER DUKE PROGRAMS AND CHANNELING

Less than half (44%) of respondents recalled receiving information about other Duke Energy programs while participating in the REA Program. Of those who did recall receiving information, three-fourths (75%) received information about the Home Energy Report, followed by Smart $aver (56%) and Usage Alerts (50%; see Figure 6).

Figure 6. Information Received About Other Duke Energy Programs



Note: This question was only asked of respondents who recalled receiving information about other Duke Energy Programs.

A review of cross-program participation data found that about one in ten (14%) respondents participated in another Duke Energy program after participating in the REA Program, most commonly the Smart $aver Program, suggesting opportunities to strengthen program channeling strategies and leverage the REA experience to drive participation in other offerings.

7. EM&V SUMMARY FORM

DUKE ENERGY KENTUCKY
RESIDENTIAL ENERGY ASSESSMENT PROGRAM
COMPLETED EM&V FACT SHEET

PROGRAM DESCRIPTION

The Residential Energy Assessment Program offers participants a home energy assessment, a starter kit of free, low-cost, energy-efficient measures, and a small selection of additional free measures. At the end of the assessment, the customer receives an auditor report of recommended upgrades and a booklet of suggested behavioral changes. Customers also have the option to purchase certain energy efficiency equipment at a discount.

Date:	June 5, 2026
Region(s):	Duke Energy Kentucky
Evaluation Period:	January 1, 2022–January 31, 2024
Annual kWh Savings (ex post net):	799,207 kWh
Coincident kW Impact (ex post net):	162.86 kW (Summer) 190.31 kW (Winter)
Measure Life:	Varies by measure
Net-to-Gross Ratio:	160%
Process Evaluation:	Yes
Previous Evaluation(s):	Duke Energy Kentucky Residential Energy Assessment Program Evaluation, August 7, 2020

EVALUATION METHODOLOGY

The evaluation team conducted both a consumption analysis and engineering analysis to estimate program impacts. The consumption analysis used utility billing data to estimate net energy savings, while the engineering analysis provided insights into measure-level contributions and demand savings. The team updated deemed savings values, leveraging the 2024 DEI REA Program Evaluation and customizing inputs with DEK program tracking and survey data and updating TRM assumptions. In-service rates and free ridership values were carried over from the 2024 DEI evaluation, while participant spillover was estimated through a participant survey conducted specifically for this evaluation.

EVALUATION FINDINGS

The impact analysis showed kit measures account for 68% of gross program savings, followed by additional free measures (25%) and discounted measures (7%). Participant spillover was notably high at 85%, driven primarily by duct sealing and insulation measures.

Participants reported moderate to high satisfaction with various components of the REA Program. Program recommendations demonstrate high effectiveness, with 75% of participants recalling receiving recommendations, with all those participants acting on at least one recommendation, indicating strong program influence on participant behavior beyond direct install measures.

8. PROSPECTIVE SAVINGS FOR DSMORE

Duke Energy Kentucky applies savings assumptions prospectively. Because the REA Program made changes to the measures offered following the evaluation period, Duke Energy asked Opinion Dynamics to assist in developing savings assumptions for the new measure bundle. This section describes the methodology, including data inputs, and the resulting DSMore values for prospective application. The analysis leverages, where possible, the evaluation results from this report and the filing assumptions developed by the REA program team.

The prospective savings methodology was conducted in three steps, described below.

STEP 1: DISAGGREGATION OF PROGRAM SAVINGS

As described throughout this evaluation report, program savings are comprised of three major components: (1) measure savings (kit measures as well as additional free and discounted measures); (2) PSO savings; and (3) behavioral savings. The prospective savings for the new bundle reflect an updated measure mix but assume the same NTGR (i.e., the same relationship between measure savings and PSO) and the same behavioral savings as developed in this evaluation report.[5] To develop prospective savings, we first disaggregated the overall per-household program savings (derived through consumption analysis) into the three components. Table 20 shows these components (highlighted in bold font), including their values and sources/derivation.

Table 20. Disaggregation of per Household Savings

	Component	Value	Source
a	Total net savings (kWh/HH)	628.802	Consumption analysis (Table 1 and Table 8)
b	**Total measure gross savings (kWh/HH)**	**291.694**	**Engineering analysis (Table 2 and Table 11)**
c	Program NTGR	1.60	NTG analysis (Table 4)
d	**PSO (net of FR, kWh/HH)**	**175.950**	**Calculation: d = b * (1 - c)**
e	**Behavioral savings (kWh/HH)**	**161.158**	**Calculation: e = a - b - d**

STEP 2: DEVELOPMENT OF PROSPECTIVE GROSS SAVINGS FOR NEW BUNDLE

To develop savings for the new measure bundle, we took two different approaches, depending on whether the measure was already evaluated (i.e., offered during the evaluation period of this report) or is new:

1. For **evaluated measures**, we applied results from this evaluation report.
2. For **new measures**, we relied on filing assumptions provided by Duke Energy.

Table 21 summarizes, for each measure, (a) the per unit gross savings, (b) the average number of measures installed per participating household, and (c) the average per home gross energy savings, which is calculated by multiplying (a) and (b). The table also notes the sources of the assumptions. The total average estimated gross energy savings for the measures included in the bundle is 453.342 per household.

[5] We decided to apply the same *absolute* behavioral savings since the program did not make changes to its recommendations. As such, there is no reason to believe that behavioral savings would change commensurate with changes in measure savings.

It should be noted that Opinion Dynamics did not verify Duke Energy's filing assumptions, as they had previously been accepted and approved as planning values. As such, the savings per household value should be considered ex ante rather than verified (ex post).

Table 21. Prospective Bundle Savings

Measure	(a) Per Unit Gross Savings (kWh)	(b) Average Measures Installed	(c) Per Home kWh [a * b]	Source
Evaluated Measures [A]				
Kitchen Aerator	72.67	0.61	44.386	Gross Savings: Table 10 Average Measures Installed: Table 6
Bath Aerator 1.0 GPM	7.12	0.55	3.902	
1.5 GPM Showerhead	83.77	0.49	40.743	
Weatherstripping	124.98	0.72	89.689	
New Measures [A]				
0.5 GPM Bath Aerator	59.52	0.10	5.952	Duke Energy filing assumptions
1.25 GPM Showerhead	348.84	0.15	52.326	
T8 Tube Lights-4ft	22.00	0.01	0.220	
Smart Power Strip	85.60	0.85	72.760	
Hot Water Turndown	75.61	0.35	26.464	
TSV	39.41	0.20	7.882	
Furnace Filter Whistle	130.20	0.65	84.630	
Spray Foam	21.67	0.53	11.387	
Caulking	21.67	0.60	13.002	
Total Bundle			**453.342**	

[A] For fuel-dependent evaluated measures, both the per unit gross savings and the average measures installed represent the weighted average of homes with electric and non-electric fuels (consistent with values in this report). For fuel-dependent new measures, both the per-unit gross savings and the average measures provided by Duke Energy represent homes with electric fuel only. As such, neither the per-unit gross savings nor the average measures installed are directly comparable between evaluated and new measures. However, they result in per-home kWh that are consistent across both measure types and reflect the assumed distribution of measures between electric and non-electric homes.

STEP 3: CALCULATION OF PROSPECTIVE SAVINGS

In the final step, we replaced the original measure kWh savings (and associated PSO) from Step 1 with the newly developed prospective savings (and associated PSO) from Step 2 to develop per household kWh savings for the new measure bundle (see Table 22, row e). We developed demand savings (rows f and g) by multiplying the kWh savings by the demand-to-energy ratios developed in this evaluation (see Table 12).

Table 22. Prospective per Household Savings

	Component	Bundle	Source
a	Total measure gross savings (kWh/HH)	453.342	Step 2 calculations
b	Program NTGR	1.603	NTG analysis (Table 4)
c	PSO (net of FR, kWh/HH)	726.797	Calculation: c = a * b
d	Behavioral savings (kWh/HH)	161.158	Step 1 calculations
e	**Total net energy savings (kWh/HH)**	**887.955**	**Calculation: e = c + d**
f	**Total net summer demand savings (kW/HH)**	**0.1809**	**Calculation: f = e * Summer Ratio (Table 12)**
g	**Total net winter demand savings (kW/HH)**	**0.2114**	**Calculation: g = e * Winter Ratio (Table 12)**

DSMORE TABLE

Table 23 provides DSMore inputs for the prospective bundle. Energy and demand savings are based on the analysis above, while the measure life was verified as part of the deemed savings review.

In addition, Table 23 provides DSMore inputs for non-bundle measures. Values for non-bundle measures reflect analyses for the evaluation period and were calculated as each measure's per unit ex post gross savings (see Table 10) multiplied by its ISR (see Table 6). No additional analysis for prospective non-bundle measures was conducted.

Table 23. Inputs for Prospective DSMore Table

Measure	Annual kWh Gross w/o losses	Saved Summer Coincident kW w/o losses	Saved Winter Coincident kW w/o losses	Measure Life	NTGR
Prospective Bundle	887.955	0.1809	0.2114	14	100.00%
Water Heater Pipe Wrap	46.674	0.0053	0.0053	12	174.68%
Smart Thermostat - Electric Heat	509.446	0.0598	0.2965	11	159.95%
Smart Thermostat - Gas Heat	115.204	0.0598	0.0000	11	159.95%
Handheld Showerhead	181.381	0.0185	0.0369	10	165.26%

Note: Values for non-bundle measures reflect analyses for the evaluation period; no additional analysis for prospective non-bundle measures was conducted.

The Excel spreadsheet embedded below contains the detailed measure-level inputs for Duke Energy Analytics.

DEK_Residential_Assessments_DSMore_

APPENDIX A. DETAILED CONSUMPTION ANALYSIS METHODOLOGY

This appendix describes the steps we followed for data collection, data cleaning, model specification, and regression analysis.

CONSUMPTION DATA PREPARATION

The team received 15-minute interval AMI meter consumption data from Duke Energy, which was then aggregated to the daily level and merged with the participant data. When aggregating the hourly data to daily, the team addressed the following issues with the data (described further in Table 24):

- **Timestamps.** Ensured that timestamps were formatted consistently with no duplicates and that all intervals were one hour in length.
- **Time zone.** Confirmed the data were in local time and applied adjustments for daylight savings.
- **Inconsistent interval lengths.** Checked and removed accounts that had a sub-hourly interval switch between 15-minutes and 30-minutes interval.
- **Duplicate records.** Identified and removed exact and partial duplicate records.
- **Null usage.** Identified intervals with null usage and dropped them.
- **Zero usage.** Flagged zero usage not associated with net energy metering (NEM) accounts and used this flag as a part of the occupancy check, as described below.
- **Data completeness.** Reviewed the number of hours in each day with consumption readings and ensured that all days included in the analysis had consumption readings for at least 20 hours. Days with fewer than 20 hours of data were excluded. Missing values were imputed for days with 20 to 23 hours of data, based on the average usage for that account and date.
- **Multiple meters.** Explored and removed accounts with multiple meters with exact duplicate readings.

Table 24. Summary of Interval Data Cleaning Steps

Attrition Reason	Total Accounts Remaining	
	N	%
Initial Count	1,779	100%
Check and fix Daylight Saving	1,779	100%
Exact Duplicates	1,779	100%
Sub-hourly Interval Switch	1,768	99%
Hours with Null Usage	1,768	99%
Not in Participant Data	1,767	99%
Days with Less than 20 hours	1,767	99%
With Multiple Meters and Duplicate Readings	1,759	99%

Subsequently, several data cleaning steps were performed on the daily consumption data:

- **Insufficient billing history**: Dropped all accounts with less than nine months of coverage preceding or following the intervention. All participants in the analysis sample have at least nine months of baseline period data and nine months of reporting period data.
- **Insufficient seasonal billing history**: Dropped all accounts with fewer than 68 days (75%) of coverage during the summer (June–August) and winter seasons (December–February).
- **Occupancy.** We assessed whether a home was occupied by exploring and identifying accounts with 30 days or more of zero consumption across 24 hours of each day.
- **Extreme usage values.** Identified and removed outliers in the consumption data exceeding five standard deviations from the mean for each account and the entire dataset.
- **Symmetric non-routine event adjustment.** Identified and removed accounts with an increase or decrease in consumption between pre- and post-intervention periods greater than 75%. Any such change in consumption is attributable to causes other than the REA Program.

PARTICIPANT DATA PREPARATION

The REA Program participant data includes customer and premise numbers, participation dates, measure details, and housing characteristics. We received data for customers who participated between January 1, 2022, and January 31, 2024 ("ever-treated" participants) or between February 1, 2024, and January 31, 2025 (never-treated future participants). Consistent with past REA evaluations, we used the date field *Project Work Complete Date* to categorize billing periods into pre- or post-intervention periods.

Initially, the evaluation team received data for 1,785 participants across various projects, including free and discounted measures in addition to the starter kit. The participant data cleaning and analysis process included several steps, building on the consumption data preparation. The team verified the participation dates for "ever-treated" and "never-treated" future participants and eliminated REA Program participants who participated in another Duke Energy program following their participation in the REA Program. Cross participants are customers who participated in one or more programs, including Smart $aver, Marketplace Smart Thermostats, and Income Qualified Weatherization, among others, immediately after receiving the energy audit and the free energy efficiency starter kit. This dropped 14% of the treatment accounts and 6% of the comparison accounts. These drops are summarized in detail in Table 25.

Several participants had more than one measure spanning the evaluation period. We defined the pre- and post-intervention periods based on the latest measure, depending on the project work completion date.

WEATHER DATA PREPARATION

To account for weather impacts in our energy consumption models, we collected daily weather data from weather stations across the DEK territory, utilizing the station closest to each home. Using data from the closest station increases the accuracy of the weather data associated with each account. We obtained the weather data from the National Centers for Environmental Information (NCEI).

The daily average temperature data are based on hourly temperature readings. We calculated CDD and HDD for each day in the analysis using a base temperature of 65˚F for HDD and 75˚F for CDD.[6] We merged the daily weather data with the consumption data.

DATA CLEANING SUMMARY

Table 25 summarizes the treatment group and comparison group accounts dropped as part of each cleaning step in the cleaning and preparation of the participant data, consumption data, and weather data. Upon completing data cleaning, we retained 81% of the treatment group participants and 89% of the comparison group participants that remained following the initial participant data preparation steps outlined above.

Table 25. Summary of Data Cleaning Results

Attrition Reason	Treatment Accounts Remaining		Comparison Accounts Remaining	
	N	%	N	%
Initial Count of Participants	1,271	100%	514	100%
Interval Data Cleaning	1,254	99%	505	98%
Remove Cross-participants	1,082	85%	480	93%
Merge Daily Weather	1,082	85%	480	93%
Drop Outliers	1,082	85%	480	93%
Full-Year Sufficiency with 75% Threshold	1,073	84%	475	92%
Summer & Winter Sufficiency with 75% Threshold	1,071	84%	475	92%
Symmetric Non-routine Event Adjustment	1,037	82%	473	92%
Unoccupancy	1,025	81%	457	89%
Final Count	**1,025**	**81%**	**457**	**89%**

We compared participant characteristics before and after data cleaning to ensure the customers in the analysis sample were similar to the broader population of participants. Table 26 shows the comparison's results. The data cleaning had only small effects on the characteristics of the participant sample, suggesting that the consumption impact estimates can be applied to the whole population.

Table 26. Treatment Participant Composition (Pre- and Post-Consumption Data Cleaning)

	Before Cleaning (n=1,271)	After Cleaning (n=1,025)
Average Daily Consumption (kWh)	39.08	38.49
Fuel Type		
Electric	28%	27%
Gas	68%	68%
Other	4%	5%

[6] A "degree-day" is a unit of measure for recording how hot or how cold it has been over a 24-hour period. The number of degree-days applied to any particular day of the week is determined by calculating the mean temperature for the day and then comparing the mean temperature to a base value of 65°F for space heating (HDD) and 75°F (CDD) for space cooling. (The "mean" temperature is calculated by adding together the high for the day and the low for the day, and then dividing the result by two.) If the mean temperature for the day is five degrees higher than 75°F, then there have been five cooling degree-days. On the other hand, if the weather has been cool, and the mean temperature is, say, 55°F, then there have been 10 heating degree-days (65 minus 55). "Degree Days," National Weather Service, https://www.weather.gov/ffc/degdays.

	Before Cleaning (n=1,271)	After Cleaning (n=1,025)
Cooling Type		
Central Air Conditioning (CAC)	98%	98%
Window Units	1%	1%
Other	1%	1%
Water Heater Fuel Type		
Electric	43%	41%
Natural Gas	55%	58%
Other	2%	1%
Average Square Footage	2,252	2,282

COMPARISON GROUP EQUIVALENCY ASSESSMENT

The validity of the future participant design depends on whether future participants provide an accurate baseline for treated participants. The future participant approach makes two types of comparisons: (1) participants to future participants during the analysis period (January 2022–January 2024); and (2) participants to future participants not treated during the evaluation period but treated later (February 2024 and later). If there are trend differences between participants and future participants in pre-treatment consumption or differences in other characteristics affecting electricity consumption, this would suggest the future participant approach is not valid. Therefore, as a check of our approach, we made the following comparisons of REA Program participants between January 2022 and January 2024 to REA Program participants after January 2024:

- Pre-period consumption in the year 2021
- Weather

Participants enter the REA Program on a rolling basis, which means there is no common baseline and reporting period, and each participant's pre- and post-period is defined by their participation date. Therefore, when assessing the equivalency of the comparison and treatment groups based on energy consumption, it is important to do so for a common pre-period. Given that the program evaluation period started in January 2022, the pre-period consumption equivalency analysis used consumption data for the preceding 12 months (i.e., 2021).

Figure 7 compares the monthly consumption of REA-treated customers and comparison customers (never-treated future participants). In the common pre-period, there are no statistically significant differences in energy consumption between the treatment and comparison groups.

Figure 7. REA Treatment and Comparison Group Monthly Differences in ADC

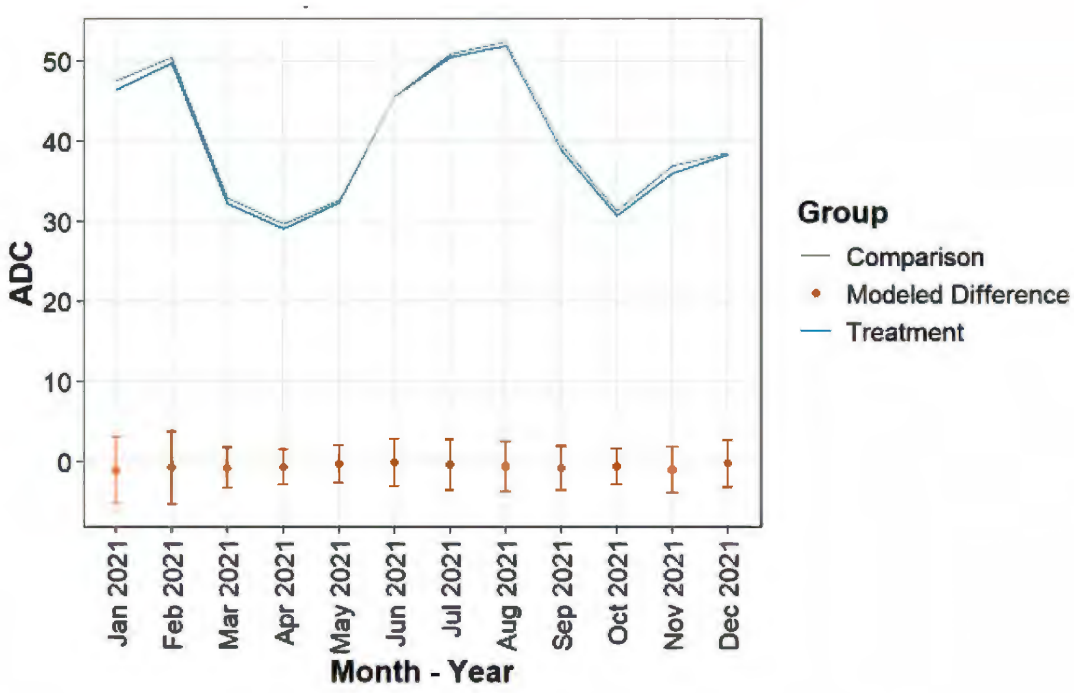


Figure 8 and Figure 9 compare baseline period HDD, CDD, and consumption between the treatment and comparison groups. Weather patterns are nearly identical between treatment and comparison participants. There are no statistically significant differences in energy consumption in the common pre-period between the treatment and comparison groups.

Figure 8. REA Treatment and Comparison Group Average Heating Degree Days by Month in 2021

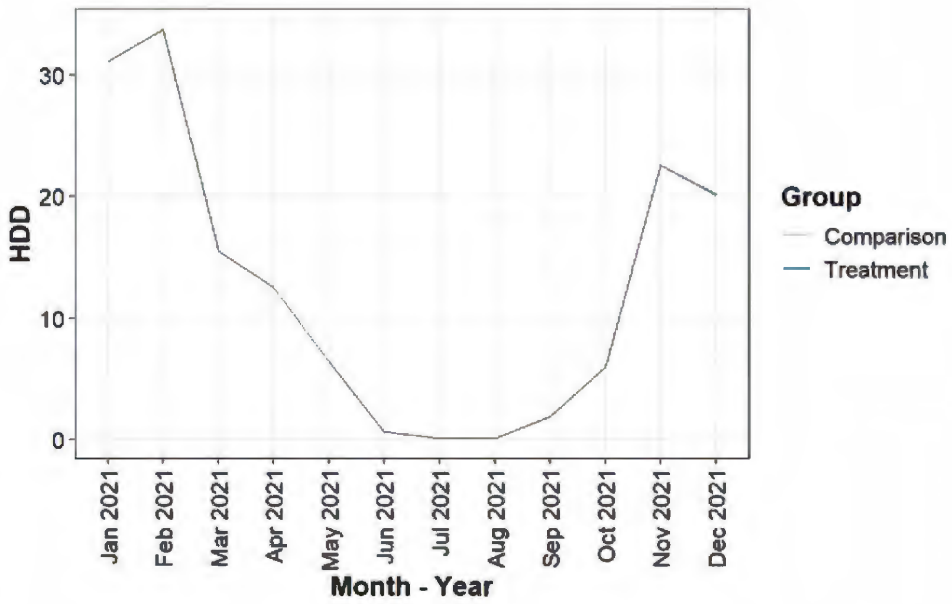
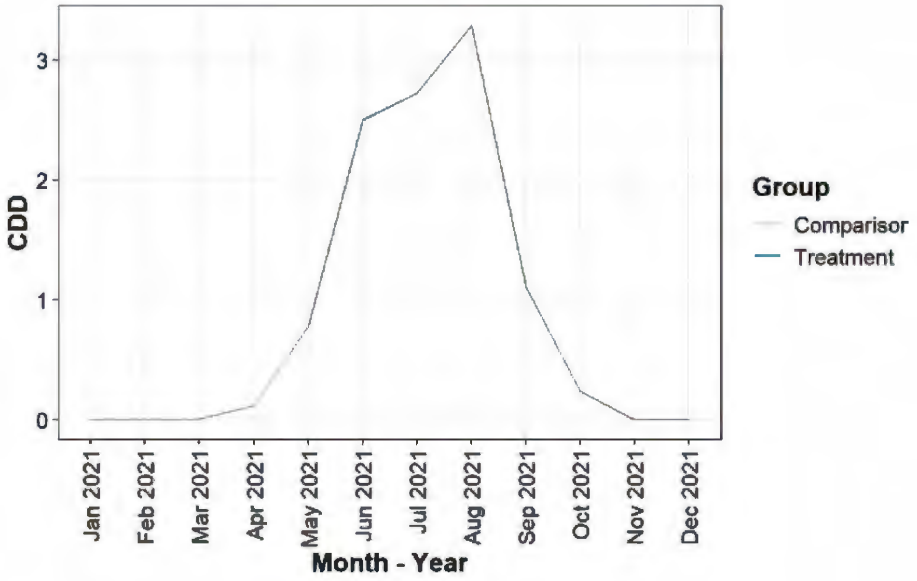
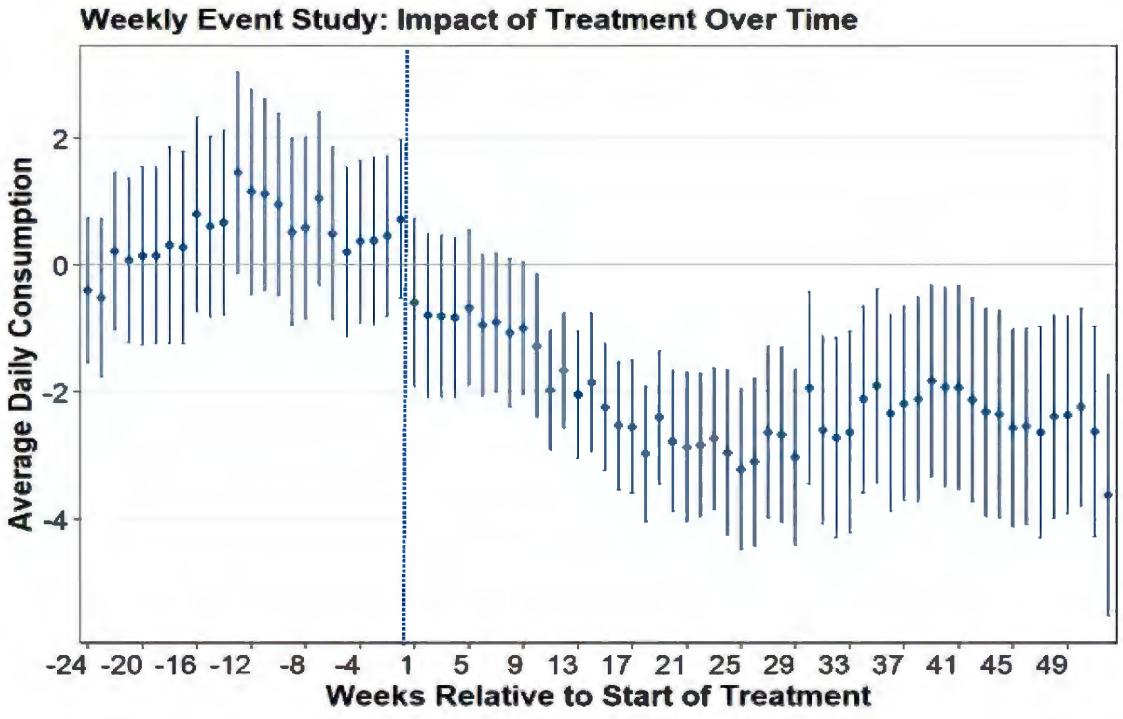


Figure 9. REA Treatment and Comparison Group Average Cooling Degree Days by Month in 2021



In addition, we estimated an event study to test for differences in trend consumption between treated customers and future participants. The study estimates energy impacts for the 24 weeks before the start of REA treatment and the 52 weeks after the start of treatment. The impacts are estimated conditional on customer fixed effects and date-of-sample fixed effects.

Figure 10. REA Weekly Event Study Plot



The main takeaways from this analysis are:

- Our estimates show treatment effects before the start of treatment that are not statistically different from zero, which strongly suggests that our baseline and research design are valid.
- The figure shows a clear decrease in energy consumption after the start of treatment, which further suggests that the savings estimates are valid.

MODEL SPECIFICATIONS

To estimate REA Program savings, the evaluation team specified a linear two-way fixed effects D-in-D model. This is the industry-standard specification for estimating energy impacts for efficiency programs where the start of treatment varies between participants. The model compares participants to future participants during the evaluation period as well as future participants who are treated after the evaluation period ends (i.e., the comparison group) while controlling for weather, differences in average consumption between participants (using participant fixed effects), and differences in average consumption over time unrelated to weather (using date-of-sample fixed effects). We also moderated home heating fuel with heating degree days to explain any differences in electricity consumption between participants in the winter months due to the use of different heating fuels.

We estimated the model with data between January 1, 2021, and January 31, 2025, using ordinary least squares and clustered the standard errors on participants. All participants included in the analysis had at least nine months of consumption data before treatment and nine months after treatment before the end of January 2025.

To estimate savings for all REA participants the team used the model specified in Equation 4.

Equation 4. REA Model Specification

$$kWh_{it} = \gamma_{im} + \tau_t + \beta_1 Treat_{1,it} + \beta_2 Treat_{2,it} + \beta_3 Treat_{3,it} + \beta_{CDD} CDD_{it} + \beta_{HDD} HDD_{it} + \beta_{HDD:Heating\ Fuel} HDD_{it} \times Heating\ Fuel_{it} + \varepsilon_{it}$$

Where:

kWh_{it}= Average daily consumption for account *i* in time (date) *t*

γ_{im} = Account-specific intercept for account *i* in month *m*

τ_t = Date-specific intercept for time *t*

$Treat\ 1_{it}$ = Indicator variable for the first participation year period (coded "1" in the first year after participation, coded "0" otherwise)

$Treat\ 2_{it}$ = Indicator variable for the second participation year period (coded "1" in the second year after participation, coded "0" otherwise)

$Treat\ 3_{it}$ = Indicator variable for the third participation year period (coded "1" in the third year after participation, coded "0" otherwise)

CDD_{it} = Daily cooling degree days for account *i* at time *t*

HDD_{it} = Daily heating degree days for account *i* at time *t*

$Heating\ Fuel_{it}$ = Indicator variable for heating fuel (coded "1" if heating fuel was electric, coded "0" otherwise)

β_x = Model coefficients

ε_{it} = Error term

We used several criteria to judge the validity of our final models. We estimated different model specifications that included or excluded terms such as fixed effects, weather, and heating type to test the sensitivity of the savings estimates. We found the savings estimates were robust to changes in model specification. We also aimed to use a model that explained as much about changes in the dependent variable as possible. The most direct measure of this is the overall R-squared, which estimates how much the model explains. An R-squared of 1.0 would represent a model that explains 100% of the variance in the dependent variable, and an R-squared of 0.5 would explain 50%.

As can be seen in Table 27, the Post × Treat coefficient for Treatment Year 1 is statistically significant for participants, indicating that the model establishes a statistically significant relationship between participation in the program and energy consumption in the first year immediately following the treatment. The R-squared for the model is 0.63.

Table 27. Results of REA Consumption Analysis Models

Variable	Result
Post × Treat	1.72* (Standard Error = 0.31)
CDD	3.49*
HDD	0.10**
HDD*Heating Fuel	1.45*
Total Modeled Participants	1,482
Observations (Number of Customer Bills)	2,096,036
Adjusted R-Squared	0.63

* p<0.1, ** p<0.05, *** p<0.01.

APPENDIX B. SURVEY INSTRUMENT

As part of the evaluation activity, the evaluation team developed and implemented the following survey instrument.

REA_DEK2025_Partici
pant Survey_FINAL.do

Opinion Dynamics
an E Source Company

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KY.P.S.C. Electric No. 2
First Revised Sheet No 125
Cancels and Supersedes
Original Sheet No. 125
Page 1 of 2

RESIDENTIAL PEAK TIME REBATE (PTR) PILOT PROGRAM
PTR PILOT PROGRAM ~~(N)~~

APPLICABILITY

This rider is a pilot and is available on a limited and voluntary basis, at the Company's option, to residential customers in the Company's electric service area who choose to participate by enrolling in the pilot program. This rider is not available to customers served under Rider TS, Rider AMO, Rider NM, and the Residential Direct Load Control – Power Manager Program. In addition, customers with arrears and/or deferred payment arrangements are not eligible to participate. Residential customers may participate only if Company has installed an advanced meter with interval recording registers that may be used for billing the customer. ~~Pilot participation will be based on the lesser of a sample design developed for this pilot or the first one thousand (1,000) customers to enroll. At the Company's option, the maximum participation number may be exceeded by at most 100 additional participants~~. (T) (T) (T)
The Company may select pilot participants such that a diverse customer group is ensured. This rider is available upon Kentucky Public Service Commission (Commission) approval and may change or conclude upon the Commission's order.

PROGRAM DESCRIPTION

Under this pilot program, participating customers have the opportunity to lower their electric bill by reducing their electric usage during Company-designated peak load periods known as Critical Peak Events ("CPE").

The Company may call a CPE, at its discretion, during any calendar month but limited to at most twelve (12) CPEs for a program year. CPEs may only occur on a weekday, Monday through Friday, and will last 4 hours. During the months of May through October, the summer season, a CPE will begin at 3 p.m. and end at 7 p.m. The Company may call eight to ten CPEs during the months of May through October. During months of November through April, a CPE will begin at 6 a.m. and end at 10 a.m. The Company may call two to four CPEs during the months of November through April. CPEs will not occur on weekends, New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day, and Christmas Day on the day nationally designated to be celebrated as such.

For each CPE, the Company, using the customer's electric usage history, will estimate a baseline which is the electric usage (i.e., kWh) that would have been used by the customer absent any customer initiated action to reduce electric usage. The customer's actual kWh usage during the CPE will be compared to the baseline. Net reduction in usage from the baseline over the CPE period will receive a cents/kWh credit. If no net reduction occurred, no credit will be provided. If, for any reason, the actual kWh is not available, an estimate of the actual kWh consumed during the CPE will be used.

Credits will be calculated and applied to the customer's bill no later than the second billing month following the CPE(s). However, for customers who earn credits during a CPE, the credit amount for each CPE will be communicated to the customer using the contact information provided by the customer within 5 business days of the CPE.

Issued by authority of an Order by the Kentucky Public Service Commission in Case No. ~~2019-00277~~ _____ dated ~~April 27, 2020~~ _____.

Issued: ~~April 29, 2020~~ August 14, 2026
Effective: ~~April 30, 2020~~ September 14, 2026
Issued by Amy B. Spiller, President /s/ Amy B. Spiller

Duke Energy Kentucky, Inc.
1262 Cox Road
Erlanger, Kentucky 41018

KY.P.S.C. Electric No. 2
First Revised Sheet No 125
Cancels and Supersedes
Original Sheet No. 125
Page 2 of 2

PROGRAM DESCRIPTION (Cont'd.) ~~(N)~~

Participating customers must provide and maintain a contact method (i.e, an email address and/or a text number) at the customer's expense in order for the Company to provide notification of CPEs.

In the event electric service to the customer is interrupted during a CPE, the customer shall not receive credit for reductions due to the service interruption.

It will be customer's responsibility to monitor and control their energy usage before, during, and after a CPE.

Other provisions of the customer's applicable rate schedule will apply to service supplied under this pilot program.

CREDITS

Credit per net kWh Reduced during CPE ~~$0.60 / kWh~~ (D)

- $1.00/kWh credit for reducing energy use by up to 10% of baseline. (I)
- $1.25/kWh credit for reducing energy use by 10%-20% of baseline. (I)
- $1.50/kWh credit for reducing energy use by more than 20% of baseline. (I)

NOTIFICATION OF CRITICAL PEAK EVENTS

The Company will notify customers of a CPE using the contact information provided by the customer. The Company will use its best efforts to notify customers of a CPE by 8:00 p.m. on the day prior to such event. However, notification can occur at any time but no later than one hour prior to the event. At most one (1) CPE with less than day ahead notice will occur in each year of the pilot. A same day notice CPE will only occur in the summer season. If the original notice of a CPE is provided on the day prior during the summer period of May through October, the Company will also send customer a reminder notice by 1 p.m. of the CPE using the contact information provided by the customer. Failure of the customer to receive the Company notice(s) of a CPE shall not entitle the customer to receive credits under this program.

PARTICIPATION PERIOD

Customer agrees to participate in the pilot until the end of the 2-year pilot program and may continue to participate at their option and under their enrolled account until the pilot program is terminated. Company reserves the option to terminate customer's participation for operational issues or upon customer request.

SERVICE REGULATIONS

The provisions contained in this tariff sheet do not supersede or replace any of the charges and terms contained in the standard base rate and rider tariff sheets. The standard base rate and rider charges apply to all customers participating in this pilot program.

The supplying of, and billing for, service and all conditions applying thereto, are subject to the jurisdiction of the Kentucky Public Service Commission, and to Company's Service Regulations currently in effect, as filed with the Kentucky Public Service Commission, as approved by law.

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