**COMMONWEALTH OF KENTUCKY**

**BEFORE THE PUBLIC SERVICE COMMISSION**

| | | |
|---|---|---|
| In The Matter of: | ) | |
| | ) | |
| THE ANNUAL COST RECOVERY FILING | ) | Case No. 2021-00424 |
| FOR DEMAND SIDE MANAGEMENT BY | ) | |
| DUKE ENERGY KENTUCKY, INC. | ) | |

**FILING OF THE ANNUAL STATUS REPORT, ADJUSTMENT OF THE DSM COST RECOVERY MECHANISM, AND AMENDED TARIFF SHEETS FOR GAS RIDER DSMR (SHEET NO. 62) AND ELECTRIC RIDER DSMR (SHEET NO. 78)**

Now comes Duke Energy Kentucky, Inc. (Duke Energy Kentucky or the Company) with the consensus of the Residential Collaborative and the Commercial and Industrial Collaborative, and pursuant to prior Orders of the Kentucky Public Service Commission (Commission) relevant to Duke Energy Kentucky's Demand Side Management (DSM) strategy,[1] and hereby files its Annual Status Report, Adjustment of the DSM Cost Recovery Mechanisms for both gas and electric service (DSM Riders), and Amended Tariff Sheets for Gas Rider DSMR and Electric Rider DSMR (Application).

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. Duke Energy Kentucky is engaged in the business of furnishing

[1] *See* November 4, 2004 Order in Case No. 2003-00367, February 14, 2005 Order in Case No. 2004-00389, April 4, 2006 Order in Case No. 2005-00402, May 15, 2007 Order in Case No. 2006-00426, May 14, 2008 Order in Case No. 2007-00369, May 12, 2009 Order in Case No. 2008-00473, March 22, 2010 Order in Case No. 2009-00444, June 7, 2011 Order in Case No. 2010-00445, April 13, 2012 Order in Case No. 2011-00448, June 29, 2012 Order in Case No. 2012-00085, April 11, 2013 Order in Case No. 2012-00495, March 28, 2014 in Case No. 2013-00395, May 7, 2015 in Case No. 2014-00388, April 4, 2016 in Case No 2015-00368, March 28, 2017 in Case No. 2016-00382, September 13, 2018 in Case No. 2017-00427, October 2, 2019 in Case No. 2018-00370, April 29, 2020 in Case No. 2019-00406, and April 9, 2021 in Case No. 2020-00371.

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 October 20, 2021, the Residential Collaborative[2] and the Commercial & Industrial Collaborative[3] met to review the Application. Unless otherwise stated, the Residential Collaborative and the Commercial & Industrial Collaborative are jointly referred to herein as "Collaborative." The Collaborative has received the Company's proposal and had the opportunity to provide comments.

4. In addition to filing the annual status report in this Application, Duke Energy Kentucky respectfully requests a modification of Duke Energy Kentucky's DSM Riders to reflect the reconciliation of planned and actual expenditures, lost revenues, and shared savings.

5. Pursuant to the Commission's Order dated September 13, 2018, in Case No. 2017-00427, the Company's portfolio of programs in effect during the fiscal year covered by this Application were approved. The Company requested and received approval to continue the approved portfolio with the commitment to file the annual cost recovery DSM

[2] The Residential Collaborative members in attendance were Angela Goad (Office of the Kentucky Attorney General), Jock Pitts (People Working Cooperatively), and Trisha Haemmerle (Duke Energy).
[3] The Commercial & Industrial Collaborative members in attendance were Angela Goad (Office of the Kentucky Attorney General) and Trisha Haemmerle (Duke Energy).

filing and the annual amendment filing.[4] As a result, this Application serves as the annual true-up of the fiscal year ending June 30, 2021 of programs.

## Background

6. The Company's offering of DSM programs dates back close to two decades.[5] Throughout the years, the Company has offered many enhancements to its portfolio with the purpose of increasing participation and providing customers new and innovative opportunities to control their consumption and impact their utility bill. The portfolio of programs in place during the fiscal year ending June 30, 2021 and that is the subject of this Application was approved by the Commission's September 13, 2018 Order in Case No. 2017-00427. In its February 14, 2018 Order, the Commission consolidated Case Nos. 2017-00324 and 2017-00427 and suspended the Company's portfolio of programs. In response to the Company's request for Rehearing, on September 13, 2018, the Commission issued an Order modifying the Company's portfolio and lifting the suspension.

7. Like the Company's prior annual DSM filings, this Application specifically addresses the requirements in prior Commission Orders[6] and is being made consistent with the Commission's September 18, 2007 Order in Case 2007-00369 granting Duke Energy Kentucky's request to file annual DSM applications no later than November 15. In the status

[4] Order in Case No. 2017-00427

[5] *In the Matter of the Joint Application Pursuant to 1994 House Bill No. 501 For the Approval of Principles of Agreement, Demand Side Management, The Union Light Heat and Power Company, and for Authority for the Union Light Heat and Power Company to Implement Various Tariffs and Receive Incentives Associated the Demand Side Management Programs,* Case No. 95-312, Order December 1, 1995.

[6] November 20, 2003 Order in Case No. 2003-00367, February 14, 2005 Order in Case 2004-00389, April 4, 2006 Order in Case No. 2005-00402, May 15, 2007 Order in Case No. 2006-00426, May 14, 2008 Order in Case No. 2007-00369, March 22, 2010 Order in Case No. 2009-00444, June 7, 2011 Order in Case No. 2010-00445, April 13, 2012 Order in Case No. 2011-00448, April 11, 2013 Order in Case No. 2012-495, March 28, 2014 Order in Case No. 2013-00395, May 7, 2015 Order in Case No. 2014-00388, April 4, 2016 Order in Case No 2015-00368, March 28, 2017 in Case No. 2016-00382, September 13, 2018 in Case No. 2017-00427, October 2, 2019 in Case No. 2018-00370, April 29, 2020 in Case No. 2019-00406, and April 9, 2021 in Case No. 2020-00371.

and reconciliation portion of this report, expenses are reported for the fiscal year period July 1, 2020 through June 30, 2021.

8. In this Application, Duke Energy Kentucky also requests an Order approving the proposed adjustments to the DSM riders and the revised rate tariffs (Appendices C – D).

**Definitions**

For the purposes of this Application, the following terms will have the following meanings:

9. **"DSM Revenue Requirements"** shall mean the revenue requirements associated with all Program Costs, Administrative Costs, Lost Revenues (less fuel savings), and the Shareholder Incentive.

10. **"Program Costs"** shall mean the costs incurred for planning, developing, implementing, monitoring and evaluating the DSM programs that have been approved by the Collaborative

11. **"Administrative Costs"** shall mean the costs incurred by or on behalf of the collaborative process and that are approved by the Collaborative, including, but not limited to, costs for consultants, employees and administrative expenses.

12. **"Lost Revenues"** shall have the same meaning as "LR" as described in Rider DSM - Demand Side Management Cost Recovery Rider, Sheet No. 75.

13. **"Shareholder Incentive"** shall have the same meaning as "PI" as described in Rider DSM - Demand Side Management Cost Recovery Rider, Sheet No. 75.

14. **"DSM Cost Recovery Mechanism"** shall refer to Rider DSM - Demand Side Management Cost Recovery Rider, Sheet No. 75.

## Status of Prior Portfolio of DSM Programs

15. Through June 30, 2021, Duke Energy Kentucky offered the following programs, the costs of which are recoverable through the DSM Cost Recovery Rider mechanism approved by the Commission in prior proceedings:

- Program 1: Residential Smart $aver® Energy Efficient Residences Program;
- Program 2: Residential Smart $aver® Energy Efficient Products Program;[7]
- Program 3: Residential Energy Assessments Program (Residential Home Energy House Call);
- Program 4: Low Income Services Program;
- Program 5: Residential Direct Load Control- Power Manager® Program;
- Program 6: Smart $aver® Prescriptive Program;
- Program 7: Smart $aver® Custom Program;
- Program 8: Peak Load Manager (Rider PLM) - PowerShare® Program;
- Program 9: Low Income Neighborhood Program;
- Program 10: My Home Energy Report Program;
- Program 11: Small Business Energy Saver Program;
- Program 12: Non-Residential Pay for Performance;[8] and

[7] The Smart $aver® Residential Energy Efficient Products Program and the Energy Efficient Residences Program are individual measures that are part of a single and larger program referred to and marketed as Residential Smart $aver®. For ease of administration and communication with customers the two measures have been divided into separate tariffs even though they are a single program.
[8] Marketed as Smart $aver® Performance

- Program 13: Peak Time Rebate Pilot Program.

16. This section of the Application provides a brief description of each current program, a review of the status of each program, and information on any changes that may have been made to the programs. The following table provides a summary of the load impacts achieved and level of participation obtained during this filing period.

| | 1 | Summary of Load Impacts July 2020 Through June 2021 | | |
|---|---|---|---|---|
| **Residential Programs** | | **Incremental Participation** | **kWh** | **kW** |
| Low Income Neighborhood | | - | - | - |
| Low Income Services | | 90 | 129,702 | 28 |
| My Home Energy Report | | 6,547 | 1,594,319 | 442 |
| Residential Energy Assessments | | 2,645 | 557,051 | 71 |
| Residential Smart $aver® | | 40,431 | 2,002,835 | 187 |
| Power Manager® | 2 | 12,372 | - | 13,370 |
| Peak Time Rebate Pilot Program | | 792 | - | 238 |
| **Total Residential** | | **62,877** | **4,283,907** | **14,336** |
| | | | | |
| **Non-Residential Programs** | | **Incremental Participation** | **kWh** | **kW** |
| Small Business Energy Saver | | 2,359,178 | 2,335,586 | 413 |
| Smart $aver® Custom | | 170 | 162,779 | 22 |
| Smart $aver® Prescriptive | | 21,340 | 4,180,363 | 714 |
| Power Manager® for Business | | 35 | - | 44 |
| PowerShare® | 3 | 16 | - | 14,609 |
| **Total Non-Residential** | | **2,380,739** | **6,678,729** | **15,802** |
| | | | | |
| **Total** | | **2,443,616** | **10,962,635** | **30,138** |

**1 - Impacts are net of freeriders, without losses and reflected at the customer meter point.**
**2 - Cumulative number of controlled devices installed. Impacts reflect average capability over the contract period.**
**3 - Impacts reflect average capability over the contract period.**

17. Results of the current cost-effectiveness test results for each of the programs are provided in Appendix A.

## Programs 1 and 2: Residential Smart $aver® Energy Efficient Residences and Products Programs

18. The purpose of the Residential Smart $aver® Energy Efficient Residences portion of the Residential Smart $aver® Program is to offer customers prescriptive incentives for a variety of energy conservation measures designed to target the largest energy consumption equipment and increase energy efficiency in their homes. The

program utilizes a network of participating contractors to encourage the installation of high efficiency equipment and the implementation of energy efficient home improvements with eligible customers. Equipment and services to be incentivized include:

- Installation of high efficiency air conditioning (AC) and heat pump (HP) systems;
- Implementation of attic insulation and air sealing services;
- Implementation of duct sealing and insulation services; and
- Installation of efficient heat pump water heaters.

19. The Program includes a tier approach to the level of incentives available for AC and HP system replacements based on the efficiency rating of the system, along with an optional additional incentive if a qualifying smart thermostat is included and installed with the replacement. A referral marketing component for eligible trade allies has also been added as a delivery channel to enhance customer experience as the customer is making the energy efficient purchase decision. The Program continues to experience a steady demand from customers participating in the incentives. During the period July 2020 through June 2021, the Program approved over 1,400 individual rebate applications.

20. Duke Energy Kentucky currently contracts with Blackhawk Engagement Solutions (BES) to administer this program. BES provides services including application processing and fulfillment, data reporting, call center services, and IT support for program tools such as the trade ally portal which allows trade allies to register, check customer eligibility, and submit applications online. These Residential Smart $aver® services are jointly implemented with the Duke Energy Indiana, Duke Energy Carolinas, and Duke Energy Progress territories to reduce administrative costs and leverage promotion. BES has

experience in delivering similar utility energy efficiency programs.

21. The purpose of the Residential Smart $aver® Energy Efficient Products portion of the Residential Smart $aver® Program is to provide high efficiency lighting through various channels, along with other high efficiency products in new or existing residences, including pool pumps, water measures for single family, and water measures for multifamily.

22. The Free Lighting component of the program was discontinued on June 30, 2020 as a result of potential efficiency standards for general service bulbs that may be imposed as a part of the Energy Independence and Security Act (EISA). Although, there is still uncertainty as to how and when this legislation will be imposed, Duke Energy Kentucky moved forward with its sunsetting strategy. Although no orders could be placed by a customer after June 30, 2020, participation continued to come in through mid-July as a result of supply chain issues with delaying inventory arrival to fulfill June orders. This accounted for 936 orders/13,839 bulbs. In addition, the program continued to offer customer service to customers receiving free LEDs for three additional months after the June 30, 2020 discontinuation (through September 30, 2020). As a result, 16 orders were returned during this timeframe accounting for 225 bulbs.

23. The Residential Smart $aver® lighting program launched an online Saving Store for specialty lighting on April 26, 2013. The Savings Store is an extension of the on-demand ordering platform enabling eligible customers to purchase specialty bulbs and have them shipped directly to their homes. The program offers a variety of LEDs including: Reflectors (indoor and outdoor), Globes, Candelabra, 3 ways, and Dimmables. The program discontinued offering A-line type bulbs in 2020. The incentive levels vary by bulb

type and the customer pays the difference, including shipping.

24. In 2020, the program was approved to add smart thermostats, water products, LED fixtures, & small appliance- dehumidifiers & air purifiers. Customer purchase limits are as follows:

- Smart thermostats, 2 total;
- Water measures, 3 total;
- LED fixtures (direct wires, portable, & outdoor photocell), limit 8 total; and
- Small appliance, dehumidifiers & air purifiers, limit 2 each total.

25. Customers can check eligibility and shop for a variety of energy efficient products through the Company Web Site and My Account (formally OLS). The Savings Store is managed by a third-party vendor, Energy Federation Inc. (EFI). EFI is responsible for maintaining the Savings Store and fulfilling all customer purchases. The Saving Store landing page provides information about the store, energy efficient products, account information and order history. Support features include a toll-free number, Live Chat, package tracking and frequently asked questions.

26. Educational information is available to help assist customers with their purchasing decisions. The information discusses bulb types, application types, benefits of energy efficient products, understanding watts versus lumens and recycling/safety tips.

27. The Online Savings Store program carefully tracks towards budget by monitoring our marketing activities to customers. The program drove 1,806 unique orders and sold approximately 11,623 LED bulbs, 29 fixtures, 1,046 smart thermostats, 4 air purifiers and 6 water measures.

28. The Multifamily Energy Efficiency Program is an extension of the Residential Smart $aver® lighting program and allows Duke Energy Kentucky to use an alternative delivery channel which targets multifamily apartment complexes. The measures are directly installed in permanent fixtures by the program vendor, Franklin Energy. The target audience for the program is property managers who have properties that are served on an individually metered residential rate schedule. To receive water measures, apartments must have electric water heating. Properties that have already been served by the Property Manager CFL program are only eligible for water measures and specialty bulbs.

29. The program helps property managers upgrade lighting with energy efficient LEDs and saves energy by offering water measures such as bath and kitchen faucet aerators, water saving showerheads and pipe wrap. The quantity of lighting measures installed may vary by apartment size but there are no limits on LED installations in permanent fixtures. These measures assist with reducing maintenance costs while improving tenant satisfaction by lowering energy bills.

30. As program implementer, Franklin Energy is responsible for all marketing and outreach for the program. This is primarily done through outbound calls and on-site visits to solicit initial interest in the program from property managers in the Company's service territory. Additionally, program information and supporting documents are available on the Duke Energy Kentucky web site for property managers to learn more about the program and request applications to participate in the program.

31. Duke Energy Kentucky received approval to replace CFLs with LEDs for

the lighting offering associated with the Multi-Family Program.[9] Beginning in July 2017, the program began installing LED lighting. The program also added two additional bulb types to bring the LED offering to three types with unlimited quantities per unit. The three bulbs (A-Line, Candelabras, and Globes) provide more options for tenants, are more aesthetically appealing and create more bill savings. In 2019, the program added new 4000K LED bulb options for A-lines. These bulbs provide a brighter, whiter light which has been requested by several property management companies. Property managers and owners also receive benefits with the longer lasting bulbs, which reduce maintenance costs for the properties and make the units more marketable to tenants.

32. The program was suspended in mid-March 2020 due to the COVID-19 pandemic and concerns for the safety of customers and program staff. The program remained suspended through July 1, 2020 – June 30, 2021 fiscal year.

33. The Save Energy and Water Kit (SEWK) program is designed to increase the energy efficiency of residential customers by offering customers low flow water devices and insulating pipe tape to install within their homes. The SEWK offer is available through a business reply card (BRC) or through direct email solicitation, enabling customers to request a kit and have it shipped directly to their homes. A website has been established to provide customers with additional information about the program and instructional videos to assist in the installation of items from the do it yourself (DIY) kit.

34. To be eligible, customers must have an electric water heater, have not already participated in SEWK or another Duke Energy Kentucky program offering water saving devices, and live in a single-family, owner-occupied home. Eligible customers, who

[9] *In the Matter of the Application of Duke Energy Kentucky, Inc., to Amend its Demand Side Management Programs,* Case No. 2016-00289, KY. P.S.C. Order January 24, 2017.

respond to the BRC or email offer, will receive a kit free of charge. There are two kit sizes to accommodate homes with one or more full bathrooms. The kit size available to the customer is predetermined based on the square footage of the home. Customers in homes less than or equal to 1,500 square feet receive a one (1) bath kit. Customers in homes greater than 1,500 square feet receive a two (2) bath kit. The kits contain varying quantities of shower heads, bath aerators, kitchen aerators and insulated pipe tape.

35. The SEWK program is an invitation only program where customers are prequalified and then directly solicited for participation. This allows the program to carefully track performance against budget and adjust marketing efforts as needed. The program shipped 1,344 kits containing 4,032 kitchen and bath aerators, 1,935 showerheads, and 6,720 feet of insulating pipe wrap for a total of 12,687 measures.

**Program 3: Residential Energy Assessments Program**

36. The primary goal for Home Energy House Call (HEHC) is to empower customers to better manage their energy usage and cost. Duke Energy Kentucky partners with several key vendors to administer the program which an energy specialist completes a 60 to 90-minute walk through assessment of the home and analyzes energy usage to identify energy savings opportunities. The Building Performance Institute (BPI) building certified energy specialist discusses behavioral and equipment modifications that can save energy and money with the customer. The program targets Duke Energy Kentucky residential customers that own a single family residence that has electric water heater and/or electric heat, or central air. The energy specialist analyzes energy usage, checks air infiltration, examines insulation levels, checks appliances, and inspects the heating/cooling system(s). The report focuses on the building envelope improvements

as well as low-cost and no-cost improvements to save energy. At the time of the home audit, the customer receives a free efficiency kit containing a variety of energy saving measures energy efficient lighting, low flow shower head, low flow faucet aerators, outlet/switch gaskets and weather stripping. The auditors will install these measures, if approved by the customer, so the customer can begin saving immediately, and to help insure proper installation and use. Example recommendations might include the following:

- Turning off vampire load equipment when not in use;
- Turning off lights when not in the room;
- Using energy efficient lighting in light fixtures;
- Using a programmable/smart thermostat to better manage heating and cooling usage;
- Replacing older equipment with more energy efficient equipment; and
- Adding insulation and sealing the home.

37. The program primarily targets through online channels, electronic mail, and direct mail to acquire the participation for this program.

38. The program temporarily paused for the remainder of the fiscal year and discontinued marketing outreach effective March 16, 2020 due to the pandemic. During this time, existing appointments were cancelled or rescheduled based on customer preference. Two hundred sixty customers were impacted in the duration of the pandemic related pause. The program proactively rescheduled 35 percent of those appointments in March 2020 when making the cancellation contact. Adapting to the impacts of the

pandemic, the program evaluated and coordinated with the current implementor to integrate new safety protocols and effectively relaunched the program in July 2020. On January 1 of 2021, the program was shut down again until March 29th due to the pandemic and safety concerns. During this time, any existing scheduled appointments were cancelled and attempted to be rescheduled to a future date. The program continues to evaluate customer and employee feedback as it relates to the pandemic to ensure the team is adapting as soon as possible to customer needs as well as maximizing safety awareness. The program was also approved to begin offering additional measures that included an additional assessment kit with an assessment with blower door, handheld low-flow showerheads, smart thermostats, specialty globes and candelabras, and recessed LED bulbs. The program ended the fiscal year completing 539 assessments and installed 1,300 additional LED bulbs, 67 additional bathroom aerators, 10 specialty globes, 25 LED candelabras, 55 recessed LED bulbs and 649 feet of pipe insulation.

**Program 4: Low Income Services Program**

***Weatherization***

39. The Weatherization program portion of Low-Income Services is designed to help income-qualified customers that are below 200 percent of the federal poverty level to reduce their energy consumption and lower their energy cost. The program works with local weatherization agencies using Federal DOE/LIHEAP funds as well as other community outreach initiatives for participation. The program provides the agencies incentives for installing energy efficient measures in qualified customers' homes. Agencies also educate customers on their energy usage and other opportunities that can help reduce energy consumption and lower energy costs. The program has provided

weatherization services to the following number of customers:

| Fiscal Year | Customers Served |
|---|---|
| 1999 - 2000 | 251 |
| 2000 - 2001 | 283 |
| 2001 - 2002 | 203 |
| 2002 - 2003 | 252 |
| 2003 - 2004 | 252 |
| 2004 - 2005 | 130 |
| 2005 - 2006 | 232 |
| 2006 - 2007 | 252 |
| 2007 - 2008 | 265 |
| 2008 - 2009 | 222 |
| 2009 - 2010 | 199 |
| 2010 - 2011 | 234 |
| 2011 - 2012 | 220 |
| 2012 - 2013 | 228 |
| 2013 - 2014 | 143 |
| 2014 - 2015 | 203 |
| 2015 - 2016 | 162 |
| 2016 - 2017 | 166 |
| 2017 - 2018 | 127 |
| 2018 – 2019 | 120 |
| 2019 – 2020 | 99 |
| 2020 - 2021 | 81 |

40. The program is structured so that homes needing the most work, and having the highest energy use per square foot, receive the most funding. The program accomplishes this by placing each home into one of two "Tiers." For each home, the field auditor uses the National Energy Audit Tool (NEAT) to determine which specific measures are cost effective for that home.

The tier structure is defined as follows:

| | Therm / square foot | kWh use/ square foot | Investment Allowed |
|---|---|---|---|
| Tier 1 | 0 < 1 therm / ft2 | 0 < 7 kWh / ft2 | Up to $600 |
| Tier 2 | 1 + therms / ft2 | 7 + kWh / ft2 | All SIR* $\geq$ 1.5 up to $4K |

*SIR = Savings - Investment Ratio

**Tier One Services**

41. Tier 1 services are provided to customers through weatherization agencies. Customers are considered Tier 1 if they use less than 1 therm per square foot per year or less than 7-kilowatt hour (kWh) per square foot per year, based on a year's usage of Company supplied fuels. Square footage of the dwelling is based on conditioned space only, whether occupied or unoccupied. It does not include unconditioned or semi-conditioned space (non-heated basements). The total program dollars allowed per home for Tier One services is $600.00 per home. Tier One services are as follows:

- Furnace / Heating system Tune-up & Cleaning;
- Furnace repair up to $600;
- Venting check & repair;
- Water Heater Wrap and Pipe Wrap;
- Cleaning of refrigerator coils;
- Cleaning of dryer vents;
- Energy Efficient Light Bulbs;
- Low-flow shower heads and aerators;
- Weather-stripping doors & windows;
- Limited structural corrections that affect health, safety, and energy up to $150; and,
- Energy Education.

**Tier Two Services**

42. Duke Energy Kentucky will provide Tier Two services to a customer if they use at least 1 therm or at least 7 kWh per square foot per year based on the annual usage of

Duke Energy Kentucky supplied fuels.

Tier Two services are as follows:

- All Tier One services; plus
- Additional cost-effective measures (with SIR $\geq$ 1.5) based upon the results of the NEAT audit. Through the NEAT audit, the agency can determine if energy saving measures pay for themselves over the life of the measure as determined by a standard heat loss/economic calculation (NEAT audit) utilizing the cost of gas and electric as provided by Duke Energy Kentucky. Such items can include but are not limited to attic insulation, wall insulation, crawl space insulation, floor insulation and sill box insulation. Safety measures applying to the installed technologies can be included within the scope of work considered in the NEAT audit if the SIR is greater than 1.5 including the safety changes; and
- Replacement of heating system if cannot be repaired.

Regardless of placement in a specific tier, Duke Energy Kentucky provides energy education to all customers in the program.

43. Refrigerator replacement is also a component of this program. To determine replacement, the program weatherization provider performs a two-hour meter test of the existing refrigerator unit. If it is a high-energy consuming refrigerator, as determined by this test, the unit is replaced. Replacing with a new Energy Star qualified refrigerator, with an estimated annual usage of 400 kWh, results in an overall savings to the average customer typically more than 1,000 kWh per year.

Refrigerators tested and replaced:

| Year | Refrigerators Tested | Refrigerators Replaced |
|---|---|---|
| 2002 – 2003 | 116 | 47 |
| 2003 – 2004 | 163 | 73 |
| 2004 – 2005 | 115 | 39 |
| 2005 – 2006 | 116 | 52 |
| 2006 – 2007 | 136 | 72 |
| 2007 – 2008 | 173 | 85 |
| 2008 – 2009 | 153 | 66 |
| 2009 – 2010 | 167 | 92 |
| 2010 – 2011 | 112 | 76 |
| 2011 – 2012 | 107 | 64 |
| 2012 – 2013 | 206 | 69 |
| 2013 – 2014 | 112 | 37 |
| 2014 – 2015 | 42 | 24 |
| 2015 – 2016 | 60 | 22 |
| 2016 – 2017 | 92 | 54 |
| 2017 - 2018 | 48 | 18 |
| 2018 – 2019 | 43 | 12 |
| 2019 – 2020 | 66 | 15 |
| 2020 - 2021 | 19 | 15 |

The existing refrigerator being replaced is removed from the home and recycled in an environmentally appropriate manner to assure that the units are not used as a second refrigerator in the home or do not end up in the secondary appliance market.

44. The Weatherization and Refrigerator Replacement programs were affected by the impacts of the pandemic, with shutdowns in 2020, and participation significantly lower. In recognition of the COVID-19 environment that now exists, proper safety protocols are being adhered to, to ensure everyone's safety always.

**Payment Plus**

45. The Payment Plus portion of Low-Income Services program is designed to impact participants' behavior (*e.g.*, encourages utility bill payment and reducing arrearages) and to generate energy conservation impacts.

The program is made up of three components:

- Energy Education & Budget Counseling – to help customers understand how to control their energy usage and how to manage their household bills, a combined education/counseling approach is used;
- Weatherization – to increase the energy efficiency in customers' homes, participants are required to have their homes weatherized as part of the normal Residential Conservation and Energy Education (low-income weatherization) program unless weatherized in past program years; and,
- Bill Assistance – to provide an incentive for these customers to participate in the education and weatherization, and to help them get control of their bills. Payment assistance credits are provided to each customer once they complete each aspects of the program. The credits are: $200 for participating in the EE counseling, $150 for participating in the budgeting counseling, and $150 for participating in the Residential Conservation and Energy Education program (weatherization services). If all the requirements are completed, a household could receive up to a total of $500 towards their arrearage. This allows for approximately 200 homes to participate per year. Some customers do not complete all three steps or may have already had weatherization services completed prior to the program.

46. This program is offered twice over six winter months per year (October-March).

47. Duke Energy Kentucky utilizes a community action agency to recruit customers to participate in the Payment Plus program. The Payment Plus program is

designed to help income-qualified customers that are below 200 percent of the federal poverty level to reduce their energy consumption and lower their energy cost. Using a list of potential customers provided by Duke Energy Kentucky, the agency sends a letter describing the program to eligible customers. Included in this letter are various dates, times, and locations of scheduled classes. The courses are designed to accommodate customers with varied schedules and widespread locations. The customer contacts the agency to register for a course. Make-up courses are also offered to those customers who may have missed their initial scheduled time.

48. For the filing period, 50 participants attended energy education counseling, 50 participants attended budget counseling and 5 participants' homes have been weatherized. The participation was significantly down in 2020 since the classes were suspended in March due to COVID-19, resulting in lower participation from previous years.

**Program 5: Residential Direct Load Control - Power Manager® Program**

49. The purpose of the Power Manager® program is to reduce demand by controlling residential air conditioning usage during periods of peak demand, high wholesale price conditions and/or generation emergency conditions during the summer months. It is available to residential customers with central air conditioning. Duke Energy Kentucky attaches a load control device to the outdoor unit of a customer's air conditioner. This enables Duke Energy Kentucky to cycle the customer's air conditioner off and on under appropriate conditions.

50. Customers selecting the option that moderately cycles their air conditioner, receive a $25 credit at installation. Customers selecting the longer cycling option, receive

a $35 credit at installation.

51. Customers also receive annual credits during the months of May - September depending on the program they signed-up for. Customers that signed-up for the moderate control option receives an annual event credit of $2.40 per month for each year they are on the program and customers that signed-up for the longer control option receive an annual event credit of $3.60 per month each year they are on the program.

52. Duke Energy Kentucky continues to use load control devices manufactured by Eaton's Cooper Power Systems for new installations and replacement of existing load control devices. The load control devices have built-in safeguards to prevent the "short cycling" of the air-conditioning system. The air-conditioning system will always run the minimum amount of time required by the manufacturer. The cycling simply causes the air-conditioning system to run less, which is no different than what it does on milder days. Additionally, the indoor fan will continue to run and circulate air during the cycling event.

53. The Company continued its primary Power Manager® marketing during the past fiscal year through outbound telephone calling. Providing customers with an opportunity to ask questions before deciding to participate has proven to be a significant attribute in making this the most effective sales channel.

54. Ongoing evaluation, measurement, and verification (EM&V) is conducted through a sample of Power Manager® customers with devices that record hourly run-time of the air conditioner unit and with load research interval meters that measure the household kWh usage. Operability studies are also used to measure the performance of Power Manager® load control devices in Kentucky. In addition, Duke Energy Kentucky has reviewed the statistical sampling requirements of PJM Interconnection, LLC (PJM) for

demand response resources of this type. The Duke Energy Kentucky studies comply with all PJM requirements.

55. There were no Power Manager® events that took place from July 2020 through June 2021 event season. There was a PJM required one-hour test on September 3, 2020.

**Program 6: Smart $aver® Prescriptive Program**

56. The Smart $aver® Non-residential Prescriptive Incentive Program provides incentives to commercial and industrial consumers for installation of high efficiency equipment in applications involving new construction, retrofit, and replacement of failed equipment. The program also uses incentives to encourage maintenance of existing equipment to reduce energy usage. Incentives are provided based on Duke Energy Kentucky's cost effectiveness modeling to assure cost effectiveness over the life of the measure.

57. Commercial and industrial consumers can have significant energy consumption but may lack knowledge and understanding of the benefits of high efficiency alternatives. The program provides financial incentives to help reduce the cost differential between standard and high efficiency equipment, offer a quicker return on investment, save money on customers' utility bills that can be reinvested in their business, and foster a cleaner environment. In addition, the program encourages dealers and distributors (or market providers) to stock and provide these high efficiency alternatives to meet increased demand for the products.

58. The program promotes prescriptive incentives for the following technologies – lighting, HVAC, pumps, variable frequency drives, food services, and

process equipment. The eligible measures, incentives and requirements for both equipment and customer eligibility are listed in the applications posted on Duke Energy's website.

59. The program has developed multiple approaches to reaching the very broad and diverse audience of business customers. In 2020-21, this consisted of incentive payment applications, with paper and online options, and instant incentives offered through the Online Energy Savings Store. 2020-21 results include:

- Customers showed high interest in the Smart $aver® Prescriptive Program, even in the midst of negative effects on businesses from the COVID-19 pandemic. Many customers utilized the Prescriptive incentive prequalification feature in the 2019-20 fiscal year and early in the 2020-21 fiscal year to reserve incentive funds on planned projects, which led to Prescriptive incentive funds becoming fully reserved in August 2020. A waitlist was then established for new applications once funds were fully reserved.
- Outreach continues to support Trade Allies virtually working within the program.
- Program marketing efforts were postponed in 2020-21 due to budgetary limitations.
- A dedicated team of representatives answering customer questions via phone and email continue to provide high levels of customer service.

60. The Non-residential Prescriptive program ended the year at 109 percent of the kWh savings goal and was able to leverage excess funds from the Smart $aver® Custom Program in order to fulfill customer incentive requests on prequalified applications and

applications on the waitlist once the Prescriptive incentive budget was depleted. In anticipation of increased customer demand, the Company sought approval to add the unspent $1,396,010 from the 2019-20 Non-Residential budget to the 2020-21 Smart $aver® Prescriptive budget of $548,785 for July 2020 – June 2021, as approved in Case No. 2019-00406. This request was denied, so the Smart $aver® Prescriptive program remained fully reserved and used a waitlist to manage customer incentive applications for the balance of the 2020-21 fiscal year.

61. Duke Energy Kentucky continues to offer the Business Savings Store on the its website, with orders fulfilled by the third-party Energy Federation Inc. (EFI). The site provides customers the opportunity to take advantage of a limited number of incentive measures by purchasing qualified products from an on-line store and receiving an instant incentive that reduces the purchase price of the product. The incentives offered in the store are consistent with current program incentive levels. The online application store has been well received by the DIY niche market and allows customer a path for instant incentives without the burden of paperwork.

62. Over the years, the program has worked closely with Trade Allies (TA) to promote the program to our business customers at the critical point in time when customers are considering standard or high efficiency equipment options. The Smart $aver® outreach team provides training and technical support to the TA network. The outreach team also recruits new TAs to participate in the program. TA company names and contact information appears on the TA search tool located on the Smart $aver® website. This tool was designed to help customers who do not already work with a TA, to find someone in their location who can serve their needs. The Company continues to look for ways to engage the TAs in

promotion of the program as well as more effective targeting of TAs based on market opportunities.

63. Duke Energy Kentucky continues to evaluate changes to existing measures, to take into consideration changes to market conditions and energy efficiency standards, and the addition of measures to offer customers additional options for energy savings. Any future measure changes will be presented to the Commission in accordance with the applicable review and approval processes and procedures.

64. The Company continues to work with outside consultants and internal resources to develop strategies to understand equipment supply/value chains and increase awareness of these measures going forward.

65. Non-residential customers are informed of programs via targeted marketing material and communications. Information about incentives is also distributed to TAs, who in turn sell equipment and services to all sizes of nonresidential customers. Large business or assigned accounts are targeted primarily through assigned Duke Energy Kentucky account managers. Accounts that do not have an assigned account manager typically receive information about the program through direct mail, electronic mail and other direct marketing efforts including outbound call campaigns. Planned program marketing efforts were postponed in 2020-21 due to COVID-19 considerations and budgetary limitations.

66. The internal marketing channel is comprised of assigned Large Business Account Managers, Segment Managers, and Local Government and Community Relations, and Business Energy Advisors, who all identify potential opportunities as well as distribute program collateral and informational material to customers and TAs. In addition, the Economic and Business Development groups also provide a channel to customers who are

new to the service territory.

**Program 7: Smart $aver® Custom Program**

67. The purpose of this program is to encourage the installation of high efficiency equipment in new and existing non-residential establishments. The program provides incentive payments to offset a portion of the higher cost of energy efficient equipment.

68. Duke Energy Kentucky contracts with a third party to perform technical review of applications as part of implementation of this program. This program is jointly implemented with the Duke Energy Indiana and Duke Energy Carolinas territories to reduce administrative costs and leverage promotion.

69. During the current reporting period of July 2020 through June 2021, the Kentucky Smart $aver® Custom Incentive program provided incentives totaling $579 to 1 customer. A total of 5 applications were received resulting $232,000 in new incentive offers. The level of participation in terms of incentives and impacts decreased sharply from the previous year.

70. Although participation was lower than the prior year, the Custom Incentive program continues to utilize a reservation system to allocate available incentive dollars for each fiscal year. Currently, all the funds for 2021-2022 incentive dollars are reserved due to higher levels of participation to start the year.

71. Upon receiving a Custom Incentive application, Duke Energy Kentucky reviews the application and performs a technical evaluation as necessary to validate energy savings. Measures submitted by the customer are then modeled to ensure cost effectiveness to the program overall, given the energy savings, and improves a customer's payback to

move them to invest in energy efficiency. Third party evaluation follow-up and review includes: application review, site visits and/or onsite metering and verification of baseline energy consumption, customer interviews, and/or use of loggers/sub-meters.

72. Smart $aver® Prescriptive & Custom program management have collaborated to share program funding from Smart $aver® Custom to Prescriptive to ensure spend levels do not exceed the total of the two programs. Moving forward, the program will be consolidated as Non-Residential Smart $aver®.

**Program 8: Peak Load Manager (Rider PLM) - PowerShare® Program**

73. PowerShare® is the brand name given to Duke Energy Kentucky's Peak Load Management Program (Rider PLM, Peak Load Management Program KY.P.S.C. Electric No. 2, Sheet No. 77). Rider PLM was approved pursuant as part of the settlement agreement in Case No. 2006-00172. In the Commission's Order in Case No. 2006-00426, approval was given to include the PowerShare® program within the DSM programs. The PLM program is voluntary and offers customers the opportunity to reduce their electric costs by managing their electric usage during the Company's peak load periods. Customers and the Company will enter into a service agreement under Rider PLM, specifying the terms and conditions under which the customer agrees to reduce usage. There are two product options offered for PowerShare® - CallOption® and QuoteOption®:

- CallOption®:
    - A customer served under a CallOption® product agrees, upon notification by the Company, to reduce its demand;
    - Each time the Company exercises its option under the agreement, the Company will provide the customer a credit for the energy

reduced;

- For the 2020/2021 program year, there was one type of event;
  - Emergency events are implemented due to reliability concerns. Participants are required to curtail during emergency events.
- In addition to the energy credit, customers on the CallOption® will receive an option premium credit;
- For the 2020/21 PowerShare® programs associated with the fiscal year of this filing, there were three enrollment choices for customers relative to CallOption. The first choice, "Limited Summer", required participants to be able to curtail during the months of June through September 2020, with a maximum event length of 8 hours and maximum number of curtailments of 10 during the program year. The second choice, "Summer Period", required participants to be able to curtail during the months of June through October 2020 and May 2021, with a maximum event length of 12 hours and no maximum number of curtailment events. The third choice, "Annual", requires participants to be able to curtail during the full contract term of June 2020 through May 2021, with a maximum event length of 12 hours during the months of June through October 2020 and May 2021, and with a maximum event length of 15 hours during the months of November 2020 through April 2021 and no maximum number of curtailment events. Duke Energy Kentucky is seeking approval to discontinue its "Limited Summer" program

option effective May 31, 2022. Resources with a limited number of curtailment events are no longer eligible for registration and therefore hold no value with PJM.

- Only customers able to provide a minimum of 100 kW load response qualify for CallOption®.

- QuoteOption®:
  - Under the QuoteOption® products, the customer and the Company agree that when the average wholesale market price for energy during the notification period is greater than a pre-determined strike price, the Company may notify the customer of a QuoteOption® event and provide a price quote to the customer for each event hour;
  - The customer will decide whether to reduce demand during the event period. If they decide to do so, the customer will notify the Company and provide an estimate of the customer's projected load reduction;
  - Each time the Company exercises the option, the Company will provide the participating customer who reduces load an energy credit;
  - There is no option premium for the QuoteOption® product since customer load reductions are voluntary; and
  - Only customers able to provide a minimum of 100 kW load response qualify for QuoteOption®.

**PowerShare® 2020-2021 Summary**

74. Duke Energy Kentucky's customer participation goal for 2020 was to retain all customers that currently participate and to promote customer migration to the CallOption® program. The table below displays monthly account participation levels for July 2020 through June 2021, as well as MWs enrolled in the program.

| Kentucky PowerShare® Participation Update | | | | |
|---|---|---|---|---|
| | CallOption® | | QuoteOption® | |
| Month | Enrolled Customers* | Summer Capability** | Enrolled Customers* | Summer Capability** |
| Jul-20 | 17 | 18.92 | 0 | 0 |
| Aug-20 | 17 | 18.92 | 0 | 0 |
| Sep-20 | 17 | 15.91 | 0 | 0 |
| Oct-20 | 17 | 15.91 | 0 | 0 |
| Nov-20 | 17 | 15.91 | 0 | 0 |
| Dec-20 | 17 | 15.91 | 0 | 0 |
| Jan-21 | 17 | 15.91 | 0 | 0 |
| Feb-21 | 17 | 15.91 | 0 | 0 |
| Mar-21 | 17 | 15.91 | 0 | 0 |
| Apr-21 | 17 | 15.91 | 0 | 0 |
| May-21 | 17 | 15.91 | 0 | 0 |
| Jun-21 | 12 | 13.22*** | 0 | 0 |

*Enrolled Customers represents the number of parent accounts participating.

**Summer Capability is consistent with the associated program year. Numbers reported are adjusted for losses.

***Estimated Summer capability

(Note that Duke Energy Kentucky has signed 12 contracts for the 2021/2022 PowerShare® CallOption®. Measured and verified MW values for the summer of 2020 will be available and presented in the update filing.)

75. During the July 2020 through June 2021 period, there were zero PowerShare® CallOption® or QuoteOption® events. There were curtailment tests performed to meet PJM requirements. The table below summarizes event participation.

| Duke Energy Kentucky - PowerShare CallOption and QuoteOption<br>Economic, Emergency, and Test Events<br>July 2020 - June 2021 Activity - Reduction Values in MWs | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | Event Hours (EDT) | Event Type | Event Participants | Participants Reducing Load Partially or Fully | Average Hourly Load Reduction Expected - At the Meter | Average Hourly Load Reduction - At the Meter | Average Hourly Load Reduction - At the Plant |
| 9/3/2020 | 4 pm to 5 pm | PJM Test | 15 | 15 | 12.008 | 17.774 | 19.146 |
| 9/17/2020 | 4 pm to 5 pm | PJM Test | 1 | 1 | 0.884 | 0.893 | 0.961 |
| 9/24/2020 | 4 pm to 5 pm | PJM Re-Test | 1 | 0 | 0.150 | 0.00 | 0.00 |
| 9/29/2020 | 4 pm to 5 pm | PJM Re-Test | 1 | 1 | 0.150 | 0.107 | 0.115 |

(Note that for the summer period of June 2021 through September 2021, zero PowerShare® events have been called. The annual, required, PJM test event was conducted on September 2, 2021 at 4 pm. Information on these events will be available and presented in next year's update filing.)

**Program 9: Low Income Neighborhood Program**

76. The Duke Energy Kentucky Neighborhood Energy Saver (NES) Program takes a non-traditional approach to serve income-qualified areas of the Duke Energy Kentucky service territory through the direct installation of energy efficiency measures in customer homes. This customer-facing program allows for the direct engagement in a familiar setting to reduce energy consumption with the installation of energy efficient measures. In addition, Duke Energy Kentucky uses this opportunity to educate and work with customers to efficiently manage and lower their energy bills. Examples of direct installed measures include energy efficient light bulbs, water heater and pipe wrap, low flow shower heads/faucet aerators, window and door air sealing and a year supply of HVAC filter replacements.

77. As low-income neighborhoods are identified for the program, if at least 50percent percent of the households are at or below 200percent percent of the federal poverty

guidelines, a community with an average size of about 900 customers is selected. Duke Energy Kentucky analyzes census and internal data to select and prioritize neighborhoods that have the greatest need and propensity to participate. While the goal is to serve neighborhoods where most residents are low income, the program is available to all Duke Energy Kentucky customers within the selected boundary. This program is available to both homeowners and renters occupying single family and multi-family dwellings in the target neighborhoods that have electric service provided by Duke Energy Kentucky.

78. In the past, community-based kick-off events have been held in targeted neighborhoods. Kick-off events have featured local community leaders, community-based organization representatives, local weatherization program managers, the installation vendor, and the technical crew. The Duke Energy Kentucky program manager and vendor provide attendees detailed information about NES along with a tentative neighborhood schedule.

79. The purpose of the kick-off event has been to rally the neighborhood around energy efficiency and educate customers on actions they can take to help lower their energy bills and save energy. Additionally, attendees have had the opportunity to meet technical staff and view measures. In days, or a few weeks, shortly following the kick-off event, customers are contacted by the technical crew to receive the free in-home energy assessments (walk-through) and the appropriate energy saving measures are installed if the customer elects to have the work completed. Direct mail and call center support supplement community-based outreach efforts.

80. In recognition of the COVID-19 environment that now exists, proper safety protocols shall be adhered to, to ensure everyone's safety always. Future kick-off events are anticipated to look different which shall at minimum include an outdoor venue (weather

permitting), masks, attendees socially/physically distanced at 6 feet apart, etc. Future community customer engagement opportunities shall be regularly reviewed on a case-by-case basis.

81. For fiscal year 2020-2021, with a participation goal of 600 homes, we have completed 0 homes in Duke Energy Kentucky territory. The existence of a new COVID-19 environment led to work stoppage due to a local government mandate to engage in customer-facing activities when most safe to do so. With this challenge, Duke Energy Kentucky continues to collaborate with organizations such as the Northern Kentucky Community Action Commission, People Working Cooperatively and other local agencies, businesses, and government-backed programs to rally around efforts of the NES program. Duke Energy Kentucky's NES program provides residents information about the service and helps leverage additional services available in their communities. The program has been well-received, and neighbors regularly share the benefits of their experience with others.

82. Duke Energy Kentucky is requesting to expand the NES program by adding NES 2.0. In addition to the current 16 measures offered to customers, we are requesting to revise the available measures to include insulation, air sealing, duct sealing, and smart thermostats to address customers high energy use. Eligibility of the revised measures (NES 2.0) will be made available to customers that the Company deems a high-energy user.

**Program 10: My Home Energy Report Program**

83. The My Home Energy Report (MyHER) compares household electric usage to similar, neighboring homes, and provides recommendations and actionable tips to lower energy consumption. The report also informs a customer of the Company's other energy efficiency programs when applicable. These normative comparisons are intended to induce

customers to adopt more efficient energy consumption behavior. MyHER is delivered in printed and email form. The reports are distributed up to 12 times per year (2 printed reports and 12 electronic reports if the customer provides their email address). Currently, to qualify to receive the report, customers must be living in a single metered, single family home with 13 months usage history.

84. The MyHER program, originally an opt out program, has been changed to an opt in program beginning in 2019-2020, the next fiscal term following the Commission's September 13, 2018 Order. The Company provides information on every report as to how a customer may update their information or request to stop receiving the reports. In 2021, the program has had 10 opted in customers decide to opt out of the program after receiving reports. As of June 30, 2021, there were 6,547 Kentucky MyHER customers receiving reports.

85. The Company has designed an interactive portal and enabled email technology to further engage with customers with the intention of increasing the level of engagement with customers and hence their efficiency. This portal is available online and through mobile channels. The portal was rolled out in March 2015 with a small email campaign for MyHER customers for whom we have an email address. As of June 30, 2021, there were 4,219 Kentucky MyHER customers enrolled in the portal.

86. The Company launched the MyHER program in the Duke Energy mobile app starting in 2019. Customers who have opted into the program are now able to see their My Home Energy Report monthly comparisons and usage disaggregation on the Duke Energy mobile app.

**Program 11: Small Business Energy Saver Program**

87. The purpose of Duke Energy Kentucky's Small Business Energy Saver program (SBES Program) is to reduce energy usage through the direct installation of energy efficiency measures within qualifying small non-residential Duke Energy Kentucky customer facilities. All aspects of the SBES Program are administered by a single Company-authorized vendor. The SBES Program measures address major end-uses in lighting, refrigeration, and HVAC applications.

88. The SBES Program participants receive a free, no-obligation energy assessment of their facility followed by a recommendation of energy efficiency measures to be installed in their facility along with the projected energy savings, costs of all materials and installation, and up-front incentive amount from Duke Energy Kentucky. Upon receiving the results of the energy assessment, if the customer decides to move forward with the proposed energy efficiency project, the customer makes the final determination of which measures will be installed. The energy efficiency measure installation is then scheduled at a convenient time for the customer and the measures are installed by electrical subcontractors of the Duke Energy Kentucky-authorized vendor.

89. The SBES Program is designed as a pay-for-performance offering, meaning that the Duke Energy Kentucky-authorized vendor administering the SBES Program is only compensated for kWh energy savings produced through the installation of energy efficiency measures.

90. The SBES Program is available to existing Duke Energy Kentucky non-residential customer accounts with an actual average annual electric demand of 180 kW or less. An individual business entity's participation is limited to no more than five premises

on the Company's system during a calendar year.

91. The SBES Program launched in late February 2015, after receiving the Order of Approval from the Commission on January 28, 2015.[10] In June of 2019, the contract for the program was transitioned to Lime Energy. Lime Energy is a leader in the direct install pay for performance market and implements the SBES Program in Duke Energy's other regulated markets.

92. For the July 2020 to June 2021 period, 55 SBES projects were completed in Kentucky, which was a volume as projected, and those 55 projects resulted in savings of over 2,424,000 kWh at the meter.

93. While LED lighting measures are expected to remain the primary driver of kWh savings in the Program for the foreseeable future, the Company has been actively working with the new vendor Lime Energy to implement initiatives focused on increasing refrigeration and HVAC measure adoption.

94. Duke Energy Kentucky will continue to evaluate the opportunity to add incentivized measures suitable for the small business market to the approved program which fit the direct install program model. The Company would ultimately like to ensure that small business customers are given the opportunity to maximize their energy savings by being offered a comprehensive energy efficiency project through the SBES Program wherever possible.

95. During parts of 2020 and 2021, the program was shut down due to the spread of the COVID-19 virus. The program uses on site marketing to reach customers and then follows up with an on-site free energy assessment for customers that agree to have

[10] Case No. 2014-00280

one. These activities are considered high risk for getting and spreading the COVID-19 virus. The Program was able to restart at reduced levels during the second half of 2020 and at full compacity during 2021. Despite these challenges the Program had a successful program year.

**Program 12. Smart $aver® Performance**

96. Duke Energy Kentucky received approval of this non-residential program: Smart $aver® Non-Residential Performance Incentive Program in Case No 2016-00289. The purpose of this program is to encourage the installation of high efficiency equipment in new and existing non-residential establishments. The program will provide incentive payments to offset a portion of the higher cost of energy efficient installations that are not offered under either the Smart $aver® Prescriptive or Custom programs. The types of measures covered by the program include retro-commissioning and projects with some combination of unknown building conditions or system constraints, coupled with uncertain operating, occupancy, or production schedules. The specific type of measures is included in the contract with the Customer.

97. The Company did not market the program due to the high levels of participation in the Prescriptive and Custom programs. The result was no participation during the 2020-2021 filing period. Similarly, for 2021-2022, unless participation in other Non-Residential programs declines, the Company does not plan to offer the Performance Incentive program.

**Program 13. Peak Time Rebate (PTR) Pilot Program**

98. The PTR pilot program offers participating customers 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 has branded the program to customers under the name Peak Time Credits and describes CPEs to participants as Peak Day events.

99. July 27, 2020 marked the official start date of the 2-year pilot. For purposes of counting the number of events each year of the pilot, the Company will designate July 27, 2020 through July 31, 2021 as the first year of the pilot. The second year of the pilot will be August 1, 2021 through July 31, 2022. August 1, 2022 will start the third year of the pilot. As approved, the Company will continue the pilot until the Company files a final report requesting action on the pilot and receives the KYPSC order on such request. The Company enrolled a total of 899 participants. As of October 11, 2021, 759 participants remain active on the pilot. Almost all attrition has been from customers moving.

100. The table below displays the dates CPEs were implemented during year 1 of the pilot. Resource Innovations, formerly Nexant, the EM&V vendor, will begin their work to determine the final impact estimates from the events following the end of the 2021 summer. This evaluation will include all the events from Year 1 and the August 2021 events from Year 2 of the PTR Pilot program.

| Critical Peak Event Day | Date |
|---|---|
| Yes | 8/25/2020 |
| Yes | 8/26/2020 |
| Yes | 1/21/2021 |
| Yes | 2/12/2021 |
| Yes | 6/18/2021 |
| Yes | 6/28/2021 |
| Yes | 6/29/2021 |
| Yes | 7/7/2021 |
| Yes | 7/15/2021 |
| Yes | 7/20/2021 |
| Yes | 7/28/2021 |
| Yes | 7/29/2021 |

101. In addition, post-CPE participant surveys are a component of the current, approved EM&V plan. The objectives of these post-event participant surveys are to assess winter and summer event awareness, participant behavior responses to the events, and satisfaction with the Peak Time Credit Pilot program. As such, Resource Innovations fielded a Winter post-event participant survey on February 12, 2021. Likewise, a Summer post-event participant survey was fielded on June 28 and June 29, 2021.

102. High-level takeaways show similarities between the Winter and Summer post-event survey responses with few differences, including:

- Reported awareness of the program was high in both surveys (Winter 98 percent, Summer 99 percent) and while most participants could recall experiencing a winter event day, many could not recall the exact day. More participants could recall specific Summer event days.
- Most participants were aware of the event notification and indicated the company provided pertinent notification information in the customer's preferred channel and at the time they needed.
- Participants who indicated they took action during the peak event had much higher average savings than participants who took no action; most of the actions were to adjust the thermostat or turn off lights.
- While most participants indicated the program was easy to understand, they also indicated that the peak days didn't always coincide with their household schedule.
- Participants were generally satisfied with the program overall (score for Winter 8.0, Summer 8.2 on a 1-10 scale), however overall participants

were less satisfied with the amount of the bill credit (Winter 7.0, Summer 6.8, again on a 1-10 scale)

- Only about a quarter of participants offered any recommendations to improve the program, however the most mentioned recommendation to the Winter program was to receive text notifications or to have more notice of events (21 out of 63 participants). For the Summer program, less than one-third of those participants who gave a recommendation said to increase the bill incentive (16 out of 53 participants).

103. The Company would like to update the Commission on efforts to incorporate the pilot impacts into the Company's PJM load forecast by using PJM's Peak Shaving Adjustment mechanism (PSA). As previously reported, the Company submitted information to PJM requesting a PSA. PJM clarified that PSA load impacts are measured in 1 MW increments. After reviewing information on the estimated load impact from the PTR Pilot program, PJM concluded that 0 MWs would apply for the pilot since total load reduction is not greater than the minimum amount

104. Finally, the Company proposes to expand the scope of the PTR Pilot program as encouraged by the Commission. As noted in previous filings, the current, approved EM&V plan is scheduled for completion in April 2022. This schedule provides the opportunity for the Company to address a Commission-encouraged research aspect of the PTR Pilot program during the summer of 2022.

105. The Company proposes to enhance the PTR Pilot program per the Commission's urging. This pilot program was discussed thoroughly in Case No. 2019-00277. The settlement reached between the Kentucky Attorney General and the Company

was approved by the Commission with a notable comment regarding pilot incentives. On page 15 of the Commission's order in Case No. 2019-00277, the Commission states "The Commission further urges Duke Kentucky to study the incentive, or rebate, to ensure that the carrot is high enough to encourage behavioral changes that are impactful." As approved, the rebate currently offered is $0.60 / kWh reduced during CPEs.

106. The Company wishes to satisfy the Commission's direction and propose a change to the PTR Pilot program for the Commission's consideration. To address the Commission's urging to perform incentive research on the Peak Time Rebate Pilot program for Duke Energy Kentucky, the Company proposes to perform incentive research during the summer of June through September 2022. This summer period would span the end of Year 2 of the pilot and continue into the post-Year 2 period through September 2022. The EM&V plan for this incentive research is provided in Appendix F to this filing.

107. After discussing incentive research design with Resource Innovations, the Company proposes to continue the current pilot with current participants without change. This satisfies the stipulation between the Company and the Attorney General. Resource Innovations recommends that the cleanest approach to the incentive research will be to recruit two (2) new groups of program participants with one group receiving a credit of $1.20 / kWh reduced and the other receiving the current credit of $0.60 / kWh reduced during CPEs. Note, the current pilot is not estimated to be cost effective. It has a Utility Cost Test (UCT) score = 0.14. The Company would not typically recommend such research for a program with a UCT = 0.14. However, the Company wishes to satisfy the Commission and thoroughly investigate the program's potential under a higher incentive value. Load reduction from participants will need to be several multiples higher at the $1.20 / kWH reduced incentive

level if the PTR Pilot is to become cost effective. As the Commission urges, the Company will determine if such response occurs. The Company will attempt to enroll approximately 900 participants for each group resulting in 1,800 total new participants with a buffer limit of 100 for each group. The buffer participation helps to eliminate the need to turn away customers if a strict participation enrollment limit is set. Based on the recruitment results from 2020, these participation numbers may not be achievable. The Company will use the same methods used in 2020 and track customer response. All other aspects of the current pilot program will remain the same. For clarity, the incentive research portion of the pilot proposed will terminate after September 30, 2022. This incentive research will provide the Commission with the information it urges the Company to gather. A revised pilot tariff sheet is not provided since the current tariff sheet acknowledges that the pilot can change upon Commission order.

108. For timely implementation, the Company requests approval by December 31, 2021 to start planning for implementation of the incentive research and implement on schedule before the summer of 2022. The Company will true-up the costs and include the cost effectiveness scores within the Annual Cost Recovery Filing for Demand Side Management to be filed November 15, 2022 recovering the July 1, 2021 – June 30, 2022 timeframe costs. The Company's final report on the pilot can be expected on or before April 30, 2023. Per the agreement referenced above, this pilot program will not be included in the shared savings mechanism but will receive cost recovery of program costs.

**Evaluation, Measurement, and Verification**

109. The EM&V schedule for each program for program years 2021 – 2023 is available in Appendix E.

## Calculation of the 2020 DSM Cost Recovery Mechanism, Rider DSMR

110. The reconciliation of the cost recovery mechanism (Rider DSMR) involves a comparison of projected versus actual program expenses, lost revenues, and shared savings, as well as inclusion of the prior year's reconciliation. The actual cost of residential and non-residential program expenditures, lost revenues, and shared savings for this reporting period was $5.80 million. The projected level of program expenditures was $6.82 million. The primary drive of the variance in projections versus the actual costs was due to program suspension from COVID-19.

111. Lost revenues are computed using the applicable marginal block rate net of fuel costs and other variable costs times the estimated kWh savings for a three-year period from installation of the DSM measure. The estimate of kWh savings is based upon the results from any recently completed impact evaluation studies and actual customer participation. Lost revenues accumulate over a three-year period from the installation of each measure unless a general rate case has occurred.

112. With respect to shared savings, Duke Energy Kentucky utilized the shared incentive of 10 percent of the total savings net of the costs of measures, incentives to customers, marketing, impact evaluation, and administration. The savings are estimated by multiplying the program spending times the UCT value and then subtracting the program costs. Shared savings are only valued for installation of new DSM measures.

## 2020 DSM Riders

113. Duke Energy Kentucky submits the proposed adjustments to its Rider DSMR for both electric and gas programs (Appendices C and D respectively). The two

Rider DSMRs are intended to recover projected July 1, 2022 – June 30, 2023[11] (fiscal year 2022) program costs, lost revenues and shared savings and to reconcile the actual DSM revenue requirement, as previously defined, to the revenue recovered under the riders for the period July 1, 2020 through June 30, 2021. The spreadsheet model contained in Appendix B has been used by the Company for a number of years in its Rider DSMR update filings.

114. Appendix B, page 1 of 7, tabulates the reconciliation of the DSM revenue requirement associated with the prior reconciliation, Duke Energy Kentucky's program costs, lost revenues, and shared savings between July 1, 2020 and June 30, 2021, and the revenues collected through the DSMR Riders over the same period. The true-up adjustment is based upon the difference between the actual DSM revenue requirement and the revenues collected during the period July 1, 2020 through June 30, 2021.

115. The DSM revenue requirement for the period July 1, 2020 through June 30, 2021 consists of: (1) program expenditures, lost revenues, and shared savings; and (2) amounts approved for recovery in the previous reconciliation filing.

116. Appendix B, page 6 of 7, contains the calculation of the 2020 – 2021 residential cost allocation factors for gas and electric, as approved in Case No. 2014-00388. These factors are the Electric Percent of Total Percent of Sales, and the Gas Percent of Total Percent of Sales, and are calculated by program. The calculation includes the residential kWh and ccf sales for July 2020 – June 2021, along with the kWh and ccf savings achieved for July 2020 – June 2021. The factors are used in Appendix B, page 1 of 7, columns 5 and 6.

117. Appendix B, page 7 of 7, contains the calculation of the 2022–2023

[11] The projected July 1, 2022 – June 30, 2023 program expenditures used in this filing will be trued-up as part of the 2022 annual status report and will be described as 2022 throughout the document.

residential cost allocation factors for gas and electric, as approved in Case No. 2014-00388. These factors are the Electric Percent of Total Percent of Sales, and the Gas Percent of Total Percent of Sales, and are calculated by program. The calculation includes the projected Rate RS kWh and ccf sales found in Appendix B, page 4 of 7, along with the projected kWh and ccf savings for July 2022 – June 2023. The factors are used in Appendix B, page 2 of 7, Residential Program Summary, columns G and H (Allocations of Costs).

118. Appendix B, page 5 of 7 contains the calculation of the 2021 Residential DSMR Riders. The calculation includes the reconciliation adjustments calculated in Appendix B, page 1 of 7 and the Residential DSM revenue requirement for 2023. The Projected Residential DSM revenue requirement for 2022 includes the costs associated with the Residential DSM programs: My Home Energy Report, Low Income Neighborhood, Low Income Services, Residential Energy Assessments, Residential Smart $aver®, Power Manager®, and any applicable net lost revenues and shared savings (Appendix B, pages 2 and 3 of 7). Total revenue requirements are incorporated along with the projected electric and gas volumes (Appendix B, page 4 of 7) in the calculation of the Residential DSM Rider.

119. Appendix B, page 5 of 7 also contains the calculation of the 2021 Commercial and Industrial DSM Rider. The calculation includes the reconciliation adjustments calculated in Appendix B, page 1 of 7 and the DSM revenue requirement for 2023. The Commercial & Industrial DSM revenue requirement for 2022 includes the costs associated with the Commercial and Industrial DSM programs: Smart $aver® Custom, Smart $aver® Prescriptive, Small Business Energy Saver, Smart $aver® Non-Residential Performance Incentive Program, and PowerShare® the associated net lost revenues and shared savings (Appendix B, pages 2 and 3 of 7). The 2021 Commercial and Industrial DSMR Rider is

calculated in two parts. One part (Part A) is based upon the revenue requirements for Smart $aver® Custom, Smart $aver® Prescriptive, Small Business Energy Saver, Power Manager® for Business and PowerShare®. This part is only recovered from all non-residential rate classes except rate TT. The other part (Part B) is based upon the revenue requirements for the PowerShare® program and is recovered from all non-residential rate classes including rate TT.

120. Total revenue requirements are incorporated along with the projected electric volumes (Appendix B, page 4 of 7) in the calculation of the Commercial and Industrial DSM Rider.

121. The Company's proposed DSMR Riders, shown as Appendices C and D, replace the current DSMR Riders. The latest version of DSMR was issued on April 9, 2020 in Case No. 2020-00371. The electric DSMR rider, proposed to be effective with the first billing cycle in the month following Commission approval, is applicable to service provided under Duke Energy Kentucky's electric service tariffs as follows:

- Residential Electric Service provided under:
  - Rate RS, Residential Service, Sheet No. 30.
- Non-Residential Electric Service provided under:
  - Rate DS, Service at Secondary Distribution Voltage, Sheet No. 40;
  - Rate DT, Time-of-Day Rate for Service at Distribution Voltage, Sheet No. 41;
  - Rate EH, Optional Rate for Electric Space Heating, Sheet No. 42;

- Rate SP, Seasonal Sports, Sheet No. 43;
- Rate GS-FL, Optional Unmetered General Service Rate for Small Fixed Loads, Sheet No. 44;
- Rate DP, Service at Primary Distribution Voltage, Sheet No. 45;
- Rate RTP-M, Real Time Pricing – Market-Based Pricing, Sheet No. 59;
- Rate RTP, Experimental Real Time Pricing Program, Sheet No. 99; and,
- Rate TT, Service at Transmission Voltage, Sheet No. 51.

The gas DSM rider is applicable to service provided under the following residential gas service tariff:

- Rate RS, Residential Service, Sheet No. 30.

**Calculation of the Residential Charge**

122. The proposed residential charge per kWh for 2021 was calculated by dividing the sum of: (1) the reconciliation amount calculated in Appendix B, page 1 of 7; and (2) the DSM revenue requirement associated with the DSM programs projected for 2023, by the projected sales for calendar year 2022. DSM program costs for 2023 include the total implementation costs plus program rebates, lost revenues, and shared savings. The calculations in support of the residential recovery mechanism are provided in Appendix B, page 5 of 7. Based on the updated rider amounts, the estimated annual cost for the average residential customer of about $79.30 for electric, and a charge of about $10.07 for gas.[12] The

[12] The cost for average customer was calculated by using the 2021 forecasted sales of Appendix B page 4

estimated average annual cost for electric per customer increased due to a regulatory lag in collections. For most of the year ending June 30, 2021, the DEK residential electric DSMR rate was negative.

**Calculation of the Non-Residential Charge**

123. The proposed non-residential charge per kWh for 2021 was calculated in two parts. The first part (Part A), applicable to all non-residential rate classes except Rate TT, is calculated by dividing the sum of: (1) the reconciliation amount calculated in Appendix B, page 1 of 7; and (2) the DSM revenue requirement associated with the Smart $aver® Custom, Smart $aver® Prescriptive, and Small Business Energy Saver, programs projected for 2022, by the respective projected sales for calendar year 2022. The second part (Part B), applicable to all non-residential rate classes including Rate TT, is calculated by dividing the DSM revenue requirement associated with the PowerShare® program projected for 2023, by total non-residential projected sales for calendar year 2022. DSM program cost for 2023 includes the total implementation costs plus program rebates, lost revenues, and shared savings.

124. The rider applicable to all non-residential rate classes except Rate TT is the sum of Part A and Part B. The rider applicable to all non-residential rate classes including Rate TT is only Part B.

**Allocation of the DSM Revenue Requirement**

125. As required by KRS 278.285(3), the DSM Cost Recovery Mechanism attributes the costs to be recovered to the respective class that benefits from the programs. The costs for the Power Manager program are fully allocated to the residential electric class, since this is the class benefiting from the implementation of the program. As required,

divided by the number of residential electric or gas customers multiplied by the cost per kWh or cost per CCF respectively of Appendix B page 5. The costs are estimates and will vary by customer based on usage.

qualifying industrial customers are permitted to "opt-out" of participation in, and payment for, Smart $aver® Custom and Smart $aver® Prescriptive and Small Business Energy Saver. All of Duke Energy Kentucky's Rate TT customers met the "opt-out" requirements prior to the implementation of the DSM riders in May 1996 and are not subject to this portion of the DSM Cost Recovery Mechanism (*i.e.* Rider DSMR). However, all non-residential customers, including Rate TT customers, will be charged for the PowerShare® program.

**WHEREFORE,** Duke Energy Kentucky respectfully requests that the Commission review and approve this Application and Duke Energy Kentucky gives notice that the new rates will take effect 30 days from the date of this Application.

Respectfully submitted,

*/s/Rocco O. D'Ascenzo*

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## CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing filing was served on the following via email, this 15th day of November 2021:

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*/s/Rocco O. D'Ascenzo*
Rocco O. D'Ascenzo

# Appendix A
## Cost Effectiveness Test Results

| Program Name | | UCT | TRC | RIM | PCT |
|---|---|---|---|---|---|
| **Residential Programs** | | | | | |
| Low Income Neighborhood | | 0.00 | 0.00 | 0.00 | |
| Low Income Services | | 0.21 | 0.26 | 0.16 | 2.49 |
| My Home Energy Report | | 2.60 | 2.60 | 0.66 | |
| Residential Energy Assessments | | 2.04 | 1.97 | 0.52 | 36.29 |
| Residential Smart $aver® | | 1.08 | 0.73 | 0.41 | 1.96 |
| Power Manager® | | 3.14 | 4.77 | 3.14 | |
| Peak Time Rebate Pilot Program | | 0.14 | 0.15 | 0.14 | |
| **Total** | | **1.36** | **1.25** | **0.68** | **2.61** |
| **Non-Residential Programs** | | | | | |
| Small Business Energy Saver | | 1.99 | 1.52 | 0.61 | 2.88 |
| Smart $aver® Custom | | 0.50 | 0.45 | 0.31 | 3.66 |
| Smart $aver® Prescriptive | | 3.36 | 2.65 | 0.68 | 4.90 |
| Power Manager® for Business | | 4.40 | 21.85 | 4.40 | |
| PowerShare® | | 2.63 | 8.79 | 2.63 | |
| **Total** | | **2.54** | **2.56** | **0.82** | **4.33** |
| **Overall Portfolio Total** | | **1.95** | **1.87** | **0.76** | **3.54** |

Kentucky DSM Rider

Comparison of Revenue Requirement to Rider Recovery

| Residential Programs | (1) Projected Program Costs 7/2020 to 6/2021 (A) | (2) Projected Lost Revenues 7/2020 to 6/2021 (A) | (3) Projected Shared Savings 7/2020 to 6/2021 (A) | (4) Program Expenditures 7/2020 to 6/2021 (B) | (5) Program Expenditures (C) Gas | (6) Program Expenditures (C) Electric | (7) Lost Revenues 7/2020 to 6/2021 (B) | (8) Shared Savings 7/2020 to 6/2021 (B) | (9) ############ Reconciliation Gas (D) | (10) Reconciliation Electric (E) | (11) Rider Collection (F) Gas | (12) Rider Collection (F) Electric | (13) (Over)/Under Collection Gas (G) | (14) (Over)/Under Collection Electric (H) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low Income Neighborhood | $ 306,300 | $ 3,758 | $ (10,254) | $ 31,189 | $ - | $ 31,189 | $ - | $ (3,119) | | | | | | |
| Low Income Services | $ 450,263 | $ 1,662 | $ (18,999) | $ 369,712 | $ 147,287 | $ 222,425 | $ 1,013 | $ (27,001) | | | | | | |
| My Home Energy Report | $ 171,457 | $ 91 | $ 6,071 | $ 52,775 | $ - | $ 52,775 | $ 21,185 | $ 8,468 | | | | | | |
| Residential Energy Assessments | $ 272,353 | $ 8,060 | $ 19,308 | $ 252,862 | $ - | $ 252,862 | $ 4,255 | $ 19,283 | | | | | | |
| Residential Smart $aver® | $ 905,354 | $ 10,949 | $ 62,074 | $ 1,054,468 | $ - | $ 1,054,468 | $ 14,088 | $ 8,840 | | | | | | |
| Power Manager® | $ 585,261 | $ - | $ 131,900 | $ 554,581 | $ - | $ 554,581 | $ - | $ 115,158 | | | | | | |
| Peak Time Rebate Pilot Program | $ 377,189 | $ - | $ - | $ 254,720 | $ - | $ 254,720 | $ - | | | | | | | |
| Revenues collected | | | | | | | | | | | $1,930,554 | ($3,618,453) | | |
| Total | $ 3,068,178 | $ 24,520 | $ 190,100 | $ 2,570,307 | $ 147,287 | $ 2,423,020 | $ 40,540 | $ 121,630 | $ 2,532,504 | $ (122,563) | $ 1,930,554 | $ (3,618,453) | $ 749,237 | $ 6,081,080 |

(A) Amounts identified in report filed in Case No. 2018-00370
(B) Actual program expenditures, lost revenues (for this period and from prior period DSM measure installations), and shared savings for the period July 1, 2020 through June 30, 2021.
(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. 2012-00085.
(E) Recovery allowed in accordance with the Commission's Order in Case No. 2012-00085.
(F) Revenues collected through the DSM Rider between July 1, 2020 and June 30, 2021.
(G) Column (5) + Column (9) - Column(11).
(H) Column (6) + Column (7) + Column (8) + Column (10) - Column(12).

| Commercial Programs | (1) Projected Program Costs 7/2020 to 6/2021 (A) | (2) Projected Lost Revenues 7/2020 to 6/2021 (A) | (3) Projected Shared Savings 7/2020 to 6/2021 (A) | (4) Program Expenditures 7/2020 to 6/2021 (B) | (5) Lost Revenues 7/2020 to 6/2021 (B) | (6) Shared Savings 7/2020 to 6/2021 (B) | (7) 2020 Reconciliation (C) | (8) Rider Collection (D) | (9) (Over)/Under Collection (E) |
|---|---|---|---|---|---|---|---|---|---|
| Small Business Energy Saver | $ 763,524 | $ 4,825 | $ 123,224 | $ 686,019 | $ 22,427 | $ 67,824 | | | |
| Smart $aver® Custom | $ 707,158 | $ 8,176 | $ 241,184 | $ 298,368 | $ 1,235 | $ (10,643) | | | |
| Smart $aver® Prescriptive | $ 548,785 | $ 6,818 | $ 85,745 | $ 926,601 | $ 22,478 | $ 218,329 | | | |
| Power Manager® for Business | $ - | $ - | $ - | $ 639 | $ - | $ 217 | | | |
| Total | $ 2,019,467 | $ 19,819 | $ 450,153 | $ 1,911,627 | $ 46,140 | $ 275,727 | $ (5,271,825) | $ 1,851,141 | $ (4,889,472) |
| PowerShare® | $ 904,512 | $ - | $ 147,510 | $ 720,386 | $ - | $ 117,598 | $ (420,313) | $ 1,156,131 | $ (738,460) |

(A) Amounts identified in report filed in Case No. 2018-00370
(B) Actual program expenditures, lost revenues (for this period and from prior period DSM measure installations), and shared savings for the period July 1, 2020 through June 30, 2021.
(C) Recovery allowed in accordance with the Commission's Order in Case No. 2012-00085.
(D) Revenues collected through the DSM Rider between July 1, 2020 and June 30, 2021.
(E) Column (4) + Column (5) + Column (6) + Column (7) - Column (8)

Kentucky DSM Rider

2022-2023 Projected Program Costs, Lost Revenues, and Shared Savings

Residential Program Summary (A)

| | Costs | Lost Revenues | Shared Savings | Total | Allocation of Costs (B) Electric | Gas | Budget (Costs, Lost Revenues, & Shared Savings) Electric Costs | Electric | Gas Costs |
|---|---|---|---|---|---|---|---|---|---|
| Low Income Neighborhood | $ 503,214 | $ 27,702 | $ (20,137) | $ 510,779 | 100.0% | 0.0% | $ 503,214 | $ 510,779 | $ - |
| Low Income Services | $ 698,215 | $ 26,554 | $ (26,796) | $ 697,973 | 73.1% | 26.9% | $ 510,624 | $ 510,383 | $ 187,590 |
| My Home Energy Report | $ 78,224 | $ 83,976 | $ 6,620 | $ 168,820 | 100.0% | 0.0% | $ 78,224 | $ 168,820 | $ - |
| Residential Energy Assessments | $ 284,858 | $ 69,660 | $ 9,820 | $ 364,338 | 100.0% | 0.0% | $ 284,858 | $ 364,338 | $ - |
| Residential Smart $aver® | $ 1,192,589 | $ 240,313 | $ 1,918 | $ 1,434,820 | 100.0% | 0.0% | $ 1,192,589 | $ 1,434,820 | $ - |
| Power Manager® | $ 855,519 | $ - | $ 116,813 | $ 972,332 | 100.0% | 0.0% | $ 855,519 | $ 972,332 | $ - |
| Peak Time Rebate Pilot Program | $ 216,257 | $ - | $ - | $ 216,257 | 100.0% | 0.0% | $ 216,257 | $ 216,257 | $ - |
| Total Costs, Net Lost Revenues, Shared Savings | $ 3,828,877 | $ 448,205 | $ 88,239 | $ 4,365,321 | | | $ 3,641,287 | $ 4,177,730 | $ 187,590 |

NonResidential Program Summary (A)

| | Costs | Lost Revenues | Shared Savings | Total | Allocation of Costs (B) Electric | Gas | Budget (Costs, Lost Revenues, & Shared Savings) Electric Costs | Electric | Gas |
|---|---|---|---|---|---|---|---|---|---|
| Small Business Energy Saver | $ 771,723 | $ 273,455 | $ 70,371 | $ 1,115,548 | 100.0% | 0.0% | $ 771,723 | $ 1,115,548 | NA |
| Smart $aver® Non-Residential | $ 1,218,433 | $ 527,401 | $ 261,716 | $ 2,007,549 | 100.0% | 0.0% | $ 1,218,433 | $ 2,007,549 | NA |
| PowerShare® | $ 851,383 | $ - | $ 67,100 | $ 918,484 | 100.0% | 0.0% | $ 851,383 | $ 918,484 | NA |
| Total Costs, Net Lost Revenues, Shared Savings | $ 2,841,540 | $ 800,855 | $ 399,187 | $ 4,041,581 | | | $ 2,841,540 | $ 4,041,581 | NA |
| Total Program | $ 6,670,417 | $ 1,249,060 | $ 487,425 | $ 8,406,902 | | | | | |

(A) Costs, Lost Revenues (for this period and from prior period DSM measure installations), and Shared Savings for Year 9 of portfolio.
(B) Allocation of program expenditures to gas and electric in accordance with the Commission's Order in Case No. 2014-00388.
(C) Smart $aver® Prescriptive consists of the following technologies: Energy Efficient Food Service Projects, HVAC, Lighting, IT, Pumps and Motors, and Process Equipment.

Kentucky DSM Rider

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

July 2022 to June 2023

| | Program Costs (A) |
|---|---|
| Electric Rider DSM | |
| Residential Rate RS | $ 4,177,730 |
| Distribution Level Rates Part A<br>DS, DP, DT, GS-FL, EH & SP | $ 3,123,098 |
| Transmission Level Rates &<br>Distribution Level Rates Part B | $ 918,484 |
| Gas Rider DSM | |
| Residential Rate RS | $ 187,590 |

(A) See Appendix B, page 2 of 7

Kentucky DSM Rider

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

| | |
|---|---|
| Year | July 2022 - June 2023 |
| Projected Annual Electric Sales kWH | |
| Rate RS | 1,482,230,250 |
| Rates DS, DP, DT, GS-FL, EH, & SP | 2,334,245,150 |
| Rates DS, DP, DT, GS-FL, EH, SP, & TT | 2,596,106,150 |
| Projected Annual Gas Sales CCF | |
| Rate RS | 63,944,369 |

Kentucky DSM Rider

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

July 2020 to June 2021

| 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 | $ 6,160,135 | $ 4,177,730 | $ 10,337,865 | 1,482,230,250 | kWh | $ 0.006975 | $/kWh |
| Distribution Level Rates Part A | | | | | | | |
| DS, DP, DT, GS-FL, EH & SP | $ (4,953,036) | $ 3,123,098 | $ (1,829,938) | 2,334,245,150 | kWh | $ (0.000784) | $/kWh |
| Transmission Level Rates & Distribution Level Rates Part B | | | | | | | |
| TT | $ (748,060) | $ 918,484 | $ 170,424 | 2,596,106,150 | kWh | $ 0.000066 | $/kWh |
| Distribution Level Rates Total | | | | | | | |
| DS, DP, DT, GS-FL, EH & SP | | | | | | $ (0.000718) | $/kWh |
| Gas Rider DSM | | | | | | | |
| Residential Rate RS | $ 758,977 | $ 187,590 | $ 946,567 | 63,944,369 | CCF | $ 0.014803 | $/CCF |
| Total Rider Recovery | | | $ 9,624,918 | | | | |

(A) (Over)/Under of Appendix B page 1 multiplied by the average three-month commercial paper rate for 2019 to include interest on over or under-recovery in accordance with the Commission's order in Case No. 95-312. Value is: **1.013000**
(B) Appendix B, page 2.
(C) Appendix B, page 4.

Summary of Load Impacts July 2020 Through June 2021 (1)

| Residential Programs | kWh | % of Total Res Sales | ccf | % of Total Res Sales | Allocation Factors based on July 2020-June 2021 Elec % of Total Sales | Gas % of Total Sales |
|---|---|---|---|---|---|---|
| Low Income Neighborhood | 0 | 0.0000% | - | 0.0000% | 100% | 0% |
| Low Income Services | 129,702 | 0.0085% | 3,415 | 0.0056% | 60% | 40% |
| My Home Energy Report | 1,594,319 | 0.1043% | - | 0.0000% | 100% | 0% |
| Residential Energy Assessments | 557,051 | 0.0365% | - | 0.0000% | 100% | 0% |
| Residential Smart $aver® | 2,002,835 | 0.1311% | - | 0.0000% | 100% | 0% |
| Power Manager® | - | 0.0000% | - | | 100% | 0% |
| Peak Time Rebate Pilot Program | - | 0.0000% | - | | 100% | 0% |
| Total Residential | 4,283,907 | 0.2804% | 3,415 | 0.0056% | | |
| | | | | | | |
| Total Residential (Rate RS) Sales For July 2020 Through June 2021 | 1,527,864,819 | 100% | 60,754,974 | 100% | | |

(1) Load Impacts Net of Free Riders at Meter

Summary of Load Impacts July 2022 Through June 2023 (1)

| **Residential Programs** | kWh | % of Total Res Sales | ccf | % of Total Res Sales | Allocation Factors Projected Elec % of Total Sales | Gas % of Total Sales |
|---|---|---|---|---|---|---|
| Low Income Neighborhood | 362,459 | 0.0237% | - | 0.0000% | 100% | 0% |
| Low Income Services | 268,103 | 0.0175% | 3,917 | 0.0064% | 73% | 27% |
| My Home Energy Report | 1,660,636 | 0.1087% | - | 0.0000% | 100% | 0% |
| Residential Energy Assessments | 730,111 | 0.0478% | - | 0.0000% | 100% | 0% |
| Residential Smart $aver® | 2,245,994 | 0.1045% | - | 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 | 5,267,302 | 0.3022% | 3,917 | 0.0064% | | |
| Total Residential (Rate RS) Sales Projected | 1,482,230,250 | 100% | 63,944,369 | 100% | | |

(1)Load Impacts Net of Free Riders at Meter

KY.P.S.C. Electric No. 2
~~Thirtieth~~ Thirty-First Revised Sheet No. 78
Duke Energy Kentucky
1262 Cox Road
Cancels and Supersedes
~~Twenty-Ninth~~Thirtieth Revised Sheet No. 78
Erlanger, KY 41018
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.~~002175~~ 006975 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.~~000868~~000718) per kilowatt-hour. (~~R~~I)

The DSMR to be applied for transmission service customer bills is $0.~~000218~~ 000066 per kilowatt-hour. (R)

Issued by authority of an Order by the Kentucky Public Service Commission dated ~~April 9, 2021~~ ____ in Case No. ~~2020~~2021-~~00371~~00424.

Issued: ~~April~~ November 15, 2021
Effective: ~~May 3~~December 15, 2021
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
Thirty-First Revised Sheet No. 78
Cancels and Supersedes
Thirtieth 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 $0.006975 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 ($0.000718) per kilowatt-hour. (I)

The DSMR to be applied for transmission service customer bills is $0.000066 per kilowatt-hour. (R)

Issued by authority of an Order by the Kentucky Public Service Commission dated ____ in Case No. 2021-00424.

Issued: November 15, 2021
Effective: December 15, 2021
Issued by Amy B. Spiller, President /s/ Amy B. Spiller

KY.P.S.C. Gas No. 2
Thirty-~~First~~ Second Revised Sheet No. 62
Duke Energy Kentucky
1262 Cox Road
Cancels and Supersedes
~~Thirtieth~~ Thirty-First Revised Sheet No. 62
Erlanger, Kentucky 41018
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. 61 of this Tariff.

The DSMR to be applied to residential customer bills is $0.~~045817~~ 014803 per hundred cubic feet. (~~I~~R)

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 service customer bills is $0.00 per hundred cubic feet.

Issued by authority of an Order by the Kentucky Public Service Commission dated ~~April 9, 2021~~ ____ in Case No. ~~2020~~2021-~~00371~~00424.

Issued: ~~April~~ November 15, 2021
Effective: ~~May 3~~December 15, 2021
Issued by Amy B. Spiller, President /s/ Amy B. Spiller

Duke Energy Kentucky
1262 Cox Road
Erlanger, Kentucky 41018

KY.P.S.C. Gas No. 2
Thirty-Second Revised Sheet No. 62
Cancels and Supersedes
Thirty-First Revised Sheet No. 62
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. 61 of this Tariff.

The DSMR to be applied to residential customer bills is $0.014803 per hundred cubic feet. (R)

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 service customer bills is $0.00 per hundred cubic feet.

Issued by authority of an Order by the Kentucky Public Service Commission dated ____ in Case No. 2021-00424.

Issued: November 15, 2021
Effective: December 15, 2021
Issued by Amy B. Spiller, President /s/ Amy B. Spiller

**Status Update for Duke Energy Kentucky Energy Efficiency and Demand Response Programs; 2021-2023**

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

| Residential Customer Programs | Program/Measure | Last Evaluation completion | Next Evaluation ==> | Q1 2021 | Q2 2021 | Q3 2021 | Q4 2021 | Q1 2022 | Q2 2022 | Q3 2022 | Q4 2022 | Q1 2023 | Q2 2023 | Q3 2023 | Q4 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low Income Neighborhood | Neighborhood | 2/27/2015 | | | M&V | M&V | M&V | Report | | | | | | | |
| Low Income Services | Refrigerator Replace | | TBD | | | | | | | | | | | | |
| | Weatherization/Payment Plus | 7/31/2013 | | | | | | | | | | | | | |
| My Home Energy Report | MyHER | 2/1/2014 | | | | | | | | | M&V | M&V | Report | | |
| Residential Energy Assessments | HEHC | 8/7/2020 | | | | | | | | | | | | | |
| Residential Smart Saver® | HVAC | 9/21/2015 | | | | | M&V | M&V | M&V | M&V | Report | | | | |
| | Specialty Bulbs/Online Savings Store | 6/22/2015 | | | | M&V | M&V | M&V | Report | | | | | | |
| | Water Measures | 9/25/2020* | | | | | | | | | | | | | |
| | Multi-Family | 12/26/2019 | | | | | | M&V | M&V | M&V | M&V | M&V | Report | | |
| Power Manager | | 8/13/2020 | | | | | | | M&V | M&V | M&V | Report | | | |
| Peak Time Rebate Pilot | Peak Time Rebate | N/A | | M&V | M&V | M&V | M&V | Report | | | | | | | |

| Non-Residential Customer Programs | Program/Measure | | | Q1 2021 | Q2 2021 | Q3 2021 | Q4 2021 | Q1 2022 | Q2 2022 | Q3 2022 | Q4 2022 | Q1 2023 | Q2 2023 | Q3 2023 | Q4 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Small Business Energy Saver | | 4/7/2017 | | | | | | | M&V | Report | | | | | |
| Smart $aver® Non-Res, Custom | | 3/1/2016 | | M&V | M&V | Report | | | | | | | | | |
| Smart $aver® Non-Res, Prescriptive | | 7/24/2019 | | | | | | | | | | M&V | M&V | M&V | M&V |
| PowerShare | | 2/14/2017 | | | | | M&V | M&V | Report | | | | | | |
| Pay For Performance | | N/A | TBD | | | | | | | | | | | | |

[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.
* Revised report

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

Proposal

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# Peak Time Credit Pilot Incentive Testing Evaluation Proposal

## Submitted to Duke Energy Kentucky

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August 27, 2021

# 1 Background and Evaluation Summary

Thank you for the opportunity to present Nexant's proposal to evaluate the Duke Energy Kentucky (DEK) Peak Time Credit (PTC) Pilot Incentive Test. The proposal that follows includes details on the impact and process evaluation approaches and the associated timeline and budget. The primary objective of this evaluation is to determine if customers respond differently to $0.60 per kWh versus $1.20 per kWh incentives for event period load reductions. The evaluation will analyze differences in customer enrollment rates, load impacts, and responses to survey questions in order to determine the influence of the different incentive rates on customer behavior.

As a vendor with more than 10 years of experience evaluating Peak Time Rebate (PTR) programs, including the primary phase of the DEK PTC Pilot, Nexant brings considerable knowledge and expertise to the evaluation of the DEK PTC Pilot Incentive Test. Our prior experience has demonstrated our ability to properly design pilots, provide precise estimates of load impacts, and assess the customers' experiences. Selecting Nexant as the EM&V vendor would ensure that the lessons learned from the primary phase of the DEK PTC Pilot would be applied to the evaluation of this incentive test.

Nexant's evaluation rests on a few key assumptions:

- Duke Energy will randomize the population of customers eligible for the Pilot incentive test into two samples for recruitment;
- Duke Energy will conduct the customer recruitment, track which customers receive each offer and when, and track when each customer accepts the offer;
- The Pilot incentive test is scheduled to take place between June and September, 2022;
- The number of summer events will be limited to between 8 and 10, similar to the current Pilot;
- The preferred event trigger is a temperature-heat index (THI) of 82, which may result in fewer than 8-10 events;
- Duke Energy would like to determine if the load impacts (e.g. reductions) are significantly different between customers with different incentive levels; and
- Duke Energy would like to conduct a single post-event customer survey in order to learn about any potential differences in customer experience or satisfaction between the two different incentive levels.

# 2 Impact Evaluation

## 2.1 Sample Size

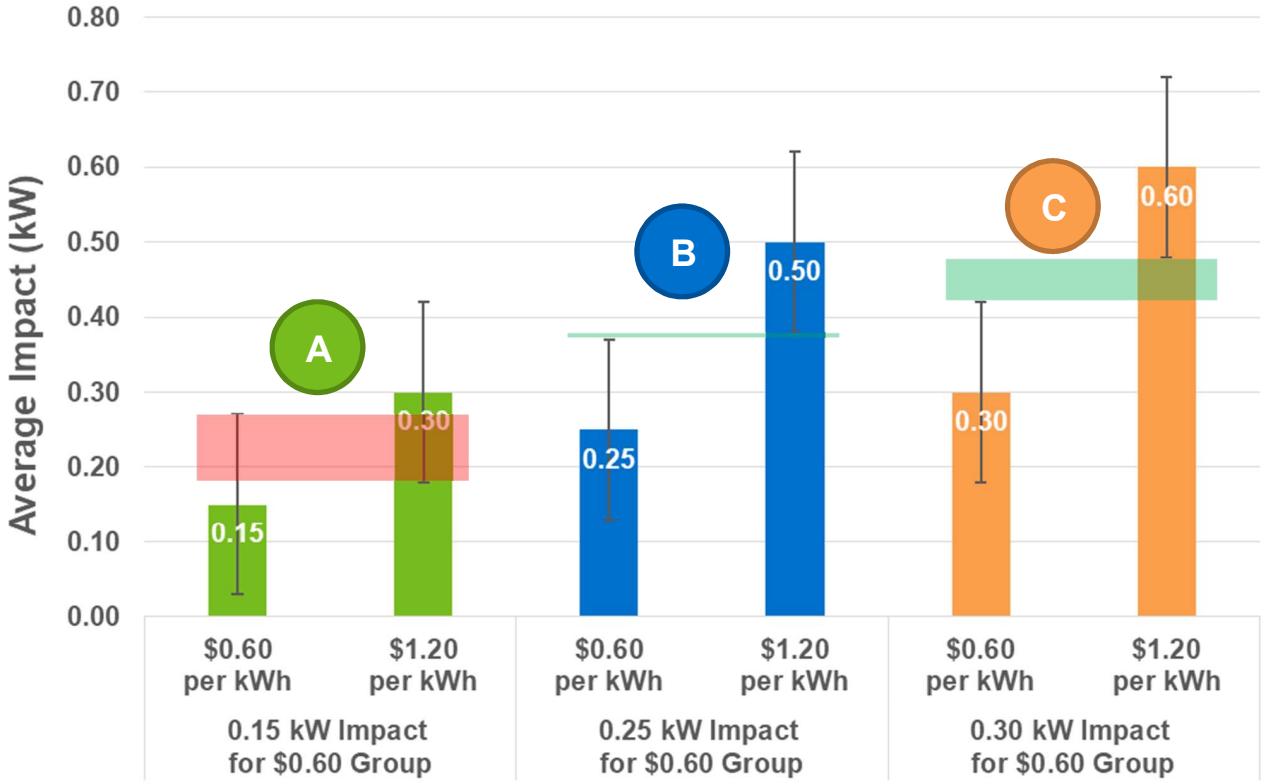
Impact evaluations often focus on determining if load impacts (reductions) are statistically significantly different from zero. Meaning, the evaluator has a certain degree of confidence that the load reductions are attributable to the pilot or program, and not due to random chance. The ability to determine if load impacts are statistically significant depends on several factors including: the size of the population or sample, number of events, and the size of the impacts. Prior to the primary phase of the Pilot, Nexant conducted a statistical power analysis and confirmed the enrollment cap of 1,000 customers was sufficient for estimating statistically significant impacts.

Determining the difference in performance between two treatment populations for the incentive test requires additional considerations for determining the minimum sample size. In this case, the two treatment groups are those associated with the two incentive levels. Each treatment group will have separate impact results which must be compared to one another, rather than to zero. Formally, statistically significant differences are validated via a statistical T-test. However, observing whether confidence intervals from two sets of impacts overlap is generally sufficient, and allows for a simple visual determination of whether sets of impacts are statistically significantly different from one another.

Based on results from the two summer events in 2020 and an enrolled population of approximately 900 customers, the absolute margin of error (MOE) from enrolled participants was +/- 5%. With the impacts observed in the Pilot, there is no question as to whether load impacts from the first summer are statistically significantly different from zero. However, the 5% absolute MOE and related confidence bands must be taken into consideration when determining the sample size for testing differences between two sets of impacts. Generally, sets of impacts from two different samples are said to have statistically significant differences if the 90% confidence intervals do not overlap.

Figure 1 below provides examples of three scenarios with differing sizes of impacts between the populations of customers with $0.60 per kWh and $1.20 per kWh incentives, and shows when a doubling of the impacts between the two groups are and are not statistically significantly different. The error bars in each of the examples were derived from actual impacts from the two events in the summer of 2020.

**Figure 1: Determining Statistical Significance at Various Impact Levels**




In example A, the $0.60 group shows a load impact of 0.15 kW, and the $1.20 group has twice the load impact at 0.30 kW. However, at that impact size, the difference between the two groups is not statistically significant because the error bars representing the 90% confidence interval overlap. This overlap is shown by the red rectangle covering both error bars.

With a greater number of events than the two from the summer of 2020, it is likely the confidence intervals would be narrower. It is also worth noting that the 2020 events took place during the COVID-19 pandemic, and may not reflect typical customer behavior. Nevertheless, under the circumstances from the 2020 events, if a population of 900 customers were enrolled in each of the incentive groups, for a total of 1,800 participants, the difference between impacts of 0.15 kW and 0.30 kW for each of the groups would not be a statically significant difference.

Example B reflects a scenario where the minimum impact for the $1.20 group is double the impact of the $0.60 group, and results in a statistically significant difference shown by the thin green rectangle between the two error bars. The minimum impact associated with the $0.60 group in this scenario is 0.25 kW per customer. Impacts any smaller than 0.25 kW for the $0.60 group would not allow for a doubling of the impact from the $1.20 group to constitute a statistically significant difference.

Finally, Example C reflects a scenario where there is clearly a statistically significant difference between the $0.60 and the $1.20 groups, at 0.30 kW and 0.60 kW, respectively. In this case, it is clear to see that the error bars of the 90% confidence interval do not overlap, and are separated by the area of the green rectangle.

It is important to note that an increase in the number of events from two to five or more should narrow the confidence intervals. However, if the impacts are on the smaller side as shown in Example A, an increase in the number of events may not be enough to result in statistically significant differences in load impacts between the two incentive groups. Accordingly, Nexant recommends that Duke Energy Kentucky maintain sample sizes for each incentive level test group consistent with the primary phase of the Pilot of approximately 900 to 1,000 customers (1,800 to 2,000 total customers) to provide the best chance for estimation of statistically significant differences if load impacts for the $0.60 group fall below the 0.25 kW threshold.

## 2.2 Impact Estimation

The primary challenge in estimating load impacts for demand response programs such as PTC is estimating how much electricity participants would have consumed during a PTC event in the absence of the incentive payment. The estimated usage in the absence of the incentive is referred to as the reference load. PTC payments for each customer are based on an estimated reference load called a baseline. Although these estimates are necessary to determine incentive payments, prior studies (many of them conducted by Nexant) have shown them to be inaccurate at the individual customer level and often biased for the average customer. As such, they are not appropriate methods to use for estimating ex post load impacts for a PTC program.

On November 1, 2018 Nexant met with Duke Energy for the Project Initiation Meeting for the primary phase of the Pilot. The meeting included a discussion of the merits of different analysis approaches, and resulted in a decision to proceed with a difference-in-differences analysis using a matched control group. Under this analysis approach, participants are matched up with similar non-participants and the difference in usage on event days is compared to the difference in usage on non-event days to infer the impact of the program. The matched control group approach was decided on because it simplifies the program design and implementation, and maximizes the value to participants via providing the most opportunities to earn credits.

To conduct the difference-in-differences analysis, Nexant will compare participant load to a matched control group on PTC event days. Customers who did not sign up for the program—non-participant customers—have been shown in the past to not reduce electricity usage on PTC event days. As such, these customers are appropriate candidates for selection into the control group in the ex post analysis. Nexant will match PTC participants with non-participant customers—the control group—based on similar usage during event-like days. The impact estimates will be based on the difference in loads for the participant and control group customers on the event day minus the difference in load between the two groups on similar, non-event days. By accounting for differences between the participant and control groups on

non-event days, this methodology accounts for any remaining dissimilarities between the two groups that were not controlled for by the statistical matching process.

The matched control group method used for this analysis is superior to a within-subjects analysis because it eliminates the problem of model misspecification. Any reference load model based on loads observed at non-event times requires the modeler to make assumptions about the relationships between load, time, and temperature. If this assumed function does not reflect the true relationships between load, time, and temperature, the model can produce incorrect results. In contrast, the matched control group deals with this problem by assuming that the customers who behave similarly to PTC customers during non-event periods would also behave similarly during event periods. This eliminates the need to specify load as a function of weather.

One important caveat for this evaluation is that the Pilot will recruit customers on an opt-in basis, meaning that any results cannot be applied to a default, or opt-out, enrollment program without calibrating the expected load impacts to account for behavioral differences. Customers who opt-in to a demand response program tend to be more cognizant of their electricity usage and will often consciously look for ways to reduce their usage compared to a typical customer who has been defaulted onto a program.

The specific activities for the impact evaluation are described below:

**Select control group** – Nexant will select the control group using a propensity score match to find non-participant customers who have similar load shapes to program participants. For this process, Nexant will use AMI data (and perhaps other variables depending on what is available) to identify control group customers with similar electricity usage on event-like days. Ideally, a full summer of AMI data will be available at the time of control group selection. In this procedure, Nexant will use a probit model to identify control customers who were similar to treatment customers in terms of observable characteristics such as hourly use and average daily use for proxy event days. The probit model will estimate a score for each customer with the assumption that observable variables affect a customer's decision to participate in PTC. A probit model is a regression model designed to estimate probabilities—in this case, the probability that a customer would enroll. The propensity score can be thought of as a summary variable that includes all relevant observable information about whether a customer would enroll in the program. Nexant will match each customer in the participant population with the customer in the non-participant population that has the closest propensity score.

**Estimate ex post load impacts** – After matching and validating the control groups for participating customers, Nexant will estimate load impacts using a difference-in-differences methodology. Nexant will calculate the estimated impacts as the difference in average loads between participant and control customers on each event day, minus the small difference between the two groups on the chosen event-like days. This calculation will control for residual differences in load between the groups that were not eliminated through the matching process, thus reducing bias.

The primary output for this analysis will be the average event load impacts by incentive level group. The difference in impact performance between groups will be presented in easy to understand graphs, similar to those in Figure 1. The error bars reflecting the 90% confidence intervals will allow reviewers to observe the differences in load impacts between the two groups.

Preliminary load impacts from the evaluation will be presented to Duke Energy via a slide deck. The final load impacts will be documented in a written report that also includes enrollment trends, survey findings, and conclusions and recommendations.

**Present results to Collaborative** – Once the Pilot has been implemented and ex post load impacts have been produced, Nexant will prepare a presentation summarizing all results and share it with the Collaborative.

# 3 Process Evaluation

Nexant's process evaluation will collect information directly from Pilot participants. Leveraging insights from the impact evaluation, the process evaluation's goals are to develop insights into the differences in performance, customer satisfaction, and other factors that may differ between customers who enrolled under the two different incentive levels.

Specifically, the evaluation will address the following research questions:

- Does the Pilot's bill credit motivate behavior change?
- Were customers effectively educated and motivated to use the program?
- Did event notifications reach the customer such that they could effectively respond to the event?
- What actions did customers take in response to the event notifications?
- Were customers on the higher incentive level more satisfied?
- Did customers with the higher incentive do more to respond to the event?

Process evaluation activities for the DEK PTC Pilot Incentive Test will rely on customer surveys designed to obtain information sufficient to inform the research objectives itemized above. Billing data (participants' hourly electricity usage and bill credits) is also required for the process evaluation. Process evaluation activities include the following:

**Conduct post-event surveys** – Nexant will conduct one post-event survey during the summer. Immediately following a single PTC event, we will conduct a mixed-mode survey to obtain feedback from participants to estimate awareness of the event and to collect information on actions customers take to reduce load and their motivations for those actions. The post-event surveys will also collect information on participants' assessment and opinions on Duke Energy's role in empowering and motivating participants to reduce load, in addition to educating participants on how the program works. The post-event survey will assess satisfaction with the bill credit offering, with the event notification process, and of the Pilot overall. Customers' bill

credits associated with the specific event(s) will also be compared to their survey responses to identify trends in perception and behavior.

To ensure that the survey accurately assesses the experiences of participants before and during a PTC event, the surveys will need to be finalized and fully programmed prior to the beginning of the season so that it can be deployed within 24 hours of an event. Working with Duke Energy and the impact evaluation team, we will prepare a sample of participant households for each season to receive the post-event survey. This sample will be linked to the survey software and ready to deploy. Any participants for whom we have email addresses will receive an email invitation with a link to the survey URL. Up to half of the expected sample will be surveyed by phone to ensure completes by both modes. Depending on the design of the Pilot pertaining to event triggers and any minimum/maximum number of events that can be called, we propose to carefully consider the timing of the post-event survey, whether to conduct the survey at the earliest possible opportunity in the season, or to wait for an event in the middle of the season (after participants have already experienced some events), or to target the end of the season.

The preliminary results from the post-event survey will be presented to Duke Energy via a slide deck. One of the primary focuses of the survey analysis will be to determine if any of the survey findings are statistically significantly different between the two incentive level groups. The final survey results will be documented in a written report that also includes enrollment trends, load impacts, and conclusions and recommendations.

**Present results to Collaborative** – Once the Pilot has been implemented and survey findings have been produced, Nexant will prepare a presentation summarizing all results and share it with the Collaborative.

# 4 Timeline & Budget

The project timeline is driven primarily by the schedule DEK has outlined for the PTC Pilot Incentive Test, with a focus on completing the evaluation by the end of 2022, and a presentation to the collaborative in early 2023. Overall, we propose a budget of $84,995, which includes developing matched control groups separately for each incentive level group, conducting the ex post load impact analysis, conducting the post-event survey, developing presentations for the load impacts and survey findings, writing the report, presenting the findings to the collaborate, and meeting regularly with the Duke Energy team. We believe this is a competitive price considering the scope of work requested, and we are open to discussing the inclusion/exclusion of specific tasks and expected level of effort for each task, as appropriate.

| Task | Budget | Due Date[1] |
|---|---|---|
| Check-in Calls | $6,900 | Ongoing |
| Post-Event Survey | $18,950 | August, 2022 |
| Ex Post Analysis Data Management | $4,975 | October, 2022 |
| Matched Control Group Selection | $9,825 | November, 2022 |
| Ex Post Load Impact Analysis | $19,900 | December, 2022 |
| Report Writing | $19,000 | December 31, 2022 |
| Present Results to Collaborative | $5,445 | Q1 2023 |
| **Total Budget** | **$84,995** | |

[1] Due dates are subject to change based on Pilot and evaluation needs agreed upon between Duke Energy and Nexant.

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