COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	)	**CASE NO. 2024-00370**

VERIFIED APPLICATION

Comes now East Kentucky Power Cooperative, Inc., ("EKPC" or the Company") by and through the undersigned counsel, pursuant to KRS 278.020, KRS 278.216, KRS 278.285, 807 KAR 5:001 and other applicable law and hereby tenders its Application with the Kentucky Public Service Commission ("Commission") requesting approval for Certificates of Public Convenience and Necessity ("CPCN") to construct new generation, approval of a site compatibility certificate, approval of Demand-Side Management ("DSM") tariffs, and any other relief required. In support of the Application, EKPC respectfully states as follows:

I. INTRODUCTION

1. EKPC is a not-for-profit, rural electric cooperative corporation established under KRS Chapter 279 with its headquarters in Winchester, Kentucky. Pursuant to various agreements, EKPC provides electric generation capacity and electric energy to its sixteen (16) owner-member Cooperatives ("owner-members"), which in turn serve over 570,000 Kentucky homes, farms and

commercial and industrial establishments in eighty-nine (89) Kentucky counties. EKPC's Board has stated its strategic objective is to maintain a generation fleet that prudently diversifies its fuel sources while maximizing its capital investments and minimizing stranded assets. EKPC is a "utility" as that term is defined in KRS 278.010(3)(a) and a "generation and transmission cooperative" as that term is defined in KRS 278.010(9).

2. In total, EKPC owns and operates approximately 2,963 MW of net summer generating capacity and 3,265 MW of net winter generating capacity. EKPC owns and operates coal-fired generation at the John S. Cooper Station in Pulaski County, Kentucky (341 MW) and the Hugh L. Spurlock Station (1,346 MW) in Mason County, Kentucky. EKPC also owns and operates natural gas-fired generation at the J. K. Smith Station in Clark County, Kentucky (753 MW (summer)/989 MW (winter)) and the Bluegrass Generating Station in Oldham County, Kentucky (501 MW (summer)/567 MW (winter)), landfill gas-to-energy facilities in Boone County, Greenup County, Hardin County, Pendleton County and Barren County (13.8 MW total), and a Community Solar facility (8.5 MW) in Clark County, Kentucky. Finally, EKPC purchases hydropower from the Southeastern Power Administration at Laurel Dam in Laurel County, Kentucky (70 MW), and the Cumberland River system of dams in Kentucky and Tennessee (100 MW). EKPC also has 200 MWs of interruptible load and approximately 28 MWs in peak reduction mechanisms. EKPC's record peak demand of 3,754 MW occurred on January 17, 2024.

3. EKPC owns 2,994 circuit miles of high voltage transmission lines in various voltages, mainly 69kV and greater. EKPC also owns the substations necessary to support this transmission line infrastructure. Currently, EKPC has seventy-seven (77) free-flowing interconnections with its neighboring utilities. EKPC's transmission system is operated by PJM Interconnection, LLC ("PJM"), of which EKPC has been a fully integrated member since June 1,

2013. PJM is a regional electric grid and market operator with operational control of over 180,000 MW of regional electric generation through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. It operates the largest capacity and energy market in North America.

II. CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY

4. The Commission has expressed an expectation that every electric utility in Kentucky will have sufficient generation capacity to serve its native load.[1] EKPC takes this expectation very seriously and has developed a strategy, based upon forecasted load growth, that will ensure EKPC is in the position to serve all the forecasted load. Winter storms Elliott and Gerri had an impact on EKPC's resource planning. These storms reinforced EKPC's view of its reliability and capacity and reserve needs, as well as the need for a reliability fix for the south-central Kentucky service area. In furtherance of the goal, mandated by Kentucky law and otherwise articulated by the Commission, EKPC is requesting three separate CPCNs to construct new generation resources that will allow EKPC to continue to provide safe, reliable, and economical service while simultaneously planning for future generation needs. These projects are: (1) an Integrated Combined Cycle Gas Turbine ("CCGT") facility at the Cooper Station; (2) coal to natural gas co-firing conversion at the Cooper Station; and (3) coal to natural gas co-firing conversion at the Spurlock Station.

[1] Case No. 2014-00226, *An Examination of the Application of the Fuel Adjustment Clause of East Kentucky Power Cooperative, Inc. from November 1, 2013, through April 30, 2014*, January 30, 2015 Order (Ky. P.S.C. January 30, 2015); Case No. 2022-00402, *Electronic Joint Application of Kentucky Utilities Company and Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Site Compatibility Certificates and Approval of Demand Side Management Plan and Approval of Fossil Fuel-Fired Generating Unit Retirement*, November 6, 2023 Order at 95 (Ky. P.S.C. November 6, 2023); and Case No. 2023-00153, *Electronic Tariff Filing of East Kentucky Power Cooperative, Inc. and its Member Distribution Cooperatives for Approval of Proposed Changes to Their Qualified Cogeneration and Small Power Production Facilities Tariffs*, October 31, 2023 Order at 10 (Ky. P.S.C. October 21, 2023).

5. Before undertaking a construction project that is not in the ordinary course of business, a utility must obtain a CPCN from the Commission under the authority of KRS 278.020(1), which states in relevant part:

> No person, partnership, public or private corporation, or combination thereof shall…begin the construction of any plant, equipment, property, or facility for furnishing to the public any of the services enumerated in KRS 278.010…until that person has obtained from the Public Service Commission a certificate that public convenience and necessity require the service or construction.… The commission, when considering an application for a certificate to construct a base load electric generating facility, may consider the policy of the General Assembly to foster and encourage use of Kentucky coal by electric utilities serving the Commonwealth.

6. The statute is silent, however, with regard to the criteria which the Commission should apply to any such request from a utility. Accordingly, case law construing KRS 278.020(1) provides the appropriate standard for evaluating EKPC's request for a CPCN in this proceeding. The leading authority on CPCNs is *Kentucky Utilities Co. v. Public Service Comm'n*, 252 S.W.2d 885 (Ky. 1952), which articulates a two-part test for demonstrating entitlement to a CPCN: (1) need; and (2) absence of wasteful duplication. *Kentucky Utilities Co.* provides significant guidance as to what further considerations should be taken into account when evaluating a request for a CPCN under these two criteria.

7. As to "need," Kentucky's highest Court wrote:

> We think it is obvious that the establishment of convenience and necessity for a new service system or a new service facility requires first a showing of a substantial inadequacy of existing service, involving a consumer market sufficiently large to make it economically feasible for the new system or facility to be constructed and operated. Second, the inadequacy must be due either to a substantial deficiency of service facilities, beyond what could be supplied by normal improvements in the ordinary course of business; or to

> indifference, poor management or disregard of the rights of consumers, persisting over such a period of time as to establish an inability or unwillingness to render adequate service.[2]

8. As established by the Commission's decision in *Kentucky Utilities Co v. Public Service Comm'n*, 252 S.W.2d 885 (Ky. 1952), need must be shown by an inadequacy of the existing service involving such capital outlay that it is economically feasible for the new project to be constructed.[3] The three projects proposed herein are needed to fulfill service for a growing area that existing service is inadequate to provide.[4] The Cooper CCGT project includes construction of a 745 MW two-on-one unfired combined cycle electric generating station at the existing John Sherman Cooper Power Station. This is a modern combined cycle plant design that will use reliable, commercially available F-Class combustion turbines, heat recovery steam generators, a steam turbine generator, and cooling tower technology. A new Meter and Regulation ("M&R") station will also be constructed. A new pipeline will supply a minimum of 600 pounds per square inch gauge ("PSIG") natural gas. Two fuel oil storage tanks are planned to be located in concrete secondary containment structures with redundant offloading and forwarding pumps to support emergency backup operation. Importantly, the Cooper CCGT project is the only addition to EKPC's existing generating capacity that is being proposed as part of this Application. More detail can be found in Exhibit 3, the Direct Testimony of Julia J. Tucker, and Exhibit 4, the Direct Testimony of Brad Young.

9. Next, as a result of the co-firing project, Cooper Unit 2 will have burner and igniter upgrades to include fuel gas firing capabilities up to 100% of the required heat–input, while

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[2] *Kentucky Utilities Co v. Public Service Comm'n*, at 890.

[3] *See*, *Id.* at 890.

[4] *See*, Direct Testimony of Julia J. Tucker at Exhibit 3.

retaining its current coal capabilities. The fuel gas system will be supplied by a new M&R yard that will be located northwest of the Cooper Station in an unoccupied area near the existing main entrance. This M&R yard will supply fuel gas at an assumed temperature of 40 ºF to 80 ºF. Pressure will be regulated through a new Fuel Gas Conditioning ("FGC") yard to serve the unit. The Cooper Unit 2 co-firing project will retain EKPC's existing capacity associated with that unit, but will not increase the unit's total capacity. More detail can be found in Exhibit 3, the Direct Testimony of Julia J. Tucker, and Direct Testimony of Brad Young, attached at Exhibit 4.

10. Finally, Spurlock Units 1-4 will be co-fired in a manner similar to that proposed for Cooper Unit 2. Fuel gas will be supplied from a new M&R Yard that will be located near the main entrance. From the M&R yard gas will flow to the FGC yard, then to each unit. Each unit will be capable of burning up to 50% of fuel gas. The Spurlock Units 1-4 co-firing project will retain EKPC's existing capacity associated with those units, but will not increase the units' total capacity. More detail can be found in Exhibit 3, the Direct Testimony of Julia J. Tucker, and Direct Testimony of Brad Young, attached at Exhibit 4.

11. The three CPCN projects presented in this Application are needed, and represent a critical component of a single comprehensive plan, along with the resources presented in Case No. 2024-00129 and Case No. 2024-00310, to ensure reliability and rate competitiveness of EKPC's system (see Direct Testimony of Julia J. Tucker attached as Exhibit 3) as well as serve growing demand. Throughout EKPC's owner-members' service areas, there are sites that can accommodate new investment and job creation as part of economic development efforts. The addition of gas pipelines, owned and operated by a pipeline company, with available capacity will only enhance the desirability of these locations. More information and detail on the economic development opportunities can be found in the Direct Testimony of Rodney Hitch, attached as Exhibit 9.

12. EKPC's 2024 Load Forecast Study supports the need for the new generation capacity requested in this Application. The 2024 Load Forecast states that residential, small commercial, and large commercial sales are forecast to grow over the forecast period (2025 – 2039). Total energy requirements, winter peak demand, and summer peak demand, including electric vehicle projections, are forecast to grow. The 2024 Load Forecast Study is attached as Confidential Attachment JJT-2 to the Direct Testimony of Julia J. Tucker.

13. Additionally, PJM's Effective Load Carrying Capacity ("ELCC") paradigm reduces EKPC's existing generating capacity, which underscores the need for new generating resources. This is described more fully in Exhibit 3, the Direct Testimony of Julia J. Tucker.

14. Electric utilities are among the most heavily environmentally regulated companies in the United States. Authorities at the federal and state levels oversee nearly every aspect of EKPC's operations, with particular emphasis on the monitoring and abatement of the waste and by-products that accompany coal-fired electric generation. EKPC has devoted, and continues to devote, substantial resources to ensure its proactive compliance with environmental requirements. The CCGT and co-firing of Cooper and Spurlock will assist EKPC in complying with environmental rules and regulations. More information and detail on the environmental rules and regulations that are impacting EKPC can be found in the Direct Testimony of Jerry Purvis attached as Exhibit 7.

15. The CCGT will also allow EKPC to have operational flexibility. The 2x1 CCGT configuration will allow for one combustion turbine train being out of service for a maintenance event. Having one combustion turbine train out of service will result in the maximum derate of the entire plant of approximately 33%. This will greatly reduce the shaft risk over a 1x1 design with a comparable rating. EKPC's intention is to utilize this facility as a base load unit, meaning

EKPC does not anticipate daily cycling of this unit. This modern combined cycle will have excellent load following capabilities to manage the intermittent nature of renewable assets. The CCGT also has an expected low load condition with two combustion turbines operating of approximately 50% of the total rated output. Electrically, the Cooper co-firing and the Spurlock co-firing units will have the same operating characteristics as they do today. More detail can be found in Exhibit 5, the Direct Testimony of Craig Johnson.

16. The new CCGT located at Cooper Station will help to support the transmission system in the region. During Winter Storm Elliott, the transmission system in the region around Cooper came perilously close to not being able to serve the load in that region, which meant that owner-member consumers would have been without electric service during a bitterly cold period of time. The CCGT is also expected to provide the least-cost variable energy when compared to EKPC's other power supply alternatives and provide a hedge against market volatility. More details can be found in the Direct Testimony of Julia J. Tucker, attached as Exhibit 3.

17. An additional consideration supporting the approval for the issuance of a CPCN is the lack of wasteful duplication.[5] The Commission has determined that lack of wasteful duplication requires the utility to demonstrate that all reasonable alternatives have been considered.[6]

18. With regard to what constitutes "wasteful duplication," the Court opined:

> [W]e think that 'duplication' also embraces the meaning of an excessive investment in relation to productivity or efficiency, and an unnecessary multiplicity of physical properties, such as right of ways, poles and wires. An

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[5] *Kentucky Utilities Co v. Public Service Comm'n* at 890.

[6] Case No. 2005-00142, *Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for the Construction of Transmission Facilities in Jefferson, Bullitt, Meade, and Hardin Counties, Kentucky*, September 8, 2025 Order (Ky. P.S.C September 8, 2005).

> inadequacy of service might be such as to require construction of an additional service facility to supplement an inadequate existing facility, yet the public interest would be better served by substituting one large facility, adequate to serve all the consumers, in place of the inadequate existing facility, rather than constructing a new small facility to supplement the existing small facility. A supplementary small facility might be constructed that would not create duplication from the standpoint of an excess of capacity, but would result in duplication from the standpoint of an excessive investment in relation to efficiency and a multiplicity of physical properties.[7]

19. In evaluating the "wasteful duplication" aspect of CPCN analysis, the Court further instructed, "[w]e are of the opinion that the Public Service Commission should have considered the question of duplication from the standpoints of excessive investment in relation to efficiency, and an unnecessary multiplicity of physical properties."[8] While the avoidance of "wasteful duplication" is a primary consideration for evaluating a request for a CPCN, *Kentucky Utilities Co*. makes clear that the Commission must not focus exclusively upon the cost of a proposal alone. The Commission must also look at an application for a CPCN in relation to the service to be provided by the utility:

> [W]e do not mean to say that *cost* (as embraced in the question of duplication) is to be given more consideration than the need for *service*. If, from the past record of an existing utility, it should appear that the utility cannot or will not provide adequate service, we think it might be proper to permit some duplication to take place, and some economic loss to be suffered so long as the duplication and resulting loss be not greatly out of proportion to the need for service.[9]

[7] *Kentucky Utilities Co. v. Public Service Comm'n*, at 891.

[8] *Id*.

[9] *Id*., at 892 (emphasis in original).

20. In other words, the complete absence of "wasteful duplication" need not be shown to an absolute certainty, "it is sufficient that there is a reasonable basis of anticipation" that the "consumer market in the immediately foreseeable future will be sufficiently large to make it economically feasible for a proposed system or facility to be constructed…."[10] The Commission affirmed this point in 2012:

> To demonstrate that a proposed facility does not result in wasteful duplication, we have held that the applicant must demonstrate that a thorough review of all alternatives has been performed. Selection of a proposal that ultimately costs more than an alternative does not necessarily result in wasteful duplication. All relevant factors must be balanced.[11]

21. The generation assets proposed in this Application are the most reasonable, least cost options to meet the needs of EKPC and its owner-members. More detail on the alternatives and cost benefits can be found in the Direct Testimony of Julia J. Tucker, attached as Exhibit 3.

22. The execution of the CCGT at Cooper, the co-firing at Cooper Station, and the co-firing at Spurlock Station has been planned and will be performed to limit the three project's risk exposure to potential delays due to supply chain concerns and impacts of the PJM queue for the CCGT. Refer to Exhibit 4, the Direct Testimony of Brad Young, and Exhibit 6, the Direct Testimony of Darrin Adams, for a complete discussion of the timeline and PJM interconnection process.

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[10] *Kentucky Utilities Co. v. Public Service Commission***,** 59 P.U.R.3d 219, 390 S.W.2d 168, 172 (Ky. 1965).

[11] *In re the Application of Big Rivers Electric Corporation for Approval of its 2012 Environmental Compliance Plan*, Case No. 2012-00063, Final Order, pp. 14-15 (Ky. P.S.C. Oct. 1, 2012) (citations omitted).

III. SITE COMPATIBILITY CERTIFICATE

23. KRS 278.216 requires the issuance of a site compatibility certificate before a utility may undertake the construction of new generation resources if the generation is capable of producing over ten (10) MW of electricity. The new CCGT will have an average net rating of 745 Megawatts based upon a two by one (2x1) combined cycle configuration and therefore EKPC is requesting the Commission issue a site capability certificate for the proposed CCGT. KRS 278.216(2) requires a Site Assessment Report ("SAR") in accordance with KRS 278.708(3) or National Environmental Policy Act (NEPA) compliance documents be provided to demonstrate site compatibility. EKPC is providing a SAR to comply with KRS 278.216(2).

24. The SAR, attached as Attachment BY-5 to Exhibit 4, the Direct Testimony of Brad Young, contains information regarding all the elements required in KRS 278.708 including, but not limited to, the site layout, surrounding land uses, facilities description, site compatibility with scenic surroundings, property impact study, traffic study, and a noise study.

25. EKPC is only requesting a site compatibility certificate for the CCGT. Site compatibility certificates are not required for the two co-firing projects since those projects are only updating existing generation units to allow for an additional source of fuel, and not constructing new generation units. After the co-firing projects are complete, the generating units will still be able to use coal as a fuel source, as they do currently.

IV. DEMAND-SIDE MANAGEMENT TARIFF UPDATES

26. To further EKPC's holistic approach to planning for future reliable service and load growth, EKPC also proposes to expand and continue its DSM offerings established in Case No. 2019-00059.[12]

27. As part of this CPCN filing, EKPC submits a new DSM-EE program plan to the Commission. This plan includes program expansions and increased incentives to three existing DSM-EE programs and the creation of four new DSM-EE programs. The proposed DSM-EE programs will not result in any unreasonable prejudice or disadvantage to any class of customer. The DSM-EE plan was developed supporting the following goals:

- Develop cost-effective demand-side resources that address the needs of end-use members
- Continued development of demand-side resources as a balanced approach to supply-side resources
- Provide end-use members with tools to assist them in utilizing efficient energy consumption at their home or business
- Collaborate with stakeholders to ensure a successful DSM-EE plan
- Increase energy security for economically challenged end-use members
- Improve home comfort for end-use members

The expansion of existing DSM-EE programs along with the new programs will more than double the current annual investments in DSM-EE programs. EKPC and its owner-members continue to invest in DSM-EE programs. Recently, investments excluding administrative costs were $2.88M in 2021, $3.11M in 2022, and $3.49M in 2023 with nearly 300,000 DSM-EE

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[12] *Demand-Side Management Filing of East Kentucky Power Cooperative, Inc.*, Case No. 2029-00059, Order (Ky. P.S.C. November 26, 2019).

program participation touchpoints resulting in 16,446 MWh energy savings while eliminating 540,831,937 pounds of carbon dioxide. See Attachments SD-4 2021 EKPC DMS DLC Annual Report (FINAL).pdf, SD-5 2022 EKPC DSM DLC Annual Report.pdf, and SD-6 2023 EKPC DMS DLC Annual Report (Final).pdf for EKPC's Annual DSM reports for 2021, 2022, and 2023, respectfully. The expected investment for the first full year of this DSM-EE plan (2026) is $7.4M, excluding administrative costs. Included in this plan are changes to the tariffs of three existing DSM-EE programs and four new DSM-EE program tariffs. EKPC seeks Commission approval for the tariffs to coincide with the approval of this CPCN. EKPC will submit its IRP to the Commission in April 2025. The DSM plan included in this CPCN filing will also be included as the plan for the IRP submission. More details on the review process, design and plan for DSM-EE programs can be found in the Direct Testimony of Scott Drake, attached at Exhibit 10.

V. KRS 278.264 AND KRS 164.2807

28. KRS 164.2807(7)(b) requires a utility that proposes to retire any existing coal generating plant to give notice the Energy Planning and Inventory Commission at least one hundred eighty (180) days prior to submitting an application for retirement to the Public Service Commission. The utility may include any information that will assist the Energy Planning and Inventory Commission in its evaluation of the proposal. KRS 278.264 requires a utility to approve the retirement of an electric generating unit. The proposal to retire an electric generating unit must include how the electric generating unit will be replaced.

29. EKPC is not requesting in this proceeding that the Commission make a decision regarding the retirement of Cooper Unit 1. However, EKPC is requesting the Commission to understand that the proposed CCGT will reduce future development risks for replacement capacity before any changes in federal environmental regulations necessitates the eventual closure of

Cooper Unit 1. In other words, it is prudent to assure that the requisite replacement capacity is available and online before retiring a unit pursuant to the statutes. For additional details regarding the status of Cooper 1 see the Direct Testimony of Don Mosier, attached as Exhibit 2.

VI. FILING REQUIREMENTS

30. Pursuant to 807 KAR 5:001, Section 14(1), EKPC's business address is 4775 Lexington Road, Winchester, Kentucky 40391 and its mailing address is Post Office Box 707, Winchester, Kentucky 40392-0707. EKPC's email address is: psc@ekpc.coop. EKPC's telephone number is 859-744-4812 and its fax number is 859-744-6008. EKPC requests that the following individuals be included on the service list:

Gregory H. Cecil, EKPC's Director of Regulatory and Compliance Services:

greg.cecil@ekpc.coop

L. Allyson Honaker, Counsel for EKPC:

allyson@hloky.com

Brittany Hayes Koenig, Counsel for EKPC:

brittany@hloky.com

Heather S. Temple, Counsel for EKPC:

heather@hloky.com

31. Pursuant to 807 KAR 5:001, Section 14(2), EKPC is a Kentucky corporation, in good standing, and was incorporated on July 9, 1941. The certificate of good standing is attached as Exhibit 1.

32. Pursuant to 807 KAR 5:001, Section 15(2)(a), a more detailed description of the need for the projects is contained in the Direct Testimony of the Julia J. Tucker contained in Exhibit 3 to this Application.

33. Pursuant to 807 KAR 5:001, Section 15(2)(b), EKPC has listed in the Direct Testimony of Jerry Purvis, attached as Exhibit 7, specifically Attachments JBP-1 and JBP-2, the necessary franchises [if any] or permits that will be necessary for construction of the proposed generation facilities. EKPC will file copies of each of the franchises or permits when they are obtained from the proper authorities.

34. Pursuant to 807 KAR 5:001, Section 15(2)(c) and KRS 322.340, the description of the proposed projects, the manner of proposed construction, and the names of all public utilities, corporations, or persons with whom the proposed construction or extension is likely to compete is in the Direct Testimony of Brad Young, contained in Exhibit 4 to this Application.

35. Pursuant to 807 KAR 5:001, Section 15(2)(d)(1) and Section 15(2)(d)(2), three copies of maps of suitable scale showing the location of the proposed construction and plans of the proposed plant, equipment, and facilities is found in the Direct Testimony of Brad Young attached as Exhibit 4, specifically Attachments BY-1, BY-2, and BY-3. Pursuant to KRS 322.340 these have been stamped by a licensed professional engineer in Kentucky.

36. Pursuant to 807 KAR 5:001, Section 15(2)(e), EKPC plans to initially finance the proposed projects by funding any expenditure with general corporate cash and borrowings on the revolving credit facility or by means of other interim financing, for which separate financing cases will be submitted according to KRS 278.300, if necessary. Ultimately, EKPC intends to seek Rural Utilities Service ("RUS") financing for the Projects discussed herein, which will be the lowest cost financing option, but will not necessarily be available when needed for construction expenditures. For more details on the financing plan, please refer to the Direct Testimony of Tom Stachnik, attached as Exhibit 11 to this Application.

37. Pursuant to 807 KAR 5:001, Section 15(2)(f), EKPC's estimated annual cost of operation after the proposed facilities are placed into service can be found in Exhibit 5, the Direct Testimony of Craig Johnson.

38. Pursuant to KRS 278.216, EKPC is providing a SAR with all of the content required by KRS 278.708: the SAR includes; a description of the facility and site development plan; evaluation of the compatibility of the facility with scenic surroundings; the potential change in property value; evaluation of peak and average noise during construction and operation; impact of the facility on the road and rail traffic in the area; and mitigation measures to avoid adverse effects of the facility.

39. Pursuant to KRS 278.704(4) EKPC requests a deviation from KRS 278.708(3)(a)(7) regarding the setback requirements contained in KRS 278.704(2). EKPC is requesting the current setbacks for the Cooper Station be applied to the CCGT that EKPC is requesting to be built at Cooper Station. EKPC believes that the proposed CCGT's location will meet the goals of KRS 224.10-280, 278.010, 278.212, 278.214, 278.216, 278.218, and 278.700 to 278.716 at a distance closer than the 2,000 foot setback required in KRS 278.704(2) for residential neighborhoods. The residential neighborhood that is within 2,000 feet of the Cooper Station is across the Cumberland River. The residential neighborhood is screened by vegetation on both sides of the river. Additionally, the Cooper Station has been at this location since 1965 and has been operating with the setbacks proposed for the new CCGT. The statutory goals of the setback requirements will continue to be met by permitting the new CCGT to be constructed with the same setback from the residential neighborhood. Additional information regarding the location of the proposed CCGT location can be found in the Direct Testimony of Brad Young and the SAR.

40. In addition to the statutory and regulatory requirements, EKPC is supporting this application with the verified testimony and exhibits of the following individuals:

- Don Mosier, Executive Vice President and Chief Operating Officer, will provide an overview of the Cooperative and the new generation projects.
- Julia J. Tucker, Vice President of Power Supply, will provide EKPC's a discussion of EKPC's power supply needs and how the new generation will meet the current and future needs of the Cooperative. She will also discuss the 2024 Load Forecast.
- Brad Young, Vice President of Engineering and Construction, will provide information on the projects' scope, siting, and construction.
- Craig Johnson, Senior Vice President of Power Production, will provide an overview of EKPC's generation resources and how the new generation will be integrated into the EKPC's generation portfolio.
- Darrin Adams, Director of Transmission Planning & System Protection, will discuss the transmission system upgrades needed for the projects.
- Jerry Purvis, Vice President of Environmental Affairs, will provide information regarding current and future Environmental Protection Agency rules and permits required for the project.
- Mark Horn, Director of Fuels and Emissions, will provide information about natural gas supply to fuel the new generation projects.
- Rodney Hitch, Director of Economic Development, will provide information regarding the economic development for the proposed projects.
- Scott Drake, Director of Business and Technical Services, will provide information regarding the DSM-EE program plan.

- Tom Stachnik, Vice President of Finance and Treasurer will provide information on EKPC's financing for the projects.

VII. CONCLUSION

41. EKPC needs additional generation in order to have sufficient "steel in the ground" to serve its owner-members. That involves both investing in a new CCGT and retaining EKPC's existing investments in its coal-fired generation at Cooper Unit 2 and Spurlock Units 1-4. EKPC has reviewed and analyzed multiple alternatives and has determined that a new CCGT, co-firing Cooper, and co-firing Spurlock proposed in this Application are the best, least-cost alternatives to meet the needs of EKPC and its owner-members at this time and in the foreseeable future as part of an overall generation planning strategy. EKPC has developed a strategy, inter alia, based upon: (a) forecasted load growth; (b) recent extreme winter weather experiences; (c) increasing economic development prospects; (d) the potential large influx of new, intermittent generation across Kentucky (and the PJM footprint) and its impact on dispatchable generation needs during the morning and evening peak periods; (e) the evolving nature of PJM's capacity market, including the introduction of ELCC considerations; (f) regional grid reliability and resiliency considerations; (g) long-term hedges against market fluctuations; (h) consistency with existing and new federal environmental regulations; and (i) the ability to reduce EKPC's CO_2 emissions intensity, that will ensure EKPC is in the best position to reliably serve its forecasted load at a competitive rate. The addition of the CCGT at Cooper, the co-firing of Cooper, and the co-firing of Spurlock will allow EKPC to continue to provide safe, reliable, and competitive service while simultaneously planning for future generation needs.

42. In addition, as part of an integrated strategy, the proposed DSM-EE programs proposed in this Application provide EKPC's owner-members with the tools to assist them in

utilizing cost-effective demand-side resources to better serve end-use members. The programs proposed expand and increase incentives for the three existing programs and create four new DSM-EE programs. EKPC and its owner-members believe that the investment in DSM-EE programs is an important part of an integrated resource plan.

WHEREFORE, on the basis of the foregoing, EKPC respectfully requests the Commission to grant relief as follows:

1. Issuance of a Certificate of Public Convenience and Necessity for:
    a. Cooper Station Combined Cycle Gas Turbine Unit;
    b. Co-firing at Cooper Station;
    c. Co-firing at Spurlock Station;
2. Issuance of a Site Compatibility Certificate for the Cooper Station Combined Cycle Unit;
3. Deviation from the setback requirements in KRS 278.704(2);4.
4. Approval of DSM/Energy Efficiency Tariffs;
5. An acknowledgment that the CCGT will be the eventual replacement capacity for Cooper Unit 1 under KRS 278.264; and
6. Any and all other relief to which EKPC is entitled.

This 20th day of November, 2024.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF CLARK)

Comes now Don Mosier, Executive Vice President and Chief Operating Officer of East Kentucky Power Cooperative, Inc., and, after being duly sworn, does hereby verify, swear and affirm that the averments set forth in the foregoing Application are true and correct based upon my personal knowledge and belief, formed after reasonable inquiry, as of this 18h day of November 2024.

Don Mosier

Don Mosier, Executive Vice President
and Chief Operating Officer

East Kentucky Power Cooperative, Inc.

The foregoing Verification was verified, sworn to and affirmed before me, by Don Mosier, Executive Vice President and Chief Operating Officer of East Kentucky Power Cooperative, Inc. on this 18th of November 2024.

Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

Respectfully Submitted,

L. Allyson Honaker

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Counsel for East Kentucky Power Cooperative, Inc.

EXHIBIT 1

CERTIFICATE OF GOOD STANDING

Commonwealth of Kentucky
Michael G. Adams, Secretary of State

Michael G. Adams
Secretary of State
P. O. Box 718
Frankfort, KY 40602-0718
(502) 564-3490
http://www.sos.ky.gov

Certificate of Existence

Authentication number: 310267
Visit https://web.sos.ky.gov/ftshow/certvalidate.aspx to authenticate this certificate.

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

EAST KENTUCKY POWER COOPERATIVE, INC.

EAST KENTUCKY POWER COOPERATIVE, INC. is a corporation duly incorporated and existing under KRS Chapter 14A and KRS Chapter 273, whose date of incorporation is July 9, 1941 and whose period of duration is perpetual.

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

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal at Frankfort, Kentucky, this 26th day of April, 2024, in the 232nd year of the Commonwealth.

Michael G. Adams

Michael G. Adams
Secretary of State
Commonwealth of Kentucky
310267/0015195

EXHIBIT 2

DIRECT TESTIMONY OF DON MOSIER

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	**)))))))))**	**CASE NO. 2024-00370**

DIRECT TESTIMONY OF DON MOSIER
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	**CASE NO. 2024-00370**

A F F I D A V I T

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Don Mosier, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Don Mosier

____

Subscribed and sworn before me on this 18th day of November 2024.

Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Don Mosier, and my business address is East Kentucky Power Cooperative, Inc. ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391. I am Executive Vice President and Chief Operating Officer at EKPC.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I obtained my Bachelor of Science degree in civil engineering from the University of Virginia and my Master of Business Administration degree from the Kenan-Flagler Business School at the University of North Carolina. My professional experience includes working at Carolina Power & Light (now Duke Energy) in Raleigh, North Carolina, developing merchant generation projects and marketing activities, regulatory affairs, and nuclear power plant engineering and operations. I also was an engineering manager of U.S. Operations for Canatom Corp., a Toronto-based engineering firm that provides nuclear plant engineering and construction services. Immediately prior to joining EKPC, I was Vice President of St. Louis-based Ameren Energy Marketing ("AEM"), a subsidiary of Ameren Corp. At AEM, I managed wholesale power trading, plant dispatch, NERC and SERC compliance, transmission and congestion management activities, and customer account management for Ameren Corporation's unregulated merchant generation fleet located in the Midwest ISO and PJM RTO.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. I oversee the functions of power production, engineering and construction, power delivery, power supply and resource planning, environmental compliance, PJM market and FERC regulatory affairs. I report directly to EKPC's Chief Executive Officer, Mr. Anthony Campbell.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. I have provided written testimony and testified at several proceedings.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to support EKPC's application in this proceeding and to discuss EKPC's corporate profile and highlight important aspects of its strategic goals. I will also discuss the process undertaken by EKPC to prepare and propose the projects at issue.

Q. ARE YOU SPONSORING ANY ATTACHMENTS?

A. Yes. Attachment DM-1, and Attachment DM-2 are the Board Resolutions approving the filing of the application for the new generation projects proposed in the Application and DM-3 is a Louisville Courier Journal article regarding the importance of renewable energy for economic development.

Q. PLEASE DESCRIBE EKPC AND ITS OWNER-MEMBERS' SYSTEM.

A. EKPC is a not-for-profit, rural electric cooperative corporation established under KRS Chapter 279 with its headquarters in Winchester, Kentucky. EKPC has $4.68 billion in assets and approximately 700 employees. In 2023, EKPC's energy sales exceeded 13.946 million Megawatt ("MW") hours, contributing to an operating revenue of $1.11 billion and a net margin of $17.9 million. Pursuant to various agreements, EKPC provides electric generation capacity and electric energy to its sixteen (16) Owner-Members: Big Sandy RECC, Blue Grass Energy, Clark Energy, Cumberland Valley Electric, Farmers RECC, Fleming-Mason Energy, Grayson RECC, Inter-County Energy, Jackson Energy, Licking Valley RECC, Nolin RECC, Owen Electric, Salt River Electric, Shelby Energy, South Kentucky RECC and Taylor County RECC. Those Owner-Members in turn serve approximately 570,000 Kentucky homes, farms and commercial and industrial establishments in eighty-nine (89) Kentucky counties.

EKPC is a member of the PJM Interconnection, LLC ("PJM") and owns and operates a total of approximately 2,963 MW of net summer generating capability and 3,265 MW of net winter generating capability. EKPC owns and operates coal-fired generation at the John S. Cooper Station in Pulaski County, Kentucky (341 MW) ("Cooper Station") and the Hugh L. Spurlock Power Station ("Spurlock") (1,346 MW). EKPC also owns and operates natural gas-fired generation at the J. K. Smith Station in Clark County, Kentucky (753 MW (summer)/989 MW (winter)) ("Smith Station") and the Bluegrass Station in Oldham County, Kentucky (501 MW (summer)/567 MW (winter)), and landfill gas-to-energy facilities in Boone County, Greenup County, Hardin County, Pendleton County and Barren County (13.8 MW total). In November 2017, EKPC added a Community Solar facility (8.5 MW) in Winchester, Kentucky to its generation portfolio. Finally, EKPC purchases hydropower from the Southeastern Power Administration at Laurel Dam in Laurel County, Kentucky (70 MW), and the Cumberland River system of dams in Kentucky and Tennessee (100 MW). EKPC's record peak demand of 3,754 MW occurred on January 17, 2024.

EKPC also owns approximately 2,994 circuit miles of high voltage transmission lines in various voltages and the substations necessary to support this transmission line infrastructure. Currently, EKPC has seventy-seven (77) free-flowing interconnections with its neighboring utilities.

Q. PLEASE DESCRIBE THE DECISION MAKING PROCESS FOR THE PROJECTS PROPOSED IN THIS PROCEEDING?

A. The Strategic Plan ensures EKPC prudently invests and operates a portfolio that includes reliable, dispatchable thermal generation and renewable energy resources in an "all of the above" strategy. I would like to address some of our experience driven rationale and assumptions underlying the recommendation for the projects presented. There are a number of factors that support the need for additional dispatchable thermal generation in EKPC's generation portfolio. EKPC has experienced two successive winters that set all-time peaks. On January 17, 2024, EKPC set a new winter peak record of 3,754 MW during Winter Storm Gerri coming on the heels of the December 23, 2022 Winter Storm Elliot's previous all-time peak of 3,747 MW. Both winter storms exceeded EKPC's installed winter peak generation capacity by over 400 MW. As a result EKPC has an obvious immediate need for new capacity resources including 7% winter planning reserves. EKPC, and the utility industry in general, are also facing increasing pressure from tightening EPA regulations to reduce greenhouse gas emissions and other pollutants. EKPC's existing and current economic development prospects are very interested in “greening” their power supply needs. Based on these demands, the EKPC Board’s Strategic and Sustainability Plans include directives on decarbonization and sustainability goals. The Plans and industry fleet experience has guided the technology selections for the new generation projects EKPC has proposed. Organic load growth and the success of economic development efforts in Kentucky are increasing EKPC’s expected capacity and economic energy needs now, and through the next decade at least. The rise of data centers as a part of the economic development in the state is also a factor in the increase needed capacity, however the 2024 Load Forecast does not specifically include any potential data center load. Additionally, reliability concerns in Kentucky and throughout the PJM region require dispatchable and competitive generation to ensure EKPC can supply competitive, safe, and reliable power to its owner-members. PJM has indicated concern with both generation replacement not keeping pace with generation deactivation and rapid load growth due to data centers. Electrification has increased the need to retain and add dispatchable generation to ensure resource adequacy as well as add flexible, dispatchable generation to complement the increasing intermittent non-dispatchable generation additions anticipated into the foreseeable future.

Q. PLEASE EXPLAIN HOW WINTER STORMS ELLIOTT AND GERRI IMPACTED EKPC’S RESOURCE PLANNING.

A. Winter storm Elliott in December 2022 and then winter storm Gerri in January 2024 demonstrated an immediate need for which EKPC developed its resource plan. These two storms reinforced how EKPC viewed its reliability, capacity, and reserve needs. These storms highlighted that EKPC is short on generation to meet the Commission's expectations for serving its Owner Member's loads plus capacity planning reserves. It also reinforced the need for a long-term grid reliability fix for south cental Kentucky that was jeopardized during both storms.

Q. EKPC HAS SEVERAL PENDING CASES BEFORE THE COMMISSION FOR CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY FOR DIFFERENT TYPES OF GENERATION ASSETS. PLEASE EXPLAIN THE NEED FOR EKPC TO DIVERSIFY ITS PORTFOLIO.

A. EKPC has taken an "all of the above" approach in its resource planning. EKPC needs the solar facilities it has proposed in Case No. 2024-00129 to help to meet the needs of its Owner-Members' and businesses for renewable energy and to assist EKPC in meeting its sustainability goals. Renewable energy is important for economic development.[1] However, due to the intermittent nature of solar, EKPC also needs to construct the other generation assets proposed in Case No. 2024-00310[2] and this proceeding in order to meet its generation, capacity, and reliability needs. EKPC also anticipates seeking a CPCN for additional renewable energy as soon as next year due in part to the investment tax credits and New ERA funds available to cooperatives.

Q. DOES EKPC BELIEVE THAT THE PROJECTS PROPOSED IN THIS APPLICATION, AS WELL AS THE PENDING SOLAR PROJECTS, (CASE

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[1] *See*, Conner Griffin, "Kentucky could land a 1,000-job aluminum plant, but there's a catch: Clean energy," The Louisville Courier Journal, April 29, 2024. (Attached as Attachment DM-3).

[2] *In the Matter of: Electronic Application of East Kentucky Power Cooperative, Inc. for 1) a Certificate of Public Convenience and Necessity to Construct a New Generation Resource; 2) a Site Compatibility Certificate; and 3) Other General Relief*, Case No. 2024-00310, (Ky. P.S.C. Sept. 20, 2024).

NO. 2024-00129) THE RICE FACILITY (CASE NO. 2024-00310) AND THE FORTHCOMING NEW ERA FILING ASSIST EKPC IN HAVING THE "STEEL ON THE GROUND" NEEDED TO SUPPORT THE NEEDS OF ITS OWNER-MEMBERS AND TO MAINTAIN ITS RELIABILITY?

A. Yes. EKPC believes that the "all of the above" approach it has proposed herein and the other cited cases are required to meet the competitive power supply needs of its Owner-Members' economic development efforts, "greening" the needs of existing commercial and industrial loads, supporting the first step in preparing for the possible influx of large data center loads, and to allow EKPC to maintain its Board's reliability and competitiveness expectations. The solar projects allow EKPC to provide a renewable energy source to the Owner-Members' end users as well as assist EKPC in meeting its sustainability goals while simultaneously offsetting much higher market purchases of economic energy when available. The RICE units give EKPC operational flexibility, higher efficiency when compared to most simple cycle combustion turbines and have much shorter start up times. With over 20% higher efficiency than natural gas peakers, these units produce less GHG emissions and lower costs as well. EKPC's plan, including the projects included in this application are all carefully balanced to wholistically reduce EKPC's carbon intensity and encourage economic development while also preserving reliability and keeping rates competitive.

Q. IN PLANNING FOR GENERATION RESOURCES, DOES EKPC TAKE INTO ACCOUNT PJM'S ACTIONS AND CONCERNS?

A. Yes.

Q. PLEASE EXPLAIN HOW PJM'S ACTIONS AND CONCERNS HAVE IMPACTED EKPC'S DECISION FOR ITS PROPOSED GENERATION ASSETS IN THIS APPLICATION AND OTHER CASES.

A. Over the last few years, PJM has been evaluating its reliability outlook considering announced and anticipated generation retirements, planned new generation additions, and projected load growth. Those factors have continued to evolve in a manner that has increased PJM's concerns that the pace of generation replacement and addition will not satisfy the load requirements near the end of the decade. PJM has shared data with stakeholders projecting that it will not have sufficient capacity to satisfy the forecasted peak load as early as 2029/2030. However, what is not yet included in the peak load forecast is what is escalating PJM's resource adequacy concerns. In late October the utilities across PJM shared that large load additions could be upwards of 50 GW by 2030[3]. Indeed, EKPC's known interest from data center investors on its system will exceed the size of our existing fleet alone by that time, more than doubling our load today. Prior to that meeting, PJM's CEO informed stakeholders that the projected large load growth additions are "eye popping." To put this large load addition projection into perspective, it would take sixty-seven (67) 745 MW combined cycle generators like what EKPC proposes to build, or more than 166 small modular nuclear reactors (300 MW each). Moreover, there is insufficient total new generation that has been studied and received a Generation Interconnection Agreement or is in process of being studied to meet this additional load need, let alone replace the projected generation retirements.

[3] Zonal Load Adjustment Requests for 2025 Load Forecast - 20241025-post-meeting---zonal-large-load-adjustment-requests.ashx.

Given the load centers PJM serves and potential national security interest in the Artificial Intelligence capabilities of the data centers driving the load growth, PJM's CEO Manu Asthana expressed his concern at a recent Organization of PJM States Inc. Annual Meeting by saying, "We don't have a ton of time – this load is coming upon us rapidly. We're talking about our way of life and our dominance as a global superpower."[4] It is extremely uncharacteristic for PJM to indicate that it is "worried" about performing its primarty task – ensure reliability. However, that is how PJM has characterized its concern.[5]

This worry is driving PJM to take unprecedented actions to preserve resource adequacy. PJM announced to stakeholders its plans to make adjustments to its capacity market rules and create a method to expedite the study of dispatchable generation interconnection projects that could be on line in time to forestall the reliability crisis PJM is warning may occur at the end of this decade. In determining which planned generation resources it would advance through this proposed expedited study process, PJM indicated a desire to weight more heavily resources with high Unforced Capacity (UCAP) value and high Effective Load Carrying Capability (ELCC) capacity accreditation for selection. PJM intends to file changes with the Federal Energy Regulatory Commission (FERC) in December 2024.

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[4] PJM Inside Lines article; Manu Asthana comments at the OPSI Annual Meeting https://insidelines.pjm.com/asthana-to-opsi-we-need-capacity/#:~:text=%E2%80%9CI%20haven't%20seen%20any,efficient%20addition%20of%20generation%20capacity.

[5] *Id.*

EKPC's proposed combined cycle and RICE units (Case No. 2024-00310) are squarely responsive to the need PJM articulated. They are dispatchable, have high UCAP value and high ELCC accreditation. Additionally, EKPC plans to install the capability to run both of these facilities on backup fuel oil, satisfying the requirements to achieve the higher ELCC accreditation for dual fuel resources. Recognizing the superior reliability value of dual fuel resources, PJM recognizes a higher capacity value for them over a single fuel thermal gas generation resource.

That said, PJM has clearly realized that a both/and solution is needed. In addition to the expedited process it will use to identify capacity resources that can move ahead for interconnection study faster, it intends to change the study process that would allow additional energy-only resources onto the grid. PJM recently indicated that it intends to propose to FERC revisions to how it studies "surplus interconnection," which is an expedited study process for resources that utilize the same Capacity Injection Rights as an existing generation resource and inject power when the existing resource is not injecting.[6] The revisions PJM is contemplating should expedite the study and connection of storage resources.

Importantly, PJM needs resources to commit to providing capacity in order to rely upon them to perform during the times the system is in most need of their energy. It is no surprise that solar does not perform at night. As a result of solar resources receiving non-performance charges for not performing during Winter Storm Elliott, the region has seen a decline in those resources offering to be capacity

[6] Reliability Resource Initiative MRC Update - item-04---reliability-resource-initiative---presentation.ashx.

resources.[7] Indeed, EKPC plans to add solar to its portfolio as energy resources, not capacity. These resources may over time fuel the batteries that will build out to firm up the intermittency into the future. However, at this time, the prudent decision for EKPC is to build thermal resources to serve EKPC's forecasted load needs and best respond to the call that PJM has made for the region to shore up resource adequacy.

Q. DOES EKPC HAVE ANY CONCERNS WITH SUPPLY CHAIN ISSUES IN THE PROPOSED PROJECTS?

A. Yes. EKPC has identified the risks as described in the Project Risk Register (refer to the Direct Testimony of Brad Young). One risk area that is crucial to this application is the combustion turbine manufacturer's selection for the natural gas combined cycle at Cooper Station. EKPC narrowed the vendor selection process to combustion turbine suppliers in the U.S. with the largest combined share of existing fleet installations and, importantly, proven operating performance. These vendors included Siemens, General Electric and Mitsubishi. EKPC narrowed the selection to Siemens due to the availability of two production slots that enables EKPC to have the facility in commercial operation prior to the end of 2030. Siemens met that need with two production slots available that could meet that strict schedule. The other vendors could not supply the units on time to meet EKPC's schedule needs and would have delayed the project by at least two years. It is important to note that worldwide, these three vendors have a combined annual production capability of only just over 100 units of all combustion turbine types.

[7] 2025/2026 Base Residual Auction Report 2025-2026-base-residual-auction-report.ashx.

With the expected turbine production needs of many U.S. electric utilities accelerating due to rapid electric demand including data centers, EKPC had no choice but to sole source the combustion turbines from Siemens or otherwise risk reliability and incur significant replacement energy and capacity costs.

Q. WHY DO THE NEW GENERATION ADDITIONS NOT INCLUDE BATTERY ENERGY STORAGE SYSTEMS (BESS) ?

A. EKPC has a duty to its Owner-Members to review all technologies that are available that meet its mission of safe, reliable, and competitive resources. EKPC thus looked at utility scale storage and while costs for utility scale Battery Energy Storage Systems (BESS) have dramatically declined in the last decade, it still remains uncompetitive at $450,000/MWh for a 100MW capacity and minimum of 4 – 10-hour discharge capability needed for EKPC's winter peaking needs. It is important to note that unlike wind and solar, BESS was excluded from the USDA's New ERA program. Without this grant opportunity, BESS could not compete with solar and hydro resources, nor with more traditional forms of dispatchable generation.

EKPC will continue to consider BESS if the levelized cost of energy becomes more competitive coupled with improved, cost-effective long duration operating characteristics that are needed in extended winter peak conditions. EKPC is a founding member and board participant of the National Renewable Cooperatives Organization (NRCO) as well the Electric Power Research Institute (EPRI) and is fully engaged in monitoring BESS and its future potential for addition to its supply portfolio.

Q. WHAT ARE THE ESTIMATED CONSTRUCTION COSTS FOR EACH ELEMENT OF THE PROPOSED PROJECT?

A. The total project cost is estimated at $1,577.8 million for all of the projects proposed in this Application. The estimated cost for the Cooper Combined Cycle Gas Turbine ("CCGT") facility at Coopr Station is approximately $1,317 million; the Cooper and Spurlock Co-Fire Projects combined total is $260.8 million.

Q WILL EKPC AND ITS OWNER-MEMBERS BENEFIT FROM THE PROPOSED PROJECTS?

A. Yes. The construction of a state of the art, highly efficient CCGT and the capability to co-fire Cooper Unit 2 and Spurlock Station with lower emitting natural gas will reduce the overall carbon intensity of EKPC's fleet. The capacity value and dispatchability of these resources will reduce market volatility, hedge EKPC's market price exposure, and incentivize economic development success.

Q. WHAT BENEFITS WILL BE PROVIDED TO EKPC AND ITS OWNER-MEMBERS AS A RESULT OF THE PROPOSED PROJECTS?

A. These projects continue EKPC's progress in executing its Board approved Strategic Plan and Sustainability Plan as we continue transitioning to a lower greenhouse gas emissions fleet. The co-firing of Cooper Unit 2 and Spurlock Units 1 through 4 are required to meet the requirements for continued coal power plant operations post 2030 and through the end of 2038, avoiding substantial stranded costs being imposed upon our Owner-Member cooperatives. In general, these projects provide and preserve necessary reliable and dispatchable capacity and economic sources of energy to meet higher winter peak demands, satisfy organic and economic development growth and protect our Owner-Members from highly volatile market pricing and emergency energy needs during extreme weather events such as was experienced during Winter Storm Elliott in December 2022. The projects are highly complementary by providing dispatchable baseload resources to support our planned significant increase in intermittent renewable resources, to assure overall portfolio reliability for our Owner-Members, and ensuring cost competitiveness.

Q. DO THE PROPOSED RESOURCES IN ADDITION TO THE LIBERTY RICE FACILITY IN CASE 2024-00310 SATISIFY EKPC'S LONG TERM NEED FOR NEW GENERATION?

A. With the planned significant addition of solar generation, subject to successfully negotiating funding and loans from the Rural Utilities Services' "New ERA" program and the subsequent filing next year for a CPCN to construct these renewable energy resources, yes. EKPC, as part of its Integrated Resource Planning ("IRP") process and load growth projections, coupled with new United States Environmental Protection Agency ("EPA") regulations including the Greenhouse Gas Rule that became law in April, has identified the critical need for the resources identified in this filing. These resources are enhanced by increased investments in demand response and energy efficiency as detailed in the direct testimony of Scott Drake, attached at Exhibit 10 to the application, and the Liberty Station detailed in Case 2024-00310. These additions combined are fundamental to EKPC's commitment to our Board's Sustainability Plan and its overall Strategic Plan to diversify and decarbonize our generation fleet over the next decade. But even if the GHG Rule with the new administration, reducing our carbon intensity while fully preserving EKPC's coal assets' ability to operate is a strategic imperative.

Q. IS EKPC PLANNING TO RETIRE ANY OF ITS EXISTING GENERATION AT THIS TIME AS A RESULT OF THE NEW GENERATION PROPOSED?

A. Not at this time given the levels of uncertainty in the Courts concerning EPA rulemaking. Cooper Station Unit 1 is a one hundred (100) MW coal fired unit that currently does not have a Selective Catalytic Reduction ("SCR") system installed for reduction of nitrous oxide emissions which may become a requirement to continue operating under current and future EPA regulations. A decision to mothball Cooper Unit 1 will be based on a number of factors. These include the plant's material condition when the CCGT becomes commercial, the ultimate outcome of the EPA's GHG Rule, Cross State Air Pollution Rule and the Good Neighbor Federal Implementation Plan which could result in a requirement to co-fire and/or add an SCR. Cooper Unit 2 has an SCR installed, will be co-fired with natural gas, and is not affected by the remaining and pending regulations. The cost of adding an SCR and the lack of available space to accommodate it and the CCGT would require mothballing and deactivating it as a resource in PJM. While EKPC does not currently have a plan to retire Cooper 1, it is important to know that the proposed CCGT unit at Cooper is designated as the replacement capacity for Cooper 1 at some point in the future.

Q. PLEASE DESCRIBE ANY RECENT LEGISLATION THAT WILL IMPACT EKPC'S DECISION TO RETIRE ANY OF ITS EXISTING COAL-FIRED GENERATION.

A. In recent legislative sessions, Kentucky's legislature passed Senate Bill 4 and Senate Bill 349, which impact a utility's ability to retire coal-fired generation. As a result of these two pieces of legislation, KRS 278.264 creates a rebuttable presumption against the retirement of coal-fired generation units. In order for a utility to rebut the presumption it must show that the generation unit to be retired will be replaced with new electric generating capacity that is dispatchable, maintains or improves reliability and resiliency of the electric transmission grid, maintains the minimum reserve capacity and has the same or higher capacity value and net capability unless the capacity value and net capability is not required to provide reliable service. In addition, KRS Chapter 164 establishes rules for the Energy Planning and Inventory Commission ("EPIC") and sets forth the procedures and requirements for submission of a retirement decision to EPIC. EPIC has no decision-making authority as to the ability of a utility to retire coal-fired generation; however, it will provide relevant analysis to the Public Service Commission prior to the Commission's decision on a retirement.

Q. IS EKPC REQUESTING THE COMMISSION TO ACKNOWLEDGE THAT THE COOPER COMBINED CYCLE IS THE INTENDED FUTURE REPLACEMENT CAPACITY FOR COOPER UNIT 1?

A. Yes. For EKPC to eventually be able to retire Cooper Unit 1, it must comply with KRS 278.264(2)(d) which encourages a utility to have the replacement generating capacity fully constructed, permitted and in operation prior to commencing retirement or decommissioning of a coal-fired generating unit.

Q. PLEASE DESCRIBE WHY YOU BELIEVE THE COOPER COMBINED CYCLE GAS TURBINE SHOULD BE RECOGNIZED AS THE FUTURE REPLACEMENT CAPACITY FOR COOPER UNIT 1.

A. The Cooper Combined Cycle Gas Turbine satisfies the future replacement capacity element for Cooper Unit 1 and gives flexibility for optimizing current investment in existing capacity. It will also minimize stranded investments, which benefits consumers.

Q. ARE THERE ANY POTENTIAL BENEFICIAL IMPACTS ON ECONOMIC DEVELOPMENT IN EKPC'S SERVICE TERRITORY AS A RESULT OF THE PROPOSED PROJECTS?

A. In addition to the testimony provided herein, for the last 60 years Cooper Station in Burnside, Kentucky has been an important part of the greater Pulaski County community, the City of Somerset and surrounding counties and municipalities. The construction of a new CCGT facility continues the employment of 60 plus high-paying local jobs while ensuring overall grid stability of south-central Kentucky and directly aiding the reliability of nearby Kentucky Utilities and TVA. The pipeline to serve Cooper would provide an important resource for the City of Somerset's gas LDC future needs and economic development in general. Similarly, at Spurlock Station in Maysville, Kentucky the region and City of Maysville will benefit tremendously from a new natural gas pipeline. It should also be noted that International Paper is reliant on steam production from Spurlock Station to continue its operations and the upgrades planned will increase Spurlock's competitiveness and viability in the long term.

Q. WHAT IS THE TIMELINE FOR COMPLETION OF EACH OF THE PROPOSED PROJECTS?

A. EKPC expects the proposed CCGT to be completed and operational by December 31, 2030, and the co-firing of Cooper Unit 1 and Spurlock Units 1-4 by December 31, 2029, to meet the deadline for 40% natural gas co-firing of existing coal units as required by the EPA's GHG Rule. Even if the GHG Rule goes away, EKPC still believes this plant's important to EKPC's ability to serve its Owner-Members going forward.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

ATTACHMENT DM-1

**FROM THE MINUTE BOOK OF PROCEEDINGS
OF THE BOARD OF DIRECTORS OF
EAST KENTUCKY POWER COOPERATIVE, INC.**

At a regular meeting of the Board of Directors of East Kentucky Power Cooperative, Inc. held at the Headquarters Building, 4775 Lexington Road, located in Winchester, Kentucky, on Tuesday, September 10, 2024 at 9:30 a.m., EDT, the following business transacted:

Approval to Fully Implement a New Combined Cycle Gas Turbine Facility at Cooper Station and Related Electric Transmission Interconnection Facilities, Including the Filing of an Application for a CPCN and Site Compatibility, Seeking Required Regulatory Approvals, and Construction

After review of the applicable information, Tim Eldridge made a motion to approve to Fully Implement a New Combined Cycle Gas Turbine Facility at Cooper Station and Related Electric Transmission Interconnection Facilities, Including the Filing of an Application for a CPCN and Site Compatibility, Seeking Required Regulatory Approvals, and Construction, seconded by Danny Wallen, and passed by the full Board to approve the following:

Whereas, East Kentucky Power Cooperative, Inc. ("EKPC"), to meet the expectation to be set forth in its 2025 Integrated Resource Plan ("IRP"), demonstrates a continuing need for EKPC's existing coal-fired generation units at the Hugh L. Spurlock Station ("Spurlock") and John Sherman Cooper Station ("Cooper"); Station,

Whereas, based on EKPC staff evaluation, determination was reached to propose the development of a new combined cycle gas turbine ("CCGT") facility (the CCGT Project");

Whereas, the proposed CCGT Project is the most prudent business option and would entail constructing a new 745 MW CCGT dual fuel facility, located at EKPC's existing Cooper Station, in Burnside, Kentucky, including generator step-up ("GSU") transformers and the necessary transmission and natural gas interconnection facilities; now, therefore be it

Resolved, the Board hereby authorizes the President and Chief Executive Officer, or designee, to fully implement the CCGT Project, at a total estimated cost of $1,317,000,000.00, including contingency, in accordance with the Rural Utilities Service ("RUS")-required 2025 – 2027 EKPC Three-Year Construction Work Plan and approved EKPC budget; and

Resolved, the Board hereby further authorizes the President and CEO, or a designee, to execute the necessary contracts for equipment or services; to apply for and borrow funds from RUS and other lenders; to request any needed authorization for financing or rate recovery from the Kentucky PSC; and to use general funds for the CCGT Project, until such time as RUS or other loan funds become available; and

Resolved, The Board hereby further authorizes staff to apply for the required or advisable certificates, permits and approvals with regulatory and environmental agencies of the Commonwealth of Kentucky and the United States Federal Government or other entities, including a Certificate of Public Convenience and Necessity and rate recovery for the CCGT Project, and to take any other actions, necessary or desirable, to assure that full implementation is achieved.

The foregoing is a true and exact copy of a resolution passed at a meeting called pursuant to proper notice at which a quorum was present and which now appears in the Minute Book of Proceedings of the Board of Directors of the Cooperative, and said resolution has not been rescinded or modified.

Witness my hand and seal this 10th day of September 2024.

Corporate Seal

Randy Sexton, Secretary

ATTACHMENT DM-2

**FROM THE MINUTE BOOK OF PROCEEDINGS
OF THE BOARD OF DIRECTORS OF
EAST KENTUCKY POWER COOPERATIVE, INC.**

At a regular meeting of the Board of Directors of East Kentucky Power Cooperative, Inc. held at the Headquarters Building, 4775 Lexington Road, located in Winchester, Kentucky, on Tuesday, September 10, 2024 at 9:30 a.m., EDT, the following business transacted:

Approval to Fully Implement the Spurlock and Cooper U2 Natural Gas Co-Firing Project, Including the Filing of an Application for a Certificate of Public Convenience and Necessity, Seeking Required Regulatory Approvals, and Construction

After review of the applicable information, Boris Haynes made a motion to approve to Fully Implement the Spurlock and Cooper U2 Natural Gas Co-Firing Project, Including the Filing of an Application for a Certificate of Public Convenience and Necessity, Seeking Required Regulatory Approvals, and Construction, seconded by Jody Hughes, and passed by the full Board to approve the following:

Whereas, East Kentucky Power Cooperative, Inc.'s ("EKPC") 2022 Integrated Resource Plan ("IRP"), filed with the Kentucky Public Service Commission ("PSC"), demonstrated a continuing need for EKPC's existing coal-fired generation units at the Hugh L. Spurlock Station ("Spurlock") and John Sherman Cooper Station ("Cooper");

Whereas, based on EKPC staff evaluation, in order to meet expectations set forth in the IRP, and to comply with the U.S. Environmental Protection Agency's ("EPA") final Greenhouse Gas Rule ("GHG Rule") issued in April 2024, determination was reached to propose the co-firing of Spurlock units and Cooper Unit 2, (collectively, "the Units"), ("the Co-Firing Project");

Whereas, Spurlock units would have 0-50% natural gas-burning capability, Cooper Unit 2 would have 0-100% natural gas-burning capability, and the Units would retain 0-100% coal-burning capability;

Resolved, the EKPC Board of Directors (the "Board") hereby authorizes the President and Chief Executive Officer, or designee, to fully implement the Co-firing Project, at a total estimated cost of $260,800,000.00, including contingency, in accordance with the Rural Utilities Service ("RUS")-required 2025 – 2027 EKPC Three-Year Construction Work Plan and approved EKPC budget; and

Resolved, the Board hereby further authorizes the President and CEO, or a designee, to execute the necessary contracts for equipment or services; to apply for and borrow funds from RUS and other lenders; to request any needed authorization for financing or rate recovery from the Kentucky PSC; and to use general funds for the Co-firing Project, until such time as RUS or other loan funds become available; and

Resolved, The Board hereby further authorizes staff to apply for the required or advisable certificates, permits and approvals with regulatory and environmental agencies of the Commonwealth of Kentucky and the United States Federal Government or other entities, including a Certificate of Public Convenience and Necessity and rate recovery for the Co-firing Project, and to take any other actions, necessary or desirable, to assure that full implementation is achieved.

The foregoing is a true and exact copy of a resolution passed at a meeting called pursuant to proper notice at which a quorum was present and which now appears in the Minute Book of Proceedings of the Board of Directors of the Cooperative, and said resolution has not been rescinded or modified.

Witness my hand and seal this 10th day of September 2024.

Corporate Seal

Randy D Sexton

Randy Sexton, Secretary

ATTACHMENT DM-3

courier journal

LOCAL

Kentucky could land a 1,000-job aluminum plant, but there's a catch: Clean energy

Connor Giffin
Louisville Courier Journal

Published 5:30 a.m. ET April 29, 2024 | Updated 8:49 a.m. ET April 29, 2024

Kentucky could lose a massive, 1,000-job aluminum smelter project to another state if it can't scrape up enough clean energy to support it.

Century Aluminum would like to build its plant in Northeast Kentucky, but is considering other options. The facility is predicted to double the size of the U.S. primary aluminum smelting industry and help curb the industry's emissions, company and state leaders announced recently.

But the "green aluminum" project coming to fruition will hinge on access to huge amounts of clean energy — a resource Kentucky has been slow to cultivate compared to competing states, as lawmakers in Frankfort have fought to keep coal-fired power plants burning.

Century, which already operates a smelter in Sebree and has an idle smelter in Hawesville, was selected for a cost share of up to $500 million, pending award negotiations, from the U.S. Department of Energy to support the project as part of the Biden administration's efforts to decarbonize key U.S. industries.

In recent decades, the U.S. has ceded its position as a leading producer of aluminum globally. There are only four operating primary aluminum smelters left in the U.S., and Century's proposed plant would be the first built in 45 years.

The metal, used in solar panels, wind turbines and electric vehicles, is pivotal to the Biden administration's plans for combating climate change. And Century's new smelter would cut out 75% of the emissions from a traditional smelter due to "energy-efficient design and use of carbon-free energy," according to the Department of Energy.

But aluminum smelting is an incredibly energy-intensive process, said Annie Sartor, aluminum campaign director for Industrious Labs, an organization advocating for decarbonizing U.S. industry. And in this case, under the DOE-funded proposal, the smelter will be "primarily powered by carbon-free energy."

"They say they want clean energy. They say they want to be in Kentucky," Sartor said. "I think we're going to find out here in a few months if they're able to find it, or if they need to go somewhere else."

'Not a done deal'

In a press briefing, Gov. Andy Beshear touted the smelter proposal as potentially "the largest investment on record in Eastern Kentucky."

It will create 1,000 permanent jobs represented by the United Steelworkers union, and 5,500 additional construction jobs. Salary and benefits packages for workers at the smelter are expected to be over $100,000 annually, according to the company.

If the construction jobs are any indicator, Century's proposed plant could rival the scale of the BlueOval SK Battery Park in Glendale, which brought in about 6,000 construction workers, said Chad Mills, state director of the Kentucky Building and Construction Trades Council.

At a Department of Energy presentation in April, a Century representative said the company wants to facilitate minority and female representation in the new workforce, as well as create jobs in "energy communities" — regions of the nation that have seen hardship as a result of the declining fossil fuel industry.

The investment would be significant — particularly for Northeast Kentucky, an area that's been hit hard by the loss of industry in recent decades, as well as the collapsed promise of the Braidy Industries aluminum plant near Ashland.

“Eastern Kentucky, Northeast Kentucky especially, has been through the wringer,” said Boyd County Judge Executive Eric Chaney at a March press conference on the proposal. “And to have this opportunity is just truly incredible. We're on the rise.”

If Century chooses Kentucky, the state's workforce is "certainly capable" of taking on the project, said Dustin Reinstedler, president of the Kentucky AFL-CIO.

“Kentucky has a very strong skilled labor force," he said, "and a lot of it."

But Century's siting decision is “not a done deal,” Beshear said.

“A myriad of steps” remain in the company's final siting decision, according to Jesse Gary, Century's president and CEO, including costs of development, utilities, workforce and incentives.

A company spokesperson did not respond to a phone call and email requesting further comment on its decision-making process or elaboration on its preference for Northeast Kentucky. A spokesperson from the state's Cabinet for Economic Development declined to share additional details on "an active project."

However, Century has indicated it's also considering other states around the Ohio River and Mississippi River basins, which together make up more than 40% of the contiguous U.S.

And Kentucky is more reliant on fossil fuels for electricity generation than almost any other state in the region of consideration.

Kentucky's clean energy momentum

Access to affordable clean energy is necessary for the “green aluminum” project — and the cost of electricity typically accounts for a significant portion of smelters' production costs.

“The aluminum industry's reliance on fossil fuels has put its future in jeopardy,” according to a news release from Ford Motor Co., whose supply chain leans heavily on aluminum. “At the same time, the price of electricity from renewable sources like wind and solar has plummeted over the last 10 years.”

Kentucky doesn't have utility-scale wind generation, although researchers at LG&E and KU are experimenting with its potential. Other potential carbon-free sources, like nuclear, would take years to establish in the state — making solar the most obvious energy source for filling the renewable gap, Sartor said.

As of late last year, Kentucky had less than 200 megawatts of solar installed statewide, according to the Solar Energy Industries Association (SEIA).

Judging by the plant's projection to double the size of the U.S. primary aluminum industry, Sartor said the “back-of-the-napkin math” suggests Century's new facility could demand somewhere between 700-1,000 megawatts.

“That scale of renewables does not currently exist in Kentucky,” she said. “They're going to need to find an energy provider partner to build truly massive-scale renewables in order for this project to be sited in Kentucky, and not go somewhere else.”

There are about 40 solar projects in various stages of development around the state, according to Lane Boldman, executive director of the Kentucky Conservation Committee. At least some of those could likely help feed Century's carbon-free energy needs.

Construction of the new smelter could take up to five years, according to a company presentation, and SEIA estimates Kentucky could add nearly 3,000 megawatts of solar in that time, as prices continue to fall.

"The main point is the technology is already here for solar," Boldman said. "It just requires the political will to do it."

But state lawmakers have consistently resisted energy transition, instead looking to preserve the coal industry. Boldman pointed to the recent legislative session, in which Republicans passed Senate Bill 349, despite the governor's veto and fervent pushback from LG&E and KU, Duke Energy and various business and consumer advocacy groups.

The bill gives the fossil fuel industry a greater voice in Kentucky's energy policy decisions, such as coal-fired power plant retirements.

"From those lawmakers that have districts in the coalfields, I totally understand their concern," Boldman said.

But clean energy projects like Century's, she added, are "the new economy coming to their region."

Reviving the crippled U.S. aluminum industry

In 2022, Century announced a temporary halt in production at its Hawesville smelter “as a direct result of skyrocketing energy costs.”

The company originally expected to idle the plant — once its largest U.S. smelter and “the largest producer of high purity primary aluminum in North America” — for less than a year, but it still has not come back into production nearly two years later.

Based on Century’s latest earnings calls, Sartor said it appears bringing Hawesville back online “is not off the table” — but she expects it would take significant amounts of affordable, renewable energy to support it.

Hawesville is one of many U.S. smelters that have been idled or permanently shuttered in the last 40 years. The trend of closures, often citing energy affordability, has led to tens of thousands of lost jobs and a steady decline in the country's global share of aluminum production.

At the turn of the century, the U.S. was still the leading producer of primary aluminum, according to the BlueGreen Alliance. By 2022, American-made primary aluminum represented only a 1.2% share of the global market, lagging far behind countries like China, India and Russia, according to critical mineral data from the U.S. Geological Survey.

In September, Ford Motor Co., General Motors, PepsiCo, SunPower and other companies sent a letter to Secretary of Energy Jennifer Granholm, calling on her department to prioritize the growth and decarbonization of the domestic aluminum industry in its deployment of federal infrastructure funding.

"Spiking electricity prices, lack of access to low-cost renewable energy, and insufficient federal investment" have pushed remaining primary aluminum smelters "to the brink," the companies wrote.

The Inflation Reduction Act and Bipartisan Infrastructure Law infused billions of dollars into the Department of Energy's Industrial Demonstrations Program, with the aim of decarbonizing important industries.

And without a reliable supply of aluminum, the Biden administration's climate goals could remain out of reach.

‘The aluminum paradox’

Aluminum is important to the production of solar panels, wind turbines and electric vehicles, among other key climate solutions prioritized in Biden’s efforts to decarbonize the economy and electrify transportation.

But traditionally, the production of aluminum has been carbon intensive, largely due to reliance on large amounts of fossil fuel-based energy.

And emissions from the smelters themselves also contribute to warming — perfluorocarbons released from Century's Sebree plant in 2021 were equal to the annual greenhouse gas contributions of 40,000 automobiles, according to Inside Climate News.

Smelters in Kentucky owned by Century Aluminum have also had a history of harmful pollution released into local air and water.

The Environmental Integrity Project, a watchdog group, issued a report last year on “the aluminum paradox,” describing the industry’s fundamental role in energy transition and its historically high rates of toxic and planet-warming emissions.

Between 2018-23, Century’s Kentucky operations racked up at least 39 violations of air and water pollution standards, according to an EIP analysis of federal data.

These violations point to another challenge of restarting a traditional smelter like the one in Hawesville.

"They're older operations. They're more polluting operations," Boldman said. "It would take a lot to get those cleaned up."

In Century's new proposal, she added, "We have an opportunity to start fresh, to get a new, clean, green smelter ... that will produce the aluminum needed, and keep that economy going here in Kentucky."

The Beshear administration is still working to secure Century's final siting in Kentucky, and an incentive package is likely to play a key role. In a recent press conference, the governor said "there were literally dozens of trips" made in a push for the Department of Energy's support for the smelter, "from the president to anyone else that would listen."

But Beshear has also indicated concern about the state legislature's approach to energy policy as a barrier to bringing major projects to Kentucky. In his veto of Senate Bill 349, he wrote the bill would cause "inordinate delays in authorizing new generation, which will jeopardize economic development."

"There's a commitment to fossil energy in some parts of this country that is shaping up to be a very anti-business position," Sartor said. "And that's concerning for us. We would like to see a thriving industry, and what industry is saying is they need renewables."

Connor Giffin is an environmental reporter for The Courier Journal and a corps member with Report for America, a national service program that places journalists in local newsrooms to report on under-covered issues. The program funds up to half of corps members' salaries, but requires a portion also be raised through local community fundraising. To support local environmental reporting in Kentucky, tax-deductible donations can be made at courier-journal.com/RFA.

Learn more about RFA atreportforamerica.org. Reach Connor directly at cgiffin@gannett.com or on X@byconnorgiffin.

EXHIBIT 3

DIRECT TESTIMONY OF JULIA J. TUCKER

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	)))))))))	**CASE NO. 2024-00370**

DIRECT TESTIMONY OF JULIA J. TUCKER
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	)	**CASE NO. 2024-00370**

AFFIDAVIT

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Julia J. Tucker, being duly sworn, states that she has read the foregoing prepared testimony and that she would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of her knowledge, information and belief.

Julia J. Tucker

Subscribed and sworn before me on this 18th day of November 2024.

Gwyn McWilloughby
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

I. Introduction

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Julia J. Tucker. I am the Vice President of Power Supply and Planning for East Kentucky Power Cooperative, Inc. ("EKPC"). My business address is 4775 Lexington Road, Winchester, Kentucky 40391.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I have a Bachelor's degree in Electrical Engineering from the University of Kentucky. I am a licensed Professional Engineer, Registration Number 15532, in the state of Kentucky. I have worked for EKPC for the past 18 years.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. I oversee EKPC's Power Supply Planning, Load Forecasting, PJM Market Operations, Fuels Procurement, Demand Side Management, Distributed Energy Resources and development of Renewable Energy Projects.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes, recently in the Fuel Adjustment Clause review case, the Certificate of Public Convenience and Necessity ("CPCN") application to construct the solar facilities in Marion and Fayette Counties, and the CPCN application to construct the Liberty

Station.[1]

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is first to describe EKPC's power supply needs and the efforts it has undertaken to address those needs. I will discuss PJM's Effective Load Carrying Capacity ("ELCC") Capacity Paradigm and how it reduces EKPC's existing generating capacity. I also provide information on EKPC's 2024 Load Forecast Study and how it shows support for the new generation proposed in this Application.

Q. ARE YOU SPONSORING ANY EXHIBITS?

A. Yes. I am sponsoring the following exhibits, which I ask to be incorporated into my testimony by reference:

- Attachment JJT-1, EKPC Sustainability Plan;
- Attachment JJT-2, EKPC Long-Term Load Forecast 2024 Report (Confidential);
- Attachment JJT-3, EKPC Forecast Vintage Comparisons (Confidential);
- Attachment JJT-4, EKPC Capacity Expansion Plan;
- Attachment JJT-5, Projected Net Cost Benefit and Generation

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[1] Case No. 2024-00129, *In the Matter of the Electronic Application of East Kentucky Power Cooperative, Inc. for Certificates Of Public Convenience and Necessity and Site Compatibility Certificates for the Construction of a 96 Mw (Nominal) Solar Facility in Marion County, Kentucky and a 40 Mw (Nominal) Solar Facility in Fayette County, Kentucky and Approval Of Certain Assumptions of Evidences of Indebtedness Related to the Solar Facilities and Other Relief*; Case No. 2023-00009, *In the Matter of An Electronic Examination of the Application of the Fuel Adjustment Clause of East Kentucky Power Cooperative, Inc. from November 1, 2020 through October 31, 2022* (Ky. P.S.C filed Set. 6, 2023); Case No. 2024-00310, *In the Matter of the Electronic Application of East Kentucky Power Cooperative, Inc. for a Certificate Of Public Convenience and Necessity and Site Compatibility Certificate for the Construction of a 214 MW Recripcocating Internal Combustion Engine Facility and Other Relief.*

Each of these documents was prepared by me, under my supervision, or at my request.

II. Existing Generation Portfolio and Identification of Need

Q. PLEASE GENERALLY DESCRIBE EKPC'S EXISTING GENERATION PORTFOLIO.

A. In total, EKPC owns and operates coal-fired generation at the John S. Cooper Station in Pulaski County, Kentucky (341 MW) and the Hugh L. Spurlock Station (1,346 MW) in Mason County, Kentucky. EKPC also owns and operates natural gas-fired generation at the J. K. Smith Station in Clark County, Kentucky (753 MW (summer)/989 MW (winter)) and the Bluegrass Generating Station in Oldham County, Kentucky (501 MW (summer)/567 MW (winter)), landfill gas-to-energy facilities in Boone County, Greenup County, Hardin County, Pendleton County and Barren County (13.8 MW total), and a Community Solar facility (8.5 MW) in Clark County, Kentucky. The net unit ratings are based upon the original equipment manufacturer's gross name plate megawatt rating minus the station service. Finally, EKPC purchases hydropower from the Southeastern Power Administration at Laurel Dam in Laurel County, Kentucky (70 MW), and the Cumberland River system of dams in Kentucky and Tennessee (100 MW). EKPC has a short-term hydro Power Purchase Agreement ("PPA") for a 350 MW facility in Pennsylvania, delivered into the PJM system. The contract currently expires May 31, 2025 but EKPC is currently discussing extending the terms of the agreement for a longer period of time. EKPC also has 200 MWs of interruptible load and approximately

28 MWs in peak reduction mechanisms. EKPC's record peak demand of 3,754 MW occurred on January 17, 2024.

Q. IN WHAT WAYS DOES EKPC PLAN FOR ITS FUTURE POWER SUPPLY NEEDS?

A. EKPC constantly strives to anticipate the challenges it may face over both the near- and long-term. As part of this process, EKPC regularly conducts and reviews load and pricing forecasts, prepares for environmental regulation developments, and evaluates the impact various factors may have on the Cooperative's existing generation portfolio and overall financial stability. Future power supply needs analysis occurs both during and between EKPC's Integrated Resource Plan ("IRP") filings. EKPC's Board of Directors, through its Strategic Plan, provides particular guidance in identifying and achieving EKPC's future goals.

Q. DOES EKPC HAVE A STRATEGIC PLAN CURRENTLY IN PLACE?

A. Yes. Following a Commission-directed management audit, EKPC's Board adopted a Strategic Plan in 2011 that identified various core strategies, including but not limited to pursuing prudent diversity in the fuel mix of the Cooperative's generation portfolio and evaluating new investments using sound financial principles. EKPC has convened several Strategic Planning retreats since 2011, with the most recent being held in 2023.

One of EKPC's strategic objectives is to actively manage its current and future asset portfolio to safely deliver reliable and sustainable energy from appropriately diversified resources at competitive prices, and work with federal and state stakeholders to ensure high reliability and economic viability while mitigating evolving regulatory challenges including possible carbon emissions reduction mandates and penalties. EKPC will accomplish this objective by actively managing its current and future asset portfolio to maintain high reliability of electric service to its owner-member Cooperatives ("owner-members") and economically diversify its energy resources, including market purchases, fossil fuels, renewables, storage, demand management, and energy efficiency programs, and partnering opportunities when feasible.

Another strategic objective is to continue to ensure reliability and rate-competitiveness of electric service while supporting beneficial electrification and thoughtfully responding to growing pressures to decarbonize. EKPC will continue to manage for reliability and minimize negative financial impacts to End-Use Retail Members while supporting beneficial electrification that could generate significant load growth, particularly through continuing penetration of electric vehicles, electrification of industrial processes, and electrification of residential and commercial heating applications. EKPC will also work with state, federal, regional, and PJM stakeholders to respond to the legal, regulatory, and industry pressures to decarbonize the fleet through solutions based on science, engineering and economics that ensure electric service continues to be highly reliable and available at competitive rates to the public. The co-fire conversion of EKPC's existing coal assets along with the addition of a Combined Cycle Gas Turbine ("CCGT") unit at Cooper Station, along the addition of the Liberty Station[2] and addition of significant

[2] Case No. 2024-00310, *In the Matter of the Electronic Application of East Kentucky Power Cooperative, Inc. for a Certificate Of Public Convenience and Necessity and Site Compatibility Certificate for the Construction of a 214 MW Recripcocating Internal Combustion Engine Facility and Other Relief*.

solar facilities, will help create more diversity within EKPC's generation portfolio and advance EKPC's efforts to fulfill the Strategic Plan.

Q. DOES EKPC BELIEVE ITS EXISTING GENERATION PORTFOLIO WILL ADEQUATELY PROVIDE FOR ITS LONG-TERM NEEDS?

A. No. EKPC expects to need additional generation resources to meet its growing needs for the future and to comply with increasingly stringent federal environmental rules. EKPC is an electric generation and transmission cooperative with a growing demand for electricity within its service territory. In addition, the increasing demand within the PJM system along with significant baseload generation retirements, two consecutive winters with extremely cold temperatures, the ongoing nationwide shift towards electrification, and the unprecedented rapid expansion of stringent federal environmental regulation affecting utilities all combine to make the ownership of electric generation a continuous consideration requiring thorough evaluation from EKPC.

Q. PLEASE GENERALLY DESCRIBE EKPC'S ENERGY NEEDS AS REFLECTED IN ITS MOST-RECENT INTEGRATED RESOURCE PLAN.

A. On April 1, 2022, EKPC filed its most recent triennial IRP ("2022 IRP"), which analyzed EKPC's forecasted load, capacity needs and related issues over a fifteen-year period from 2022 through 2036. The 2022 IRP indicated that EKPC's total energy requirement will increase by 1.1% per year over a fifteen-year period. Reflecting EKPC's status as a winter-peaking utility, the 2022 IRP indicated that EKPC's winter net peak demand will increase 0.6% annually while its summer net peak demand will increase by 0.8% annually. Also, the 2022 IRP predicted that EKPC's annual load factor would increase from 50% to 54%.

EKPC desires to keep its plans as flexible as possible to be able to adjust to market and load conditions as needed. EKPC continues to monitor its load and all economic power supply alternatives. EKPC joined PJM on June 1, 2013, which has significantly beneficially impacted its operations and improved its ability to economically serve its native load. EKPC realized significant saving benefits from operating within PJM from June 1, 2013 through May 31, 2024, as described in its annual reports to the Commission.[3] PJM begins the Capacity Delivery Year ("DY") on June 1st and ends the DY on May 31st, therefore the annual report and related analysis reflects the DY beginning and ending dates. EKPC continuously evaluates its resource portfolio compared to its forecasted load profile and considers how best to manage its energy market price exposure, and future load needs, while providing reliable power supply during extreme conditions. The 2022 IRP indicated that EKPC could benefit from adding solar energy to its portfolio, along with some additional fossil fired generation to preserve reliability.

Q. HAS EKPC MATERIALLY CHANGED ITS LOAD FORECAST SINCE ITS 2022 IRP?

A. Yes. EKPC has completed the 2024 Long Term Load Forecast ("LTLF") which substantially alters the base demand and energy projections as compared to those used in the development of the 2022 IRP, which were based on EKPC's 2020 load

[3] See post case correspondence annual filings for Case No. 2012-00169, *In the Matter of the Application of East Kentucky Power Cooperative, Inc. to Transfer Functional Control of Certain Transmission Facilities to PJM Interconnection, LLC.*

forecast. Key drivers of the 2024 LTLF include native load growth, load growth attributed to economic development, and the addition of assumptions for electric vehicle ("EV") penetration. The 2024 LTLF is likely to be conservative in that it does not take into account the possible addition of megaloads, such as energy intensive manufacturing or data centers and artificial intelligence computing loads. While these types of large leaps in a load profile are certainly possible based upon economic development activities in EKPC's owner-member service territories, they are somewhat speculative until specific projects are finalized and announced.

Q. HOW HAS THE INFLATION REDUCTION ACT AFFECTED THE LOAD FORECASTING?

A. Tax incentives from the Inflation Reduction Act ("IRA") are included in the cost-effectiveness determinations of energy efficiency measures and programs. The tax incentives reduce the cost for the consumer to install energy efficiency measures, and any utility rebate goes to make the installation even more attractive. These changes were taken into account in the cost / benefit analysis of energy efficiency programs and utilized in developing the future plans for Demand Side Management programs. The impact of those plans were then incorporated into the long-term load forecast, so the forecast was modified downward as a result of considering the IRA tax incentives.

Q. DID EKPC CONSIDER DEMAND SIDE MANAGEMENT AND ENERGY EFFICIENCY (DSM/EE) PROGRAMS IN ITS CAPACITY NEEDS ANALYSIS?

A. Yes. EKPC has undertaken an extensive review of DSM / EE programs and is increasing its program selection. The expected resulting decrease in load has been included in the 2024 LTLF. Comprehensive discussions and tariff updates have been completed and are included in this CPCN filing. Scott Drake's Direct Testimony, attached to the Application at Exhibit 10, discusses and quantifies the details of this analysis and the results. The following table shows the values used in the current LTLF.

(negative value= reduction in load)

Year	Impact on Energy Requirements (MWh)	Impact on Winter Peak (MW)	Impact on Summer Peak (MW)
2025	-5,232	-7	-24
2026	-18,177	-13	-29
2027	-31,129	-19	-33
2028	-44,127	-25	-37
2029	-56,761	-31	-41
2030	-69,792	-38	-45
2031	-82,852	-44	-49
2032	-96,103	-50	-54
2033	-108,663	-56	-58
2034	-121,091	-60	-56
2035	-133,857	-66	-60
2036	-147,802	-72	-64
2037	-160,175	-78	-67
2038	-173,082	-83	-71
2039	-185,729	-89	-74

Q. HAS EKPC ACCOUNTED FOR PRICE ELASTICITY IN ITS ANALYSIS?

A. Yes, EKPC uses Statistically Adjusted End use ("SAE") forecast models defined by Itron, Inc. Price elasticity is an explicit assumption in EKPC'S SAE models.

Q IS THE LOAD FORECASTING UNDERTAKEN TO ASSESS EKPC'S NEEDS REASONABLE?

A. Yes, EKPC forecasts consumer and energy growth for each of its owner-members' Rural Utility Service ("RUS") consumer classification. Winter and summer seasonal peak demands are also forecast for each cooperative. Class forecasts are based on 2024 S&P economic projections, appliance saturations from EKPC's 2022 Residential Appliance Saturation Survey, appliance efficiencies from the Energy Information Administration's ("EIA") 2023 Annual Energy Outlook ("AEO"), and near term commercial and industrial growth not captured in models. The summation of the owner-member forecasts represents EKPC's load forecast. These models and assumptions are reasonable to assess EKPC's needs.

Q. PLEASE SUMMARIZE THE 2024 LONG-TERM LOAD FORECAST.

A. Residential, small commercial, and large commercial sales are forecast to grow at compound annual growth rates of 1.0%, 0.2%, and 1.5% respectively over the forecast period (2025 – 2039). In addition to class forecasts, EKPC partnered with a consultant to forecast EV growth and energy requirements. Charging profiles from the U.S. Department of Energy's ("DOE") Alternative Fuel Data Center ("AFDC") were analyzed and incorporated into EKPC's forecast to project EV hourly charging needs and seasonal peak contributions. Total energy requirements, winter peak demand, and summer peak demand including EV projections are forecast to grow at compound annual growth rates of 1.4%, 0.9%, and 1.2% respectively. Refer to Attachment JJT-2, the EKPC Long-Term Load Forecast 2024 Report, for more detail.

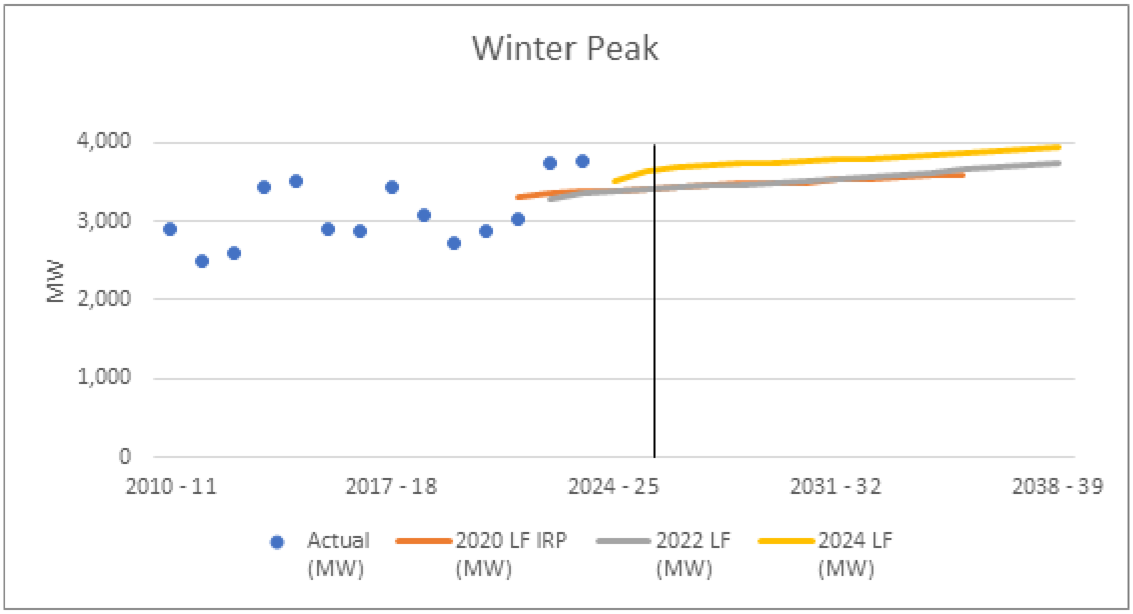
Q. HOW DOES THE 2024 LONG-TERM LOAD FORECAST COMPARE TO THE 2020 AND 2022 LONG-TERM LOAD FORECAST?

A. The 2024 LTLF winter peak forecast is higher than both the 2020 and 2022 forecasts. The peak experienced during Winter Storm Elliott in December 2022 is attributed to an extreme weather event with unprecedented wind-chill ratings, meaning that once that peak was weather-normalized it was in-line with forecasted expectations. However, the peak witnessed during Winter Storm Gerri in January 2024 (EKPC's all-time peak) did not occur during an extreme weather event, indicating that prior forecasts were under-projecting winter peaks. A comparison of the peaks during Winter Storms Elliott and Gerri is as follows:

- Winter Storm Elliott resulted in a 3,747 MW peak during an extreme weather day on 12/23/2022 (which was a holiday for many businesses) with minimum temperature reaching -5°F
- Winter Storm Gerri resulted in a 3,754 MW peak during a non-extreme weather day in the middle of the workweek on 1/17/2024 with minimum temperature reaching 3°F

In addition, the 2024 LTLF is up from the 2020 forecast primarily due to the updated assumptions related to peak load weather and partly driven by industrial growth and EV assumptions. Figure 1 displays actual winter peaks witnessed from 2009-2024 along with forecasted peaks from the 2020, 2022, and 2024 LTLFs. The 2020 and 2022 LTLF show similar peak load forecasts, while the 2024 LTLF shows the increase due to the aforementioned assumptions.

Figure 1



Attachment JJT-3, EKPC Forecast Vintage Comparisons (Confidential), shows a comparison of each vintage of LTLF discussed herein. From the 2022 forecast to the 2024 forecast, winter peak loads are up by 227 MW in the 2025/2026 winter period and up by 199 MW net over the previous load forecast in the 2038/2039 winter period.

Q. CAN YOU DESCRIBE EKPC'S GENERAL APPROACH TO RESOURCE PLANNING?

A. EKPC utilizes the load forecast to project future capacity and energy needs. The 2024 load forecast serves as the basis for evaluating resource planning needs. Capacity Planning Reserve Margin ("Reserve Margin") is then added to the base forecast, 7% for winter and summer peak, to account for unknown risks in weather and generation availability. The base forecast plus Reserve Margin constitutes the forecasted capacity need. EKPC models its expected generation resources, how they are predicted to operate within the PJM energy market and compares that to the cost of not having those resources and having to purchase that energy from the PJM energy market. If the resources show net positive margins, then they are economic resources for the EKPC owner-members portfolio.

Q. WHY DOES THE RESERVE MARGIN DISCUSSED IN THIS APPLICATION DIFFER FROM EKPC'S 2022 IRP?

A. The Reserve Margin of 7% for winter peak represents a significant change from EKPC's 2022 IRP capacity reserve methodology which assumed a 0% Reserve Margin. This change has been driven by two risks associated with winter peaks: higher than anticipated demand driven by extreme cold weather events (Winter Storms Elliott and Gerri) and generator outage probability. EKPC is a winter-peaking system, and thus it is necessary and reasonable to plan for a generation portfolio to both meet expected forecasts and account for these unknown risks. On average, the actual peak load during those events was 12% higher than forecasted. A portion of that increase has been included in the revised 2024 LTLF; however, there remains the risk of an unexpected extreme weather event or generator outage. EKPC quantified this risk by analyzing the 1 in 10 probability of extreme weather events and spreading that risk over the planning horizon, with an extreme weather event occurring every two years for a 48-hour period within each of those two-year periods. This is consistent with actual events in Winter Storms Elliott and Gerri, which were multiple-day cold weather events, driving load saturation from residential consumption. The Reserve Margin of 7% reflects this inherent risk above the base forecast and enables EKPC to increase reliability while also improving the owner-members' hedge against PJM energy market prices during peak winter periods.

EKPC's Reserve Margin for the summer peak has been increased from 3% to 7% since the 2022 IRP. This increase in summer peak reserves is necessary to ensure that EKPC is hedged from potentially volatile PJM capacity market prices, which recently cleared at approximately $270/MW-Day for the 2025/2026 Base Residual Auction ("BRA"). This increase was primarily driven by the PJM adoption of ELCC in lieu of Equivalent Forced Outage Rate Demand ("EFORd") as the capacity accreditation methodology in effect starting with the 2025/2026 BRA. EFORd represents a single generator's probability of availability based on total service hours as compared to partial or total forced outage hours. ELCC is a combination of both a generator's market-wide class rating, based on thirty years' worth of historical weather patterns used to simulate thirty-nine thousand (39,000) years' worth of data, and individual generator performance using actual output during the two hundred (200) highest coincident-peak load hours over a rolling ten (10) year period. The shift to ELCC results in an overall reduction in capacity available from all generators to sell into the PJM capacity market and reduced EKPC's accredited capacity to sell into PJM by 17% on average for the 2025/2026 BRA. While the summer peak does not represent a reliability concern for EKPC, as EKPC's winter peak is approximately 1,000 MW higher than its summer peak, it does represent a financial risk should EKPC not carry enough available capacity to offset its required load obligation purchase from the PJM capacity market. While it is likely that the winter capacity needs will continue to drive capacity resource expansion, EKPC cannot ignore the risk of ELCC and therefore has increased its summer planning reserves to match its revised winter reserves.

The Commission has repeatedly stated that it has no desire for regulated utilities in Kentucky to rely on wholesale energy markets for capacity and energy.[4] The revised reserve margins further EKPC's efforts to reliably serve its owner-members with competitively priced energy and maintain sufficient capacity to more effectively hedge native load during extreme weather events.

Q. CAN YOU DESCRIBE EKPC'S FORECASTED CAPACITY NEEDS?

A. Attachment JJT-4, along with Figures 2 and 3 below, outline EKPC's generation capacity needs within the 2025 through 2039 planning horizon. Attachment JJT-4 outlines EKPC's Capacity Expansion Plan ("Expansion Plan") detailing the LTLF annual peak demand, seasonal planning reserve margins, total existing generation capacity, the capacity surplus (negative number) or deficit (positive number) prior to any capacity additions, the planned capacity additions, and the total capacity including any additions. Any deficit in the total capacity including any planned additions compared to the annual peak is shown in the seasonal purchase column, meaning that EKPC would intend to monitor the position and hedge any outstanding capacity needs on a seasonal basis.

[4] Case No. 2014-00226, *In the Matter of an Examination of the Application of the Fuel Adjustment Clause of East Kentucky Power Cooperative, Inc. from November 1, 2013 Through April 30, 2014* (Ky. P.S.C Order, Jan., 30, 2015); Case No. 2022-00402, *In the Matter of the Electronic Joint Application of Kentucky Utilities Company and Louisville Gas And Electric Company for Certificates of Public Convenience and Necessity and Site Compatibility Certificates and Approval of a Demand Side Management Plan and Approval of Fossil Fuel-Fired Generating Unit Retirements* (Ky. P.S.C. , Nov. 6, 2023); Case No. 2023-00153, *In the Matter of the Electronic Tariff Filing of East Kentucky Power Cooperative, Inc. and its Member Distribution Cooperative For Approval of Proposed Changes to their Qualified Cogeneration and Small Power Production Facilities Tariffs* (Ky. P.S.C Order, Oct. 31, 2023).

The expansion plan indicates that EKPC is expected to be short 200 MW of capacity beginning in the 2026/2027 winter period as compared to its forecasted winter peak and 454 MW as compared to its forecasted winter peak plus Reserve Margin. EKPC's Board of Directors ("Board") has approved the projects detailed in this Application which helps meet the mid- and long-term capacity needs of the company.

Figure 2 details EKPCs existing generation capacity portfolio (designated by the solid-colored bars) and generation capacity additions (designated by textured bars) compared to its forecasted winter peaks and its forecasted winter peaks plus Reserve Margin. Beginning in 2026, and through the planning horizon to 2039, EKPC is expected to be short capacity as compared to its forecasted winter peak load (not accounting to the 7% planning Reserve Margin) without the addition firm energy and/or capacity resources. EKPC's Board recently authorized moving forward with the Liberty RICE Facility and Cooper CCGT unit to meet this need with commercial operation beginning in 2028 and 2030, respectively. In addition, EKPC is seeking to execute a long-term hydro energy-only PPA beginning in 2026.

Figure 2

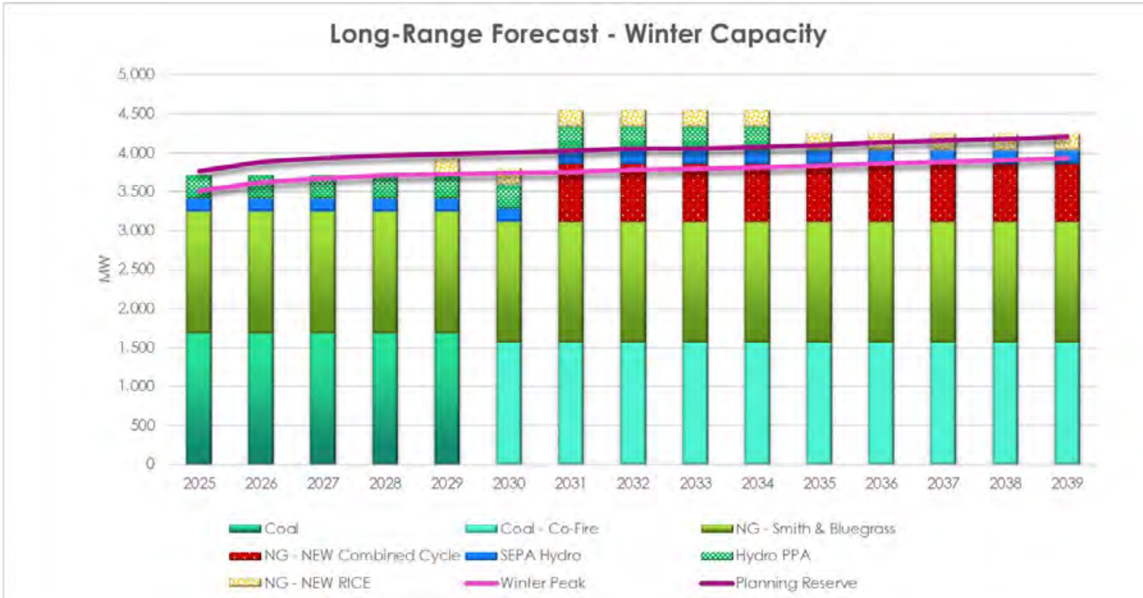
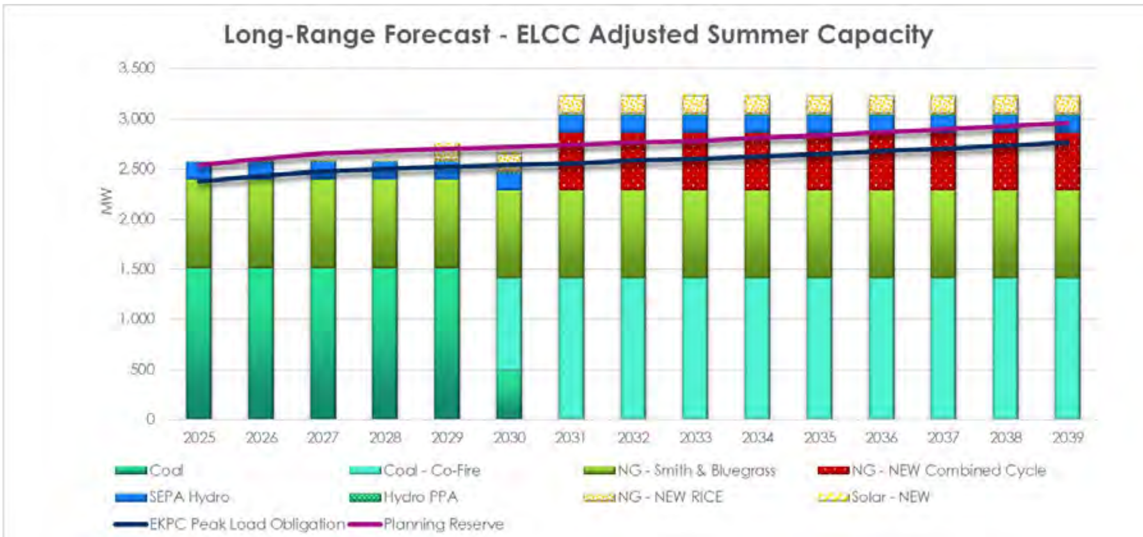


Figure 3 details EKPCs existing generation capacity portfolio (designated by the solid-colored bars) and generation capacity additions (designated by textured bars) adjusted for ELCC (based on the PJM posted ELCC values) compared to the estimated PJM load obligation ("load obligation") to be purchased by EKPC and the load obligation plus Reserve Margin. This figure is intended to provide the approximate position of EKPC's generation capacity portfolio in relation to the PJM capacity auction, which is an economic position, rather than the reliability aspect of the portfolio portrayed in Figure 2. EKPC's ELCC-adjusted capacity remains higher than its load obligation for the period from 2025 through 2029. Adding the Reserve Margin to the load obligation shows that EKPC could be short as soon as summer 2027. Without the addition of the Cooper CCGT, EKPC could be short capacity relative to its load obligation plus Reserve Margin in the 2031 through 2039 period. The Cooper CCGT project need is primarily driven by

EKPC's forecasted winter peaks; however, it also meets the summer ELCC-adjusted need. The long-term hydro energy PPA is not included in Figure 3 as the agreement would be for energy only and EKPC would not be able to monetize that PPA in the PJM capacity market.

Figure 3



Q. HAVE FEDERAL ENVIRONMENTAL REGULATIONS HAD A PARTICULARLY SIGNIFICANT IMPACT ON EKPC'S GENERATION PORTFOLIO AND POWER SUPPLY PLANNING?

A. Yes. The impacts of environmental regulations are incorporated into EKPC's generation portfolio and power supply process and are accounted for in this proposal. The specific implications of the latest federal environmental regulations are discussed more thoroughly in the Direct Testimony of Jerry Purvis, attached as Exhibit 7 to the Application.

Q. PLEASE DESCRIBE EKPC'S GENERATION PORTFOLIO AND HOW DIVERSIFICATION IN SUPPLY RESOURCES BENEFITS THAT PORTFOLIO?

A. The bulk of EKPC's generation portfolio is dependent on reliable and proven fuel resources such as coal and natural gas, with coal generation making up the majority of energy served by EKPC. Having units that are dispatchable is essential to maintain reliability. However, EKPC has expanded over the years to include non-traditional resources such as landfill gas to energy projects and a cooperative solar project. EKPC also has the ability to burn tire derived fuel in a Combustion Fluidized Bed ("CFB") unit at its Spurlock Station. EKPC purchases a significant amount of clean hydro power from existing projects on the Cumberland River System owned and operated by the United States Corps of Engineers. EKPC has a short-term contract for hydro energy from a project in Pennsylvania. The current contract ends May 31, 2025 but negotiations are currently under way to extend the terms to ensure EKPC has adequate power supply available prior to the proposed units being available. EKPC plans to diversify its portfolio further with two new solar projects that are pending Commission approval along with the potential for more solar projects which EKPC expects to file for approval later this winter.

Q. WOULD THE PROJECTS DESCRIBED IN THIS APPLICATION HAVE A BENEFICIAL IMPACT ON ECONOMIC DEVELOPMENT?

A. Yes, by further diversifying EKPC's resource portfolio to include more natural gas-fired generation, EKPC can reduce its carbon intensity, or carbon dioxide per megawatt-hour. This metric is often used by economic development projects to score project sites. Large load customers desire clean energy along with reliable, dependable power supply. Additional details are included in the Direct Testimony of Rodney Hitch, attached at Exhibit 9 to the Application.

III. Combined Cycle Gas Turbine at Cooper Station

Q. PLEASE DESCRIBE THE COOPER COMBINED CYCLE PROJECT THAT IS BEING PROPOSED IN THIS APPLICATION.

A. The proposed Cooper CCGT plant would be capable of producing up to 745 MW on a dependable and dispatchable basis. The plant would have two natural gas fired combustion turbines, two heat recovery steam generators ("HRSG") and one steam turbine.

Q. PLEASE DESCRIBE WHY THE COOPER COMBINED CYCLE PROJECT IS NOT DUPLICATIVE OF ANY OTHER SOLUTIONS OR RESOURCES CURRENTLY HELD BY THE UTILITY.

A. The CCGT would enhance EKPC's ability to reliably and economically serve its owner-members' load needs. Figure 2 above shows that EKPC is not currently meeting its desired reserve capacity position during its projected winter peaks. EKPC is currently purchasing hydro energy on a short-term PPA to ensure that it has sufficient resources to serve its load. The hydro owner sells energy, capacity and renewable energy credits separately. EKPC has only purchased the energy from the project, so the capacity from that purchase does not help hedge EKPC's capacity requirements in PJM. The new CCGT would supply both economic energy and dependable capacity, better serving EKPC's load serving needs on a local basis as opposed to being dependent on an out of state facility. Additionally, the CCGT capacity would be sold into the PJM capacity market and will help hedge EKPC's cost exposure to the amount of load requirement it must purchase from that same PJM market. The hydro PPA can supply an intermediate solution while the CCGT provides a long term economic and reliable solution. Additionally, both of the existing Cooper coal fired units will require retrofits, at a minimum, to meet new environmental compliance rules. EKPC needs dependable base load generation in the Cooper area for transmission support and load serving capability. The addition of the CCGT will provide EKPC options for future changes at the Cooper plant that could not be considered without the addition of the CCGT.

Q. PLEASE DESCRIBE THE NEED FOR THE COOPER COMBINED CYCLE.

A. As shown on Figure 2 and Attachment JJT-4, EKPC does not currently have access to the amount of capacity it deems necessary to reliably and dependably serve its winter peak load requirements including reserves. EKPC is purchasing the output of a hydro plant in Pennsylvania currently to supply energy on an interim basis until it can construct a facility on its own system. EKPC has a need for additional low cost, dispatchable energy as well as capacity. The most demonstrated reliable energy source currently available to EKPC is a CCGT. The F Class combustion turbines have been in operation for well over 25 years and are a proven technology with significant amounts of industry maintenance and operations support. The HRSG and steam turbine technologies are also well seasoned and supported within the industry. EKPC did consider nuclear, however, the technologies being developed today that would be of appropriate size for the EKPC system are not yet proven. The Electric Power Research Institute ("EPRI") says a technology needs to be repeated in at least ten different applications to be considered duplicative and proven. The small modular reactors are not at that level yet. EKPC is not of sufficient size or financial position to be able to incur that type of new development risk. New coal units are not feasible in today's environmental climate given the cost of compliance with the plethora of environmental regulations. Renewables most certainly have a place in the system, but they do not provide dispatchable, base load energy. The EKPC system needs both renewable energy and dispatchable base load energy. The CCGT is in addition to renewables not instead of renewables. The most prolific renewable resource available in the EKPC system is solar energy. EKPC has a need for dependable winter peak load generation. Solar energy is not available to EKPC during its winter peaks which either occurs early in the morning or later in the evening, both times when the sun is not shining. Therefore, the most obvious choice for new generation was a CCGT. EKPC has existing infrastructure and work force at the Cooper site. EKPC also desires to maintain its support of the surrounding communities, therefore, Cooper was chosen as the most desired site. A more detailed explanation of how Cooper was chosen as the desired site is included in the the Direct Testimony of Brad Young, attached as Exhibit 4 to the Application. Since it was an existing EKPC site and given supply chain constraints and concerns, EKPC did not issue an RFP for power supply to be provided by other sources. EKPC has conducted multiple RFPs for renewable energy resources in the past few years. The experience during those solicitations has created concern over being able to depend on a third party to successfully complete a large project as proposed in their offers. Increased regulation, along with supply chain limitations, has not provided a conducive environment for third party development. EKPC has evaluated and chosen two different solar developers to negotiate with in good faith to reach an agreement to construct utility scale solar projects. Neither of these endeavors have resulted in successful completion of contracts to move forward with constructable projects. EKPC's system reliability and dispatchability will be impacted with the proposed project. EKPC could not risk spending months, or years, on evaluations and negotiations to only determine at the end of the process that the developer could not deliver on its proposal, as has happened with the two solar developers.

In addition, Cooper Unit 2 must have the ability to co-fire with gas to remain a viable option going forward. Therefore, a gas pipeline has to be constructed for Cooper Unit 2, see the Direct Testimony of Mark Horn, attached at Exhibit 8 to the Application, for more detail. Adding the needed generation to the Cooper site enhances the economic viability of the gas pipeline addition.

Q. HOW WILL THE COOPER COMBINED CYCLE BE OFFERED INTO PJM?

A. The CCGT will be offered into the PJM capacity and energy markets, just like other EKPC owned generation. The plant will be described in the machine data details as two combustion turbines, two heat recovery steam boilers and one steam turbine, which works together as the complete CCGT plant. The plant will be modeled within the PJM system and given the assumed capacity parameters that will be allowed to be offered into the PJM capacity market (Reliability Pricing

Model "RPM"). Once the unit clears the RPM, then EKPC will be required to offer it into the daily energy market within PJM. Again, the plant will be modeled as each individual component, and then modeled also as a fully integrated project. Unit information such as heat rates, ramp rates, load following capabilities, minimum and maximum output, and any other requested unit information. Therefore, if there are system conditions that warrant running only one of the combustion turbines in a simple cycle mode, then PJM can request that operation. They can request the unit operate within any of the unit parameters that it is capable of providing. EKPC will provide cost information that reflects each mode of operation, in compliance with its approved PJM fuel cost policy. EKPC will also offer price parameters that can be used for market dispatch during non reliability-constrained operating conditions. The price offers reflect at what prices EKPC is willing to sell the energy from the unit as long as there are no reliability constraints on the system. Once a reliability constraint is identified, then the cost parameters go into effect. These are the same parameters that are defined for each unit that EKPC has sold into the RPM and must be offered daily into the energy market.

Q. WILL THE COOPER COMBINED CYCLE RESULT IN ANY UNNECESSARY DUPLICATION OF INVESTMENT OR THE CLUTTERING OF THE LANDSCAPE WITH UNNEEDED FACILITIES?

A. No. The Cooper combined cycle will provide reliable, economic electric generation in an area of the transmission system that could benefit from additional support. The generation from this project will help meet the additional needs of the EKPC system, as previously defined in Attachment JJT-4. The project does not duplicate any other similar generation in this region or on any utility system within Kentucky. The load to be served by this project is load on the EKPC system. The project will be located at an existing power plant site and will not clutter the landscape with unneeded facilities.

Q. WILL THE COOPER COMBINED CYCLE COMPETE WITH ANY OTHER ENTITIES REGULATED BY THE COMMISSION?

A. No. The Cooper combined cycle facility is being constructed to serve EKPC load and will not compete with other entities regulated by the Commission.

Q. WHAT BENEFITS WILL BE DERIVED FROM THE COOPER COMBINED CYCLE?

A. During Winter Storm Elliott, the transmission system in the Cooper area came perilously close to not being able to serve the load in that region, which meant that owner-member consumers would have been without electric service during a bitterly cold period of time. Additional generation in the region will help to address that issue.

In addition to the reliability and transmission support, the CCGT is expected to provide the least-cost variable energy when compared to EKPC's other power supply alternatives. The CCGT is projected to provide over $1.1 billion in net energy cost benefits over the 10-year period from 2030 through 2039 as it is expected to replace nearly 33 million megawatt-hours of energy that would otherwise be generated from higher-cost resources and/or purchased from the PJM energy market over that same period. Refer to Attachment JJT-5 for net revenue and energy production projections. The CCGT is also anticipated to provide between $5.8 million and $56.4 million in annual capacity market benefits based on recent BRA clearing prices.

IV. Cooper Co-Fire

Q. PLEASE DESCRIBE THE COOPER CO-FIRE PROJECT.

A. The new GHG Rule states that existing coal units must either shut down, retrofit to be able to co-fire a minimum of 40% with natural gas or install carbon capture and sequestration technology. Cooper Unit 2 meets all other environmental restrictions currently and provides reliable, dependable energy. EKPC is contracting with a third party to construct a natural gas pipeline to the Cooper site so a new combined cycle gas turbine can be installed. Therefore, it makes sense to consider modifying Cooper Unit 2 to be able to co-fire natural gas and retain that generation for owner-member load serving capabilities. The co-fire project involves the installation of gas burning nozzles to create the steam going to the existing turbine to turn the generator. Those nozzles can either work alone or in combination with the existing coal burners to create the required steam. Cooper Unit 1 cannot meet the NOx limitations without additional environmental controls. Those controls are cost prohibitive, as well as that there is not enough physical space at the plant to install the required selective catalytic reduction ("SCR") facilities. Cooper Unit 1 will not be retrofitted with the gas burners.

Q. PLEASE DESCRIBE WHY THE COOPER CO-FIRE PROJECT IS NOT DUPLICATIVE OF ANY OTHER SOLUTIONS OR RESOURCES CURRENTLY HELD BY THE UTILITY.

A. Retrofitting an existing generating unit is retaining existing capability and is not duplicating any other resources currently held by the utility.

Q. WHY IS THE COOPER CO-FIRE PROJECT NEEDED?

A. EKPC has a defined need for all of its existing generation as well as the proposed generation to reliably serve its load, see Attachment JJT-4. If EKPC does not retrofit Cooper Unit 2 and has to replace that generation due to GHG rules, it would be required to add even more generation than is currently proposed.

Q. ARE ANY ENVIRONMENTAL RULES AND REGULATIONS IMPACTING THE DECISION FOR THE COOPER CO-FIRE PROJECT?

A. Yes, the GHG rule requires that the coal units either be retired or retrofitted to co-fire natural gas or add carbon capture and sequestration technology. More details of the rule and its impacts are discussed in the Direct Testimony of Jerry Purvis, attached at Exhibit 7 to the Application.

Q. PLEASE DESCRIBE THE ALTERNATIVES THAT WERE CONSIDERED AND HOW THE COOPER CO-FIRE PROJECT WAS THE BEST AND LEAST COST ALTERNATIVE.

A. Cooper Unit 2 can be retrofitted to co-fire natural gas along with coal for a capital cost of roughly $73.8 million. EKPC modeled the Cooper Unit 2 operating costs as compared to replacing the energy with other resources or PJM energy market purchases. The modeling indicated that operating Cooper Unit 2 in a 100% natural gas fired condition was worth over $117 million for a roughly 10-year period as compared to not having that energy available to supply load. The energy value will more than pay for the upfront capital expenses for the retrofit.

Q. WILL THE COOPER CO-FIRE PROJECT COMPETE WITH ANY OTHER UTILITIES?

A. No, Cooper Unit 2 is an existing generator that is not in competition with any other utility generation.

Q. WHAT WILL BE THE BENEFITS OF THE COOPER CO-FIRE PROJECT?

A. The Cooper co-fire project is expected to substantially reduce the variable energy cost of the unit when compared to its existing configuration. The project is projected to provide over $117 million in net energy cost benefits over the 10-year period from 2030 through 2039 and is expected to replace 7 million megawatt-hours of energy that would otherwise be generated from higher-cost resources and/or purchased from the PJM energy market over that same period. Refer to Attachment JJT-5 for net revenue and energy production projections. The Cooper co-fire project is also anticipated to enable Cooper Unit 2 to continue to provide between $2 million and $20.1 million in annual capacity market benefits based on recent BRA clearing prices.

Q. ARE THERE ANY BENEFICIAL IMPACTS ON ECONOMINC DEVELOPMENT IN EKPC'S SERVICE TERRITORY?

A. Having natural gas available in the Pulaski County area will offer economic development opportunities to the region. These opportunities are discussed in more detail in the Direct Testimony of Rodney Hitch, attached as Exhibit 9 to the Application.

Q. HOW WILL THE COOPER CO-FIRE BE OFFERED INTO PJM?

A. The Cooper Unit 2 co-fired plant will be offered into the PJM capacity and energy markets, just like it is today. The plant will be described in the machine data details. The plant will be modeled within the PJM system and given the assumed capacity parameters that will be allowed to be offered into the PJM capacity market (Reliability Pricing Model "RPM”). Once the unit clears the RPM, then EKPC will be required to offer it into the daily energy market within PJM. Again, the plant will be modeled as it is today. Unit information such as heat rates, ramp rates, load following capabilities, minimum and maximum output, and any other requested unit information. They can request the unit operate within any of the unit parameters that it is capable of providing. EKPC will provide the cost information that reflects unit operation, in compliance with its approved PJM fuel cost policy. EKPC will also offer price parameters that can be used for market dispatch during non-reliability-constrained operating conditions. The price offers reflect at what prices EKPC is willing to sell the energy from the unit as long as there are no reliability constraints on the system. Once a reliability constraint is identified, then the cost parameters go into effect. These are the same parameters that are defined for each unit that EKPC has sold into the RPM and must be offered daily into the energy market.

Q. WILL THE COOPER CO-FIRE RESULT IN ANY UNNECESSARY DUPLICATION OF INVESTMENT OR THE CLUTTERING OF THE LANDSCAPE WITH UNNEEDED FACILITIES?

A. No, the Cooper co-fire project will result in the continued use of an existing valuable asset and will prevent the need for wasteful duplication.

V. Spurlock Co-Fire

Q. PLEASE DESCRIBE THE SPURLOCK CO-FIRE PROJECT.

A. The new GHG Rule states that existing coal units must either shut down, retrofit to be able to co-fire a minimum of 40% with natural gas or install carbon capture and sequestration technology. Spurlock Station meets all other environmental restrictions currently and provides reliable, dependable energy. EKPC is contracting with a third party to construct a natural gas pipeline to the Spurlock site so the continued operation of EKPC's largest generating plant can be continued. There is over 1,300 MW of existing, reliable, dependable generation at the Spurlock site and being able to co-fire natural gas will retain that generation for owner-member load serving capabilities. The co-fire project is the installation of gas burning nozzles to create the steam going to the existing turbine to turn the generator. Those nozzles can either work alone or in combination with the existing coal burners to create the required steam.

Q. PLEASE DESCRIBE WHY THE SPURLOCK CO-FIRE PROJECT IS NOT DUPLICATIVE OF ANY OTHER SOLUTIONS OR RESOURCES CURRENTLY HELD BY THE UTILITY.

A. Retrofitting an existing generating unit is retaining existing capability and is not duplicating any other resources currently held by the utility.

Q. WHY IS THE SPURLOCK CO-FIRE PROJECT NEEDED?

A. EKPC has a defined need for all of its existing generation as well as additional generation to reliably serve its load, see Attachment JJT-4. If EKPC does not retrofit Spurlock 1 through 4 and has to replace that generation, it would be required to add more generation than is currently proposed. Spurlock Station represents almost half of the EKPC generation portfolio, it would be a tremendous burden on the owner–members to replace all of that generation capacity. Additionally, EKPC has made substantial investments in the Spurlock generation to keep it operating in an environmentally compliant and efficient manner. The stranded costs associated with abandoning that facility would be tremendous.

Q. ARE ANY ENVIRONMENTAL RULES AND REGULATIONS IMPACTING THE DECISION FOR THE SPURLOCK CO-FIRE PROJECT?

A. Yes, the GHG rule requires that the coal units either be retired or retrofitted to co-fire natural gas or add carbon capture and sequestration technology. More details of the rule and its impacts are discussed in the Direct Testimony of Jerry Purvis, attached as Exhibit 7 to the Application.

Q. PLEASE DESCRIBE THE ALTERNATIVES THAT WERE CONSIDERED AND HOW THE SPURLOCK CO-FIRE PROJECT WAS THE BEST AND LEAST COST ALTERNATIVE.

A. Spurlock Units 1 through 4 can be retrofitted to co-fire natural gas along with coal for a capital cost of roughly $187 million. EKPC modeled the Spurlock Units 1 through 4 operating costs as compared to replacing the energy with other resources or PJM energy market purchases. The modeling indicated that operating Spurlock Station in a 40% natural gas fired condition was worth over $745 million for a roughly 10-year period as compared to not having that energy available to supply load. The energy value more than paid for the upfront capital expenses for the retrofit.

Q. WILL THE SPURLOCK CO-FIRE PROJECT COMPETE WITH ANY OTHER UTILITIES?

A. No, the Spurlock Station is an existing generation plant that is not in competition with any other utility generation.

Q. WHAT WILL BE THE BENEFITS OF THE SPURLOCK CO-FIRE PROJECT?

A. The Spurlock co-fire project is expected to allow the facility to further EKPC's strategic goal of providing reliable and competitive energy to its owner-member cooperatives. In total, the facility is projected to provide over $745 million in net energy cost benefits over the 10-year period from 2030 through 2039 and is expected to replace 61 million megawatt-hours of energy that would otherwise be generated from higher-cost resources and/or purchased from the PJM energy market over that same period. Refer to Attachment JJT-5 for net revenue and energy production projections. The Spurlock co-fire project is also anticipated to enable the Spurlock facility to continue to provide between $12.3 million and $118.5 million in annual capacity market benefits based on recent BRA clearing prices.

Q. ARE THERE ANY BENEFICIAL IMPACTS ON ECONOMINC DEVELOPMENT IN EKPC'S SERVICE TERRITORY?

A. Having natural gas available in the Mason County area will offer economic development opportunities to the region. These opportunities are discussed in more detail in the Direct Testimony of Rodney Hitch, attached as Exhibit 9 to the Application.

Q. HOW WILL THE SPURLOCK CO-FIRE BE OFFERED INTO PJM?

A. The Spurlock Units 1 through 4 co-fired plant will be offered into the PJM capacity and energy markets, just like it is today. The plant will be described in the machine data details as four individual units. The plant will be modeled within the PJM system and given the assumed capacity parameters that will be allowed to be offered into the PJM capacity market (Reliability Pricing Model ("RPM"). Once the unit clears the RPM, then EKPC will be required to offer it into the daily energy market within PJM. Again, the plant will be modeled as it is today. Unit information such as heat rates, ramp rates, load following capabilities, minimum and maximum output, and any other requested unit information. They can request the units operate within any of the unit parameters that it is capable of providing. EKPC will provide the cost information that reflects unit operation, in compliance with its approved PJM fuel cost policy. EKPC will also offer price parameters that can be used for market dispatch during non reliability-constrained operating conditions. The price offers reflect at what prices EKPC is willing to sell the energy from the unit as long as there are no reliability constraints on the system. Once a reliability constraint is identified, then the cost parameters go into effect. These are the same parameters that are defined for each unit that EKPC has sold into the RPM and must be offered daily into the energy market.

Q. WILL THE SPURLOCK CO-FIRE RESULT IN ANY UNNECESSARY DUPLICATION OF INVESTMENT OR THE CLUTTERING OF THE LANDSCAPE WITH UNNEEDED FACILITIES?

A. No, the Spurlock co-fire project will result in the continued use of an existing valuable asset and will prevent the need for wasteful duplication.

<u>VI. Conclusion</u>

Q. DOES EKPC HAVE A NEED FOR EACH OF THE PROJECTS THAT IT IS REQUESTING A CPCN FOR IN THIS PROCEEDING?

A. Yes, EKPC has defined its need with it 2024 Long Range Load Forecast and summarized that need in Attachment JJT-4.

Q. ARE THERE ANY OTHER REASONS WHY EKPC IS PROPOSING TO CONSTRUCT THESE PROJECTS?

A. EKPC desires to maximize the value of its existing assets and plans to fully utilize those assets for their useful lives.

Q. DOES EKPC BELIEVE ITS SELECTED PROJECTS ARE ECONOMIC AND PRUDENT?

A. Yes as described above for each individual project**.**

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

ATTACHMENT JJT-1

SUSTAINABILITY

EAST KENTUCKY POWER COOPERATIVE

Mapping the Road to EKPC's Future

Sustain (sə-ˈstā-n)

1. Strengthen or support physically or mentally.
2. Bear (the weight of an object) without breaking or falling.
3. Cause to continue for an extended period or without interruption.
4. Uphold, affirm, or confirm the justice or validity of.

EAST KENTUCKY POWER COOPERATIVE

A Touchstone Energy Cooperative

EKPC exists to serve its member-owned cooperatives by safely delivering reliable, affordable and sustainable energy and related services.

- EKPC's mission statement

SUSTAINABILITY
EAST KENTUCKY POWER COOPERATIVE

In 2018, EKPC's Board added "sustainability" to the cooperative's mission statement. For the past year, five employee teams have been gaining a better understanding of the changes taking place in and around the energy industry, changes that will affect EKPC for decades to come. These teams established the following principles and are developing plans to meet them. Like EKPC's employee-based Safety teams, these Sustainability teams are envisioned to continue functioning into the future, helping EKPC identify and meet key challenges. Sustainability will always be a moving target and this plan will change and evolve.

Purpose:

To ensure EKPC is consistent in vision and relationships with owner-members by developing strategies that ensure long-term energy solutions, partnerships and stability.

Principles

- Work with our owner-members, supporting and enabling them to expand their businesses in response to evolving member service expectations and energy solutions derived from technological advances.

- In partnership with participating owner-members, leverage our combined economies of scale to provide cost-effective and competitive behind-the-meter services.

- Attract and retain businesses in our communities, as the success of our owner-members and EKPC rely on growth and stability.

HIGHLIGHTS:

Foster entrepreneurship to cultivate home-grown jobs and investment.

Electric vehicles can save money and reduce environmental impact.

Includes team members from Farmers RECC, Licking Valley RECC, Nolin RECC and Owen Electric.

SUSTAINABILITY
EAST KENTUCKY POWER COOPERATIVE

Employees

Purpose:

To ensure EKPC meets our Owner-members expectations for cost control and reliability while remaining competitive in attracting and retaining talent by promoting a dynamic and evolving workforce today and in the future.

Principles

- Cultivate a high-performing, diverse and inclusive workforce; encourage and reward respect, collaborative thinking and community volunteerism.
- Ensure long-term workforce success; utilize succession planning, leadership development and professional development resources.
- Study, evaluate and recommend strategies to adapt to post-pandemic workforce trends related to organizational values and culture, worker expectations, candidate/employee behavior and employee relationships.
- Ensure EKPC's workforce is prepared to meet the needs of a rapidly changing energy industry, shifting consumer expectations and the many other challenges ahead by remaining strategically flexible.

HIGHLIGHTS:

Over 4,000 leadership development hours in 2019.

EKPC employees have submitted 265 ideas for improving operations in the last three years.

SUSTAINABILITY
EAST KENTUCKY POWER COOPERATIVE

SUSTAINABILITY

Energy and Environment

Purpose:

To design and implement strategies to increase fuel diversity, decrease carbon emissions, and promote environmental stewardship throughout EKPC.

Principles

- Commit to reducing greenhouse gas.
- Provide glide-path to replace aging coal resources with cleaner resources and/or market purchases.
- Enhance and promote environmental stewardship projects.
- Adopt new energy technologies to help achieve goals.

HIGHLIGHTS:

35% CO2 reduction by 2035; 70% by 2050.

10% energy from new renewables by 2030; 15% by 2035.

SUSTAINABILITY
EAST KENTUCKY POWER COOPERATIVE

Electric Grid

Purpose:

To ensure EKPC is increasing security, reliability, and resiliency on the transmission system while ensuring the solutions align with downstream grid changes.

Principles

- Grid security: Assessing facilities and cyber threats, and incorporating new technologies.
- Grid reliability: Considering ways to innovatively improve management of facilities and rights-of-way while reducing the environmental impact.
- Grid resiliency: Evaluating ways to ensure EKPC transmission grid can withstand the inevitable challenges ahead.

HIGHLIGHTS:

176 wooden poles replaced with steel poles.

All EKPC service centers certifying an employee as a commercial drone pilot.

SUSTAINABILITY
EAST KENTUCKY POWER COOPERATIVE

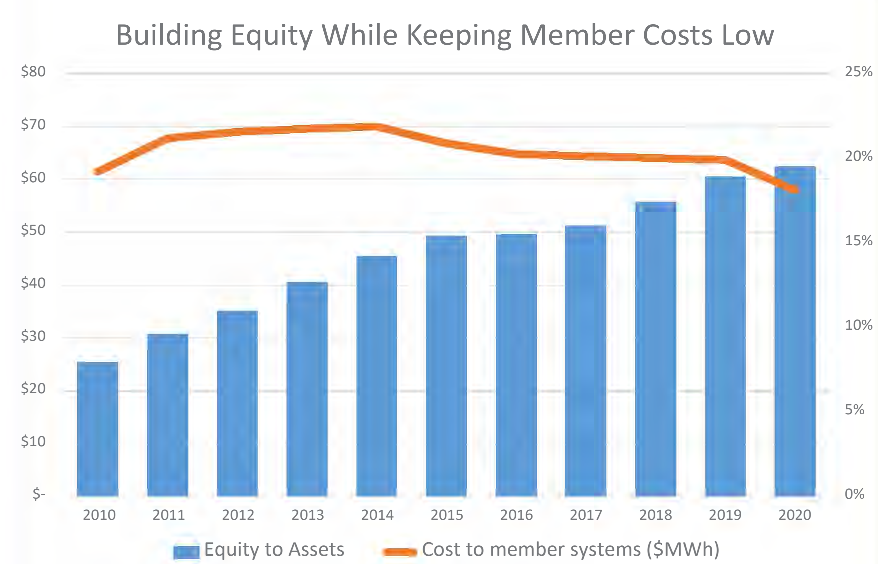
Financial Health

Purpose:

To promote financial sustainability principles that enhance long-term viability.

Principles

- Enhancing responsible financial management.
- Strengthening financial flexibility.
- Building financial resilience.
- Maintaining our forward focus to develop a high degree of strategic strength.



HIGHLIGHTS:

Improve visibility and mitigate future financial risk.

Employee transparency and engagement, such as improving financial literacy.

SUSTAINABILITY
EAST KENTUCKY POWER COOPERATIVE

SUSTAINABILITY

EAST KENTUCKY POWER COOPERATIVE

ATTACHMENT JJT-2

EAST KENTUCKY POWER COOPERATIVE

A Touchstone Energy® Cooperative

2025 - 2039
Load Forecast

Prepared by:
Power Supply Analytics
Department

December 2024

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Section 1.0
Executive Summary and Key Results

East Kentucky Power Cooperative Inc. (EKPC) is a generation and transmission electric cooperative located in Winchester, Kentucky and is a member of the PJM Interconnection LLC (PJM). EKPC is owned by 16 owner-member distribution cooperatives (owner-members) serving a population of approximately 1,100,000.

EKPC's load forecast is prepared every two years in accordance with EKPC's Load Forecast Work Plan (Work Plan) which was prepared in December 2023. The Work Plan details the methodology used to develop the forecast.

The EKPC Power Supply Analytics Department works with the staff of each owner-member to prepare 16 owner-member forecasts. Once finalized, EKPC aggregates the owner-member forecasts, adds projections of EKPC facilities and transmission losses, and incorporates energy efficiency impacts, demand side management impacts, and electric vehicle (EV) assumptions resulting in EKPC's total system forecast. Owner-members use their load forecasts as input in developing construction work plans, long-range work plans, and financial forecasts. EKPC uses the load forecast for demand side management analyses, marketing analyses, transmission planning, power supply planning, and financial forecasting.

Factors considered in preparing the forecast include national, regional, and local economic performance, population and housing trends, service area industrial development, electric price, household income, appliance saturations and efficiencies, demand side management programs, and weather.

Key Results

In 2023 EKPC owner-members served approximately 569,000 retail consumers (approximately 1,100,000 member population) in 89 counties in Kentucky and 4 counties in Tennessee, including portions of the Louisville, Cincinnati, Elizabethtown, Lexington, Huntington, and Bowling Green

Metropolitan Statistical Areas (MSA). The forecast indicates that, in the period of 2025 through 2039, total consumers served by owner-members will increase from 580,709 to 634,222, an average of 0.6 percent per year. The Residential Class will continue to be the largest class with respect to consumers and energy use.

Consumer Growth by Class

Time Period	Residential	Seasonal	Small Commercial	Public Buildings	Large Commercial	Public Street / Highway Lighting	Total Consumers
2018 - 2023	1.0%	13.6%	1.5%	0.5%	4.9%	3.6%	1.0%
2025 - 2030	0.7%	0.0%	0.8%	0.8%	1.6%	0.7%	0.7%
2013 - 2023	0.8%	11.2%	1.0%	0.8%	3.7%	1.2%	0.8%
2025 - 2035	0.7%	0.0%	0.7%	0.8%	1.6%	0.6%	0.7%
2009 - 2023	0.7%	-18.1%	0.9%	1.3%	2.4%	0.7%	0.7%
2025 - 2039	0.6%	0.0%	0.7%	0.8%	1.7%	0.6%	0.6%

Note: The Seasonal Sales Class is reported by 1 owner-member. Large percentage changes occur because this is a very small consumer class, resulting in small change in consumer count producing a large percentage change.

EKPC's load forecast projects net total energy requirements to increase from 15.4 to 18.4 million MWh, an average of 1.3 percent per year over the 2025 through 2039 period. Sales to the Residential Class will increase by 1.0 percent per year, small commercial sales (consumers with ≤1000 KVA) will increase by 0.2 percent per year, and large commercial and industrial sales (consumers with >1000 KVA) will increase by 1.6 percent per year.

Energy Sales Growth by Class

Time Period	Residential	Seasonal	Small Commercial	Public Buildings	Large Commercial	Public Street / Highway Lighting	Total Retail Sales	Net Total Requirements
2018 - 2023	-2.1%	11.5%	-0.5%	-2.0%	4.3%	-2.4%	0.0%	-0.2%
2025 - 2030	1.1%	-0.1%	0.2%	0.0%	3.2%	0.1%	1.8%	1.9%
2013 - 2023	-0.5%	13.5%	0.0%	0.0%	3.4%	-2.3%	0.7%	0.6%
2025 - 2035	1.0%	-0.1%	0.1%	0.0%	1.9%	0.1%	1.2%	1.4%
2009 - 2023	-0.2%	-16.4%	0.5%	0.3%	2.9%	-1.1%	0.8%	0.6%
2025 - 2039	1.0%	0.0%	0.2%	0.1%	1.6%	0.1%	1.1%	1.3%

Note: Net Total Requirements include owner-member office use, distribution losses, EKPC facilities use, and transmission losses. For forecast years, Net Total Requirements also include incremental projections for EVs and Demand Side Management / Energy Efficiency (DSM/EE).

Net winter and summer peak demands will increase by approximately 416 MW or 0.8 percent per year and 411 MW or 1.1 percent per year, respectively. Annual load factor projections are expected to increase somewhat from approximately 50 percent to approximately 54 percent.

Historical and projected class sales, total energy requirements, seasonal peak demands, and annual load factor for the EKPC system are presented on the following pages. Peak demands are based on coincident hourly-integrated demand intervals. Load factor is calculated using annual net peak demand and energy requirements.

Coincident Peak Demands and Total Requirements

Historical and Projected

Season	Net Winter Peak Demand (MW)	Year	Net Summer Peak Demand (MW)	Year	Net Total Requirements (MWh)	Load Factor (%)
2013 - 14	3,425	2014	2,192	2014	13,163,516	43.9%
2014 - 15	3,507	2015	2,179	2015	12,604,942	41.0%
2015 - 16	2,890	2016	2,293	2016	13,039,953	51.4%
2016 - 17	2,871	2017	2,311	2017	12,680,111	50.4%
2017 - 18	3,437	2018	2,375	2018	13,576,581	45.1%
2018 - 19	3,073	2019	2,366	2019	13,140,704	48.8%
2019 - 20	2,723	2020	2,312	2020	12,794,457	53.5%
2020 - 21	2,862	2021	2,450	2021	13,183,458	52.6%
2021 - 22	3,017	2022	2,465	2022	13,700,232	51.8%
2022 - 23	3,747	2023	2,497	2023	13,465,331	41.0%
2023 - 24	3,754	2024	2,450	2024	14,597,314	44.3%
2024 - 25	3,517	2025	2,530	2025	15,356,328	49.8%
2025 - 26	3,627	2026	2,588	2026	16,032,547	50.5%
2026 - 27	3,677	2027	2,641	2027	16,324,831	50.7%
2027 - 28	3,712	2028	2,664	2028	16,535,333	50.7%
2028 - 29	3,727	2029	2,688	2029	16,716,466	51.2%
2029 - 30	3,743	2030	2,703	2030	16,836,043	51.3%
2030 - 31	3,760	2031	2,723	2031	16,984,780	51.6%
2031 - 32	3,788	2032	2,749	2032	17,186,440	51.6%
2032 - 33	3,793	2033	2,766	2033	17,291,964	52.0%
2033 - 34	3,811	2034	2,792	2034	17,442,321	52.2%
2034 - 35	3,832	2035	2,818	2035	17,621,587	52.5%
2035 - 36	3,870	2036	2,853	2036	17,880,165	52.6%
2036 - 37	3,882	2037	2,878	2037	18,029,950	53.0%
2037 - 38	3,908	2038	2,910	2038	18,243,593	53.3%
2038 - 39	3,933	2039	2,941	2039	18,446,924	53.5%

- **Impacts from demand side management and energy efficiency programs are included in the projections.**
- **For the winter seasons 2013 – 14 through 2023 – 24 data are historical values.**
- **For the energy and summer seasons 2014 through 2023 data are historical values.**

Energy Sales by Class

Year	Residential Sales (MWh)	Seasonal Sales (MWh)	Small Comm. Sales (MWh)	Public Buildings (MWh)	Large Comm. Sales (MWh)	Public Street and Highway Lighting (MWh)	Total Retail Sales (MWh)
2014	7,142,350	370	1,919,198	39,753	3,246,287	9,916	12,357,874
2015	6,781,622	354	1,958,109	38,996	2,979,716	9,890	11,768,687
2016	6,847,090	416	1,951,787	37,627	3,296,495	9,940	12,143,355
2017	6,502,113	534	1,896,475	36,578	3,395,430	9,325	11,840,456
2018	7,324,079	621	1,962,505	41,142	3,425,613	8,796	12,762,756
2019	7,036,916	663	1,925,821	39,829	3,314,391	8,770	12,326,390
2020	6,915,401	662	1,791,061	34,187	3,251,726	8,771	12,001,809
2021	7,127,199	489	1,889,497	38,218	3,367,170	8,249	12,430,821
2022	7,218,271	753	1,940,673	38,012	3,720,863	7,633	12,926,204
2023	6,598,806	1,069	1,915,931	37,126	4,224,079	7,799	12,784,809
2024	7,199,620	1,072	1,982,768	37,832	4,493,900	7,856	13,723,049
2025	7,328,725	1,088	1,999,850	38,507	5,059,501	7,869	14,435,540
2026	7,450,913	1,090	2,012,587	38,536	5,561,242	7,881	15,072,250
2027	7,538,607	1,088	2,015,909	38,518	5,733,336	7,892	15,335,351
2028	7,635,773	1,088	2,025,042	38,536	5,804,062	7,902	15,512,403
2029	7,673,920	1,084	2,022,464	38,582	5,917,462	7,912	15,661,424
2030	7,740,202	1,082	2,020,842	38,561	5,936,225	7,920	15,744,831
2031	7,810,438	1,080	2,020,446	38,554	5,973,393	7,929	15,851,839
2032	7,904,478	1,080	2,026,511	38,584	6,025,132	7,937	16,003,722
2033	7,944,540	1,077	2,022,136	38,644	6,047,860	7,945	16,062,202
2034	8,011,516	1,076	2,023,307	38,640	6,075,940	7,952	16,158,433
2035	8,091,467	1,077	2,025,779	38,645	6,113,131	7,959	16,278,058
2036	8,202,158	1,079	2,035,241	38,691	6,183,108	7,967	16,468,243
2037	8,263,737	1,078	2,036,240	38,783	6,205,528	7,975	16,553,341
2038	8,350,371	1,079	2,043,942	38,813	6,251,672	7,983	16,693,861
2039	8,441,425	1,081	2,051,572	38,847	6,279,417	7,992	16,820,333

Notes:

- **Totals may not equal sum of components due to rounding.**
- **Additional DSM/EE and EV forecasts are not included in class or total retail sales. They are included in EKPC net total requirements.**

Total Energy Requirements

Year	Total Retail Sales (MWh)	Owner-Member Office Use (MWh)	Average Distribution Losses (%)	Sales to Owner Members (MWh)	EKPC Facilities Use (MWh)	Transmission Losses (%)	Total Requirements (MWh)	New Electric Vehicles Base Case (MWh)	DSM/EE (MWh)	Net Total Requirements includes EVs (MWh)
2014	12,357,874	10,497	4.1%	12,898,402	8,246	1.9%	13,163,516			13,163,516
2015	11,768,687	10,008	4.3%	12,303,441	8,190	2.3%	12,604,942			12,604,942
2016	12,143,355	10,270	4.1%	12,674,239	8,203	2.7%	13,039,953			13,039,953
2017	11,840,456	9,992	4.0%	12,340,793	8,374	2.5%	12,680,111			12,680,111
2018	12,762,756	10,647	3.5%	13,238,766	8,451	2.4%	13,576,581			13,576,581
2019	12,326,390	10,232	3.6%	12,798,772	7,891	2.5%	13,140,704			13,140,704
2020	12,001,809	9,444	3.9%	12,499,902	7,313	2.2%	12,794,457			12,794,457
2021	12,430,821	9,206	3.5%	12,886,454	7,631	2.1%	13,183,458			13,183,458
2022	12,926,204	8,758	4.1%	13,488,016	7,529	1.4%	13,700,232			13,700,232
2023	12,784,809	8,133	3.2%	13,211,972	7,207	1.8%	13,465,331			13,465,331
2024	13,723,049	8,596	3.5%	14,228,124	7,514	2.0%	14,520,937	76,377		14,597,314
2025	14,435,540	8,596	3.4%	14,954,336	7,514	2.0%	15,261,702	99,859	-5,232	15,356,328
2026	15,072,250	8,596	3.3%	15,602,661	7,514	2.0%	15,923,021	127,704	-18,177	16,032,547
2027	15,335,351	8,596	3.3%	15,870,588	7,514	2.0%	16,196,317	159,643	-31,129	16,324,831
2028	15,512,403	8,596	3.3%	16,053,804	7,514	2.0%	16,383,205	196,255	-44,127	16,535,333
2029	15,661,424	8,596	3.3%	16,204,972	7,514	2.0%	16,537,403	235,825	-56,761	16,716,466
2030	15,744,831	8,596	3.3%	16,291,658	7,514	2.0%	16,625,826	280,009	-69,792	16,836,043
2031	15,851,839	8,596	3.3%	16,402,956	7,514	2.0%	16,739,355	328,278	-82,852	16,984,780
2032	16,003,722	8,596	3.3%	16,560,979	7,514	2.0%	16,900,544	381,999	-96,103	17,186,440
2033	16,062,202	8,596	3.3%	16,622,110	7,514	2.0%	16,962,900	437,727	-108,663	17,291,964
2034	16,158,433	8,596	3.3%	16,722,102	7,514	2.0%	17,064,896	498,516	-121,091	17,442,321
2035	16,278,058	8,596	3.3%	16,846,686	7,514	2.0%	17,191,978	563,466	-133,857	17,621,587
2036	16,468,243	8,596	3.3%	17,044,352	7,514	2.0%	17,393,605	634,362	-147,802	17,880,165
2037	16,553,341	8,596	3.3%	17,133,164	7,514	2.0%	17,484,197	705,928	-160,175	18,029,950
2038	16,693,861	8,596	3.3%	17,279,360	7,514	2.0%	17,633,323	783,352	-173,082	18,243,593
2039	16,820,333	8,596	3.3%	17,411,162	7,514	2.0%	17,767,766	864,886	-185,729	18,446,924

Note 1: Distribution losses do not apply to direct serve loads.

Note 2: Demand Side Management (DSM) and Energy Efficiency (EE) do not include energy efficiency measures installed prior to 2025 to avoid double counting. These are assumed to be embedded in the historical data.

Note 3: Historical EV energy is embedded in total retail sales.

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Section 2.0
Description of the Cooperative

EKPC is a generation and transmission electric cooperative headquartered in Winchester, Kentucky and owned by its 16 owner-members which include:

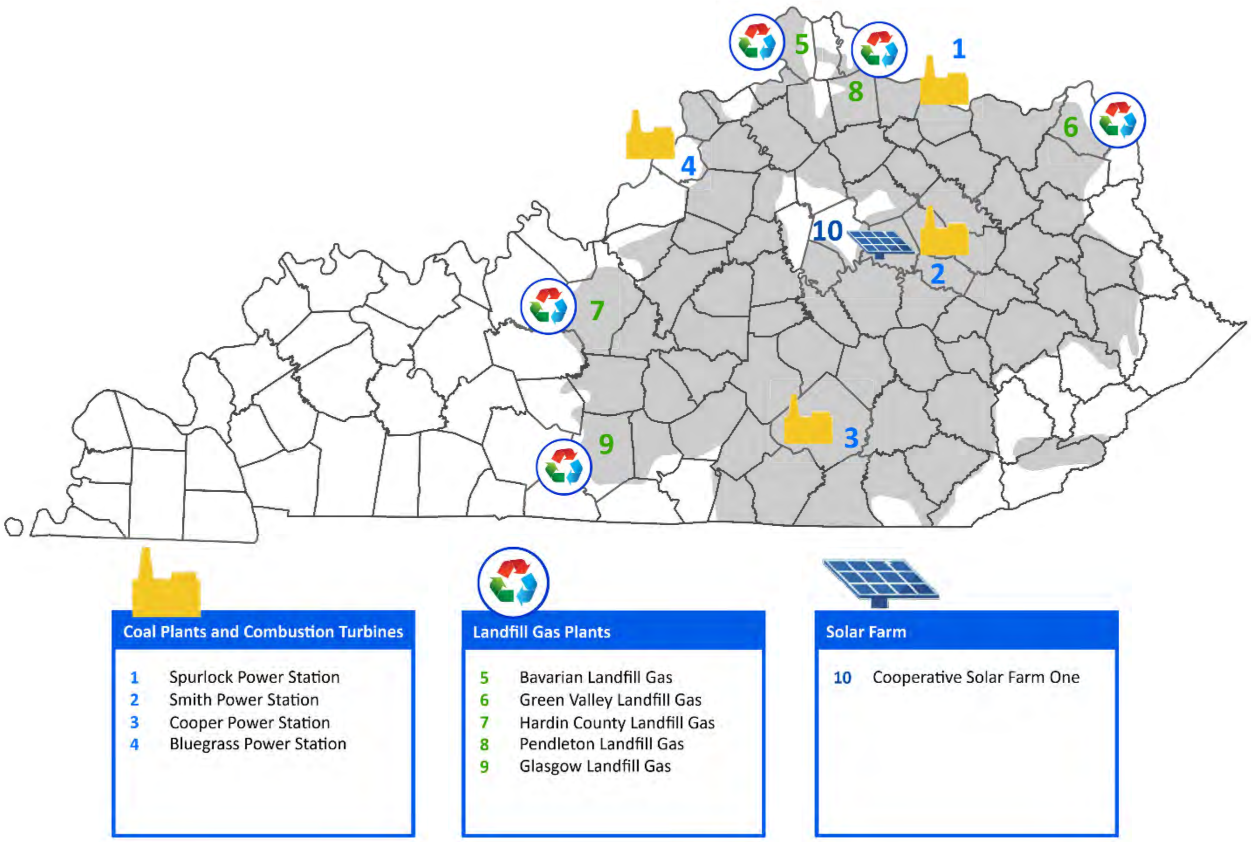
- Big Sandy RECC
- Blue Grass Energy Cooperative
- Clark Energy Cooperative
- Cumberland Valley Electric
- Farmers RECC
- Fleming-Mason Energy Cooperative
- Grayson RECC
- Inter-County Energy Cooperative
- Jackson Energy Cooperative
- Licking Valley RECC
- Nolin RECC
- Owen Electric Cooperative
- Salt River Electric Cooperative
- Shelby Energy Cooperative
- South Kentucky RECC
- Taylor County RECC

EKPC owns a generation fleet of 3,265 MW, including coal, natural gas, oil, solar and landfill gas units. An additional 170 MW of hydropower is purchased from the Southeastern Power Administration (SEPA). EKPC operates within PJM, which has over 180,000 MW of generation capacity. EKPC's all-time peak demand of 3,754 MW occurred on January 17, 2024.

Generation includes (net winter rating):

- Spurlock – 1,346 MW
- Cooper – 341 MW
- Smith Combustion Turbine Units – 989 MW
- Bluegrass Combustion Turbine Units – 567 MW
- Cooperative Solar 1 – 8.5 MW
- SEPA, hydropower – 170 MW
- Landfill Gas Plants
  - Bavarian Landfill– 4.6 MW
  - Green Valley Landfill – 2.3 MW
  - Hardin County Landfill – 2.3 MW
  - Pendleton Landfill – 3.0 MW
  - Glasgow Landfill – 0.9 MW

EKPC owns and operates a 2,995-circuit mile network of high voltage transmission lines consisting of 69 kV, 138 kV, 161 kV, and 345 kV lines, and all the related substations. EKPC is a member of the SERC Reliability Corporation (SERC). EKPC maintains 77 normally closed free-flowing interconnections with its neighboring utilities.



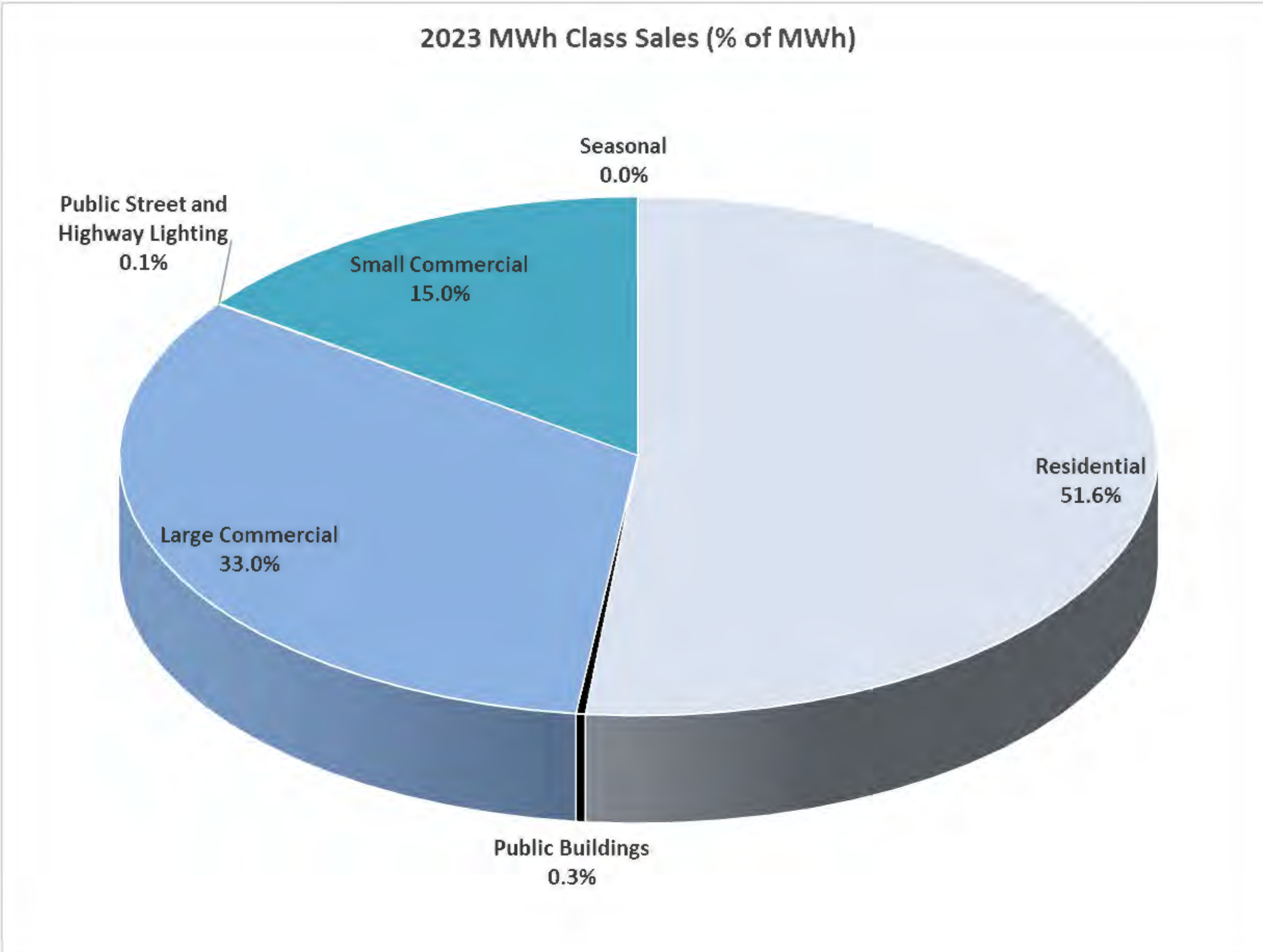
2.1 Owner-Members' Service Territory

In 2023 EKPC owner-members served approximately 569,000 retail consumers (approximately 1,100,000 member population) in 89 counties in Kentucky and 4 counties in Tennessee, including portions of the Louisville, Cincinnati, Elizabethtown, Lexington, Huntington, and Bowling Green Metropolitan Statistical Areas (MSA). EKPC owner-members serve most of the rural areas, while investor-owned and municipal utilities serve most of the cities and towns. Interstates 64, 65, 71, and 75 and several limited-access parkways pass through the area. EKPC owner-members' fixed service territory boundaries are on file with the Kentucky Public Service Commission.

The service territory is diverse. Areas around Lexington and Louisville have a significant amount of manufacturing. The region near Cincinnati contains a growing number of retail trade, transportation, and service jobs. Coal mining has seen strong decreases due to regulatory changes as well as decreased natural gas prices, the most notable impacts being in the eastern and southeastern regions of EKPC's service area. Tourism is an important aspect of the southern and southwestern service area, with Lake Cumberland and Mammoth Cave National Park contributing to jobs in the service and retail trade industries. Kentucky as a whole expects to see growth in the health care sector due to the aging population.

2.2 Consumer Overview

The owner-members' collective consumer base is comprised predominantly of residential consumers, 93 percent. In 2023, 52 percent of EKPC's owner-member retail sales were to the residential class. The 2022 End-Use Survey results indicate electricity is the primary method for water heating, 85 percent, and home heating, 62 percent. Additionally, 96 percent of residential consumers have an AC system. The availability of natural gas is limited in most of the service territory.



Over the past 10 years, residential consumer use averaged 1,139 kWh per month. The forecast projects a slight increase to 1,159 kWh per month during the forecast period, driven by economic growth and increased electric device use partially offset by appliance efficiency improvements.

Section 3.0
Description of the Forecasting Method

3.1 Forecast Process

EKPC's load forecast was prepared pursuant to the Work Plan. Factors considered when preparing the forecast include regional economic growth, electric appliance saturation and efficiency trends, and weather. The EKPC Power Supply Analytics Department works with the staff of each owner-member to prepare its forecast and then aggregates the 16 owner-member forecasts, adds forecasts of EKPC facility use and transmission losses, and subtracts planned demand side management and energy efficiency to create EKPC's system forecast. For the first time, EKPC's 2024 load forecast also includes a projection of EV charging requirements at the EKPC level, developed in collaboration with GDS Associates (GDS).

Owner-members will use the load forecast for long-term planning, including construction work plans and financial forecasts. EKPC will use the load forecast for transmission and generation planning, demand side management and energy efficiency programs, and financial planning.

The general steps followed in developing the load forecast include:

1. Develop regional economic projections: EKPC subscribes to IHS Global Inc., an entity of S&P Global (IHS), to analyze regional economic performance. IHS provides county-level projections for population, employment, income and other variables. EKPC further analyzes the data to appropriately reflect the owner-members' individual service territories.
2. Analyze and construct models: EKPC prepares a preliminary forecast for each of its owner-members for each classification as reported on the Rural Utility Services (RUS) Form 7, which contains retail sales data for owner-members. These classes include: residential, seasonal, small commercial, public buildings, large commercial, and public street and highway lighting. EKPC's sales to owner-members are then determined by adding owner-

member office use and distribution losses to total retail sales. Seasonal peak demands are developed using historical normalized peaks and modeled growth.

3. Incorporate input from the owner-members: EKPC meets with each owner-member to discuss the preliminary forecast. Owner-member staff at these meetings includes the President/CEO and other key individuals.
4. Revise the forecasts: The preliminary forecast is revised based on mutual agreement of EKPC staff and owner-member's President/CEO and staff. This final forecast is approved by the Board of Directors of each owner-member.
5. Develop the system load forecast: The EKPC forecast is the summation of the forecasts of its 16 owner-members with demand side management, energy efficiency, transmission losses, EVs, and EKPC facilities' use incorporated.
6. EKPC's forecast is reviewed and approved by its Board of Directors and submitted to RUS.

There is close collaboration and coordination between EKPC and its owner-members in this process. This working relationship is essential because EKPC has no retail consumers. Input from owner-members relating to industrial development, subdivision growth, and other specific service area information is crucial to the creation of accurate forecasts. Review meetings provide opportunities to critique the assumptions and the overall results of the preliminary forecast. The resulting load forecast reflects a combination of EKPC's structured forecast methodology combined with the judgment and experience of the owner-member staff.

3.2 Forecast Model Structure and Inputs

Consumer and energy models for each class are used to develop load forecasts for each owner-member. The regional economy, consumer and sales trends, appliance saturations, energy efficiency and demand side management impacts, and weather impacts are modeled and analyzed during the forecast study.

Regional Economic Model: EKPC has divided its owner-members' service area into seven economic regions with economic activity projected for each. Some natural regions exist within the EKPC territory. For example, the Central Economic Region defined by EKPC fits closely within the Lexington Standard Metropolitan Statistical Area (SMSA). The U.S. Bureau of Economic Analysis (BEA) defines SMSAs as areas of interrelated economic activity that go beyond a single county's boundaries. The North Region includes Kentucky counties that border Cincinnati.

Regional forecasts for population, income, and employment are developed and used as variables in consumer or energy models as appropriate. EKPC combines county-level forecasts from IHS into regional economic forecasts based roughly on owner-member service territory boundaries. Owner-members and counties are assigned to regions as follows:

- Central Region:
  Owner-members: Blue Grass Energy Cooperative
  Counties: Anderson, Bourbon, Clark, Fayette, Franklin, Harrison, Jessamine, Madison, Mercer, Scott, and Woodford
- East Region:
  Owner-members: Big Sandy RECC, Cumberland Valley Electric, Jackson Energy Cooperative and Licking Valley RECC
  Counties: Bell, Breathitt, Clay, Estill, Floyd, Harlan, Jackson, Johnson, Knott, Knox, Laurel, Lee, Leslie, Letcher, Magoffin, Martin, Morgan, Owsley, Perry, Pike, Rockcastle, Whitley, and Wolfe
- North Region:
  Owner-members: Owen Electric Cooperative
  Counties: Boone, Bracken, Campbell, Carroll, Gallatin, Grant, Kenton, Owen, and Pendleton
- North Central Region:
  Owner-members: Nolin RECC, Salt River Electric Cooperative, and Shelby Energy Cooperative
  Counties: Bullitt, Hardin, Henry, LaRue, Meade, Nelson, Oldham, Shelby, Spencer, Trimble, and Washington
- North East Region:
  Owner-members: Clark Energy Cooperative, Fleming-Mason Energy Cooperative, and Grayson RECC
  Counties: Bath, Boyd, Carter, Elliott, Fleming, Greenup, Lawrence, Lewis, Mason, Menifee, Montgomery, Nicholas, Powell, Robertson, and Rowan
- South Region:
  Owner-members: Inter-County Energy Cooperative, South Kentucky RECC, and Taylor County RECC

Counties: Adair, Boyle, Casey, Clinton, Garrard, Green, Lincoln, Marion, McCreary, Pulaski, Russell, Taylor, and Wayne

- South Central Region:
  Owner-member: Farmers RECC
  Counties: Allen, Barren, Butler, Cumberland, Edmonson, Grayson, Hart, Metcalfe, Monroe, Simpson, and Warren

EKPC utilized a geographic information system from Environmental Systems Research Institute (ESRI) to incorporate owner-members' territories. The county-level economic data provided by IHS is segmented into owner-members' service territories using the mapping of county and service territory boundaries. Economic data that closely represents individual owner-members' territories results in more accurate forecasts.

The load forecast is based on IHS's county-level economic forecasts (IHS Global Inc., an Entity of S&P Global, Market Intelligence, Dataset: Economic Forecast Released March 2024: "US Regional").

County-level historical and projected data provided to EKPC by IHS include:

- North American Industry Classification System (NAICS) Employment
  - Total Non-farm, Non-Manufacturing, Service Providing Private, Construction, Manufacturing, Transportation, Trade & Utilities, Information, Financial Activities, Professional & Business Services, Educational & Health Services, Leisure & Hospitality, Other Services, Government, Federal Government, State & Local Government, Military
- Personal Income
- Real Personal Income
- Population
- Households

These county-level projections combine into regional economic activity. EKPC interpolates a monthly series from IHS's annual county-level projections to include as independent variables in the load forecasting models. Projections of regional economic activity are important determinants of consumer and sales growth.

Consumer and Sales Models: Residential, seasonal energy sales, and the public building class are forecasted using regression analysis. At the owner-member level, energy use per consumer is projected using a statistically adjusted end-use (SAE) model. This method of modeling incorporates end-use forecasts and is used to separate the monthly and annual forecasts into end-use components. SAE models offer the structure of end-use models while also using the strength of time-series analysis. This method, like end-use modeling, requires detailed information about appliance saturation, appliance use, appliance efficiencies, household characteristics, weather characteristics, and demographic and economic data. The SAE approach segments the average household use into end-use components as follows:

$$\boxed{Use_{y,m} = Heat_{y,m} + Cool_{y,m} + Water\ Heat_{y,m} + Other_{y,m}}$$

Where, y=year
m=month

Each component is defined in terms of its end-use structure. For example, the cool index may be defined as a function of appliance saturation, efficiency of the appliance, and usage of the appliance. Annual end-use indices and a usage variable are constructed and used to develop a variable to be used in least squares regression in the model. These variables are constructed for heating, cooling, water heating, and an 'Other' variable, which includes lighting and other miscellaneous usages.

$$CoolIndex_y = \sum_{Type} Wgt^{Type} * \frac{\left(CoolShare_y^{Type} / Eff_y^{Type} \right)}{\left(CoolShare_{by}^{Type} / Eff_{by}^{Type} \right)}$$

$$CoolUse_{y,m} = \left(\frac{CDD_{y,m}}{NormCDD_{by}} \right) * \left(\frac{HHSize_y}{HHSize_{by}} \right) * \left(\frac{Income_y}{Income_{by}} \right) * \left(\frac{Price_{y,m}}{Price_{by}} \right)^{-.30}$$

Where, by=base year; HH Size =Household square footage

$$Cool_{y,m} = CoolIndex_y * CoolUse_{y,m}$$

The Cool, Heat, Water Heat, and Other variables are then used in a least squares regression, which results in estimates for annual and monthly use per household.

The number of residential consumers is also projected with regression analysis using economic variables such as population or households. The owner-member results are summed to determine total consumers and total class sales. Residential, seasonal, and public building energy use per consumer is calculated by dividing the energy sales forecast by the forecast number of consumers. Seasonal sales are only reported by one owner-member. Accounts include seasonal residences, such as vacation homes and weekend retreats. Public building sales are reported by two owner-members and include schools, churches, and community buildings.

Owner-members classify commercial and industrial accounts into two groups. Consumers 1,000 KVA or less are classified as small commercial consumers and consumers over 1,000 KVA are classified as large commercial/industrial consumers. Small commercial energy sales forecast results from regression analysis. The number of small commercial consumers is forecasted by means of regression analysis on various regional economic data. Exogenous variables include employment by sector and economic activity. Energy use per consumer is calculated by dividing the energy sales forecast by the number of consumers.

In the short term, large commercial sales projections rely on the input of the owner-members. Owner-members, having knowledge of their key accounts and the presence of industrial parks, project usage for existing large loads, and advise of new consumers or consumers that are leaving. Additional input from EKPC's Economic Development staff may also be included. In the long-term, energy projections use economic variables as model drivers. EKPC projects new large loads based on history and the economy of the service territory using regression analysis. Historical industrial growth is analyzed to distribute consumer projections among the 16 owner-members. Demand of 1.5 MW and 70 percent load factor is assumed for these new loads. This methodology for forecasting new large commercial consumers and energy provides a robust and defensible projection at the owner-member level as well as the system level.

Public street and highway lighting sales is a relatively small class reported by eleven owner-members. Consumers are correlated with residential consumers. Energy has been decreasing due to upgrading light bulbs to high-efficiency light-emitting diode light bulbs (LEDs).

Demand Side Management, Energy Efficiency Appliance Saturations: EKPC and its 16 owner-members promote the cost-effective use of energy by offering conservation, energy efficiency and other programs to the retail consumer. These programs were designed to meet the needs of the consumer and to delay the need for additional generating capacity. EKPC considers the programs' impacts as part of its overall supply portfolio. Projections of appliance efficiencies are sourced from the Energy Information Administration (EIA) Annual Energy Outlook. EKPC is a member of Itron's Energy Forecasting Group which further analyzes the EIA projections for the East South Central U.S. Census Division and incorporates it into the SAE framework. States included in this division are: Alabama, Kentucky, Mississippi, and Tennessee. These projections, combined with EKPC's End-Use Survey saturations, are used in the models. Every 2-3 years since 1981, EKPC has surveyed its owner-members' residential consumers to gather information on electric appliance saturation, household characteristics, resident demographics, and other factors affecting electricity demand and usage. EKPC projects these saturations for each owner-member as a function of time. The most recent survey was conducted in 2022. Increased appliance efficiency and lighting improvements will have a dampening effect on residential retail sales.

Electricity Rates: The wholesale power costs are based on EKPC projections. Each owner-member provides a projection of the distribution adder for the retail rate assumption used in the individual owner-member models.

Weather: Normal weather is based on historic 20-year values (2003-2023). Owner-members are assigned to weather stations as follows:

- Blue Grass Airport (LEX) in Lexington, KY:
  Owner-members: Blue Grass Energy Cooperative, Clark Energy Cooperative, and Inter-County Energy Cooperative

- Bowling Green/Warren County Regional Airport (BWG) in Bowling Green, KY:
  Owner-members: Farmers RECC and Taylor County RECC
- Cincinnati/Northern Kentucky International Airport (CVG) in Covington, KY:
  Owner-members: Fleming-Mason Energy and Owen Electric Cooperative
- Huntington Tri-State Airport (HTS) in Huntington, WV:
  Owner-member: Grayson RECC
- Jackson County Kentucky Mesonet:
  Owner-member: Jackson Energy Cooperative
- Julian Carroll Airport (JKL) in Jackson, KY:
  Owner-members: Big Sandy RECC, Cumberland Valley Electric, and Licking Valley RECC
- Louisville International Airport (SDF) in Louisville, KY:
  Owner-members: Nolin RECC, Salt River Electric, and Shelby Energy Cooperative
- Pulaski County Airport (SME) in Somerset, KY:
  Owner-member: South Kentucky RECC.

EVs: The EV stock and energy forecasts were developed by GDS. EKPC then used a government agency resource for developing the load profile. All methodologies are described below.

EV Stock (GDS)

The EV stock is a projection of number of EVs that will be owned in each owner-member service territory over time. GDS developed this element of the forecast using information from each owner-member's load forecast (number of consumers), the US Census, the EIA Annual Energy Outlook 2023, and the Bureau of Transportation Statistics. GDS first estimated the total number of vehicles owned by residential consumers for each EKPC owner-member and then estimated EV adoption for new vehicles and replacement of existing vehicles. The overall trend in EV adoption and assumptions about vehicle useful lives are assumed consistent between EKPC's owner-members whereas number of vehicles per household and consumer growth are specific to each owner-member.

EV Energy Sales (GDS)

Determination of total energy sales from EV is based on the EV stock forecast and analysis of the potential electrical consumption for those vehicles over time. EIA data on the share of passenger cars and light duty vehicles (LDV) (pickup trucks, minivans, and SUVs) is used to differentiate the stock. GDS then developed, from its in-house databases, estimates for typical miles driven per year and annual energy consumption per mile driven for charging, with both assumptions differentiated by passenger cars and LDV. The product of stock, miles driven, and kWh per mile results in cumulative EV energy sales for each owner-member.

Load Profile Development (EKPC)

The Alternative Fuels Data Center (AFDC), sponsored by the Department of Energy (DOE), provides typical charging profiles through its EVI-Pro-Lite load profile tool. EKPC used profiles for Lexington-Fayette KY using appropriate assumptions for EKPC consumers:

- ambient temperature by season
- miles driven per day per vehicle
- percentage of all-electric vs plug-in hybrid electric vehicles
- percentage of EV by type (sedans vs. SUVs)
- availability and use of workplace and at-home charging
- access to level 1 and level 2 charging
- charging strategy (timing of charging)

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Section 4.0
Key Assumptions

4.1 Regional Economy Summary
IHS provided the following analysis:

[redacted]

IHS provided the following outlook:

[redacted]

Source for 4.1: IHS Global Inc., an Entity of S&P Global, Market Intelligence, State Analysis – Kentucky (released February 2024).

Overview of Key Economic Variables

See below additional detail using regions as defined in Section 3.2. Population, household, and employment growth are important variables that affect the load forecast.

The source data EKPC used in creating the below charts is IHS Global Inc., an Entity of S&P Global, Market Intelligence, Dataset: Economic Forecast Released March 2024: “US Regional.”

[redacted]

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4.2 Results by Region

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[redacted]	[redacted]	[redacted]	[redacted]

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4.3 Energy and Peak Adjustments

EKPC's owner-member residential sales account for more than 50 percent of all retail sales. To understand the load characteristics of homes, every two to three years since 1981, EKPC has surveyed the owner-members' residential consumers. The most recent survey was conducted in 2022. EKPC gathers appliance, heating and cooling, and demographic data. Appliance holdings of survey respondents are analyzed in order to better understand electricity consumption and to project future appliance saturations.

EKPC, along with its owner-members, conducts a thorough review of the DSM/EE plan every three years in conjunction with EKPC's Integrated Resource Plan (IRP) filing as required by the Kentucky Public Service Commission. EKPC evaluates new potential programs through a multi-step process which includes a technical potential study, stakeholder engagement, and subject matter experts. The results of the DSM/EE plan are incorporated in EKPC's 2024 Load Forecast.

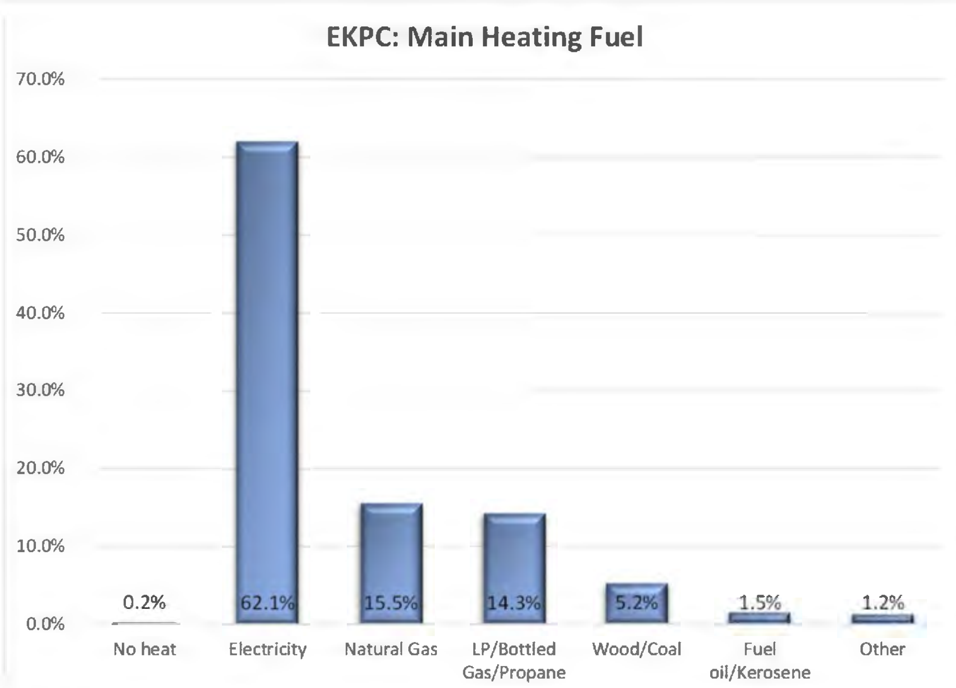
Additional Effect of Demand Side Management and Energy Efficiency Programs

Year	Energy (MWh)	Winter Peak (MW)	Summer Peak (MW)
2025	-5,232	-7	-24
2026	-18,177	-13	-29
2027	-31,129	-19	-33
2028	-44,127	-25	-37
2029	-56,761	-31	-41
2030	-69,792	-38	-45
2031	-82,852	-44	-49
2032	-96,103	-50	-54
2033	-108,663	-56	-58
2034	-121,091	-60	-56
2035	-133,857	-66	-60
2036	-147,802	-72	-64
2037	-160,175	-78	-67
2038	-173,082	-83	-71
2039	-185,729	-89	-74

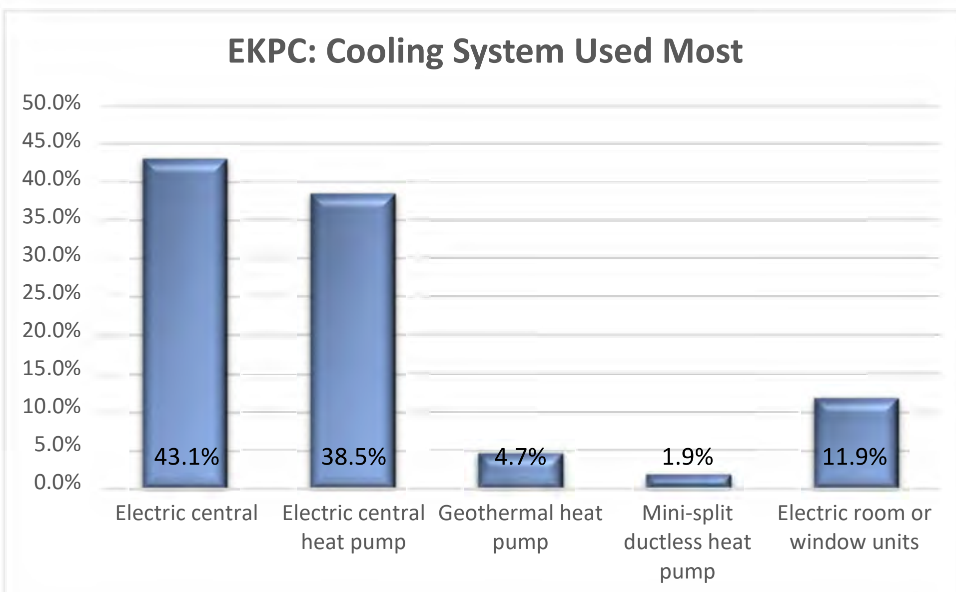
Note: To avoid double counting, additional effects do not include energy efficiency measures installed prior to 2025. These are assumed to be embedded in the historical data.

4.4 Residential Appliance Saturations

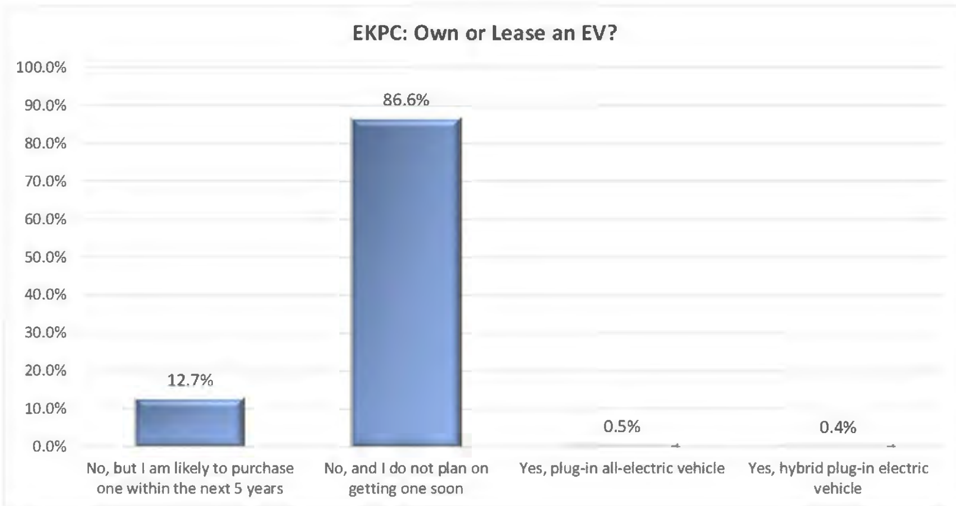
Survey Results – Main Heating Fuel: Due to limited availability of natural gas in EKPC's territory, more than 60 percent of residential consumers use electricity as the main heating fuel for their homes.



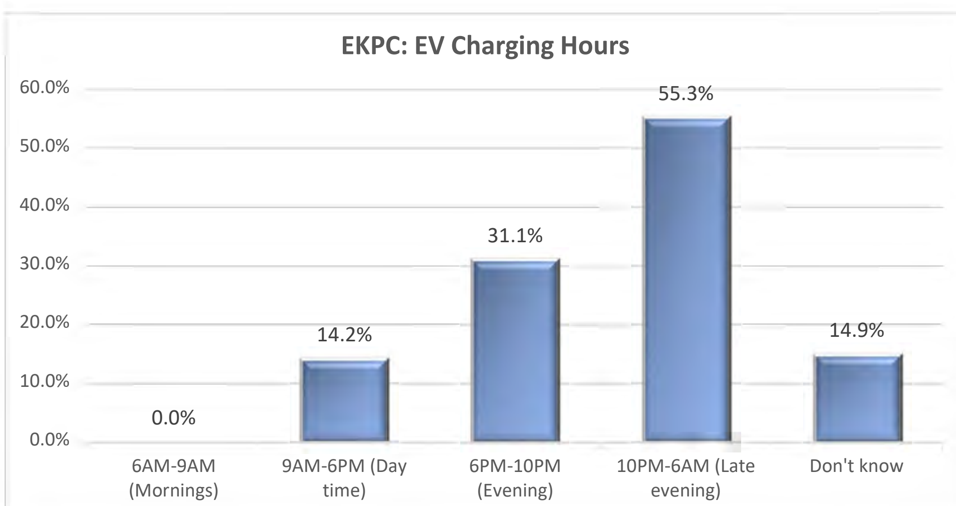
Survey Results – Cooling System: Approximately 96 percent of residential consumers have an AC system. Residential consumers with cooling systems primarily use electric central air conditioning or electric central heat pump systems.



<u>Survey Results – EV:</u> Residential consumers were asked if they owned/leased or are likely to purchase a plug-in electric vehicle. Fewer than 1 percent of residential consumers currently own an EV, and nearly 13 percent are considering one. Nearly 87 percent do not plan on getting an EV soon.



<u>Survey Results – EV Charging Hours:</u> Residential consumers that own or lease an EV charge their vehicles primarily between 10:00 PM and 6:00 AM.



4.5 Energy Efficiency Programs

Existing Programs

- Button-Up Weatherization Program (Residential)
- CARES Low-Income Weatherization (Residential)
- Heat Pump Retrofit Program (Residential)
- Touchstone Energy Program (Residential)
- Direct Load Control of Air Conditioners and Water Heaters: Switches and Bring Your Own Thermostat (BYOT) (Residential)
- EV Off-Peak Charging Program (Residential)

New Programs

- High Efficiency Heat Pump Program (Residential)
- Backup Generator Control Program (Residential)
- Advanced Lighting Program (Commercial)
- Thermostat Program (Commercial & Industrial)

Button-Up Weatherization Program is designed to incentivize end-use members with poor energy-performing homes to improve the energy efficiency of the home's shell and ductwork. The Button-up program is an important program to assist end-use members with high bills caused by excessive heat losses. The Button-Up Program offers an incentive for reducing the heat loss of a home. The incentive is paid based on heat loss reduction measured in British thermal units per hour (Btuh). The Button-Up program encourages homeowners to improve the thermal envelope of their home through improved insulation, upgraded windows/doors, and air-sealing. The program offers a separate incentive for duct sealing.

Community Assistance Resources for Energy Savings (CARES) Low Income Program provides an incentive to enhance the weatherization and energy efficiency services provided to its end-use members by the Kentucky Community Action Agency's (CAA) network of not-for-profit community action agencies or by Kentucky's non-profit affordable housing organizations (AHO). EKPC and its owner-members provide an incentive to the CAA or AHO implementing the project on behalf of the end-use member. EKPC's program has two primary objectives. First, EKPC's incentive will enable the CAA or AHO to install more measures in each home. Second, the additional incentive from EKPC will assist CAA or AHO in weatherizing more homes.

Heat Pump Retrofit Program provides incentives for end-use members to replace their existing resistance heat source (electric furnace, ceiling cable heat, baseboard heat, or electric thermal storage) with a more efficient heat pump. Most high bill complaints are from end-use members with homes that are heated with electric resistive heat instead of a heat pump. Installing an electric heat pump lowers electric bills significantly for those end-use members. The program provides incentives for both ducted systems and mini-split systems. At this time, the program provides incentives for two efficiency levels of ducted heat pump systems: DOE minimum standard heat pumps and ENERGY STAR® standard heat pumps. In recent years, EKPC and the owner-members have seen a sizable increase in mini-split heat pump systems. This heat pump technology is highly efficient. This program provides incentives to install mini-split heat pump systems that replace resistance heat units. These installations must be ENERGY STAR® rated.

Touchstone Energy® Home Program is designed to encourage new homes to be built to higher standards for thermal integrity and equipment efficiency, as well as to choose a geothermal or an air source heat pump rather than less efficient forms of heating and cooling. This program provides guidance during the building process to guarantee a home that is >25-30 percent more efficient than the Kentucky standard built home. The typical home built in rural Kentucky scores a 105 on the Home Energy Rating System (HERS) Index. The HERS testing and rating system is the industry accepted standard for evaluating the energy efficiency of a new home. Therefore, EKPC and the owner-members will provide the incentive for a home that either scores a HERS of 75 or better for the Performance Path or completes a Prescriptive Path check list of energy saving measures that assure the home performs equivalently to a 75 HERS tested home. Plans are submitted to the owner-member staff before the home is built, a pre-drywall inspection is made, and a blower door test is administered after the home is built to verify that the home meets the standard. To qualify as a Touchstone Energy® Home under EKPC's program, the participating home must be located in the service territory of a participating owner-member and must meet the program guidelines following one of the two available paths of approval. All homes must receive a pre-drywall inspection and pass EKPC's pre-drywall checklist. Homes must also receive a final inspection and pass a whole house air leakage and duct leakage test. All homes must be heated with an Air Source or Geothermal Heat Pump. In order to meet the prescriptive path requirements, the heat pump must meet or exceed current ENERGY STAR® requirements. Water heaters must be an electric storage tank water heater that meets or exceeds current Energy and Water Conservation standards established by the DOE.

Direct Load Control Program is designed to reduce peak demands to provide load relief to the grid. The objective of the program is to reduce peak demand and energy usage through the installation of thermostats or load control switches controlling air conditioners or heat pumps and load control devices managing water heaters. EKPC controls central air conditioners and heat pumps during extreme peak hours during the summer. Water heater control provides load relief in the winter months as well as in the summer months. EKPC will not install new switches. All new enrollments will be Wi-Fi enabled thermostats provided by the end-use member under the "Bring Your Own Thermostat" (BYOT) option. Existing switches on air conditioners, heat pumps, and water heaters will continue to be controlled and incentives for those units will continue to be paid for the life of the technology. Peak demand reduction is accomplished by cycling equipment on and off according to a predetermined control strategy. Central air conditioning and heat pump units are cycled on and off, while water heater loads are curtailed. For BYOT units, the cycling is accomplished by raising the thermostat setting for the duration of the control event. The typical control duration is four hours for switches and three hours for BYOT units.

Residential EV Off-Peak Charging Program is designed to reduce the growth in peak demand resulting from the adoption of EVs, thereby allowing EKPC to utilize its system more efficiently. EKPC provides a monthly incentive for all registered EV charging energy (kWh) that occurs during the off-peak hours. The program includes energy reporting from EVs or compatible EV supply equipment (EVSE). Prior to joining the program, the owner-members may inspect the end-use member's electrical equipment to ensure compatibility with the energy software program, but the owner-members shall not be responsible for the installation, repair, or maintenance of the electrical equipment or the EV.

<u>High Efficiency Heat Pump (HEHP) Program</u> offers two incentive levels to end-use members for choosing to install either an air source heat pump (ASHP) that meets or exceeds the current ENERGY STAR® Program requirements product specification for heat pump equipment established by the Environmental Protection Agency (EPA), or by installing a heat pump that has received the EPA cold climate air source heat pump (ccASHP) designation. Heat pump technology has also become available in the area of domestic hot water. The HEHP Program also provides an incentive for end-use members to choose a HEHP water heater over the standard conventional tank or instantaneous water heater.

<u>Backup Generator Control Program</u> incentivizes residential end-use members who own backup generators to participate in EKPC’s demand side management initiatives. Generators must meet certain eligibility criteria, including a minimum capacity of 14 kW, the ability to operate for at least 30 continuous hours, carry the entire load of the residence at any time of the year, and the capability for remote control by EKPC. In return, participants will receive an annual availability incentive of $350 and a performance incentive of $100 if the generator is dispatched by EKPC for 25 or more hours. Generators may be dispatched during peak demand periods and in emergency scenarios to alleviate strain on the grid. Participants will receive advance notice when possible, and dispatch events will be limited to 50 hours per year to ensure the long-term reliability of the generators.

<u>Commercial Advanced Lighting Program</u> promotes energy efficiency by incentivizing non-residential end-use members to install high-efficiency LED lighting. This program is available to businesses within EKPC's service territory whose facilities did not exceed 3,000,000 kWh of energy usage in the previous calendar year. This program employs a prescriptive approach, ensuring participants have a clear understanding of the specific incentives available for each type of lighting upgrade.

Commercial & Industrial Thermostat Program is designed to promote energy efficiency by encouraging commercial and industrial end-use members to upgrade to self-learning thermostats. These thermostats are capable of automatically adjusting temperature settings to optimize energy use, leading to significant reductions in heating and cooling costs. The program is available to non-residential end-use members within the service areas of participating EKPC owner-member cooperatives. To qualify, businesses must have a ducted air-source air conditioner or heat pump with a capacity of at least 2 tons, controlled by a single non-self-learning thermostat. Zoned systems are not eligible for the incentive.

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Section 5.0
Results by Consumer Class

Residential Class Consumers and Sales

	Consumers			*Use Per Consumer*			*Class Sales*		
	Annual Average	Annual Change	% Change	Monthly Average (kWh)	Change (kWh)	% Change	Total (MWh)	Annual Change (MWh)	% Change
2014	491,708	2,078	0.4	1,210	34	2.9	7,142,350	232,497	3.4
2015	494,254	2,546	0.5	1,143	-67	-5.5	6,781,622	-360,728	-5.1
2016	497,781	3,527	0.7	1,146	3	0.2	6,847,090	65,468	1.0
2017	500,233	2,452	0.5	1,083	-63	-5.5	6,502,113	-344,977	-5.0
2018	505,322	5,089	1.0	1,208	125	11.5	7,324,079	821,967	12.6
2019	508,561	3,239	0.6	1,153	-55	-4.5	7,036,916	-287,163	-3.9
2020	514,083	5,522	1.1	1,121	-32	-2.8	6,915,401	-121,515	-1.7
2021	521,184	7,101	1.4	1,140	19	1.7	7,127,199	211,798	3.1
2022	525,887	4,703	0.9	1,144	4	0.4	7,218,271	91,072	1.3
2023	530,007	4,120	0.8	1,038	-106	-9.3	6,598,806	-619,465	-8.6
2024	535,417	5,410	1.0	1,121	83	8.0	7,199,620	600,814	9.1
2025	540,708	5,291	1.0	1,129	9	0.8	7,328,725	129,105	1.8
2026	545,388	4,680	0.9	1,138	9	0.8	7,450,913	122,188	1.7
2027	549,754	4,366	0.8	1,143	4	0.4	7,538,607	87,693	1.2
2028	553,699	3,945	0.7	1,149	6	0.6	7,635,773	97,166	1.3
2029	557,374	3,675	0.7	1,147	-2	-0.2	7,673,920	38,147	0.5
2030	561,036	3,662	0.7	1,150	2	0.2	7,740,202	66,282	0.9
2031	564,681	3,645	0.6	1,153	3	0.3	7,810,438	70,236	0.9
2032	568,157	3,476	0.6	1,159	7	0.6	7,904,478	94,041	1.2
2033	571,557	3,400	0.6	1,158	-1	-0.1	7,944,540	40,062	0.5
2034	574,842	3,285	0.6	1,161	3	0.3	8,011,516	66,976	0.8
2035	577,962	3,120	0.5	1,167	5	0.5	8,091,467	79,951	1.0
2036	581,045	3,083	0.5	1,176	10	0.8	8,202,158	110,691	1.4
2037	584,167	3,122	0.5	1,179	2	0.2	8,263,737	61,578	0.8
2038	587,200	3,033	0.5	1,185	6	0.5	8,350,371	86,635	1.0
2039	590,097	2,897	0.5	1,192	7	0.6	8,441,425	91,053	1.1

Notes:
- **Totals may not equal sum of components due to rounding.**
- **In 2018, there was a reclassification of approximately 500 consumers from the Small Commercial Class to the Residential Class.**

Seasonal Class Consumers and Sales

	Consumers			Use Per Consumer			Class Sales		
	Annual Average	Annual Change	% Change	Monthly Average (kWh)	Change (kWh)	% Change	Total (MWh)	Annual Change (MWh)	% Change
2014	115	21	22.3	268	2	0.9	370	70	23.5
2015	120	5	4.3	246	-23	-8.4	354	-17	-4.5
2016	125	5	4.2	277	31	12.8	416	62	17.5
2017	141	16	12.8	316	38	13.8	534	118	28.4
2018	144	3	2.1	360	44	14.0	621	88	16.4
2019	150	6	4.2	368	8	2.3	663	41	6.6
2020	161	11	7.3	343	-25	-6.9	662	-1	-0.1
2021	116	-45	-28.0	351	9	2.5	489	-173	-26.1
2022	222	106	91.4	282	-69	-19.6	753	264	53.9
2023	272	50	22.5	327	45	15.9	1,069	316	42.0
2024	279	7	2.6	320	-7	-2.2	1,072	3	0.3
2025	284	5	1.8	319	-1	-0.3	1,088	16	1.5
2026	284	0	0.0	320	0	0.2	1,090	2	0.2
2027	284	0	0.0	319	0	-0.1	1,088	-2	-0.1
2028	284	0	0.0	319	0	0.0	1,088	0	0.0
2029	284	0	0.0	318	-1	-0.4	1,084	-4	-0.4
2030	284	0	0.0	317	-1	-0.2	1,082	-2	-0.2
2031	284	0	0.0	317	-1	-0.2	1,080	-2	-0.2
2032	284	0	0.0	317	0	0.0	1,080	0	0.0
2033	284	0	0.0	316	-1	-0.3	1,077	-3	-0.3
2034	284	0	0.0	316	0	-0.1	1,076	-1	-0.1
2035	284	0	0.0	316	0	0.0	1,077	0	0.0
2036	284	0	0.0	317	1	0.2	1,079	2	0.2
2037	284	0	0.0	316	0	-0.1	1,078	-1	-0.1
2038	284	0	0.0	317	0	0.1	1,079	1	0.1
2039	284	0	0.0	317	0	0.1	1,081	2	0.1

Notes:

- **Totals may not equal sum of components due to rounding.**

Public Buildings Class Consumers and Sales

	Consumers			Use Per Consumer			Class Sales		
	Annual Average	Annual Change	% Change	Annual Average (MWh)	Change (MWh)	% Change	Total (MWh)	Annual Change (MWh)	% Change
2014	1,117	8	0.7	2,966	169	6.1	39,753	2,537	6.8
2015	1,132	15	1.3	2,871	-95	-3.2	38,996	-757	-1.9
2016	1,137	5	0.4	2,758	-113	-3.9	37,627	-1,369	-3.5
2017	1,156	19	1.7	2,637	-121	-4.4	36,578	-1,049	-2.8
2018	1,165	9	0.8	2,943	306	11.6	41,142	4,563	12.5
2019	1,166	1	0.1	2,847	-96	-3.3	39,829	-1,313	-3.2
2020	1,174	8	0.7	2,427	-420	-14.7	34,187	-5,642	-14.2
2021	1,184	10	0.9	2,690	263	10.8	38,218	4,030	11.8
2022	1,187	3	0.3	2,669	-21	-0.8	38,012	-205	-0.5
2023	1,197	10	0.8	2,585	-84	-3.1	37,126	-886	-2.3
2024	1,209	12	1.0	2,608	23	0.9	37,832	706	1.9
2025	1,224	15	1.2	2,622	14	0.5	38,507	675	1.8
2026	1,233	9	0.7	2,605	-17	-0.7	38,536	30	0.1
2027	1,243	10	0.8	2,582	-22	-0.9	38,518	-18	0.0
2028	1,252	9	0.7	2,565	-17	-0.7	38,536	18	0.0
2029	1,263	11	0.9	2,546	-19	-0.8	38,582	46	0.1
2030	1,273	10	0.8	2,524	-21	-0.8	38,561	-21	-0.1
2031	1,282	9	0.7	2,506	-18	-0.7	38,554	-7	0.0
2032	1,292	10	0.8	2,489	-17	-0.7	38,584	30	0.1
2033	1,303	11	0.9	2,471	-17	-0.7	38,644	60	0.2
2034	1,312	9	0.7	2,454	-17	-0.7	38,640	-4	0.0
2035	1,322	10	0.8	2,436	-18	-0.7	38,645	5	0.0
2036	1,331	9	0.7	2,422	-14	-0.6	38,691	45	0.1
2037	1,342	11	0.8	2,408	-14	-0.6	38,783	92	0.2
2038	1,352	10	0.7	2,392	-16	-0.7	38,813	30	0.1
2039	1,361	9	0.7	2,379	-14	-0.6	38,847	34	0.1

Note: Totals may not equal sum of components due to rounding.

Small Commercial Class Consumers and Sales

	Consumers			Use Per Consumer			Class Sales		
	Annual Average	Annual Change	% Change	Annual Average (MWh)	Change (MWh)	% Change	Total (MWh)	Annual Change (MWh)	% Change
2014	33,687	395	1.2	57	-1	-1.7	1,919,198	1,468	0.1
2015	34,122	435	1.3	57	0	0.0	1,958,109	38,912	2.0
2016	34,258	136	0.4	57	0	0.0	1,951,787	-6,322	-0.3
2017	34,481	223	0.7	55	-2	-3.5	1,896,475	-55,312	-2.8
2018	34,208	-273	-0.8	57	2	3.6	1,962,505	66,030	3.5
2019	34,514	306	0.9	56	-1	-1.8	1,925,821	-36,684	-1.9
2020	34,742	228	0.7	52	-4	-7.1	1,791,061	-134,760	-7.0
2021	35,263	521	1.5	54	2	3.8	1,889,497	98,436	5.5
2022	36,169	906	2.6	54	0	0.0	1,940,673	51,176	2.7
2023	36,937	768	2.1	52	-2	-3.7	1,915,931	-24,742	-1.3
2024	37,401	464	1.3	53	1	1.9	1,982,768	66,837	3.5
2025	37,810	409	1.1	53	0	0.0	1,999,850	17,081	0.9
2026	38,184	374	1.0	53	0	0.0	2,012,587	12,738	0.6
2027	38,511	327	0.9	52	-1	-1.9	2,015,909	3,322	0.2
2028	38,825	314	0.8	52	0	0.0	2,025,042	9,132	0.5
2029	39,115	290	0.7	52	0	0.0	2,022,464	-2,577	-0.1
2030	39,398	283	0.7	51	-1	-1.9	2,020,842	-1,623	-0.1
2031	39,676	278	0.7	51	0	0.0	2,020,446	-396	0.0
2032	39,943	267	0.7	51	0	0.0	2,026,511	6,066	0.3
2033	40,207	264	0.7	50	-1	-2.0	2,022,136	-4,376	-0.2
2034	40,465	258	0.6	50	0	0.0	2,023,307	1,171	0.1
2035	40,712	247	0.6	50	0	0.0	2,025,779	2,471	0.1
2036	40,956	244	0.6	50	0	0.0	2,035,241	9,462	0.5
2037	41,205	249	0.6	49	-1	-2.0	2,036,240	1,000	0.0
2038	41,454	249	0.6	49	0	0.0	2,043,942	7,701	0.4
2039	41,696	242	0.6	49	0	0.0	2,051,572	7,631	0.4

Notes:
- **Totals may not equal sum of components due to rounding.**
- **In 2018, there was a reclassification of approximately 500 consumers from the Small Commercial Class to the Residential Class.**

Large Commercial Class Consumers and Sales

	Consumers			Use Per Consumer			Class Sales		
	Annual Average	Annual Change	% Change	Annual Average (MWh)	Change (MWh)	% Change	Total (MWh)	Annual Change (MWh)	% Change
2014	136	1	0.7	23,870	1,515	6.8	3,246,287	228,362	7.6
2015	129	-7	-5.1	23,099	-771	-3.2	2,979,716	-266,571	-8.2
2016	138	9	7.0	23,888	789	3.4	3,296,495	316,779	10.6
2017	149	11	8.0	22,788	-1,100	-4.6	3,395,430	98,935	3.0
2018	153	4	2.7	22,390	-398	-1.7	3,425,613	30,183	0.9
2019	156	3	2.0	21,246	-1,144	-5.1	3,314,391	-111,222	-3.2
2020	165	9	5.8	19,707	-1,539	-7.2	3,251,726	-62,665	-1.9
2021	173	8	4.8	19,463	-244	-1.2	3,367,170	115,444	3.6
2022	184	11	6.4	20,222	759	3.9	3,720,863	353,692	10.5
2023	194	10	5.4	21,774	1,552	7.7	4,224,079	503,216	13.5
2024	202	8	4.1	22,247	473	2.2	4,493,900	269,822	6.4
2025	213	11	5.4	23,754	1,506	6.8	5,059,501	565,600	12.6
2026	217	4	1.9	25,628	1,874	7.9	5,561,242	501,741	9.9
2027	220	3	1.4	26,061	433	1.7	5,733,336	172,094	3.1
2028	225	5	2.3	25,796	-265	-1.0	5,804,062	70,726	1.2
2029	229	4	1.8	25,840	45	0.2	5,917,462	113,400	2.0
2030	231	2	0.9	25,698	-143	-0.6	5,936,225	18,762	0.3
2031	235	4	1.7	25,419	-279	-1.1	5,973,393	37,168	0.6
2032	240	5	2.1	25,105	-314	-1.2	6,025,132	51,739	0.9
2033	243	3	1.3	24,888	-216	-0.9	6,047,860	22,728	0.4
2034	246	3	1.2	24,699	-189	-0.8	6,075,940	28,080	0.5
2035	250	4	1.6	24,453	-246	-1.0	6,113,131	37,191	0.6
2036	257	7	2.8	24,059	-394	-1.6	6,183,108	69,977	1.1
2037	260	3	1.2	23,867	-191	-0.8	6,205,528	22,420	0.4
2038	265	5	1.9	23,591	-276	-1.2	6,251,672	46,144	0.7
2039	268	3	1.1	23,431	-161	-0.7	6,279,417	27,744	0.4

Note: Totals may not equal sum of components due to rounding.

Public Street and Highway Lighting Class Consumers and Sales

	Consumers			*Use Per Consumer*			*Class Sales*		
	Annual Average	Annual Change	% Change	Monthly Average (kWh)	Change (kWh)	% Change	Total (MWh)	Annual Change (MWh)	% Change
2014	408	-4	-1.0	24	0	1.7	9,916	72	0.7
2015	411	3	0.7	24	0	-1.0	9,890	-26	-0.3
2016	404	-7	-1.7	25	1	2.2	9,940	50	0.5
2017	381	-23	-5.7	24	0	-0.5	9,325	-615	-6.2
2018	390	9	2.4	23	-2	-7.9	8,796	-530	-5.7
2019	408	18	4.6	21	-1	-4.7	8,770	-25	-0.3
2020	432	24	5.9	20	-1	-5.5	8,771	1	0.0
2021	448	16	3.7	18	-2	-9.3	8,249	-523	-6.0
2022	450	2	0.4	17	-1	-7.9	7,633	-616	-7.5
2023	465	15	3.3	17	0	-1.1	7,799	166	2.2
2024	469	4	0.9	17	0	-0.1	7,856	58	0.7
2025	471	2	0.4	17	0	-0.3	7,869	13	0.2
2026	474	3	0.6	17	0	-0.5	7,881	12	0.2
2027	478	4	0.8	17	0	-0.7	7,892	11	0.1
2028	481	3	0.6	16	0	-0.5	7,902	10	0.1
2029	484	3	0.6	16	0	-0.5	7,912	9	0.1
2030	488	4	0.8	16	0	-0.7	7,920	9	0.1
2031	491	3	0.6	16	0	-0.5	7,929	8	0.1
2032	494	3	0.6	16	0	-0.5	7,937	8	0.1
2033	497	3	0.6	16	0	-0.5	7,945	8	0.1
2034	500	3	0.6	16	0	-0.5	7,952	7	0.1
2035	502	2	0.4	16	0	-0.3	7,959	7	0.1
2036	505	3	0.6	16	0	-0.5	7,967	8	0.1
2037	508	3	0.6	16	0	-0.5	7,975	8	0.1
2038	512	4	0.8	16	0	-0.7	7,983	8	0.1
2039	515	3	0.6	16	0	-0.5	7,992	8	0.1

Note: Totals may not equal sum of components due to rounding.

Section 6.0
Results by Owner-Member

		Consumers		Total Energy Sales	
Owner-Member	**Economic Region**	**Portion of System Total**	**Growth Rate 2025 - 2039**	**Portion of System Total**	**Growth Rate 2025 - 2039**
Big Sandy RECC	East	2.1%	0.2%	2.0%	0.2%
Blue Grass Energy	Central	11.3%	0.8%	9.7%	1.0%
Clark Energy	North East	4.8%	0.5%	3.1%	0.4%
Cumberland Valley Electric	East	4.0%	0.2%	3.6%	0.6%
Farmers RECC	South Central	4.6%	0.5%	3.4%	1.0%
Fleming-Mason Energy	North East	4.5%	0.6%	6.4%	0.5%
Grayson RECC	North East	2.6%	0.1%	1.6%	0.7%
Inter-County Energy	South	4.7%	0.3%	4.8%	1.2%
Jackson Energy	East	9.0%	0.4%	7.7%	0.8%
Licking Valley RECC	East	3.0%	0.1%	2.7%	2.3%
Nolin RECC	North Central	6.8%	0.8%	5.7%	1.4%
Owen Electric	North	12.2%	1.2%	21.9%	1.0%
Salt River Electric	North Central	10.1%	0.9%	9.1%	1.3%
Shelby Energy	North Central	3.2%	0.8%	5.9%	3.1%
South Kentucky RECC	South	12.1%	0.4%	8.5%	0.8%
Taylor County RECC	South	4.9%	0.7%	4.0%	1.3%

Note:
System totals may not sum to 100 percent due to rounding.
DSM/EE and EV projections are included in the EKPC system forecast and not broken down by owner-member.

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Section 7.0
Weather, EV, and Economic Scenarios

EKPC's high and low energy and demand scenarios are summarized below. Sensitivities are considered for different economic, weather, and EV scenarios.

High Case - Economic Optimistic:

Compared to the base case forecast, the high case assumes an optimistic economic forecast with both industrial (large commercial) and non-industrial growth exceeding base assumptions.

- Industrial/Large Commercial: 90 MW of additional industrial load at a 70 percent load factor (first half in 2025, second half in 2026).
- All other consumer classes: consumer counts growing 50 percent faster than the base case beginning in 2024. For this scenario, the faster growth rate is applied by consumer class and by year (for example residential consumer growth changes from 1.0 percent to 1.5 percent in 2025 and from 0.8 percent to 1.2 percent in 2027).

High Case – Extreme Weather

The high case for energy assumes extreme weather based on the 30-year historical maximum degree days. The high case for demand is based on a 1 in 30 weather event. The LEX weather station, which is central to Kentucky, is used for identifying normal degree days, and mild and extreme temperatures.

High Case – EVs

The high case assumes stronger EV adoption and more miles/year/vehicle than the base case.

Low Case - Economic Pessimistic:

Compared to the base case forecast, the low case assumes a pessimistic economic forecast with both industrial (large commercial) and non-industrial growth falling below base assumptions.

- Industrial/Large Commercial: loss of 90 MW of industrial load at a 70 percent load factor (first half in 2025, second half in 2026).

- All other consumer classes: consumer counts growing 50 percent slower than the base case beginning in 2024. For this scenario, the slower growth rate is applied by consumer class and by year (for example residential consumer growth changes from 1.0 percent to 0.5 percent in 2025 and from 0.8 percent to 0.4 percent in 2027).

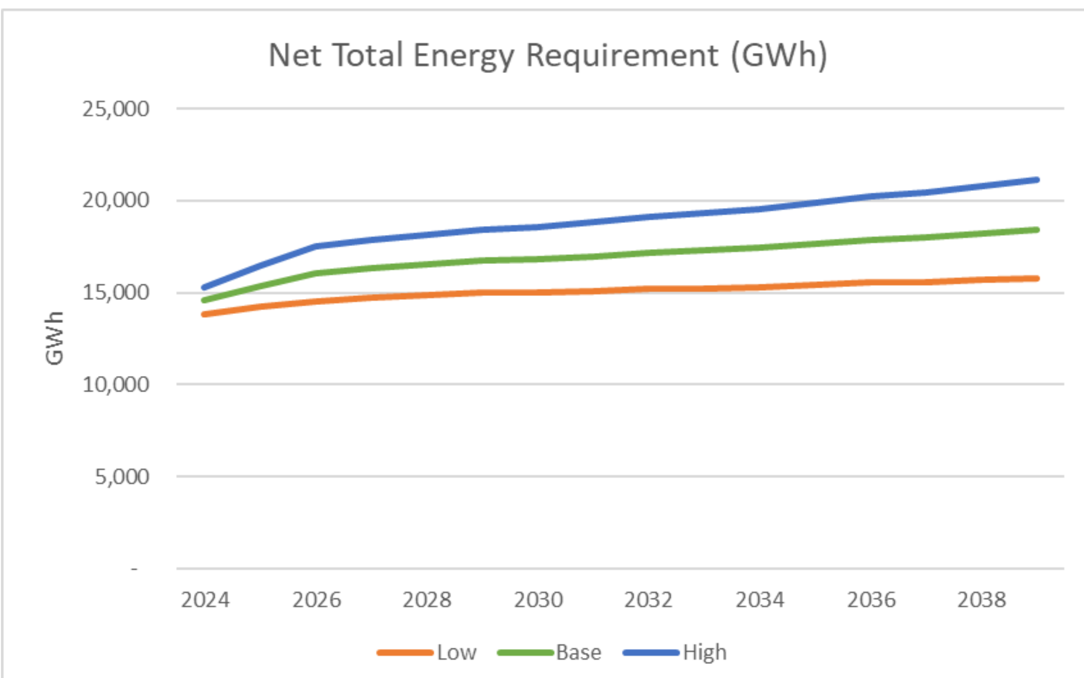
Low Case – Mild Weather

The low case for energy assumes mild weather based on the 30-year historical minimum degree days. The low case for demand is based on a 1 in 30 weather event. The LEX weather station, which is central to Kentucky, is used for identifying normal degree days, and mild and extreme temperatures.

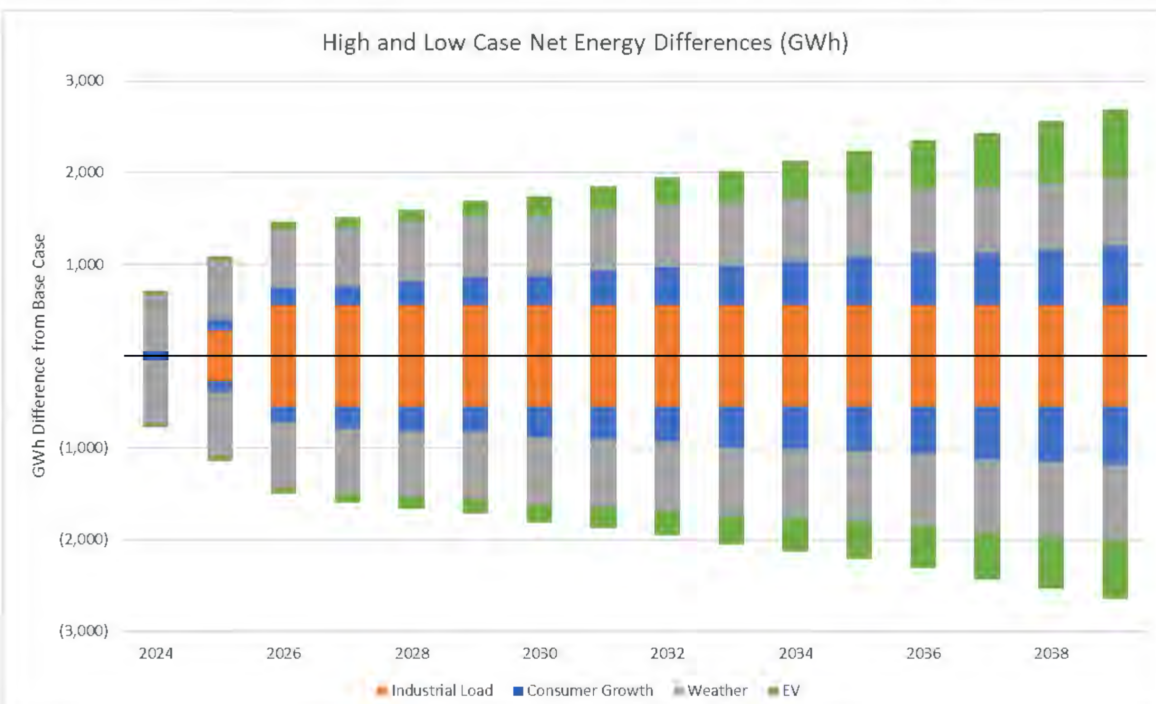
Low Case – EVs

The low case assumes lower EV adoption and fewer miles/year/vehicle than the base case.

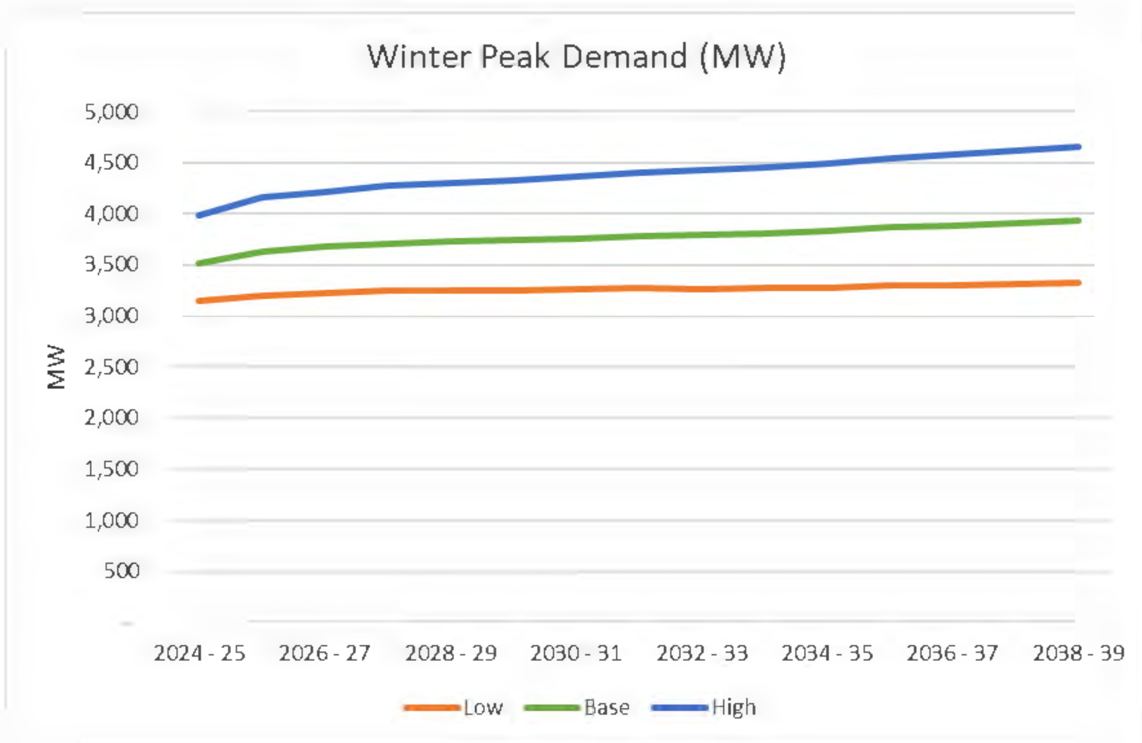
Net Total Energy Requirements (GWh) by Scenario



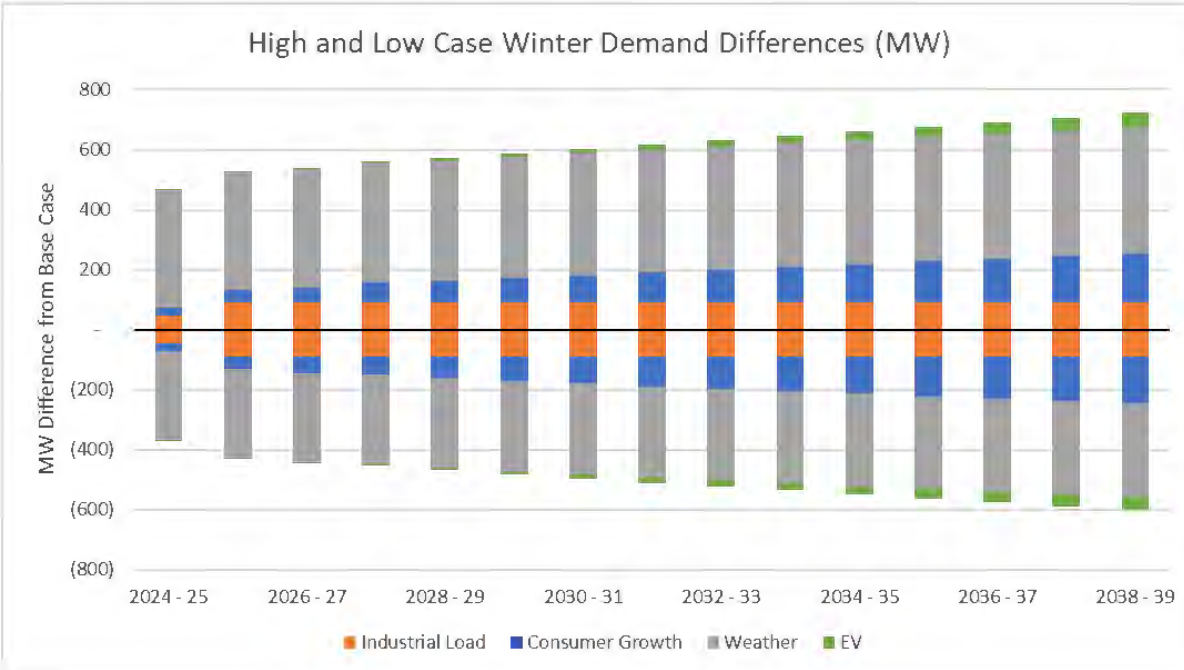
Net Total Energy Requirements (GWh)			
Year	Low	Base	High
2024	13,818	14,597	15,309
2025	14,213	15,356	16,442
2026	14,531	16,033	17,493
2027	14,727	16,325	17,833
2028	14,871	16,535	18,130
2029	15,002	16,716	18,403
2030	15,024	16,836	18,579
2031	15,109	16,985	18,830
2032	15,232	17,186	19,135
2033	15,235	17,292	19,306
2034	15,309	17,442	19,567
2035	15,407	17,622	19,861
2036	15,566	17,880	20,237
2037	15,590	18,030	20,464
2038	15,703	18,244	20,802
2039	15,802	18,447	21,135



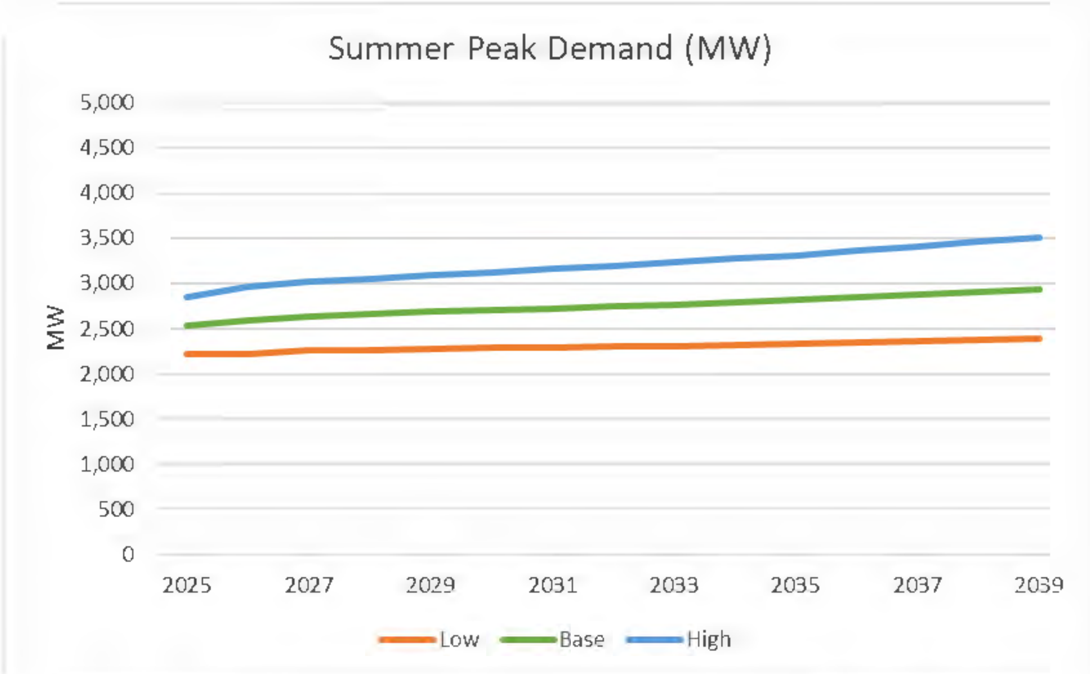
Net Winter Peak Demand (MW) by Scenario



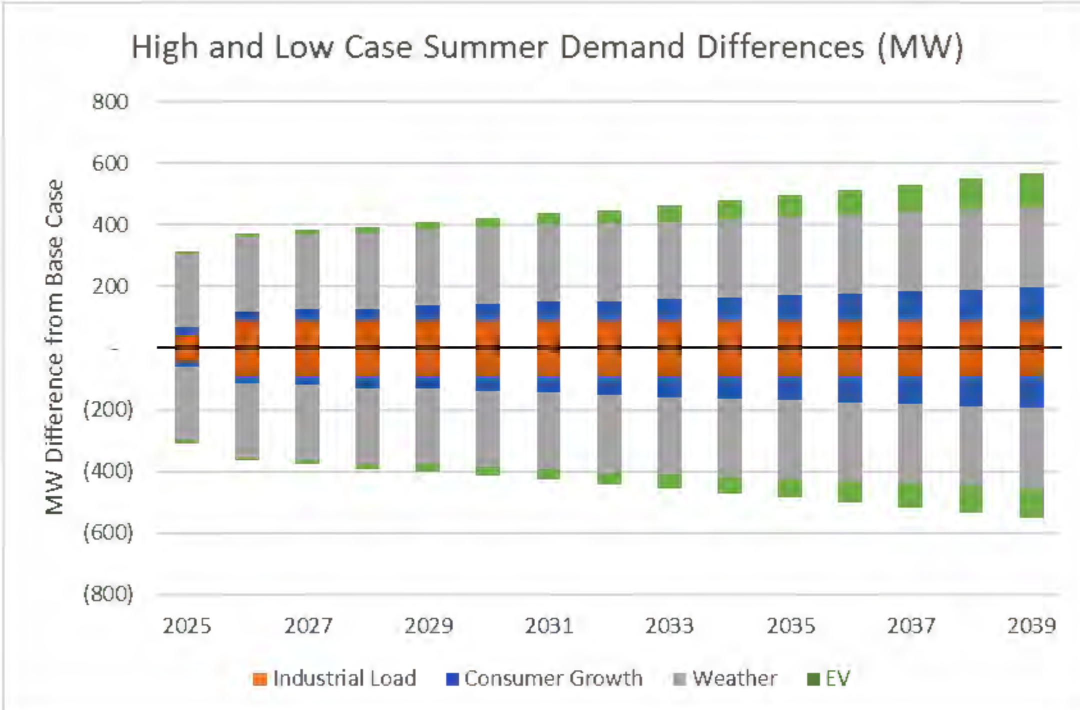
Winter Peak MW			
Year	**Low**	**Base**	**High**
2024 - 25	3,148	3,517	3,984
2025 - 26	3,197	3,627	4,155
2026 - 27	3,231	3,677	4,217
2027 - 28	3,258	3,712	4,272
2028 - 29	3,258	3,727	4,298
2029 - 30	3,259	3,743	4,331
2030 - 31	3,262	3,760	4,362
2031 - 32	3,277	3,788	4,406
2032 - 33	3,270	3,793	4,425
2033 - 34	3,275	3,811	4,458
2034 - 35	3,283	3,832	4,493
2035 - 36	3,307	3,870	4,546
2036 - 37	3,307	3,882	4,574
2037 - 38	3,319	3,908	4,615
2038 - 39	3,331	3,933	4,655


High and Low Case Winter Demand Differences (MW)
MW Difference from Base Case
800
600
400
200
-
(200)
(400)
(600)
(800)
2024 - 25
2026 - 27
2028 - 29
2030 - 31
2032 - 33
2034 - 35
2036 - 37
2038 - 39
Industrial Load
Consumer Growth
Weather
EV

Net Summer Peak Demand (MW) by Scenario

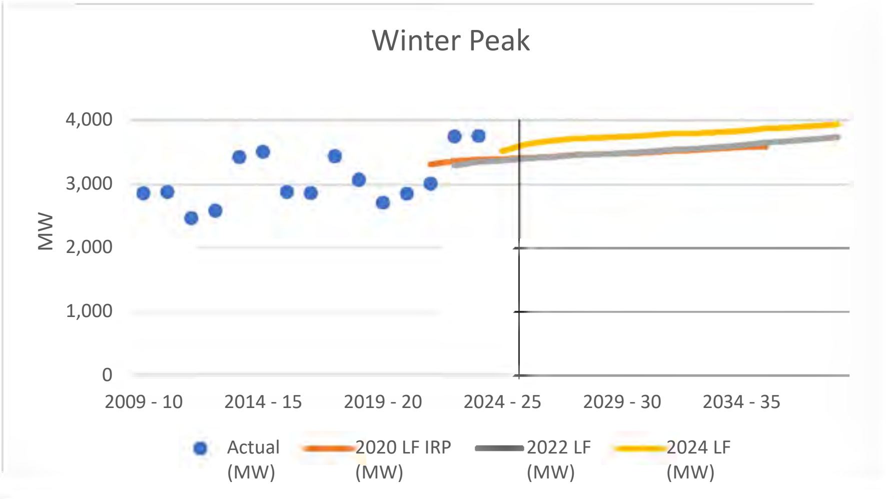


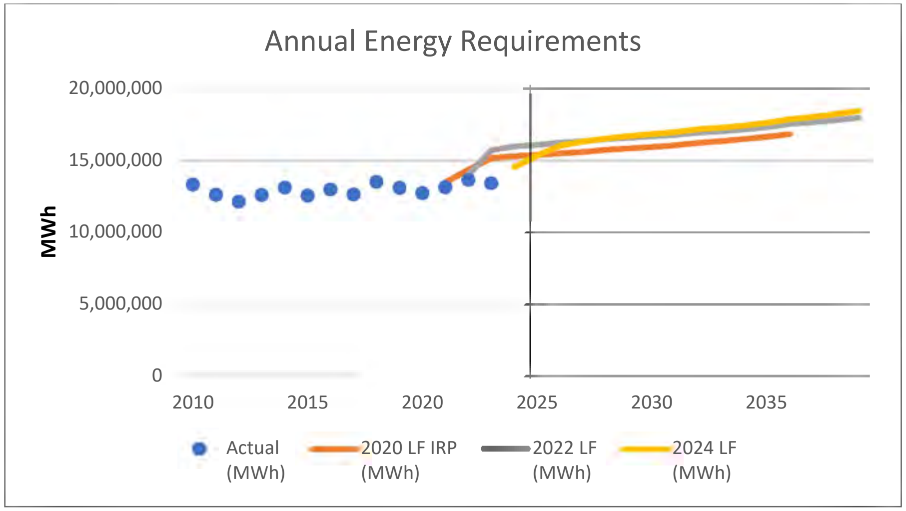
Summer Peak (MW)			
Year	Low	Base	High
2025	2,222	2,530	2,845
2026	2,223	2,588	2,960
2027	2,263	2,641	3,024
2028	2,269	2,664	3,054
2029	2,286	2,688	3,096
2030	2,289	2,703	3,124
2031	2,297	2,723	3,160
2032	2,305	2,749	3,196
2033	2,308	2,766	3,228
2034	2,321	2,792	3,271
2035	2,332	2,818	3,312
2036	2,351	2,853	3,365
2037	2,361	2,878	3,408
2038	2,377	2,910	3,459
2039	2,391	2,941	3,509

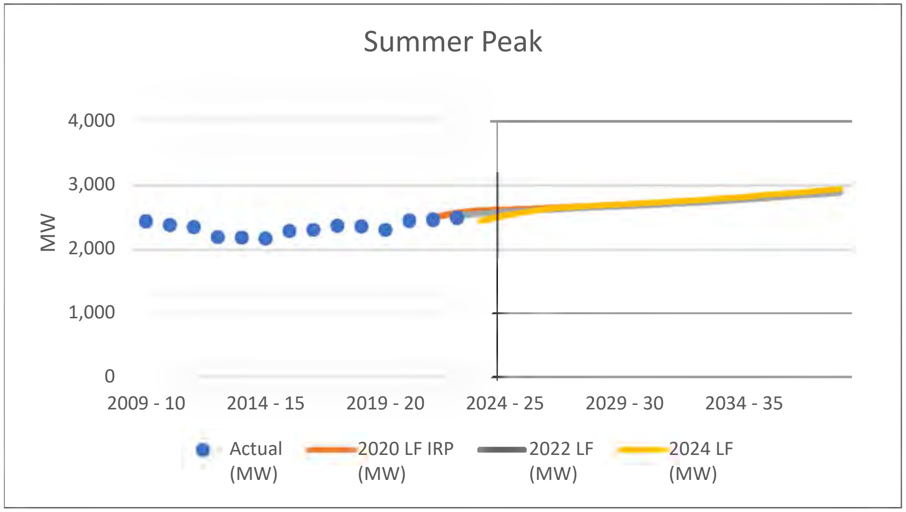

High and Low Case Summer Demand Differences (MW)
800
600
400
200
-
(200)
(400)
(600)
(800)
MW Difference from Base Case
2025
2027
2029
2031
2033
2035
2037
2039
Industrial Load
Consumer Growth
Weather
EV

ATTACHMENT JJT-3

Winter	Actual (MW)	Nucor (MW)	Actual excluding Nucor (MW)	2020 LF IRP (MW)	2022 LF (MW)	2024 LF (MW)	Summer	Actual (MW)	Nucor	Actual excluding Nucor (MW)	2020 LF IRP (MW)	2022 LF (MW)	2024 LF (MW)	Year	Actual (MWh)	2020 LF IRP (MWh)	2022 LF (MWh)	2024 LF (MWh)
2009 - 10	2,868	[redacted]	[redacted]				2010	2,443	[redacted]	[redacted]				2010	13,376,292			
2010 - 11	2,891	[redacted]	[redacted]				2011	2,388	[redacted]	[redacted]				2011	12,666,998			
2011 - 12	2,481	[redacted]	[redacted]				2012	2,354	[redacted]	[redacted]				2012	12,190,070			
2012 - 13	2,597	[redacted]	[redacted]				2013	2,199	[redacted]	[redacted]				2013	12,644,590			
2013 - 14	3,425	[redacted]	[redacted]				2014	2,192	[redacted]	[redacted]				2014	13,163,516			
2014 - 15	3,507	[redacted]	[redacted]				2015	2,179	[redacted]	[redacted]				2015	12,604,942			
2015 - 16	2,890	[redacted]	[redacted]				2016	2,293	[redacted]	[redacted]				2016	13,039,953			
2016 - 17	2,871	[redacted]	[redacted]				2017	2,311	[redacted]	[redacted]				2017	12,680,111			
2017 - 18	3,437	[redacted]	[redacted]				2018	2,375	[redacted]	[redacted]				2018	13,576,581			
2018 - 19	3,073	[redacted]	[redacted]				2019	2,366	[redacted]	[redacted]				2019	13,140,704			
2019 - 20	2,723	[redacted]	[redacted]				2020	2,312	[redacted]	[redacted]				2020	12,794,457			
2020 - 21	2,862	[redacted]	[redacted]				2021	2,450	[redacted]	[redacted]				2021	13,183,458	13,529,377		
2021 - 22	3,017	[redacted]	[redacted]	3,309			2022	2,465	[redacted]	[redacted]	2,500			2022	13,700,232	14,421,062	14,054,646	
2022 - 23	3,747	[redacted]	[redacted]	3,363	3,289		2023	2,497	[redacted]	[redacted]	2,574	2,534		2023	13,465,331	15,191,270	15,729,754	
2023 - 24	3,754	[redacted]	[redacted]	3,384	3,349		2024				2,612	2,558	2,450	2024		15,304,776	15,978,231	14,597,314
2024 - 25				3,391	3,370	3,517	2025				2,623	2,590	2,530	2025		15,397,278	16,097,281	15,356,328
2025 - 26				3,409	3,400	3,627	2026				2,634	2,603	2,588	2026		15,500,370	16,249,016	16,032,547
2026 - 27				3,427	3,419	3,677	2027				2,651	2,618	2,641	2027		15,604,583	16,344,822	16,324,831
2027 - 28				3,457	3,452	3,712	2028				2,669	2,640	2,664	2028		15,747,490	16,496,452	16,535,333
2028 - 29				3,470	3,467	3,727	2029				2,684	2,655	2,688	2029		15,849,209	16,587,477	16,716,466
2029 - 30				3,480	3,484	3,743	2030				2,695	2,669	2,703	2030		15,945,207	16,689,158	16,836,043
2030 - 31				3,494	3,504	3,760	2031				2,707	2,686	2,723	2031		16,058,087	16,784,952	16,984,780
2031 - 32				3,520	3,535	3,788	2032				2,726	2,708	2,749	2032		16,227,680	16,931,348	17,186,440
2032 - 33				3,533	3,551	3,793	2033				2,742	2,727	2,766	2033		16,339,247	17,027,037	17,291,964
2033 - 34				3,556	3,578	3,811	2034				2,761	2,748	2,792	2034		16,491,095	17,167,590	17,442,321
2034 - 35				3,578	3,607	3,832	2035				2,780	2,771	2,818	2035		16,647,000	17,330,048	17,621,587
2035 - 36				3,586	3,651	3,870	2036				2,794	2,803	2,853	2036		16,838,980	17,542,966	17,880,165
2036 - 37					3,673	3,882	2037					2,827	2,878	2037			17,663,615	18,029,950
2037 - 38					3,704	3,908	2038					2,854	2,910	2038			17,821,924	18,243,593
2038 - 39					3,734	3,933	2039					2,879	2,941	2039			17,979,010	18,446,924


Winter Peak
4,000
3,000
2,000
1,000
0
MW
2009 - 10
2014 - 15
2019 - 20
2024 - 25
2029 - 30
2034 - 35
Actual (MW)
2020 LF IRP (MW)
2022 LF (MW)
2024 LF (MW)


Annual Energy Requirements
20,000,000
15,000,000
10,000,000
5,000,000
0
MWh
2010
2015
2020
2025
2030
2035
Actual (MWh)
2020 LF IRP (MWh)
2022 LF (MWh)
2024 LF (MWh)


Summer Peak
4,000
3,000
2,000
1,000
0
MW
2009 - 10
2014 - 15
2019 - 20
2024 - 25
2029 - 30
2034 - 35
Actual (MW)
2020 LF IRP (MW)
2022 LF (MW)
2024 LF (MW)

ATTACHMENT JJT-4

EKPC Expansion Plan - Q4 2024

EAST KENTUCKY POWER COOPERATIVE

YEAR	LTLF-2024	Load Obligation	Planning Reserves		Capacity Required		Existing Capacity		Deficit before Cap Additions		CAPACITY ADDITIONS								Total Effective Addition		Total Capacity		Seasonal Purchases		Planning Reserves (Excl Seas Pur)	
			7%	7%							CCGT		Hydro PPA		RICE		SOLAR									
	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*	WIN	SUM*
2025	3,517	2,379	246	166	3,763	2,545	3,727	2,580	36	-35				9					-	9	3,727	2,589	40		-1%	2%
2026	3,627	2,433	254	170	3,881	2,603	3,427	2,580	454	23			300					11	300	20	3,727	2,600	150		-4%	0%
2027	3,677	2,482	257	174	3,934	2,656	3,427	2,580	507	77								5	300	25	3,727	2,605	210	50	-5%	-2%
2028	3,712	2,504	260	175	3,972	2,679	3,427	2,580	545	99								6	300	31	3,727	2,611	240	70	-6%	-3%
2029	3,727	2,527	261	177	3,988	2,704	3,427	2,580	561	124					214	169		6	514	206	3,941	2,786	50		-1%	3%
2030	3,743	2,541	262	178	4,005	2,719	3,300	2,474	705	245								-5	514	201	3,814	2,675	190	40	-5%	-2%
2031	3,760	2,560	263	179	4,023	2,739	3,300	2,474	723	265	745	573							1,259	774	4,559	3,248			13%	19%
2032	3,788	2,584	265	181	4,053	2,765	3,300	2,474	753	291									1,259	774	4,559	3,248			12%	17%
2033	3,793	2,600	266	182	4,059	2,782	3,300	2,474	760	308								-4	1,259	770	4,559	3,244			12%	17%
2034	3,811	2,625	267	184	4,078	2,809	3,300	2,474	778	335									1,259	770	4,559	3,244			12%	15%
2035	3,832	2,649	268	185	4,100	2,834	3,300	2,474	800	360									1,259	470	4,559	2,944			11%	4%
2036	3,870	2,682	271	188	4,141	2,870	3,300	2,474	841	396									959	470	4,259	2,944			3%	3%
2037	3,882	2,705	272	189	4,154	2,894	3,300	2,474	855	421									959	470	4,259	2,944			3%	2%
2038	3,908	2,736	274	191	4,182	2,927	3,300	2,474	882	453									959	470	4,259	2,944			2%	1%
2039	3,933	2,765	275	194	4,208	2,959	3,300	2,474	908	485									959	470	4,259	2,944			1%	-1%

*Summer capacity adjusted for class ELCC ratings and summer load adjusted for PJM load obligation (EKPC LTLF Summer Peak minus 6%)

ATTACHMENT JJT-5

IS AN EXCEL SPREADSHEET AND UPLOADED SEPARATELY

EXHIBIT 4

DIRECT TESTIMONY OF BRAD YOUNG

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	**)**	
KENTUCKY POWER COOPERATIVE,	**)**	
INC. FOR 1) CERTIFICATES OF PUBLIC	**)**	
CONVENIENCE AND NECESSITY	**)**	**CASE NO.**
TO CONSTRUCT NEW GENERATION	**)**	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	**)**	
CERTIFICATE RELATING TO THE SAME;	**)**	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	**)**	
TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	

DIRECT TESTIMONY OF BRAD YOUNG
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	**)**	
KENTUCKY POWER COOPERATIVE,	**)**	
INC. FOR 1) CERTIFICATES OF PUBLIC	**)**	
CONVENIENCE AND NECESSITY	**)**	**CASE NO.**
TO CONSTRUCT NEW GENERATION	**)**	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	**)**	
CERTIFICATE RELATING TO THE SAME;	**)**	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	**)**	
TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	

A F F I D A V I T

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Brad A. Young, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Brad Young

____

Subscribed and sworn before me on this 18th day of November 2024.

Gwyn M. Willoughby

Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

I. Introduction

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Brad A. Young and my business address is East Kentucky Power Cooperative, Inc. ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391. I am the Vice President of Engineering & Construction at EKPC.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor's degree and a Master of Science degree in Engineering from the University of Kentucky. I am a licensed professional engineer in the Commonwealth of Kentucky. I have been employed by EKPC since April 2016 and have held my current position within the EKPC organization since March 2023.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. I am responsible for all planning, engineering, and construction of projects associated with EKPC's Power Production and Transmission capital investment portfolio. I report directly to EKPC's Executive Vice President and Chief Operating Officer, Mr. Don Mosier.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. I have provided direct testimony in Case No. 2024-00310.[1]

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[1] *In the Matter of: Electronic Application of East Kentucky Power Cooperative, Inc., for 1) A Certificate of Public Convenience and Necessity to Construct a New Generation Resource; 2) A Site Compatibility Certificate; and 3) Other General Relief,* Case No. 2024-00310, (Ky. P.S.C. Sept. 20, 2024).

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to provide information regarding the project selection process, project scope, construction information, and site compatibility aspects of the new generation assets proposed by EKPC in this proceeding.

Q. ARE YOU SPONSORING ANY ATTACHMENTS?

A. Yes, I am sponsoring the following Attachments:

BY-1 Cooper Combined Cycle Project Scoping Report ("PSR"),

BY-2 Cooper Unit 2 Gas Co-firing Project Scoping Report,

BY-3 Spurlock Units 1 – 4 Gas Co-firing Project Scoping Report, and

BY-4 EKPC New Generation Project Feasibility Report ("PFR").

BY-5 Cooper Combined Cycle Project Site Assessment Report ("SAR")

Q. PLEASE DESCRIBE THE NEW GENERATION PROJECT BEING PROPOSED BY EKPC IN THE APPLICATION.

A. EKPC is proposing a new two-on-one combined cycle "F" class Combined Cycle Gas Turbine ("CCGT") facility at the existing John Sherman Cooper Power Station ("Cooper") to meet current and growing customers' needs for additional energy and to serve as the replacement capacity for the eventual retirement of Cooper Unit 1. This new facility will provide up to approximately 745 MW of generation. This will be a modern combined cycle plant design that is based on the Siemens SGT6-5000F (5000F) combustion turbine and generators paired with unfired (no duct firing) Heat Recovery Steam Generators ("HRSG"s) sending steam to a new steam turbine generator. The units will be designed to burn pipeline quality natural gas with Ultra-Low Sulfur Diesel ("ULSD") fuel oil reserves to serve as a 72-hour emergency backup. A new 161 kV switchyard will be constructed to interconnect the output from the CCGT generating plant to EKPC's existing high voltage transmission lines on the site.

<u>II. Combined Cycle Gas Turbine at Cooper Station</u>

Q. PLEASE DESCRIBE THE MANNER OF CONSTRUCTION FOR THE COMBINED CYCLE UNIT AT COOPER STATION.

A. The Cooper CCGT project includes construction of a 745 MW two-on-one unfired combined cycle electric generating station at the existing Cooper Station. Acreage currently utilized for coal storage and material handling will be repurposed to allow for sufficient space for the construction of this new proposed unit. The project's major components will include two (2) F-class combustion turbines, two (2) heat recovery steam generators, one (1) steam turbine generator, and a new counter flow wet cooling tower. This is a modern combined cycle plant design that will use the most recent commercially available F-Class combustion turbines, heat recovery steam generators, steam turbine generator, and cooling tower technology. The units will be designed to burn pipeline quality natural gas or fuel oil as a backup. A new meter and regulation ("M&R") station will be constructed on the northwest side of the site. A new pipeline will supply a minimum of 600 pounds per square inch gauge ("PSIG") natural gas. No new gas compressors will be required to maintain the operating pressure necessary for an F-class turbine. On-site heating, regulation, and fuel gas filtering to meet the pressure, superheat, and cleanliness requirements are included to meet the supply requirements of the Combustion Turbine

Generators ("CTG") and auxiliary boiler. To support emergency backup operation, the fuel oil storage tanks will be designed to provide 72 hours of fuel while firing at full load on both combustion turbines. Two fuel oil storage tanks are planned to be located in concrete secondary containment structures with redundant offloading and forwarding pumps. All fuel oil piping outside of the containment structure is supplied with double wall piping. Fuel oil heaters are supplied to ensure fuel oil temperature meets the CTG's atomizing temperature requirements.

Q. WHAT ARE THE ESTIMATED CONSTRUCTION COSTS FOR EACH ELEMENT OF THE COMBINED CYCLE UNIT AT COOPER STATION?

A. The estimated cost for the CCGT at Cooper is approximately $1.317 Billion. A detailed cost estimate is included in Appendix R of the Project Scoping Report, which is attached as Attachment BY-1. Appendix R of the Project Scoping Report is being filed under seal pursuant to a motion for confidential treatment.

Q. PLEASE DESCRIBE THE PROCESS TAKEN BY EKPC TO EVALUATE THE BEST POSSIBLE PROJECT LOCATION AMONG THE ALERTERNATIVES CONSIDERED AND WHAT FACTORS WERE INCLUDED IN THAT ANALYSIS.

A. EKPC reviewed multiple potential brownfield and greenfield site locations in central and eastern Kentucky, primarily located around EKPC's existing Cooper and J. K. Smith stations as well as in Greenup County on the eastern edge of EKPC's transmission system. Potential locations were identified that would minimize project capital cost by co-locating close to both existing high voltage transmission lines and natural gas pipelines in the area. For these site locations, a feasibility analysis was conducted (see Attachment BY-4) that included preliminary general arrangement layout drawings of the proposed facility along with high level scope, cost, and schedule of the required site development and transmission upgrades. Each proposed location was reviewed for sufficient land area for the new combined cycle facility, water availability, noise sensitivity, adjacent residences or community gathering locations, wetlands, and other potential regulatory hurdles. Of these options, Cooper Station was deemed preferable due to the lowest estimated total project cost (including transmission upgrades), the ability to meet a 2030 commercial operation date with the required permitting and regulatory approvals, and for providing the most substantial reliability benefits for the transmission system.

Q. PLEASE LIST AND DESCRIBE THE ALTERNATIVE LOCATIONS RESEARCHED.

A. The first step in the site selection process was the identification of candidate sites. Candidate sites possess the necessary infrastructure; including, interconnection capability to the transmission system, access to natural gas pipelines, water and wastewater utilities, and land availability. These characteristics are necessary to support the development, construction, and operation of a combined cycle facility. The proposed project's area of interest was selected to provide improved reliability and voltage support for EKPC's transmission system. The three (3) primary areas of interest were: EKPC's existing Cooper Station, located in Pulaski County, EKPC's existing J. K. Smith Power Station ("Smith"), located in Clark County, and a greenfield site located in Greenup County.

Q. WHAT CRITERIA WAS USED TO DETERMINE THE OPTIMAL PROJECT LOCATION FOR THE COMBINED CYCLE GAS TURBINE AT COOPER STATION?

A. The Cooper site would require a new gas pipeline to deliver natural gas for the new facility but would provide significant voltage support and reliability benefit to EKPC's existing transmission system. The Smith site already has nine simple cycle units onsite with sufficient gas supply and would have the freest space and infrastructure available between these sites for the new CCGT plant. However, based on economics, lack of sufficient water supply, expected permitting and environmental regulatory approval timelines, and incremental transmission costs, the Cooper facility provides the most overall value and benefit to EKPC and its owner-members. For the Tygarts Creek area facility in Greenup County, it was seen as a potential third option behind the other two sites, primarily due to additional siting development and transmission interconnection costs. A preliminary power-flow analysis has shown due to the proximity of the proposed Greenup County facility and possible interconnection into American Electric Power's existing 765 kV transmission line, no measurable voltage or reliability benefit would be realized to EKPC's existing transmission system. Lastly, the expected environmental permitting effort and timeline associated with the Greenup County location would be more extensive compared to the Cooper and Smith site options, primarily due to it being a greenfield site. Additional information on the proposed sites can be found in the Project Feasibility report, Attachment BY-4.

Q. WHAT BENEFITS WILL BE DERIVED FROM THE COMBINED CYCLE GAS TURBINE AT COOPER STATION?

A. The proposed project will provide a reliable and cost-effective generation facility capable of supporting base load along with the flexibility to adjust to intermittent periods due to the increased penetration of renewable generation on EKPC's and PJM's transmission system. Furthermore, the proposed unit will provide the ability to reliably serve and provide voltage support to this area of EKPC's transmission system and additional generation during severe weather events, and support continued industrial and residential load growth as part of economic development in the southern area of EKPC's transmission system with anticipation of this growth continuing.

Q. WHAT IS THE TIMELINE FOR COMPLETION OF THE INTEGRATED GAS COMBINED CYCLE UNIT AT COOPER STATION?

A. Commercial operation is expected to be achieved by December 2030. This late date demonstrates the challenges of developing generation resources.

Q. ARE THERE ANY TRANSMISSION COMPONENTS TO THE PROPOSED COMBINED CYCLE GAS TURBINE AT COOPER STATION?

A. Yes.

Q. PLEASE DESCRIBE THE TRANSMISSION COMPONENTS OF THE PROPOSED COMBINED CYCLE GAS TURBINE AT COOPER STATION??

A. The combustion turbine generators and steam turbine generator output will be connected through three (3) generator step-up transformers to a new 161 kV, 4-bay switchyard located north of the power block. Additional transmission substation, line, and interconnection upgrades are necessary to complete construction and allow operation of the new switchyard and connection to EKPC's 161kV transmission system. Details of these necessary transmission and interconnection upgrades can be found in Exhibit 6, the Direct Testimony of Darrin Adams.

Q. PLEASE DESCRIBE THE SURROUNDING LAND USE FOR THE AREA ADJACENT TO THE PROPOSED PROJECTS.

A. The CCGT will be located at the existing Cooper Station approximately 13 miles south of Somerset, Kentucky. Access to the site is from KY-1247 N or US Hwy 27 N. New equipment and structures will be located adjacent to the existing Unit 2 coal plant in the area currently used for the coal pile. As a separate project, EKPC is proposing converting Unit 2 to co-fire on natural gas. The existing coal pile could be significantly reduced and would provide the majority of the site space for the combined cycle plant. Furthermore, all construction activities will be limited to the existing property owned by EKPC. No additional property has been identified to be needed at this time to support the proposed combined cycle. The current land use of adjacent properties will remain unaffected. Internal to the plant, existing land and facilities will be repurposed to support required construction activities and operations of the new unit.

Q. DO THE MAPS CONTAINED IN THE PROJECT SCOPING REPORT SHOW THE LEGAL BOUNDARIES OF THE PROPOSED SITE; THE LOCATION OF BUILDINGS, TRANSMISSION LINES AND SRUCTURES; AND EXISTING OR PROPOSED UTILITIES?

A. Yes.

Q. HOW WILL EKPC CONTROL ACCESS TO THE PROPOSED SITES?

A. The existing entrance to Cooper Station will be utilized for access to the proposed facility. Security staff are present at all times to control access to the existing plant. Perimeter fencing is also installed around the entire perimeter of Cooper Station property at a height of 7 feet plus an additional 1 feet of barbwire fencing.

Q. IS EKPC REQUESTING A SITE COMPATIBILITY CERTIFICATE FOR THE COMBINED CYCLE GAS TURBINE AT COOPER STATION?

A. Yes.

Q. DID EKPC HAVE A SAR COMPLETED FOR THE COMBINED CYCLE GAS TURBINE AT COOPER STATION?

A. Yes. EKPC engaged Burns & McDonnell ("BMCD") to complete the required SAR.

Q. PLEASE SUMMARIZE THE ELEMENTS OF THE SAR.

- The Site Assessment Report (SAR) has been prepared by Burns & McDonnell (BMCD), to meet Kentucky Revised Statutes (KRS) 278.708. KRS 278.708 requires "*any person proposing to construct a merchant electric generating facility shall file a site assessment report with the board as required by KRS 278.706(2)(1)*". As such, the following information is intended to fulfill the requirements of the statute.
- Facility Description (KRS 278.708(3)(a) - A description of the proposed facility that shall include a proposed site development plan that describes the following:
    - Surrounding Land Uses

- Proposed Site Legal Boundaries
- Proposed Site Access Control
- Facility General Arrangements
- Facility Accessways, Roads, and Railways
- Existing or Proposed Utilities for Facility
- Applicable Setback Requirements
- Noise Evaluation

- Site Compatibility with Scenic Surroundings (KRS 278.708(3)(b)) - The Site Compatibility with Scenic Surroundings will be addressed to identify components of the facility that would otherwise impact the cultural or scenic aesthetics of the surrounding areas. This section will identify if there are features of the facility that could affect visual perception of the surrounding area.
- Property Value Impact (KRS 278.708(3)(c)) -This section identifies the potential impacts to property values and land use as a result of the siting, construction, and operation of the facility for owners adjacent to the facility.
- Acoustical Evaluation (KRS 278.708(3)(d)) - This section discusses the anticipated noise levels for the surrounding areas during operation of the facility.
- Impact on Road and Rail Traffic (KRS 278.708(3)(e))

Q. IS EKPC REQUESTING ANY DEVIATIONS FROM SETBACK REQUIREMENTS?

A. KRS Section 278.704(4) provides potential deviations that may be allowed for setback requirements and specifically references Section 278.216. KRS Section 278.216(2) states that a facility constructed on a site containing existing facilities capable of generating ten megawatts (10 MW) or more electricity shall not be required to comply with the setback requirements established pursuant to KRS 278.704(3). The proposed facility is being constructed on a site capable of generating in excess of 300 MW of electricity and therefore is exempt from the setback requirements in KRS 278.704(3). However, EKPC is requesting the current setbacks for the Cooper Station be applied to the CCGT that EKPC is requesting to be built at Cooper Station. EKPC believes that the proposed CCGT's location will meet the goals of KRS 224.10-280, 278.010, 278.212, 278.214, 278.216, 278.218, and 278.700 to 278.716 at a distance closer than the 2,000 feet setback required in KRS 278.704(2) for residential neighborhoods. The residential neighborhood that is within 2,000 feet of the Cooper Station is across the Cumberland River. The residential neighborhood is screened by vegetation on both sides of the river. Additionally, the Cooper Station has been at this location since 1965 and has been operating with the setbacks proposed for the new CCGT. The statutory goals of the setback requirements will continue to be met by permitting the new CCGT to be constructed with the same setback from the residential neighborhood.

III. Cooper Co-Firing

Q. PLEASE DESCRIBE THE MANNER OF CONSTRUCTION FOR THE COOPER CO-FIRE.

A. Cooper Unit 2 is a single front wall fired boiler designed by Babcock & Wilcox ("B&W") and placed into commercial operation in 1969. Unit 2 currently utilizes eighteen (18) coal fired burners and fuel oil fired igniters. Coal is pulverized in six (6) coal mills. Unit 2 was originally designed as a forced draft unit but was subsequently converted to balanced draft. The current configuration includes low NOx burners, Selective Catalytic Reduction ("SCR") system, Fluidized Bed Semi-Dry Absorber ("SDA"), baghouse and induced draft (ID) fan. Each burner and igniter will be upgraded to include fuel gas firing capabilities up to 100% of the required heat input, while retaining its current coal capabilities.

The fuel gas system will be supplied by a new Metering and Regulating Station ("M&R Station") that will be located northwest of the Plant in an unoccupied area near the existing main entrance to the plant. This M&R station will supply 600 PSIG (average) fuel gas at an assumed temperature of 40 ºF to 80 ºF. Pressure is then dropped from 600 PSIG down to 200 PSIG through a new Fuel Gas Conditioning ("FGC") yard to serve the unit. In the unit, Fuel gas will then be regulated to the required pressure and flow rate needed for the boiler demand. Eighteen (18) burners will be paired such that three (3) burners are operated simultaneously. Each grouping will align with the current coal mill arrangement and will receive a Safety Shut Off ("SSO") skid. The igniters will be arranged in a similar configuration. Fuel oil will be supplied to all eighteen (18) igniters and each igniter will have a single SSO skid. Controls for each fuel oil igniter will be interfaced with the burner management system (BMS). Fuel oil supply to the burners will not be modified as the existing igniter system capacity is not being changed.

Control of the new equipment will primarily be accomplished through an expanded DCS. PLCs for M&R Station and gas conditioning equipment will be provided to allow operators to monitor from the control room screens. High-fidelity simulator updates will be included and integral to the training program to prepare operators and plant staff for the new systems and controls.

Q. WHAT ARE THE ESTIMATED CONSTRUCTION COSTS FOR EACH ELEMENT OF THE COOPER CO-FIRE PROJECT?

A. The estimated cost for the Cooper Co-Fire Project is $73.8 million. A detailed cost estimate is included in Appendix R of the Project Scoping Report, which is attached as Attachment BY-2.: Appendix R is being filed under seal pursuant to a motion for confidential treatment.

Q. PLEASE LIST AND DESCRIBE THE ALTERNATIVES RESEARCHED.

A. The GHG Rule offered the following alternatives; do nothing to the existing Units and retire before January 1, 2032, co-fire units with natural gas before January 1, 2030, and retire before January 1, 2039, or install carbon capture and storage by January 1, 2030, and operate past 2039.

Q. WHAT CRITERIA WAS USED TO DETERMINE THE OPTIMAL PROJECT PROPOSAL FOR THE COOPER CO-FIRE PROJECT?

A. Costs, reliability, and compliance with the GHG Rule.

Q. WHAT BENEFITS WILL BE DERIVED FROM THE COOPER CO-FIRE PROJECT?

A. Compliance with the GHG Rule, cost competitive power for EKPC's owner-members, a reliable dispatchable generation facility for grid stability, and a continued use of a brownfield site that would prevent the need for replacement facilities at greenfield sites.

Q. WHEN IS THE EXPECTED COMPLETION OF THE COOPER CO-FIRE PROJECT?

A. Commercial operation is expected to be achieved by December 2030 in order to comply with the requirements of the GHG Rule.

Q. ARE THERE ANY TRANSMISSION PORTIONS OF THE PROPOSED COOPER CO-FIRE PROJECT?

A. No.

IV. Spurlock Co-Fire Project

Q. PLEASE DESCRIBE THE MANNER OF CONSTRUCTION FOR THE SPURLOCK CO-FIRE PROJECT.

A. Spurlock Unit 1 is an opposed wall fired boiler designed by B&W and placed into commercial operation in 1977. Spurlock Unit 1 currently utilizes twenty-four (24) coal fired burners and fuel oil fired igniters. Coal is pulverized in eight (8) coal mills. The current configuration includes low NOx burners, an SCR system, an Electrostatic Precipitator (“ESP”), Induced Draft (“ID”) fan, a wet Flue Gas Desulfurization (“FGD”) system and a wet ESP.

Spurlock Unit 2 is a tangentially fired boiler designed by Alstom Combustion Engineering and placed into commercial operation in 1981. Spurlock Unit 2 currently utilizes twenty (20) coal fired burners. Coal is pulverized in five (5) coal mills. The ignition system uses fuel oil at two elevations at each of the four corners. The current configuration includes low NOx burners, Close Coupled Over Fire Air (“CCOFA”), a Separated Overfire Air (“SOFA”), an SCR, an ESP, an ID fan, a wet FGD, and a wet ESP.

Spurlock Unit 3 and Unit 4 are Alstom Circulating Fluidized Bed ("CFB") boilers. Unit 3 was placed into operation in 2005. Unit 4 was placed into operation in 2009. Both units include limestone boiler injection, a Selective Non-Catalytic Reduction ("SNCR") system, baghouse, and ID fan.

Fuel gas will be supplied from a new M&R station that will be located near the main entrance supplied at 200PSIG at temperatures of 40 to 80 degrees Fahrenheit. From the M&R station gas will flow to the FGC yard, then to each unit. Each unit will be capable of burning up to 50% fuel gas.

Twelve (12) of the twenty-four (24) burners on Spurlock Unit 1 will be replaced with dual fuel burners. Six (6) on the front wall and six (6) on the rear wall. The burners are grouped such that three (3) burners are fed from a single pulverizer. Fuel gas at Spurlock Unit 1 will be regulated via the Low Pressure ("LP") skid to the pressure and flow rate required for boiler demand. Two low pressure control skids will be provided for the dual fuel burners and igniters. The LP control system for the front burners and LP control system for the front ignitors will be located on a single combined skid. The second LP skid will have the LP control system for the rear burns and ignitors. Each of the 12 burners will have an individual SSO. There will be 4 total ignitor SSO, one for each set of igniters grouped by coal pulverizer mill group.

Spurlock Unit 2, eight (8) new gas burners and igniters will be installed. Two (2) new gas burners will be installed in each corner of the boiler. Supplied fuel gas on Spurlock Unit 2 will then be regulated with one LP control skid to regulate flow to all 8 burners. Each gas burner and igniter will have a combined safety shut off skid.

Spurlock Unit 3 and Spurlock Unit 4 will each have sixteen (16) new gas lances installed. Nine (9) gas lances will be installed in existing secondary air ports on the rear wall of the boiler and seven (7) gas lances will be installed in new penetration on the front wall of the boiler. Fuel gas at Spurlock Unit 3 and Spurlock Unit 4 will each have 2 LP control skids. One LP skid will control the flow of gas to the front seven lances and the other will control flow to the nine rear lances. On the front, six lances will share 3 SSOs. The remaining lance will have its own safety shut off skid. On the rear, eight of the nine lances on the rear will be controlled with four SSOs, and the remaining lance will have its own SSO. There will be no modifications to the existing fuel oil systems on Spurlock Unit 3 and Spurlock Unit 4. High-fidelity simulator updates will be included and integral to the training program to prepare operators and plant staff for the new systems and controls.

Q. WHAT ARE THE ESTIMATED CONSTRUCTION COSTS FOR EACH ELEMENT OF THE SPURLOCK CO-FIRE PROJECT?

A. The estimated cost for the Spurlock Co-Fire Project is $187 million. The estimated costs per Unit are shown as follows:

Spurlock Unit 1: $54,000,000

Spurlock Unit 2: $52,000,000

Spurlock Unit 3: $42,000,000

Spurlock Unit 4: $39,000,000

A detailed cost estimate is included in Appendix R of the Project Scoping Report, which is attached as Attachment BY-3, which is being filed under seal pursuant to a motion for confidential treatment.

Q. PLEASE LIST AND DESCRIBE THE ALTERNATIVES RESEARCHED.

A. The GHG Rule offered the following alternatives; do nothing to the existing Units and retire before January 1, 2032, co-fire units with natural gas before January 1, 2030 and retire before January 1, 2039, or install carbon capture and storage by January 1, 2030 and operate past 2039.

Q. WHAT CRITERIA WAS USED TO DETERMINE THE OPTIMAL PROJECT PROPOSAL FOR THE SPURLOCK CO-FIRE PROJECT?

A. Costs, reliability, and compliance with the GHG Rule.

Q. WHAT BENEFITS WILL BE DERIVED FROM THE SPURLOCK CO-FIRE PROJECT?

A. Compliance with the GHG Rule, cost competitive power for EKPC's owner-members, a reliable dispatchable generation facility for grid stability, and a continued use of a brownfield site that would prevent the need for replacement facilities at greenfield sites.

Q. WHEN IS THE EXPECTED COMPLETION OF THE SPURLOCK CO-FIRE PROJECT?

A. Commercial operation is expected to be achieved by December 2029.

Q. ARE THERE ANY TRANSMISSION COMPONENTS TO THE PROPOSED SPURLOCK CO-FIRE PROJECT?

A. No.

V. Additional Information for the New Generation Projects

Q. PLEASE DESCRIBE THE TIMING FOR PJM APPROVAL FOR EACH OF THE PROPOSED PROJECTS AND THE IMPACT OF ANY DELAYS ON SAME.

A. Since the projects to enable Cooper and Spurlock coal generation units to co-fire a percentage of natural gas, or fully burn natural gas, do not involve an increase in MW injection into the transmission system or involve changing the Point of Interconnection for these units, EKPC will not need to submit an application into PJM interconnection process to receive PJM approvals to interconnect. These projects will not be impacted by the PJM interconnection queue.

Similarly, since these projects essentially involve adding or adjusting burners in the units' boilers and not modifying the units, PJM will not need to perform a Necessary Study. The Necessary Study process is a different process than the PJM interconnection study process. It is a process set forth in the pro forma Generation Interconnection Agreement in PJM's Open Access Transmission Tariff that requires PJM to study modification that causes the project's capacity, location, configuration or technology to differ from the information in the unit's interconnection agreement. PJM evaluates whether any system reinforcements would be needed to accommodate the potential modification.

EKPC met with PJM to review the project plans and confirmed that the changes to the units are not of the sort that would require a Necessary Study. Essentially EKPC's projects will enable the generation units to burn an additional fuel to boil water to make steam and not change how the steam leaves the boiler to turn the generator to produce electricity. The electrical characteristics of the unit will not change, nor will the operational characteristics of ramp rate or start-up time change.

EKPC understands that PJM will require EKPC to execute a Generation Interconnection Agreement that reflects the revised fuel burning capability of the units. The process to execute the Generation Interconnection Agreement is not significant and should have no impact on the projects' schedules.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

ATTACHMENT BY-1
UPLOADED SEPARATELY DUE TO FILE SIZE

ATTACHMENT BY-2
UPLOADED SEPARATELY DUE TO FILE SIZE

ATTACHMENT BY-3
UPLOADED SEPARATELY DUE TO FILE SIZE

ATTACHMENT BY-4
UPLOADED SEPARATELY DUE TO FILE SIZE

ATTACHMENT BY-5
UPLOADED SEPARATELY DUE TO FILE SIZE

EXHIBIT 5

DIRECT TESTIMONY OF CRAIG JOHNSON

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	**)**	
KENTUCKY POWER COOPERATIVE,	**)**	
INC. FOR 1) CERTIFICATES OF PUBLIC	**)**	
CONVENIENCE AND NECESSITY	**)**	**CASE NO.**
TO CONSTRUCT NEW GENERATION	**)**	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	**)**	
CERTIFICATE RELATING TO THE SAME;	**)**	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	**)**	
TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	

DIRECT TESTIMONY OF CRAIG A. JOHNSON, PE
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	**CASE NO. 2024-00370**

<u>A F F I D A V I T</u>

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Craig Johnson, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Craig Johnson
____

Subscribed and sworn before me on this 18th day of November 2024.

Gwyn M. Willoughby
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Craig A. Johnson, and my business address is East Kentucky Power Cooperative, Inc. ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391. I am the Senior Vice President of Power Production of EKPC.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I received a bachelor's degree in engineering from West Virginia Institute of Technology and a Master of Science degree in Engineering from the University of Kentucky. I am a licensed professional engineer in the Commonwealth of Kentucky. I have been employed by EKPC since September 1989 and have held my current position within the EKPC organization since January 2010.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. I am responsible for all operational and maintenance functions at EKPC's two (2) coal fired power plants, two (2) combustion turbine plants, five (5) landfill gas plants, one (1) community solar facility and a new solar facility completed in September of 2024. I report directly to EKPC's Executive Vice President and Chief Operating Officer, Mr. Don Mosier.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to provide information regarding EKPC's generation units and the need for additional generation.

Q. ARE YOU SPONSORING ANY EXHIBITS?

A. No

Q. PLEASE DESCRIBE EKPC'S EXISTING GENERATION FLEET.

A. EKPC owns and operates coal-fired generation at the John S. Cooper Station ("Cooper") in Pulaski County, Kentucky (341 MW) and the Hugh L. Spurlock Station ("Spurlock") (1,346 MW) in Mason County, Kentucky. EKPC also owns and operates natural gas-fired generation at the J. K. Smith Station in Clark County, Kentucky (753 MW (summer)/989 MW (winter)) and the Bluegrass Generating Station in Oldham County, Kentucky (501 MW (summer)/567 MW (winter)), landfill gas-to-energy facilities in Boone County, Greenup County, Hardin County, Pendleton County and Barren County (13.8 MW total), and a Community Solar facility (8.5 MW) in Clark County, Kentucky. EKPC's recently completed the installation of Star Hill Farms Solar facility, which has a 500kWac rating. This facility went into commercial operation during September 2024. The entire output of this new solar facility is under contract to Makers Mark Distillery.

Q. PLEASE DESCRIBE THE COOPER COMBINED CYCLE GAS TURBINE THAT IS BEING PROPOSED IN THIS PROCEEDING.

A. The new facility will be located at Cooper Station near the coal storage pile. The proposed facility will have an average net rating of 745 Megawatts based upon a two by one (2x1) combined cycle configuration. This modern combined cycle station will use the Siemens SGT6-5000F (5000F) technology. The two 5000F combustion turbines will be paired with individual electric generators, Generating Step Up Transformer ("GSU"), Heat Recovery Steam Generator ("HRSG"), Scrubbed Catalytic Reduction System ("SCR"), CO catalyst and exhaust stack. The steam produced in the HRSG's will be sent to power a new steam turbine with its own electric generator and GSU. The facility is designed for dual fuel capability using natural gas as its primary fuel with diesel fuel as a backup if natural gas is unavailable.

The scope of the project will include site development, new water treatment facility, new fuel oil storage for Ultra Low Sulphur Diesel ("ULSD"), new cooling tower, aqueous ammonia storage tanks, water tanks, demineralized water treatment system, new administration office and warehouse. A new 161 kVolt switchyard will be built to interconnect the new generating facility into the transmission grid.

All critical systems will be designed for cold weather operation by either enclosing equipment in a building, or with heat tracing and insulation. The primary fuel will be natural gas with the 72 hours of Ultra Low Sulfur Diesel ("ULSD") serving as the backup fuel. Raw makeup water will be withdrawn from Lake Cumberland through one of the two intake structures of the existing coal units. This water will be clarified, treated, and stored in a 400,000-gallon water storage tank located near the new generation. This water will be used to supply cooling tower makeup and will feed a filtration water system that will process water that will be stored in another 400,000-gallon tank. This tank will be used for fire protection and water service. Part of this service water will feed a reverse osmosis demineralizer which will store this demineralized water in a 1,500,000-gallon tank. The demineralized water is being sized to provide 72 hours of operation while on back up fuel. Potable water will be supplied by city water. Any process or wastewater will be treated and discharged through permitted outfall. Storm water run-off will be collected and passed through a pond designed to hold a 100-year storm event. Noise abatement technology will be provided to mitigate the sound from the operating equipment.

Q. DOES THE COOPER COMBINED CYCLE UNIT PROVIDE OPERATIONAL FLEXIBILITY?

A. Yes.

Q. PLEASE DESCRIBE HOW THE COOPER COMBINED CYCLE UNIT PROVIDES OPERATIONAL FLEXIBILITY.

A. EKPC selected a 2x1 combined cycle configuration due to its proven design and fleet experience that will provide a reliable, highly efficient and flexible operation. The major equipment is being designed to operate reliably between an extreme summer ambient temperature of 108.2 degrees Fahrenheit and an extreme winter ambient temperature of minus 13.1 degrees Fahrenheit. All critical auxiliary equipment is being designed with 100% redundancy. The summer design rating while firing natural on gas is 708.8 net Megawatts at 86.6 degrees Fahrenheit with a net plant heat rate of 6,475 Btu/kW-hour. The winter design rating while firing on natural gas is 756.8 net megawatts at 11.8 degrees Fahrenheit with a net plant heat rate of 6,500 Btu/kW-hour. The ratings are slightly lower while firing on ULSD fuel at these same ambient temperatures.

The 2x1 configuration will allow for one combustion turbine train being out of service for a maintenance event. Having one combustion turbine train out of service will result in the maximum derate of the entire plant of approximately 33%. This will greatly reduce the shaft risk over a 1x1 design with a comparable rating. EKPC's intention, if the GHG rule is struck down by the courts or sent back to the EPA for further rulemaking by the incoming Administration, is to utilize this facility as a baseloaded station, meaning we do not anticipate daily cycling of this station. Under the GHG Rule, the facility will be limited to a maximum 40% capacity factor. This modern combined cycle will have excellent load following capabilities with an expected low load condition with two combustion turbines operating of approximately 50% of the total rated output.

Q. PLEASE DESCRIBE HOW THE COOPER COMBINED CYCLE GAS TURBINE WILL BE OPERATED AND MAINTAINED.

A. EKPC will staff the plant for a 24-hours per day, 365-days per year operation. Site security will also be provided on this same basis. EKPC anticipates the need for 28 full-time staff for the around-the-clock operation. EKPC will employ our reliability-centered maintenance philosophy for equipment operation and maintenance. This philosophy is governed by a work management optimization program utilizing a computer maintenance management system. A customized maintenance program will be adopted from the OEM guidelines and recommendations. The maintenance for a combustion turbine in a combined cycle application is different than that of a combustion turbine in a simple cycle mode of operation. EKPC anticipates that this unit will have on average more than 25 hours of operation per startup. As a baseloaded facility with more than 25 hours per startup, daily and annual maintenance is based upon the actual fired hours of operation. Routine daily engine maintenance will be performed as prescribed by the OEM. EKPC will schedule and plan for maintenance outages in a three-year future window. Specific maintenance will be performed during those times in accordance with OEM guidelines which are based upon actual hours of operation. EKPC anticipates self-performing the routine daily maintenance and inspections and employing the OEM for the annual maintenance and inspections requiring an outage. EKPC will keep the recommended critical inventory in the new onsite warehouse.

Q. PLEASE DESCRIBE THE ONGOING OPERATION AND MAINTENANCE COST OF THE COOPER COMBINED CYCLE GAS TURBINE.

A. The estimated annual fixed operating and maintenance cost is $7.60 per kW-year. The fixed operating and maintenance cost includes direct and indirect labor cost, ongoing environmental monitoring, buildings and grounds maintenance, and control room and lab cost. These costs also include warehouse equipment, fire protection system testing and standby energy cost.

The levelized combustion turbine major maintenance cost is estimated to be $1.40 per MW hour. The estimated combustion turbine cost includes combustion inspections, hot gas path inspections and major inspections at the required OEM intervals. EKPC anticipates the major maintenance cost of the combustion turbines to be based upon actual fired hours if there are over 25 operating hours per start-up.

The nonfuel variable costs include water, steam cycle make-up water, steam cycle chemicals, aqueous ammonia, cooling tower treatment, routine maintenance associated with the combustion turbine equipment, steam turbine maintenance and the balance of plant equipment. The combined total operating and maintenance cost, including fixed but excluding fuel, is $1.70 per MW hour.

Q. PLEASE DESCRIBE THE COOPER CO-FIRE PROJECT THAT IS BEING PROPOSED IN THIS PROCEEDING.

A. EKPC is proposing that only Cooper Unit 2 be modified to allow for co-firing of natural gas. Cooper Unit 1 would retain the ability to only operate on coal. Cooper Unit 2 is a pulverized coal unit with six coal pulverizers. Cooper Unit 2 utilizes a wall fired burner arrangement with each coal pulverizer supplying three coal burners for a total of 18 burners. EKPC will replace each of the burners with a dual fuel burner design which will allow for buring either coal or natural gas. Natural gas burners will be associated in groups of three to correspond with one of the six pulverizers. Any combination of fuel could be fired from 0% to 100% coal or natural gas selecting which burner and the type of fuel. For example, if 100% natural gas is desired, then each of the 18 burners would be firing natural gas. If 50% coal and 50% natural gas is desired, then 9 burners would be firing coal with three pulverizers in service and the other 9 burners firing natural gas. The natural gas will be supplied from newly installed piping beginning at the Metering and

Regulating Station ("M&R Station") (supplied by others). The natural gas would flow through the conditioning skid and be reduced to the required operating pressure. The burner management control system will be upgraded to include control of the natural gas combustion along with new instrumentation and safety systems.

Q. DOES THE COOPER CO-FIRE PROJECT PROVIDE OPERATIONAL FLEXIBILITY?

A. Yes.

Q. PLEASE DESCRIBE HOW THE COOPER CO-FIRE PROJECT PROVIDES OPERATIONS FLEXIBILITY.

A. EKPC would have the ability to operate Cooper Unit 2 on the least expensive of the two fuels while remaining in compliance with all emission requirements. Even though the Green House Gas rules mandate a minimum co-fire of 40%, EKPC has chosen to be able to operate Cooper Unit 2 at 100% natural gas or any combination of natural gas and coal down to the 50% level. The minimum load for Cooper Unit 2 is approximately 50%. Cooper Unit 2 can remain in permit compliance with all emissions at this 50% load. EKPC anticipates that natural gas would be selected for low load operation. During times when natural gas is constrained, coal could be selected as the primary fuel. Electrically the unit will have the same operating characteristics as it does today. The predicted performance of Cooper 2 on a 50/50 blend of fuels should result in about the same heat rate and unit rating that it has today. A 100% burn of natural gas will result in the same unit rating but with a predicted 8% degradation in heat rate.

Q. PLEASE DESCRIBE HOW THE COOPER CO-FIRE PROJECT WILL BE OPERATED AND MAINTAINED.

A. EKPC anticipates based upon the forecasted cost of fuel that natural gas will be the least expensive fuel for normal market conditions. EKPC can select the most economical fuel to operate the unit while remaining in compliance with required permitted emission limits. As a conservative base case EKPC chose a 50% co-fire with natural gas to estimate the amount of expected O&M savings. Operating cost savings are expected from the dry scrubbing process, chemicals, and landfilling cost. Maintenance cost savings are expected due to less maintenance to systems such as pulverizer, material handling systems, scrubber systems, boiler, and air preheater maintenance.

Q. PLEASE DESCRIBE THE ONGOING OPERATION AND MAINTENANCE COST OF THE COOPER CO-FIRE PROJECT.

A. EKPC estimates that burning a blend of 50% natural gas will reduce operating variable costs by 49% and the maintenance costs by 7%. A higher blend of natural gas should achieve more savings. The annual nonfuel O&M savings should be on the order of $2.5 million.

Q. PLEASE DESCRIBE THE SPURLOCK CO-FIRE PROJECT THAT IS BEING PROPOSED IN THIS PROCEEDING.

A. EKPC is proposing that all the Spurlock Units be modified to allow for co-firing of natural gas up to 50%. Spurlock Unit 1 is a wall fired boiler which currently has eight pulverizers supplying 24 coal burners. EKPC will replace twelve of the existing burners with a dual burner design which will allow for burning either coal or natural gas. Natural gas burners will be associated in groups of three to correspond with one of the eight pulverizers. Spurlock Unit 2 is a pulverized coal unit that uses a tangentially fired boiler design. Coal is pulverized in one of five existing coal mills each supplying five burners located on five (5) elevations in a 4-corner configuration. The replacement of the existing burners with a dual fuel burner is not possible. On Spurlock Unit 2, eight (8) new burners will be installed. There will be two (2) new gas burners installed on each corner at different levels. Spurlock 3 and 4 utilize Circulating Fluidized Bed ("CFB") combustion technology. With CFB technology, there are no burners like those for a pulverized coal unit. The coal is mixed with crushed limestone and injected through eight transport pipes into the boiler. Unlike a pulverized coal unit where the coal is ignited in a "blow torch" like fire ball, the CFB combustion takes place more slowly. Currently there is a bed of material made up of coal, ash, and limestone in the CFB boiler which ignites the injected coal. This results in a much lower combustion temperature as compared to a pulverized coal boiler. The heat transfer is accomplished by convection as compared to the radiant heat transfer in a pulverized coal unit. To allow for co-firing of natural gas in Spurlock Unit 3 and Spurlock Unit 4, new gas lances will be added on the front wall and rear wall of the boiler. There will be sixteen new gas lances added to each boiler. There are four existing fuel oil warmup guns, two on each side of the boiler. These warmup guns will remain in service for the startup of the unit.

The natural gas will be supplied from newly installed piping beginning at the M&R Station (supplied by others). The natural gas would flow through a common conditioning skid and be reduced to the required operating pressure feeding gas to each unit. The natural gas piping past the connection with the M&R Station will be common for each unit and will branch off at the unit location. Each unit will incorporate new burner logic control into the existing distributed control system, new instrumentation, and safety systems.

Q. DOES THE SPURLOCK CO-FIRE PROJECT PROVIDE OPERATIONAL FLEXIBILITY?

A. Yes.

Q. PLEASE DESCRIBE HOW THE SPURLOCK CO-FIRE PROJECT PROVIDES OPERATIONAL FLEXIBILITY.

A. EKPC would have the ability to operate all Spurlock Units on a co-firing of natural gas while meeting all air permit regulations. Even though the GHG rule mandates a minimum co-fire of 40% natural gas, EKPC has chosen 50% as the minimum co-fire rate of natural gas because of the operational flexibility of maintaining the minimum load necessary for emissions compliance. EKPC anticipates that natural gas would be selected as the fuel to go to a low load condition on Units 1 and 2. The low load condition on Units 3 and 4 will have to be achieved with either all coal or a blend of coal and natural gas. This is due to maintaining a bed of material in the CFB boilers necessary for proper operation. Low load condition for any of the units is the point where permitted emission limits can be met. During times when natural gas is constrained, coal could be selected as the primary fuel. Electrically the unit will have the same operating characteristics as it does today.

The predicted unit performance and unit ratings will remain about the same while co-firing natural gas.

Q. PLEASE DESCRIBE HOW THE SPURLOCK CO-FIRE PROJECT WILL BE OPERATED AND MAINTAINED.

A. EKPC chose a 50% co-fire with natural gas to estimate the amount of expected O&M savings. Operating cost savings are expected from the scrubbing process, chemicals, and landfilling cost. Maintenance cost savings are expected due to less maintenance to systems such as pulverizer, material handling systems, scrubber systems, boiler, and air preheater maintenance.

Q. PLEASE DESCRIBE THE ONGOING OPERATION AND MAINTENANCE COST OF THE SPURLOCK CO-FIRE PROJECT.

A. EKPC estimates that burning a blend of 50% natural gas will reduce operating variable costs by 46% and the maintenance costs by 4%. The annual nonfuel O&M savings should be on the order of $13.7 million.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

EXHIBIT 6

DIRECT TESTIMONY OF DARRIN ADAMS

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	**CASE NO. 2024-00370**

A F F I D A V I T

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Darrin Adams, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Darrin Adams

____

Subscribed and sworn before me on this 18th day of November 2024.

Gwyn M. Willoughby
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	**)**	
KENTUCKY POWER COOPERATIVE,	**)**	
INC. FOR 1) CERTIFICATES OF PUBLIC	**)**	
CONVENIENCE AND NECESSITY	**)**	**CASE NO.**
TO CONSTRUCT NEW GENERATION	**)**	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	**)**	
CERTIFICATE RELATING TO THE SAME;	**)**	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	**)**	
TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	

DIRECT TESTIMONY OF DARRIN ADAMS
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

I. Introduction

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Darrin Adams, and my business address is East Kentucky Power Cooperative, Inc. ("EKPC"), 4755 Lexington Road, Winchester, Kentucky 40391. I am the Director of Transmission Planning & System Protection for EKPC.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I am a graduate of Transylvania University with a Bachelor of Arts degree in Liberal Studies, and a graduate of the University of Kentucky with a Bachelor of Science degree in Electrical Engineering. I am a licensed Professional Engineer in the Commonwealth of Kentucky and have 31 years of experience in the electric utility industry. I have been employed at EKPC since 2004 and have been responsible for transmission planning activities throughout my career at EKPC. Prior to my current position at EKPC, I served as a senior engineer, the Supervisor of Transmission Planning, the Manager of Transmission Planning, and the Director of Planning, Design, & Construction for Power Delivery. Prior to commencing employment with EKPC, I was employed at LG&E Energy/Kentucky Utilities ("LG&E/KU") for approximately 11 years in various roles in the transmission planning and operations areas of those companies.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. In my current role, I am responsible for overseeing the planning of the electric transmission line, transmission substation, and distribution substation facilities necessary to deliver energy reliably and economically to EKPC's owner-member systems. In addition to the planning of EKPC-owned facilities, I oversee coordination of transmission-development plans with other electric utilities and the PJM Interconnection Regional Transmission Organization ("PJM"). PJM is a regional electric grid and market operator with operational control of over 180,000 MW of regional electric generation through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. It operates the largest capacity and energy market in North America.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes, I have testified before the Commission on multiple occasions. Most recently, I filed direct testimony in Case No. 2024-00310 which involved EKPC's application for a Certificate of Public Convenience and Necessity ("CPCN") for the construction of the Liberty Facility. I also filed direct testimony in Case No. 2024-00263 which involved EKPC's application for a Certificate of Public Convenience and Necessity ("CPCN") for the construction of transmission facilities in Madison County, Kentucky. I have also recently participated as a witness at Commission hearings related to EKPC's most recent two-year Fuel-Adjustment Charge review (Case No. 2023-00009) and EKPC's most recent Integrated Resource Plan (Case No. 2022-00098). Regarding cases involving an application for a CPCN for electric transmission lines, I have also testified in Case No. 2022-00314 (requesting a CPCN for the construction of transmission facilities in Madison County, including a new 138 & 69 kV Fawkes-Duncannon Lane double-circuit transmission line), Case No. 2006-00463 (requesting a CPCN for the construction of the J.K. Smith-West Garrard 345 kV line in Clark, Madison, and Garrard Counties) and in Case No. 2005-00089 and Case No. 2005-00458 (both cases requesting a CPCN for construction of the Cranston-Rowan County 138 kV line in Rowan County). In addition to the direct testimony supplied in these cases, I have previously sponsored responses to data requests related to transmission-planning topics in numerous EKPC cases that have come before the Commission.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. My testimony will provide an explanation for the purpose and need for the transmission-system modifications required to connect the new generation projects proposed in this proceeding to the EKPC transmission system. I will also discuss the results of a preliminary transmission-system impact analysis performed by EKPC transmission-planning staff. I will also discuss the PJM generation-interconnection queue study process that the new Cooper Combined Cycle Gas Turbine ("CCGT") will follow to identify the specific transmission-system network upgrades that are required to accommodate the power output of the facility. Finally, I will describe the benefits that the proposed facilities will provide to the transmission system in each area.

Q. ARE YOU SPONSORING ANY ATTACHMENTS?

A. Yes. Attachment DA-1 is the report prepared by EKPC transmission-planning staff report regarding the preliminary transmission-system impact analysis that was performed for the Cooper Combined Cycle facility.

II. Combined Cycle Gas Turbine at Cooper Station

Q. PLEASE DESCRIBE THE TRANSMISSION PROJECTS ASSOCIATED WITH THE COMBINED CYCLE FACILITY AT COOPER STATION.

A. A new 161 kV substation for the Combined Cycle Gas Turbine ("Cooper CCGT Substation") will be constructed at Cooper Station to provide a point of interconnection for the three generating step-up transformers that will be installed at the facility. The connection to the existing EKPC transmission system will be established by constructing 161 kV extensions from the existing Cooper-Laurel Dam 161 kV line to this new 161 kV substation, and the existing Cooper-Denny 161 kV line will also be connected into this substation. This will result in two direct connections from the Cooper CCGT Substation to the existing Cooper Station 161 kV substation, and direct connections from the Cooper CCGT substation to the Laurel Dam 161 kV substation and the Denny 161-69 kV substation. These line extensions will be less than one mile in total length and will be located solely on property that EKPC owns at Cooper Station.

Q. PLEASE DESCRIBE THE NEED FOR THE TRANSMISSION PROJECTS DISCUSSED ABOVE FOR THE COMBINED CYCLE FACILITY.

A. These projects are required to connect the planned Cooper CCGT generation units to the EKPC transmission system. This will connect the generation facility to EKPC's existing 161 kV system centered around Cooper Station. The new Cooper

CCGT Substation will be constructed using EKPC's current design standards to maximize reliability and operational flexibility.

Q. WHAT SPECIFIC ANALYSIS HAS BEEN PERFORMED TO DETERMINE THE NEED FOR THE TRANSMISSION SYSTEM IMPROVEMENTS FOR THE COMBINED CYCLE FACILITY?

A. The physical interconnection projects I have discussed were identified based on basic engineering analysis, preliminary design work, and EKPC's experience with previous similar generation-interconnection projects on the EKPC system. These facilities are required to connect the generators to the transmission system, regardless of the impact on power flows on the existing system.

In addition to these facilities, EKPC transmission-planning staff performed power-flow analysis with the Cooper CCGT generating units included in system models (with the existing Cooper Unit 1 output set at 0 MW) to determine the potential transmission-system network upgrades that could be identified when the facility goes through the PJM generator-interconnection study process. The analysis was conducted for two scenarios to determine the lower and upper bounds of the expected network upgrades. One boundary of network upgrades is based on impacts of the Cooper CCGT units with no other generator-interconnection queue projects included in the models within the EKPC system beyond those that currently have generator interconnection agreements with PJM, plus the proposed Liberty RICE generation facility that is the subject of Case No. 2024-00310. The other boundary of network upgrades is based on impacts of the Cooper CCGT units with all currently active generator-interconnection queue projects included within the EKPC system (as well as the Liberty RICE generation facility).

Q. WHAT DID EKPC'S ANALYSIS FOR THESE TWO SCENARIOS DETERMINE?

A. For one boundary case, EKPC identified thirteen (13) potential network upgrades on the EKPC and LG&E/KU systems that could be needed. These upgrades are:

- Construct a new Cooper-Alcalde 161 kV line (~5 miles) using 954 MCM ACSS conductor.
- Rebuild the existing Cooper-Elihu 161 kV line (4.2 miles) using bundled 954 MCM ACSR conductor.
- Upgrade the Cooper 161-69 kV transformer with a 200 MVA unit (and purchase a spare 161-69 kV, 200 MVA unit).
- Replace all 161 and 69 kV circuit breakers (15 circuit breakers) at Cooper Station with 63 kA breakers.
- Increase the maximum conductor operating temperature of the Casey County-Marion County 161 kV line (17.8 miles) to 212 degrees F.
- Increase the maximum conductor operating temperature of the Laurel Dam-Laurel County 161 kV line (13.5 miles) to 212 degrees F.
- Rebuild the South Lancaster-Garrard County 69 kV line (1.8 miles) using 556 MCM ACSR conductor.
- LG&E/KU constructs a 345 kV bus at the Alcalde substation and installs a second 345-161 kV transformer.

- LG&E/KU expands the Alcalde 161 kV substation to add a line exit for the new Cooper CCGT-Alcalde 161 kV line.
- LG&E/KU increases the maximum conductor operating temperature of the Alcalde-Farley 161 kV line (27.2 miles).
- LG&E/KU increases the maximum conductor operating temperature of the Farley-Artemus Tap 161 kV line (12.8 miles).
- LG&E/KU rebuilds the Lebanon-Springfield 69 kV line (7.2 miles).
- LG&E/KU rebuilds the Alcalde-Elihu 161 kV line (3.0 miles).

For the other boundary case, EKPC identified ten (10) potential network upgrades that could be needed. These upgrades are:

- Replace all 161 and 69 kV circuit breakers (15 circuit breakers) at Cooper Station with 63 kA breakers.
- Rebuild the Liberty KU-Peytons Store 69 kV line (10.7 miles) using 795 MCM ACSR conductor.
- Upgrade the Liberty Junction 161-69 kV transformer with a 150 MVA unit.
- Upgrade the limiting terminal current transformer (CT) associated with the Laurel County 161-69 kV transformer.
- Upgrade the limiting terminal equipment (bus and jumper conductors) at the Whitley City substation associated with the McCreary County-Whitley City 69 kV line section.
- LG&E/KU expands the 345 kV bus at the Alcalde substation.
- LG&E/KU installs a third Alcalde 345-161 kV transformer.

- LG&E/KU increases the maximum conductor operating temperature of the Alcalde-Farley 161 kV line (27.2 miles).
- LG&E/KU increases the maximum conductor operating temperature of the Artemus Tap-Pineville 161 kV line (7.53 miles).
- LG&E/KU upgrades limiting terminal equipment associated with the Alcalde-Pineville 345 kV line.

Therefore, these study results demonstrate that minimal additional impacts are expected if the generator facilities currently in the PJM generation-interconnection queue become operational. In fact, the required upgrades for the Cooper CCGT Facility could be reduced due to the transmission infrastructure that would be needed to accommodate the preceding queue projects.

Q. ARE THE NETWORK UPGRADES THAT YOU HAVE LISTED CERTAIN TO BE REQUIRED TO INTEGRATE THE COOPER CCGT FACILITY INTO THE TRANSMISSION SYSTEM?

A. Not necessarily. Since the EKPC transmission system is fully integrated into PJM, any generating facility seeking to interconnect with the EKPC system must follow the Federal Energy Regulatory Commission ("FERC") approved generator interconnection process as described in PJM's Open Access Transmission Tariff. PJM is responsible for administering that process, including approving applications for interconnection, developing study models, performing power-flow, short-circuit, and stability studies, and issuing generator interconnection agreements. Therefore, the specific list of network upgrades that will be required due to the connection of the Cooper CCGT facility to the EKPC transmission system will ultimately be determined via the PJM studies that will be conducted for this facility.

Q. HAS EKPC SUBMITTED AN APPLICATION TO PJM IN ORDER FOR THE FACILITY TO ENTER PJM'S GENERATION-INTERCONNECTION STUDY PROCESS?

A. Yes, the application for this facility to enter the PJM generator-interconnection queue was submitted on January 24, 2024.

Q. WHEN DOES EKPC EXPECT TO RECEIVE A FINAL DETERMINATION FROM PJM REGARDING THE RESULTS OF THE REQUIRED STUDIES FOR THE COOPER CCGT FACILITY?

A. PJM's current projected timeline to complete studies for any new requests entering its generation queue for Cycle #1 is the fourth quarter of 2027. PJM is currently accepting applications for Cycle #1 and expects to keep the application window open into the first quarter of 2026. Once the application window closes, PJM will begin its review process of all applications received, which encompasses a three-month period. After this review period, PJM will begin the studies for all approved applications for the cycle. PJM's defined study timeline for its generation-cluster cycles is approximately 18 months. The cycle process is divided into three phases with decision points to proceed forward for a generation-project developer at the end of each phase. At the end of Phase 1 of a cycle, project developers are provided with information regarding network upgrades that are required based on results of PJM's studies for the generation cluster. Phase 1 of PJM's Cycle #1 is anticipated to finish in the third quarter of 2026. Therefore, EKPC will receive an expected list of network upgrades (along with cost estimates and estimated implementation timeline) for the Cooper CCGT facility in this timeframe. The list of network upgrades and associated cost estimates and timelines will be further refined in the subsequent two phases of PJM's cycle process, which is estimated to finish for Cycle #1 in late 2027. At that point, EKPC would have certainty regarding the network upgrades that will be required for the Cooper CCGT facility.

Q. IS EKPC REQUESTING A CPCN FOR APPROVAL OF ANY OF THE TRANSMISSION PROJECTS ASSOCIATED WITH THE COMBINED CYCLE FACILITY AT COOPER STATION AT THIS TIME?

A. No. None of the transmission projects that EKPC anticipates will be needed (i.e., the physical interconnection facilities comprised of the new Cooper CCGT 161 kV substation and the associated 161 kV line re-routes into this substation on the Cooper Station property) will require new transmission line construction of more than one mile. Furthermore, these facilities will be solely contained on property that EKPC owns. Additionally, the expected scope of transmission work and resulting expenditures are consistent with normal course of business for EKPC. EKPC undertakes projects of this nature and cost on a regular basis.

EKPC's internal studies have indicated the possibility of a need for a new 161 kV line -- a new Cooper-Alcalde 161 kV line – that would be more than one mile in length. However, that need has not been confirmed by the PJM study process. If PJM studies confirm the need for this new line – or any other new lines of voltage at 100 kV and above and for length of more than one mile – EKPC will request a CPCN for such line(s) upon receiving such confirmation.

III. Cooper Co-Fire

Q. PLEASE DESCRIBE THE TRANSMISSION PROJECTS ASSOCIATED WITH THE COOPER CO-FIRE PROJECT.

A. No transmission projects are anticipated to be needed to support the Cooper Co-Fire Project. The maximum facility output will remain at or below the existing output for Cooper Unit 2, so no additional impacts will be created on the area's transmission system.

Q. WILL EKPC NEED TO SUBMIT AN APPLICATION TO PJM IN ORDER FOR THE FACILITY MODIFICATION TO ENTER PJM'S GENERATION-INTERCONNECTION STUDY PROCESS?

A. No, provided that the maximum facility output is not increasing above the current value, EKPC is not required to submit a request for this generating-unit modification to PJM for study under its generation-interconnection process.

IV. Spurlock Co-Fire

Q. PLEASE DESCRIBE THE TRANSMISSION PROJECTS ASSOCIATED WITH THE SPURLOCK CO-FIRE PROJECT.

A. No transmission projects are anticipated to be needed to support the Spurlock Co-Fire Projects. The maximum facility output will remain at or below the existing output for the Spurlock Units, so no additional impacts will be created on the area's transmission system.

Q. WILL EKPC NEED TO SUBMIT AN APPLICATION TO PJM IN ORDER FOR THE SPURLOCK GENERATING-FACILITY MODIFICATIONS TO ENTER PJM'S GENERATION-INTERCONNECTION STUDY PROCESS?

A. No, provided that the maximum facility output is not increasing above the current value, EKPC is not required to submit a request for this generating-unit modification to PJM for study under its generation-interconnection process.

V. Summary and Conclusion

Q. ARE THE TRANSMISSION PROJECTS INCLUDED IN YOUR TESTIMONY NECESSARY TO SUPPORT THE GENERATION ASSETS PROPOSED IN THIS PROCEEDING?

A. Yes. When PJM completes its study process for the Cooper CCGT facility, EKPC will have certainty regarding all of the projects that are required to integrate that facility into the transmission system. However, EKPC already is certain that the set of projects for physical interconnection of the new facility to the transmission system (the new 161 kV substation and re-routes of the Cooper-Laurel Dam and Cooper-Denny 161 kV lines into that substation) will be needed. Furthermore, EKPC has a high degree of confidence that at least some of the transmission network-upgrade projects that I discussed earlier will be needed. As PJM continues to study the generation projects currently in its queue, more clarity will be provided regarding which projects will move to construction and which network upgrades are necessary to support those projects. This will provide a clearer picture regarding which of the network upgrades identified in EKPC's internal studies may be necessary to accommodate the Cooper CCGT generation addition. EKPC will continue to monitor the results of the PJM generator-interconnection studies to verify the network upgrades that are needed in addition to the physical-interconnection projects EKPC has identified.

Q. WHAT BENEFITS MAY BE DERIVED FROM THE TRANSMISSION PROJECTS DISCUSSED FOR ALL OF THE PROPOSED GENERATION UNITS?

A. Both the Cooper CCGT and the Cooper Unit 2 Co-Fire Project will provide substantial benefits for the transmission system in the area. The existing generating units at Cooper Station are vital to supporting the area during high-load periods. When the generating units are not available at Cooper Station during these periods, a heightened risk of needed load shedding is prevalent due to the lack of local generation that can support the load in the area. This has been a known problem for several years -- the issue was identified in Case No. 2007-00168[1], which involved EKPC's Application for a CPCN for the construction of modifications to the water intake system at Cooper Station. Current information regarding these reliability concerns was provided to the Commission in EKPC's last Integrated Resource Plan proceeding.[2] Therefore, maintaining multiple generating units at Cooper Station via the addition of the new combined-cycle facility and the co-firing of Unit 2 will ensure that local generation is available to support the transmission system in the area during these high-load periods. The transmission projects identified to connect the Cooper CCGT facility to the existing transmission system are therefore vital to integrating these units so that they are available to provide that necessary support to the electric grid.

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[1] *In the Matter of: Application of East Kentucky Power Cooperative, Inc., for a Certificate of Public Convenience and Necessity for the Construction of Modifications to the Water Intake System at Cooper Power Station in Pulaski County, Kentucky*, Case No. 2007-00168, Application (Ky. P.S.C. Apr. 27, 2007).

[2] *In the Matter of: Electronic 2022 Integrated Resource Plan of East Kentucky Power Cooperative, Inc.,* Case No. 2022-00098, (Ky. P.S.C. Apr. 1, 2022).

Similarly, the Spurlock Co-Fire Project will ensure that generation remains available in the northern portion of EKPC's transmission system to support service to load in that area and delivery of energy into the central portion of the EKPC system, as needed.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

ATTACHMENT DA-1
EKPC COOPER CCGT ADDITION
TRANSMISSION IMPACT STUDY REPORT

EKPC COOPER COMBINED CYCLE GAS TURBINE GENERATION ADDITION TRANSMISSION ANALYSIS REPORT

Prepared by EKPC Transmission Planning
October 2024

Contents

CERTIFICATION

I certify, as a Professional Engineer licensed in the state of Kentucky, that this report was produced under my direct supervision. The engineering analyses documented in this report were also conducted under my direct supervision.

By: ______________________

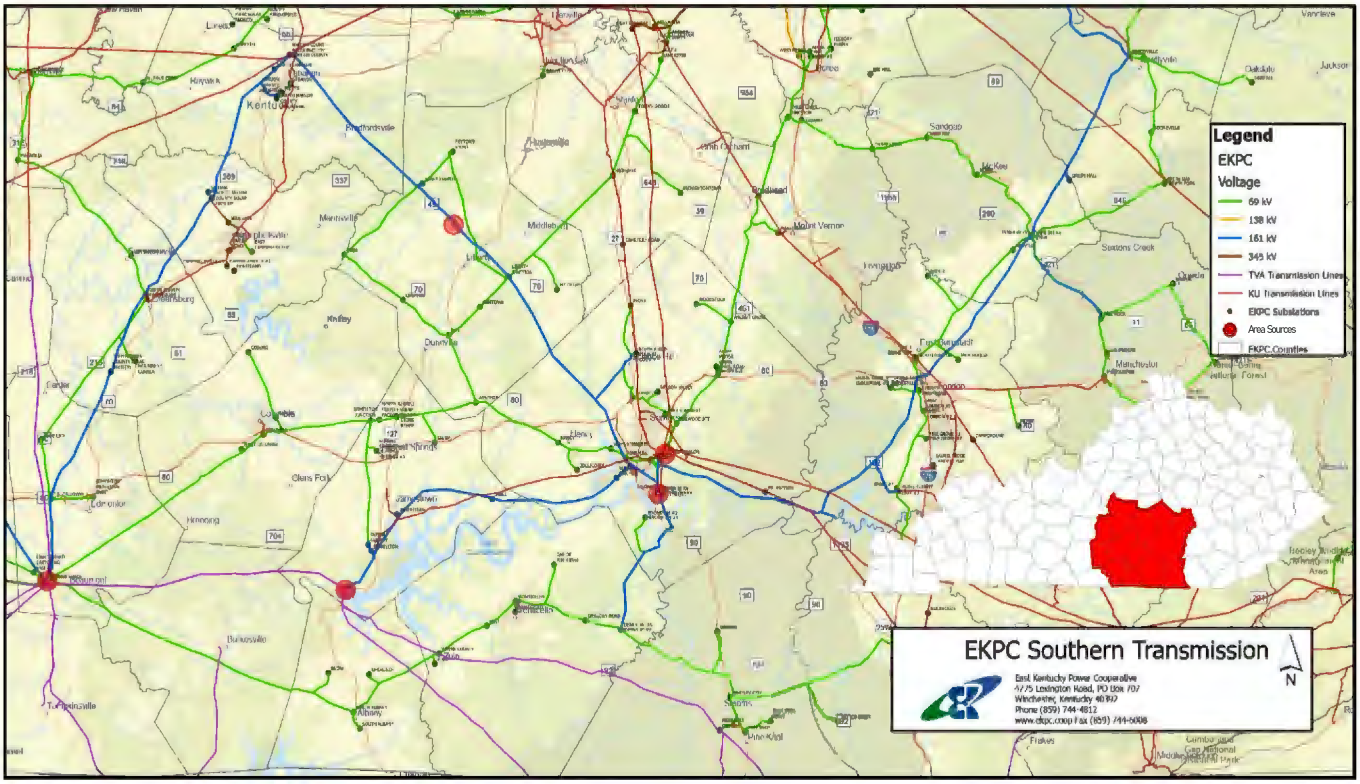
Darrin Adams, P.E. (KY License #23964)

Date: 10/11/2024

1.0 Introduction

The East Kentucky Power Cooperative's (EKPC) transmission system in the southern portion of Kentucky, extending eastward from Summer Shade, KY in Metcalfe County to Tyner, KY in Jackson County was evaluated by the EKPC Transmission Planning Team to determine future transmission system needs as a result of EKPC's future generation portfolio plans at Cooper Station. A current system map of the area is shown in Figure 1.1.

Figure 1.1: EKPC Southern Portion Area Map



The southern portion of the EKPC transmission system relies on four existing main sources to serve the electric demands of the member-owner cooperatives in the area. These sources consist of:

- Cooper Station, a coal-fired generation facility in Pulaski County;
- Free-flowing 161 kilo-volt ("kV") interconnections with Tennessee Valley Authority ("TVA") in Metcalfe County between TVA's Summer Shade substation and EKPC's Summer Shade substation;
- Wolf Creek Dam, a United States Army Corps of Engineers hydroelectric generation facility in Russell County;
- The free-flowing 161 kV interconnection with Louisville Gas & Electric/Kentucky Utilities ("LG&E/KU") in Pulaski County (Alcalde – Elihu – Cooper 161 kV).

Liberty RICE, a reciprocating internal combustion engine generating facility in Casey County that is planned to be operational by 2029 will provide a fifth source for the area[1]. These sources are shown

[1] Liberty RICE: EKPC's plans as stated in the current proceeding before the Kentucky Public Service Commission (Case No. 2024-00310)

by the shaded circles on Figure 1.1. The EKPC loads in the area are dependent on these sources to supply real and reactive power. If one or more of the sources are not available due to an unplanned outage or planned maintenance, the area may experience both thermal-loading and low-voltage issues.

2.0 Area Transmission/Generation Plan

The basis of the analyses described herein considers the following:

- Potential moth-balling of the coal-fired Cooper Unit 1 at Cooper Station,
- Installation of a two-on-one combined cycle gas-turbine power generation plant at Cooper Station ("Cooper CCGT"),
- 100% re-firing Cooper Unit 2 with natural gas ("Cooper Unit 2"), resulting in no change in net output of the unit (220 MW output).

The Cooper CCGT installation was assumed to provide 745/800 MW (summer/winter) of net generation to be injected into the EKPC transmission system. The Cooper CCGT installation is to be connected via the existing transmission infrastructure located at EKPC's Cooper Station. The site and preliminary interconnection details for the Cooper CCGT can be found below in Figures 2.1 and 2.2.

EKPC plans to interconnect the new Cooper CCGT facility to the existing transmission system by:

- Constructing a new 161 kV substation in a breaker-and-a-half configuration ("Cooper CCGT Substation")
- Constructing transmission line extensions from the existing nearby Cooper-Laurel Dam and Cooper-Denny 161 kV lines (estimated length of the extensions is less than 1 mile) in order to connect those lines in/out of the new Cooper CCGT Substation.

The transmission projects and estimated cost associated with the Cooper CCGT physical-interconnection requirements can be found in Table 2.1.

Figure 2.1 Cooper CCGT Plant Location

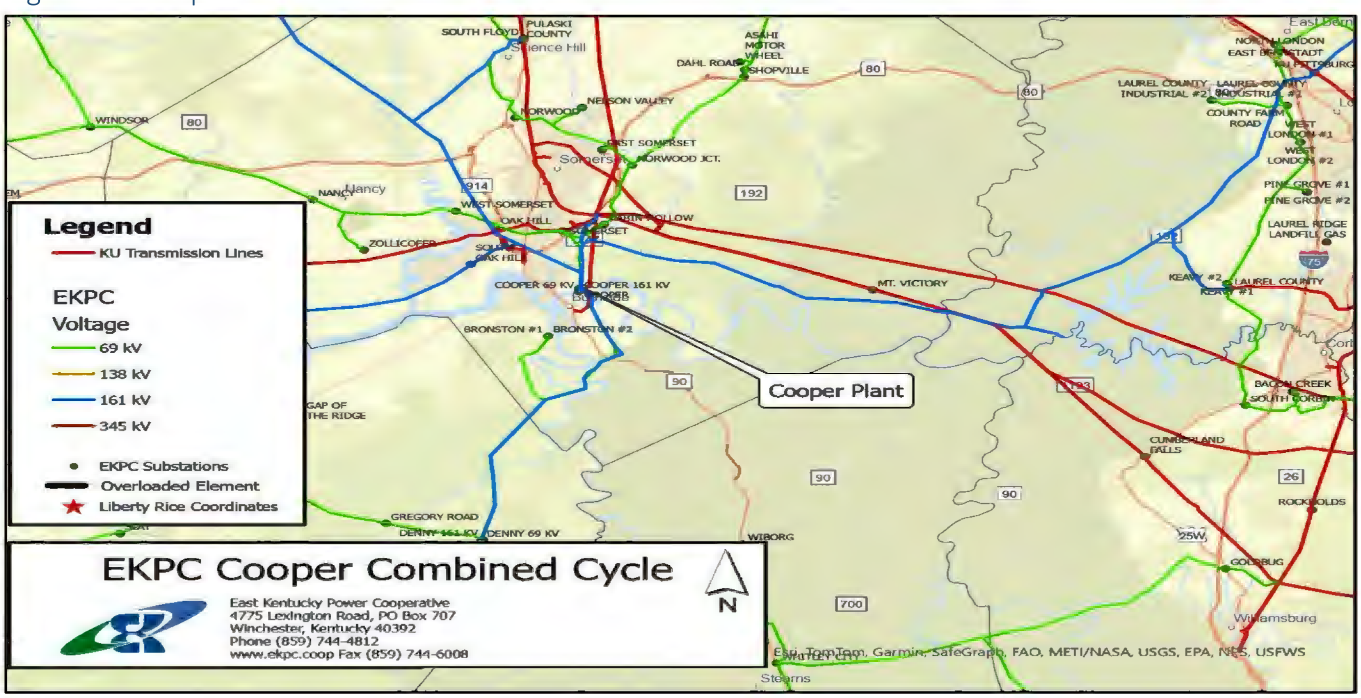


Figure 2.2 Cooper CCGT Plant Interconnection Details

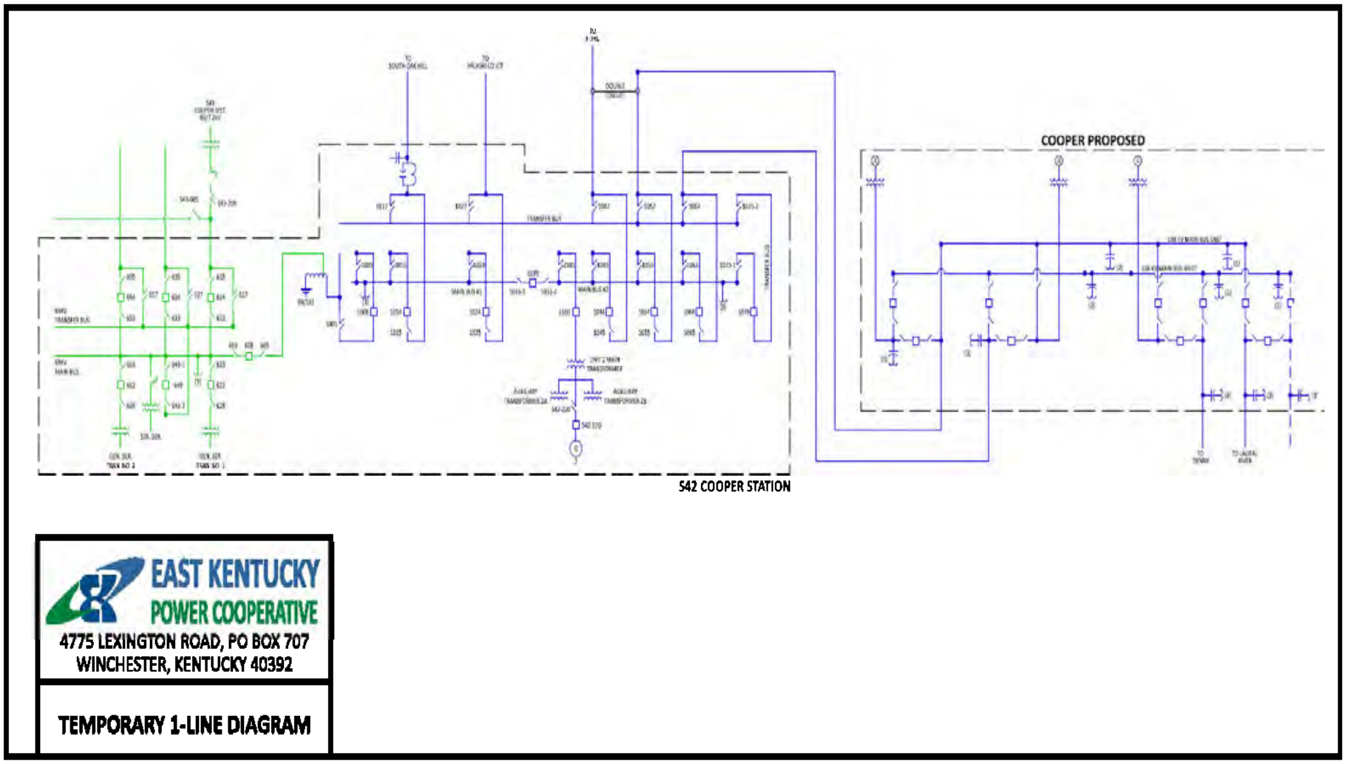


Table 2.1 Cooper CCGT Physical Interconnection Projects and Estimated Cost

Transmission Project Description	Estimated Cost ($2024)
Construct a new 161 kV substation for termination of the combined-cycle units (3 GSUs) and re-terminate existing Cooper-Laurel Dam and Cooper-Denny 161 kV lines into the new substation.	$25,000,000
TOTAL	**$25,000,000**

3.0 Study Methodology, Criteria and Assumptions

The power-flow analyses were performed in an effort to capture a low-end and high-end cost associated with transmission reinforcements necessary to facilitate the increased power flows in the area due to the installation of the Cooper CCGT facility at Cooper Station. A cost estimate reflecting one end of the range can be established using system models reflective of firm confidence loads, transmission projects, and system sources. A second cost estimate reflecting another end of the range can be established using system models reflective of assumptions maximizing surrounding system sources. Utilizing the PJM generation-interconnection queue ("PJM Queue"), which contains approximately 120 generation projects (with a combined solar generation capacity of over 10.6 gigawatt ("GW") proposing to connect facilities to EKPC's transmission system, system models can be updated to reflect a scenario where all of these queue projects are executed to their proposed scope.

These power-flow analyses include EKPC's plans as stated in the current proceeding before the Kentucky Public Service Commission (Case No. 2024-00310) for a new reciprocating internal combustion engine generating facility in Casey County, KY (Liberty RICE), which proposes to inject approximately 216 MW of net generation into the EKPC transmission system.

3.1 Analysis Approach

Power-flow analysis (using Siemens PSS/E version 35.6 and PowerGEM TARA version 2302.2 software packages) was performed to identify any additional future planning-criteria violations and associated mitigation projects in the southern portion of the EKPC transmission system after installation of EKPC's planned Cooper CCGT facility. These studies evaluated system performance under normal (N-0), single-contingency (N-1) and double-contingency (N-1-1) conditions applicable to the EKPC FERC Form 715 criteria and PJM's planning criteria.

The targeted scope of this analysis was to capture thermal-overload conditions related to the added Cooper CCGT generation on the transmission system. Thermal loading was monitored within the study area and compared with applicable planning criteria. Neighboring utility systems in the area were monitored to assess impacts on existing transmission tie lines and adjacent transmission lines, and impacts on the area due to possible new interconnections that might be required as mitigation projects.

3.2 Study Cases

The power flow models used were:

- 2032 Summer ("S")
- 2032/2033 Winter ("W")

The power-flow models listed above include all planned transmission projects, future known load additions, and PJM Queue projects with signed Interconnection Service Agreements ("ISA").[1] These models were then updated to reflect the transmission and generation plans for Cooper CCGT described in Section 2.0 (shown below as **Base**[2]). Where applicable, additional generation dispatch simulations were applied to be included in the EKPC FERC Form 715 evaluation (shown below as **Generation Dispatch**).

In order to identify transmission reinforcements that could be required if all approximately 120 potential projects in the PJM Queue are executed, these projects were modeled at 59 different transmission interconnection points with a combined solar/battery-storage generation output of over 10.6 GW (shown below as **Solar Queue Base**[3]). The full list of transmission reinforcement projects identified is located in Appendix D.1. Analysis for the PJM Queue projects was only performed on the summer power flow models, since the modeled capacity for each queue project is maximized in the summer models and at zero in the winter models. The full list of queue projects with location and maximum facility output is located in Appendix B. Lastly, to determine future system reinforcements necessary due to the addition of EKPC's planned Cooper CCGT, the 745 MW of generation was added to the model at Cooper Station as described in Section 2.0 (shown below as **Solar Queue plus Cooper CCGT**).

The descriptions of the various models developed and details of changes from the base model can be seen below in Table 3.2.

[1] Associated PJM Queue projects included in the 2032 S and 2032/33 W models can be found in Appendix A.
[2] This includes the Liberty RICE interconnection and reinforcement projects identified in PSC Case No. 2024-00310.
[3] This includes the Liberty RICE interconnection and identified reinforcement projects for full PJM Queue deployment identified in PSC Case No. 2024-00310

Table 3.2 Power Flow Models

Model	Generation	Evaluated Condition	Model Season	Loads
Base	- Cooper CCGT installation	N-0 N-1 N-1-1	2032S 2032/33W	50% probability load forecast
Generation Dispatch	- Base - LG&E/KU Brown 3 generation Offline[1]	N-0 N-1		
Solar Queue Base	- 10.6GW of generation[2]	N-0 N-1 N-1-1	2032S	
Solar Queue plus Cooper CCGT	- Solar Queue Base - System reinforcements necessary for Solar Queue Base Models[3] - Cooper CCGT 745 MW installation	N-0 N-1 N-1-1		

3.3 Monitored Area

The monitored area was comprised of EKPC, LG&E/KU and TVA transmission equipment encompassed in the area shown in Figure 1.1. All branch thermal loadings were identified per the study criteria in Tables 3.6.1 and 3.6.2 below.

3.4 Contingency Analysis

EKPC FERC Form 715

Power-flow analysis was performed during single-contingency events (N-1 conditions). The N-1 analysis included the outage of a generator in combination with a single transmission line section, circuit or transformer within the EKPC, TVA and LG&E/KU transmission systems. This included any pre-established restoration switching procedures to restore substation load. Additionally, contingencies defined in neighboring utilities' (TVA, LG&E/KU) contingency sets were included.

PJM Planning Criteria

Power-flow analysis was performed during single and double contingency events (N-1/N-1-1 conditions). The N-1/N-1-1 analyses included any category P0 – P7 condition as defined in the NERC TPL-001-5 Transmission System Planning Performing Requirements provided in Appendix C of this report. The NERC TPL-001-5 contingencies include defined P0-P7 contingencies for EKPC as well as any neighboring transmission system for both members and non-members of PJM. The intent of this analysis is to identify potential transmission upgrades that could be required as a proxy until the PJM analysis that is required for all of these queue projects has been completed, at which time the "official" set of required transmission upgrades will be defined. PJM will perform N-1 and N-1-1 contingency analysis as applicable to PJM planning criteria.

EKPC performed contingency analysis to adhere to its own criteria, and to replicate results that PJM is likely to see, in order to identify the transmission-reinforcement projects that could potentially be required, depending on the level of queue projects that move forward to commercial operation.

[1] Replacement generation net imported from the Southern Company
[2] Excess generation exported into the PJM Market
[3] Reinforcements necessary for full deployment of the PJM Queue details can be found in Appendix D.

3.5 Power-Flow Solutions

Load flow solution parameters were consistent across the software platforms used (PSS/E & TARA) and are summarized in Table 3.5.

Table 3.5: Power-Flow Solution Parameters

Contingency	Solution Methodology	Taps	Shunts	Area Interchange Control	DC Taps	Phase Shifters
N-0 N-1 N-1-1	FDNS[1]	Adjusting	Adjusting	Tie Lines and Loads	Adjusting	Locked

3.6 Study Criteria

The study criteria encompassed both EKPC's FERC Form 715 and PJM's planning criteria. Power-flow analyses were performed and evaluated against each of the criteria as applicable. Each set of criteria is summarized in Tables 3.6.1 and 3.6.2.

Table 3.6.1: EKPC FERC Form 715 Criteria

Criteria	Condition	Thermal	
		Normal	Emergency
		Rate A	Rate B
EKPC FERC Form 715	N-0	X	
	N-1		X

Table 3.6.2: PJM Planning Criteria

Criteria	Condition	Thermal	
		Normal	Emergency
		Rate A	Rate B
PJM Planning	N-0	X	
	N-1		X
	N-1-1	X[2]	X

4.0 Power Flow Analysis and Cost

Power-flow analysis was first performed and evaluated with the base and generation dispatch models to determine the transmission system needs due to the planned generation installed at the Cooper CCGT facility. These results and associated conceptual costs can be found below in Section 4.1.

Secondly, to establish the transmission reinforcements that may be necessary to accommodate all approximately 120 potential projects in the PJM Queue, 59 different transmission interconnection points with a combined solar generation capacity of over 10.6 GW were added to the model. [3] These results and associated projects can be found in Appendix D of this report.

[1] FDNS: Fixed Slope Decoupled Newton-Raphson
[2] Rate A is applied after the first contingency, Rate B is applied after the second contingency.
[3] The full list of projects with location and maximum facility output is located in Appendix A.

In the final analysis, the identified reinforcements needed to accommodate the queue projects were modeled in order to identify the incremental necessary reinforcements associated with the Cooper CCGT installation for the worst-case generation-queue project development scenario – i.e., what transmission projects will be required for the Cooper CCGT facility if all approximately 120 projects currently in the PJM Queue in the EKPC system move to commercial operation. These results and associated conceptual costs can be found in Section 4.2.

4.1 Power Flow Analysis Results and Conceptual Costs related to Cooper CCGT Generation

The thermal overloads related to the Cooper CCGT installation under the assumptions described in Section 3, and with only the PJM queue projects with a signed ISA, can be seen on Figure 4.1. Projects identified to relieve identified overloads and the associated conceptual cost estimates can be found in Table 4.1.

Figure 4.1 Thermal Overloads

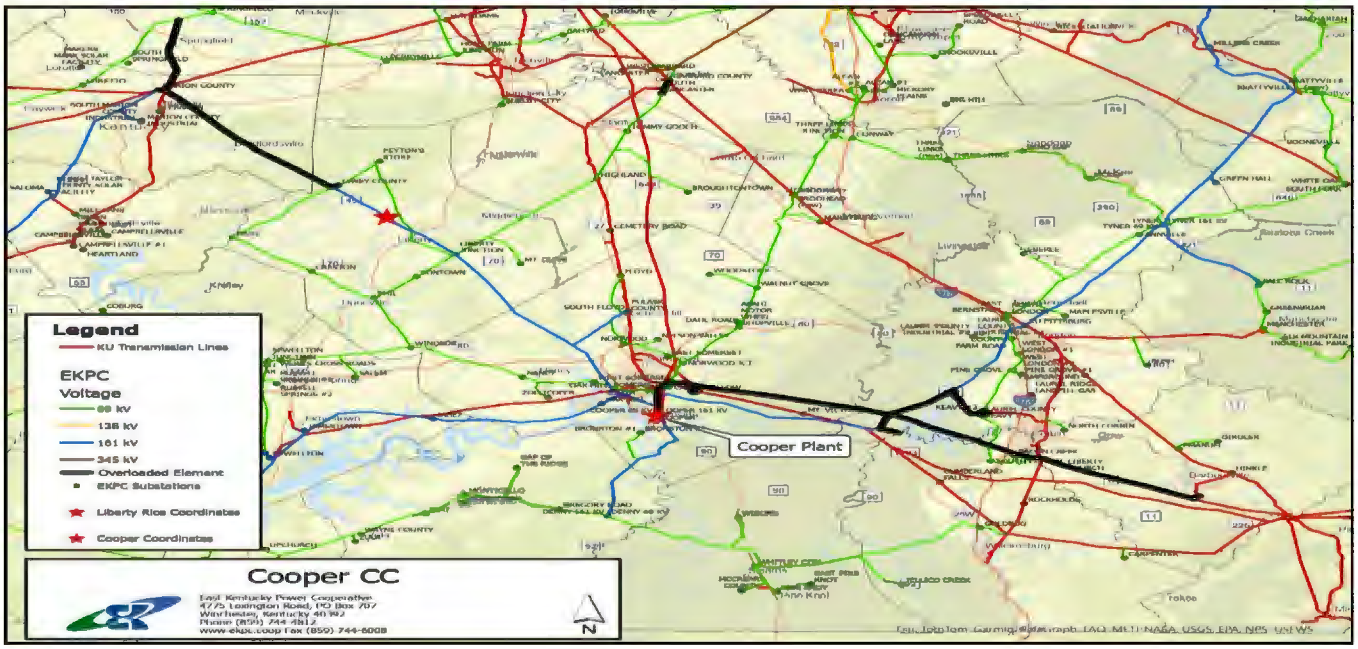


Table 4.1 Identified Transmission Network Upgrades and Estimated Costs

Overloaded Element	Project	Line Length /Units	Estimated Cost
Multiple 161kV lines in the vicinity of Cooper Station	Construct a new Cooper Alcalde 161 kV line using 954 ACSS conductor	5	$9,150,000
	KU expands the Alcalde 161 kV substation for the new 161 kV line exit to Cooper	1	$2,000,000
Cooper 161 & 69 kV Circuit Breakers	Replace all 161 kV and 69 kV circuit breakers at Cooper with 63 kA breakers.	17	$3,000,000
Cooper-Elihu 161 kV	Rebuild the line using bundled 954 ACSR conductor to replace the existing 795 ACSR conductor.	4.2	$10,325,000
Laurel Dam-Laurel County 161 kV	Increase the maximum conductor operating temperature of the line conductor to 212 degrees F.	13.5	$3,850,000

Cooper 161/69 kV transformer	Upgrade the transformer with a 200 MVA unit, and purchase a spare 200 MVA transformer.	1	$6,700,000
Marion County 161/138 kV	Upgrade the transformer with a 300 MVA unit and purchase a spare 300 MVA transformer.	1	$8,825,000
Casey County-Marion County 161 kV	Increase the maximum conductor operating temperature of the line conductor to 212 degrees F.	17.8	$5,075,000
South Lancaster-Garrard County 69 kV	Rebuild the line using 556 ACSR conductor to replace the existing 266 ACSR conductor.	1.8	$1,815,000
LG&E/KU's Alcalde-Farley 161 kV	LG&E/KU increases the maximum conductor operating temperature of the line conductor.	27.19	$11,690,000
LG&E/KU's Farley-Artemus Tap 161 kV	LG&E/KU increases the maximum conductor operating temperature of the line conductor.	12.77	$5,490,000
LG&E/KU's Lebanon-Springfield 69 kV	LG&E/KU rebuilds the line.	7.2	$9,775,000
LG&E/KU's Alcalde-Elihu 161 kV	LG&E/KU rebuilds the line.	2.95	$5,900,000
LG&E/KU's Alcalde 345/161 kV	LG&E/KU constructs a 345 kV bus at the Alcalde substation and installs a 2nd 345/161 kV transformer.	1	$18,000,000
		Total	**$101,595,000**

4.2 Power Flow Analysis Results and Conceptual Costs related to Cooper CCGT Generation with Full PJM Queue Development

The thermal overloads related to the Cooper CCGT installation under the assumptions described in Section 3, with full PJM queue development and associated expected transmission reinforcements can be found below in Figure 4.2. Projects identified to relieve identified overloads attributable to the Cooper CCGT facility under this scenario and associated conceptual cost estimates can be found in Table 4.2.

Figure 4.2 Thermal Overloads

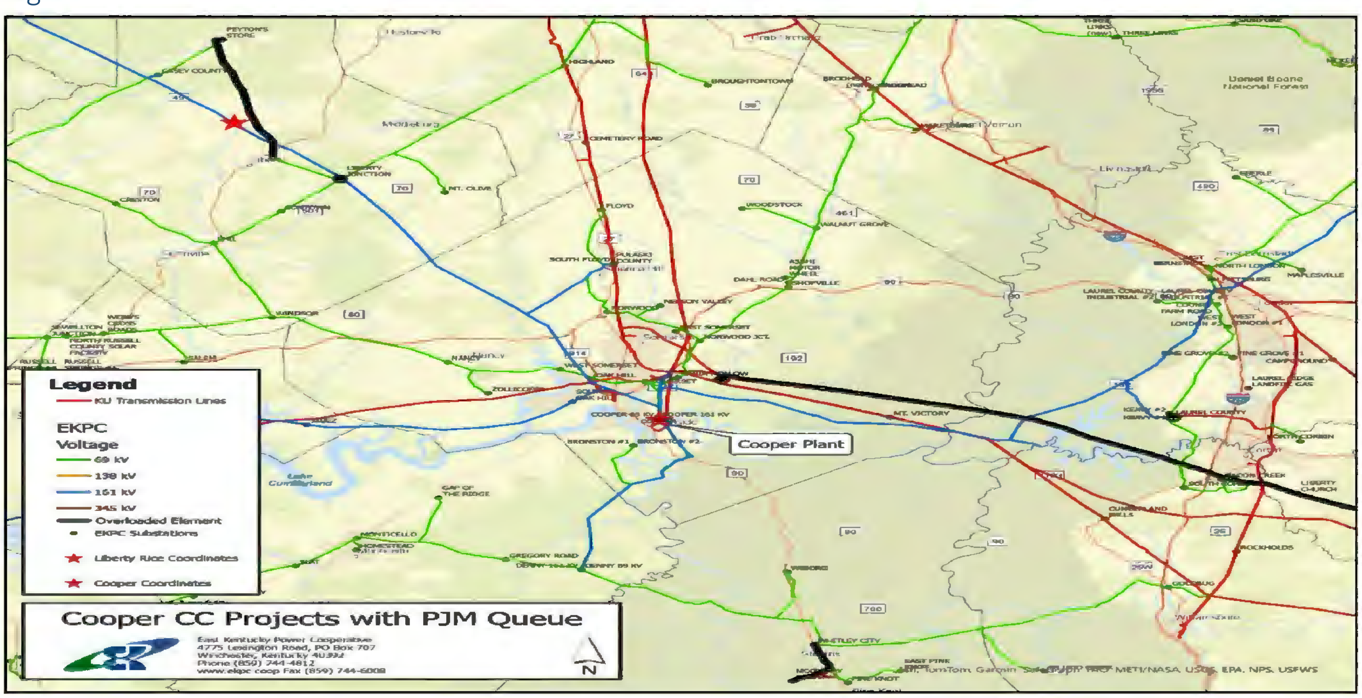


Table 4.2 Identified Transmission Projects and Estimated Cost

Overloaded Element	Project	Line Length/Units	Estimated Cost
Cooper 161 & 69 kV Circuit Breakers	Replace all 161 kV and 69 kV circuit breakers at Cooper with 63 kA breakers.	17	$3,000,000
Laurel County 161/69 kV transformer	Upgrade the limiting terminal equipment (CT)	1	$50,000
Liberty KU-Peytons Store 69 kV	Rebuild the line using 795 ACSR to replace the 556 ACSR conductor	10.7	$13,000,000
McCreary County-Whitley City 69 kV	Upgrade the limiting terminal equipment (bus & jumper) at Whitley City substation	1	$150,000
Liberty Junction 161/69 kV transformer	Upgrade the transformer with a 150 MVA unit.	1	$3,300,000
LG&E/KU Alcalde-Pineville 345 kV	LG&E/KU upgrades limiting terminal equipment (wave trap)	1	$500,000
LG&E/KU Alcalde-Farley 161 kV	LG&E/KU increases the maximum conductor operating temperature of the line conductor.	27.19	$11,690,000
LG&E/KU Artemus Tap-Pineville 161 kV	LG&E/KU builds a 345 kV bus at Alcalde and installs 345 kV circuit breakers	1	$7,000,000
LG&E/KU Artemus Tap-Pineville 161 kV	LG&E/KU increases the maximum conductor operating temperature of the line conductor.	7.53	$3,240,000
LG&E/KU Alcalde 345/161 kV transformer	LG&E/KU installs a third Alcalde 345/161 kV transformer	1	$12,500,000
		Total	**$54,430,000**

5.0 Conclusion

The transmission reinforcement projects detailed above were selected to adhere to EKPC's guiding principles of reliability, affordability, environmental stewardship, and safety. Line rebuilds were selected rather than construction of new transmission lines where applicable in order to make use of existing rights-of-way, and to minimize costs to integrate the Cooper CCGT generation into the transmission system. Due to the significant net increase of generation at Cooper Station due to the Cooper CCGT installation, one new line (Cooper-Alcalde 161 kV) has been identified in order to enable adequate transmission line outlet capacity under N-1 and N-1-1 system conditions.

The analysis discussed in this report allowed EKPC to establish a low-end to high-end cost range for transmission system reinforcements necessary to accommodate the installation of the Cooper CCGT. A low-end cost estimate totaling $79,430,000 reflective of the projects described in Sections 2.0 and 4.2 considered known, expected, and possible system alterations, and enables EKPC to establish a baseline for transmission capital expenditures related to the Cooper CCGT installation. A high-end cost estimate totaling $126,595,000 reflective of the projects described in Sections 2.0 and 4.1 considered known and expected system alterations and allows EKPC to estimate an upper bound for the transmission capital expenditures associated with the Cooper CCGT installation.

The analyses described above ensure consideration was taken around the realities of the PJM Queue, specifically the possibility of an additional large amount of generation being connected to and flowing through the EKPC transmission system. The assumed system reinforcements necessary to accommodate said generation were captured to consider the impact on reinforcements needed for the Cooper CCGT installation. The results of these studies show that the expected range of transmission reinforcements and associated costs is relatively narrow, indicating that 1) the expected transmission expenditures in order to accommodate the Cooper CCGT facility are relatively small compared to the overall project cost, and 2) the transmission requirements/expenditures are not expected to be impacted significantly by existing projects in the PJM Queue, and could in fact be reduced slightly due to the transmission reinforcements that would be necessary to accommodate the prior queue projects.

Appendix

A: PJM Queue Projects with Signed ISAs Included in Base Models

Project ID	Location	MFO
AE1-143	Marion Co 161kV	96
AE2-254	South Lancaster 69kV	50

B: Additional PJM Queue Projects Modeled for Full Queue Development Scenario

Project ID	Location	MFO	Project ID	Location	MFO
AI2-327	Eighty-Eight 69kV	55	AC1-074/AC2-075	Jacksonville 138kV	100
AH1-034	Eighty-Eight 69kV	100	AH1-081	Knob Lick 69kV	60
AF1-203	Eighty-Eight 69kV	20	AH1-082	Knob Lick 69kV	104
AE2-071	Eighty-Eight 69kV	35	AG2-598	Knob Lick 69kV	50
AF1-038	AF1-038 69kV	60	AI1-019	Laurel Dam 161kV	50
AH1-083	AF1-050 161kV	250	AG2-424	Lebanon KU 138kV	63.25
AG2-094	AF1-050 161kV	150	AG2-298	Loretto 69kV	60
AG1-354	AF1-050 161kV	150	AI2-349	Loretto 69kV	60
AF1-050	AF1-050 161kV	60	AG2-512	Loretto 69kV	17.5
AG1-353	AF1-083 161kV	98	AH1-409	Maretburg 69kV	58
AF1-083	AF1-083 161kV	55	AG1-488	Marion Co 161kV	70
AI2-371	Asahi 69kV	57	AF1-116	Marion Co 161kV	120
AG1-405	Asahi 69kV	57	AI2-066	Marion Co 161kV	96
AG1-406	Asahi 69kV	79	AE1-143	Marion Co 161kV	96
AH1-004	Avon 138kV	40	AH1-163	Millersburg 69kV	100
AE2-339	Avon 138kV	40	AH1-570	Millersburg 69kV	25
AE2-138	Avon 138kV	260	AH1-571	Millersburg 69kV	20
AE2-210	Avon 138kV	90	AH2-222	Millersburg 69kV	60
AH1-529	Avon 138kV	89	AH2-224	Millersburg 69kV	50
AG2-596	Avon 138kV	65	AH2-410	New Castle 69kV	20
AG1-070	Bon Ayr 69kV	45	AH2-411	New Castle 69kV	50
AG1-071	Bon Ayr 69kV	55	AG2-677	New Russell County Solar	150
AG2-552	Bullitt County 161kV	100	AG2-317	New Summer Shade Solar	155
AG2-553	Bullitt County 161kV	50	AE1-246	New Summer Shade Solar	85
AH1-156	Cane Ridge 69kV	40	AH2-021	New Summer Shade Solar	150
AF2-090	Central Hardin 138kV	110	AF2-111	North Clark 345kV	250
AF2-391	Central Hardin 69kV	120	AF2-348	North Clark 345kV	250
AF2-308	Central Hardin 69kV	28	AH2-263	North Lebanon	63.6
AF2-309	Central Hardin 69kV	70	AH1-532	North Lebanon	37.8
AI2-376	Central Hardin 69kV	70	AH1-463	Preston 69kV	80
AG2-662	Central Hardin 69kV	90	AG2-549	Rineyville 69kV	40
AF2-260	Central Hardin 69kV	85	AG2-676	Russell Co 161kV	150

AH2-130	Clark County 138 kV	85	AG2-153	Sideview 69 kV	75
AG2-179	Coburg 69 kV	60	AH1-429	Spurlock 138 kV	90
AG2-073	Crooksville 69 kV	100	AH1-430	Spurlock 138 kV	90
AI2-127	Cynthiana 69 kV	70	AF1-233	Spurlock 138 kV	225
AD2-048	Cynthiana 69 kV	70	AF1-256	Spurlock 138 kV	80
AI1-084	Fawkes 138 kV	150	AG2-666	Spurlock 138 kV	90
AG1-306	Fawkes 138 kV	65	AG1-341	Summer Shade 161kV	106
AE2-275	Fawkes 138 kV	90	AG2-684	Summer Shade 161kV	331
AI1-159	Fogg Pike 69kV	35	AI1-079	Summer Shade 69kV	64.8
AG2-081	Fogg Pike 69kV	30	AI1-165	Summersville 69kV	85
AI1-132	Fredricksburg 69 kV	83	AH2-002	Temple Hill 69kV	80
AG2-687	West Garrard 345 kV	215	AG1-067	Temple Hill 69kV	38
AG1-320	Glendale 69 kV	82	AE2-308	Three Forks 138kV	150
AH2-383	Goddard 138kV	70	AH1-427	Tommy Gooch 69 kV	100
AI2-123	Goddard 138kV	120	AH1-428	Tommy Gooch 69 kV	100
AI2-124	Goddard 138kV	200	AH1-330	Tyner 69kV	100
AE2-038	Goddard 138kV	200	AH1-410	Union City Tap 138kV	68
AE1-144	Goddard 138kV	100	AH1-382	Van Arsdell 69kV	20
AG2-670	Greensburg 69 kV	75	AI2-347	Van Arsdell 69kV	95
AI1-133	Hillsboro 69 kV	50	AG1-471	Wayne County 69kV	60
AG2-513	Hodgenville 69kV	20	AH1-239	Wayne County 69kV	80
AG2-671	Hope 69kV	19.9	AH1-240	Wayne County 161kV	200
AF2-306	Hope 69kV	26	AG1-526	West Garrard 345kV	222
AF2-307	Hope 69kV	66	AF2-355	West Garrard 345kV	225
AI2-374	Hope 69kV	66	AG2-159	Williamstown 69kV	61
AF2-365	Horse Cave Jct 69kV	50	AI1-180	Windsor 69kV	100
AI2-404	Horse Cave Jct 69kV	50	AH1-281	Woodlawn 69kV	20
AI2-302	Jacksonville 138kV	100			

C: NERC TPL-001-5 Transmission System Planning Performing Requirements

Category	Initial Condition	Event [1]	Fault Type [2]	BES Level [3]	Interruption of Firm Transmission Service Allowed [4]	Non-Consequential Load Loss Allowed
P0 No Contingency	Normal System	None	N/A	EHV, HV	No	No
P1 Single Contingency	Normal System	Loss of one of the following: 1. Generator 2. Transmission Circuit 3. Transformer[5] 4. Shunt Device[6]	3Ø	EHV, HV	No[9]	No[12]
		5. Single Pole of a DC line	SLG			
	Normal System	1. Opening of a line section w/o a fault [7]	N/A	EHV, HV	No[9]	No[12]
		2. Bus Section Fault	SLG	EHV	No[9]	No

P2 Single Contingency				HV	Yes	Yes
		3. Internal Breaker Fault[8] (non-Bus-tie Breaker)	SLG	EHV	No[9]	No
				HV	Yes	Yes
		4. Internal Breaker Fault (Bus-tie Breaker)[8]	SLG	EHV, HV	Yes	Yes
P3 Multiple Contingency	Loss of generator unit followed by System adjustments[9]	Loss of one of the following: 1. Generator 2. Transmission Circuit 3. Transformer[5] 4. Shunt Device[6]	3Ø	EHV, HV	No[9]	No[12]
		5. Single pole of a DC line	SLG			
P4 Multiple Contingency *(Fault plus stuck breaker[10])*	Normal System	Loss of multiple elements caused by a stuck breaker[10](non-Bus-tie Breaker) attempting to clear a Fault on one of the following: 1. Generator 2. Transmission Circuit 3. Transformer[5] 4. Shunt Device[6] 5. Bus Section	SLG	EHV	No[9]	No
				HV	Yes	Yes
		6. Loss of multiple elements caused by a stuck breaker[10] (Bus-tie Breaker) attempting to clear a Fault on the associated bus	SLG	EHV, HV	Yes	Yes
P5 Multiple Contingency *(Fault plus non-redundant component of a Protection System failure to operate)*	Normal System	Delayed Fault Clearing due to the failure of a non-redundant component of a Protection System[13] protecting the Faulted element to operate as designed, for one of the following: 1. Generator 2. Transmission Circuit 3. Transformer[5] 4. Shunt Device[6] 5. Bus Section	SLG	EHV	No[9]	No
				HV	Yes	Yes
P6 Multiple Contingency *(Two*	Loss of one of the following followed by System	Loss of one of the following: 1. Transmission Circuit 2. Transformer[5] 3. Shunt Device[6]	3Ø	EHV, HV	Yes	Yes

overlapping singles)	adjustments.[9] 1. Transmission Circuit 2. Transformer [5] 3. Shunt Device[6] 4. Single pole of a DC line	4. Single pole of a DC line	SLG	EHV, HV	Yes	Yes
P7 Multiple Contingency *(Common Structure)*	Normal System	The loss of: 1. Any two adjacent (vertically or horizontally) circuits on common structure [11] 2. Loss of a bipolar DC line	SLG	EHV, HV	Yes	Yes

Table 1 – Steady State & Stability Performance Extreme Events

Steady State & Stability

For all extreme events evaluated:

a. Simulate the removal of all elements that Protection Systems and automatic controls are expected to disconnect for each Contingency.

b. Simulate Normal Clearing unless otherwise specified.

Steady State	**Stability**
1. Loss of a single generator, Transmission Circuit, single pole of a DC Line, shunt device, or transformer forced out of service followed by another single generator, Transmission Circuit, single pole of a different DC Line, shunt device, or transformer forced out of service prior to System adjustments. 2. Local area events affecting the Transmission System such as: a. Loss of a tower line with three or more circuits.[11] b. Loss of all Transmission lines on a common Right-of-Way[11]. c. Loss of a switching station or substation (loss of one voltage level plus transformers). d. Loss of all generating units at a generating station. e. Loss of a large Load or major Load center. 3. Wide area events affecting the Transmission System based on System topology such as: a. Loss of two generating stations resulting from conditions such as: i. Loss of a large gas pipeline into a region or multiple regions that have significant gas-fired generation.	1. With an initial condition of a single generator, Transmission circuit, single pole of a DC line, shunt device, or transformer forced out of service, apply a 3Ø fault on another single generator, Transmission circuit, single pole of a different DC line, shunt device, or transformer prior to System adjustments. 2. Local or wide area events affecting the Transmission System such as: a. 3Ø fault on generator with stuck breaker[10] resulting in Delayed Fault Clearing. b. 3Ø fault on Transmission circuit with stuck breaker[10] resulting in Delayed Fault Clearing. c. 3Ø fault on transformer with stuck breaker[10] resulting in Delayed Fault Clearing. d. 3Ø fault on bus section with stuck breaker[10] resulting in Delayed Fault Clearing. e. 3Ø fault on generator with failure of a non-redundant component of a Protection System[13] resulting in Delayed Fault Clearing. f. 3Ø fault on Transmission circuit with failure of a non-redundant component of a Protection System[13] resulting in Delayed Fault Clearing.

ii. Loss of the use of a large body of water as the cooling source for generation. iii. Wildfires. iv. Severe weather, e.g., hurricanes, tornadoes, etc. v. A successful cyber-attack. vi. Shutdown of a nuclear power plant(s) and related facilities for a day or more for common causes such as problems with similarly designed plants. b. Other events based upon operating experience that may result in wide area disturbances.	g. 3Ø fault on transformer with failure of a non-redundant component of a Protection System[13] resulting in Delayed Fault Clearing. h. 3Ø fault on bus section with failure of a non-redundant component of a Protection System[13] resulting in Delayed Fault Clearing. i. 3Ø internal breaker fault. j. Other events based upon operating experience, such as consideration of initiating events that experience suggests may result in wide area disturbances

Table 1 – Steady State & Stability Performance Footnotes (Planning Events and Extreme Events)

1. If the event analyzed involves BES elements at multiple System voltage levels, the lowest System voltage level of the element(s) removed for the analyzed event determines the stated performance criteria regarding allowances for interruptions of Firm Transmission Service and Non- Consequential Load Loss.
2. Unless specified otherwise, simulate Normal Clearing of faults. Single line to ground (SLG) or three-phase (3Ø) are the fault types that must be evaluated in Stability simulations for the event described. A 3Ø or a double line to ground fault study indicating the criteria are being met is sufficient evidence that a SLG condition would also meet the criteria.
3. Bulk Electric System (BES) level references include extra-high voltage (EHV) Facilities defined as greater than 300kV and high voltage (HV) Facilities defined as the 300kV and lower voltage Systems. The designation of EHV and HV is used to distinguish between stated performance criteria allowances for interruption of Firm Transmission Service and Non-Consequential Load Loss.
4. Curtailment of Conditional Firm Transmission Service is allowed when the conditions and/or events being studied formed the basis for the Conditional Firm Transmission Service.
5. For non-generator step up transformer outage events, the reference voltage, as used in footnote 1, applies to the low-side winding (excluding tertiary windings). For generator and Generator Step Up transformer outage events, the reference voltage applies to the BES connected voltage (high-side of the Generator Step Up transformer). Requirements which are applicable to transformers also apply to variable frequency transformers and phase shifting transformers.
6. Requirements which are applicable to shunt devices also apply to FACTS devices that are connected to ground.
7. Opening one end of a line section without a fault on a normally networked Transmission circuit such that the line is possibly serving Load radial from a single source point.
8. An internal breaker fault means a breaker failing internally, thus creating a System fault which must be cleared by protection on both sides of the breaker.
9. An objective of the planning process should be to minimize the likelihood and magnitude of interruption of Firm Transmission Service following Contingency events. Curtailment of Firm Transmission Service is allowed both as a System adjustment (as identified in the column entitled 'Initial Condition') and a corrective action when achieved through the appropriate re-dispatch of resources obligated to re- dispatch, where it can be demonstrated that Facilities, internal and external to the Transmission Planner's planning region, remain within applicable Facility Ratings and the re-dispatch does not result in any Non-Consequential Load Loss. Where limited options for re-dispatch exist, sensitivities associated with the availability of those resources should be considered.

Table 1 – Steady State & Stability Performance Footnotes (Planning Events and Extreme Events)
10. A stuck breaker means that for a gang-operated breaker, all three phases of the breaker have remained closed. For an independent pole operated (IPO) or an independent pole tripping (IPT) breaker, only one pole is assumed to remain closed. A stuck breaker results in Delayed Fault Clearing. 11. Excludes circuits that share a common structure (Planning event P7, Extreme event steady state 2a) or common Right-of-Way (Extreme event, steady state 2b) for 1 mile or less. 12. An objective of the planning process is to minimize the likelihood and magnitude of Non-Consequential Load Loss following planning events. In limited circumstances, Non-Consequential Load Loss may be needed throughout the planning horizon to ensure that BES performance requirements are met. However, when Non-Consequential Load Loss is utilized under footnote 12 within the Near-Term Transmission Planning Horizon to address BES performance requirements, such interruption is limited to circumstances where the Non-Consequential Load Loss meets the conditions shown in Attachment 1. In no case can the planned Non-Consequential Load Loss under footnote 12 exceed 75 MW for US registered entities. The amount of planned Non-Consequential Load Loss for a non-US Registered Entity should be implemented in a manner that is consistent with, or under the direction of, the applicable governmental authority or its agency in the non-US jurisdiction. 13. For purposes of this standard, non-redundant components of a Protection System to consider are as follows: a. A single protective relay which responds to electrical quantities, without an alternative (which may or may not respond to electrical quantities) that provides comparable Normal Clearing times; b. A single communications system associated with protective functions, necessary for correct operation of a communication-aided protection scheme required for Normal Clearing (an exception is a single communications system that is both monitored and reported at a Control Center); c. A single station dc supply associated with protective functions required for Normal Clearing (an exception is a single station dc supply that is both monitored and reported at a Control Center for both low voltage and open circuit); d. A single control circuitry (including auxiliary relays and lockout relays) associated with protective functions, from the dc supply through and including the trip coil(s) of the circuit breakers or other interrupting devices, required for Normal Clearing (the trip coil may be excluded if it is both monitored and reported at a Control Center).

D: Power Flow Analysis Results related to Solar Queue Projects

The addition of a substantial amount of solar generation on EKPC's system caused many significant thermal overload issues. The projects below were selected to resolve issues in the southern area of EKPC's transmission system in order to establish a baseline for determination of incremental upgrades that would be attributable to the Cooper CCGT facility.

Table D.1 Thermal Overloads and Project Cost

Overloaded Element	Project	Quantity
Significant area overloads due to multiple solar generation sites in the area	Tap KU Brown North-Pineville 345kV line with a new station near Tommy Gooch	1
Significant area overloads due to multiple solar generation sites in the area	Install two step-up transformers at Tommy Gooch from 69/161kV	2

Significant area overloads due to multiple solar generation sites in the area	Install two step-up transformers at Tommy Gooch from 161/345kV	2
Significant area overloads due to multiple solar generation sites in the area	Tap KU Brown North-Pineville 345kV line with a new station near Pulaski County	1
Significant area overloads due to multiple solar generation sites in the area	Connect Pulaski to the new station via new bundled 954 ACSS 161kV line	3.10
Significant area overloads due to multiple solar generation sites in the area	Connect Asahi MW to the new station via new 954 ACSS 69kV line	6.50
Significant area overloads due to multiple solar generation sites in the area	Install a step-up transformer at the new station 161/345kV	1
Significant area overloads due to multiple solar generation sites in the area	Install a step-up transformer at the new station 69/161kV	1
Pineville 345/500kV transformer	Add a second Pineville 345/500kV transformer	1
Alcalde 161/345kV transformer	Add a second Alcalde 161/345kV transformer	1
EKPC Summer Shade-TVA Summer Shade Tie	Build a second tie using bundled 954 ACSS	1
TVA Summer Shade- TVA Summer Shade Tie	Build a second tie using bundled 954 ACSS	1
Cooper-KU Elihu-KU Alcalde	Rebuild and build a second and third Cooper-KU Alcalde line using bundled 954 ACSS	21.45
Marion County-Casey County-Liberty Junction-Pulaski County Junction-Pulaski County	Rebuild using bundled 954 ACSS	51.50
Significant overloads out of TVA Summer Shade	Rebuild using both single circuit and bundled 954 ACSS	108.54
McCreary-Wayne	Rebuild using 954 ACSS	30.10
TVA Kelsey-Huntsville & TVA Burkesville-Tompkinsville	Rebuild using 954 ACSS	53.60
Pulaski County Junction-Cooper	Rebuild using 954 ACSS	11.4
Cooper-South Oakhill-Jabez-Jamestown-Russell County Junction	Rebuild using 954 ACSS	33.10
The Cooper bus tie	Rebuild using 954 ACSS	0.01
Cooper-KU Elihu-KU Alcalde	Rebuild using 954 ACSS	7.15
Laurel Dam-Laurel County	Rebuild using 954 ACSS	13.50
Marion County 138kV tie to KU	Rebuild using bundled 954 ACSS	0.01
Significant area overloads due to multiple solar generation sites in the area	Install two more ties at Marion County 138kV tie to KU using bundled 954 ACSS	2
Significant area overloads due to multiple solar generation sites in the area	Add three more Marion County 138/161kV transformers	3
Marion County-North Lebanon-Marion Industrial Park-Saloma-Taylor County Junction-Green County	Rebuild using bundled 954 ACSS	27.90
Denny-Gregory Road-Gap of Ridge-Monticello-Slat	Rebuild using bundled 954 ACSS	14.80
Garrard County-South Lancaster-Tommy Gooch	Rebuild using bundled 954 ACSS	7.56
Nancy-Windsor-Salem	Rebuild using 954 ACSS	14.60
Nancy-Zollicoffer Tap-West Somerset-Oak Hill	Rebuild using 954 ACSS	7.50
Norwood Junction-Shopville-Dahl Road-Asahi Motor Wheel Tap	Rebuild using 954 ACSS	7.73
Somerset KU-Somerset-Oak Hill	Rebuild using 954 ACSS	2.10
KU Elihu-Somerset KU 69kV	Rebuild using 954 ACSS	1.58

Phil-Windsor	Rebuild using 795 ACSR	7.00
Liberty KU-Liberty Junction-Mt Olive Junction	Rebuild using 556 ACSR	6.90
Phil-Contown-Liberty Junction	Rebuild using 556 ACSR	8.10
Asahi-Walnut Grove	Rebuild using 556 ACSR	4.40
East Somerset-Norwood Junction	Rebuild using 556 ACSR	1.30
Somerset KU-KU Union Underwear	Rebuild using 556 ACSR	26.00
Bronston-Denny	Increase MOT to 212° F	8.00
Pulaski County-Pulaski County Junction	CT upgrade	1
KU Farley-KU Artemus Tap	Equipment upgrades to reach max conductor rating	1

EXHIBIT 7

DIRECT TESTIMONY OF JERRY PURVIS

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	**)**	
KENTUCKY POWER COOPERATIVE,	**)**	
INC. FOR 1) CERTIFICATES OF PUBLIC	**)**	
CONVENIENCE AND NECESSITY	**)**	**CASE NO.**
TO CONSTRUCT NEW GENERATION	**)**	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	**)**	
CERTIFICATE RELATING TO THE SAME;	**)**	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	**)**	
TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	

DIRECT TESTIMONY OF JERRY B. PURVIS
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	**CASE NO. 2024-00370**

<u>AFFIDAVIT</u>

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Jerry Purvis, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Jerry Purvis
____

Subscribed and sworn before me on this 18th day of November 2024.

[signature]
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

I. Introduction

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Jerry B. Purvis, and my business address is East Kentucky Power Cooperative, Inc. ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391. I am the Vice President of Environmental Affairs for EKPC.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I received a B.S. degree in Chemistry from Morehead State University and a B.S. degree in Chemical Engineering from the University of Kentucky. I also received a Master of Business Administration from Morehead State University. I have been employed by EKPC for 30 years serving the Cooperative in various positions. On May 28, 2017, I became the Vice President of Environmental Affairs at EKPC.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. As Vice President of Environmental Affairs, I am responsible for compliance with environmental laws, regulations, the preparation of applications for all environmental permits required for the construction and operation of generation stations, transmission facilities, landfills, the preparation of environmental impact statements, assessments, and other documentation necessary to demonstrate compliance with the Environmental Protection Agency and National Environmental Policy Act to achieve federally approved financing through the

Rural Utilities Service. I report directly to the Chief Operating Officer/Executive Vice President, Mr. Don Mosier.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to describe the environmental rules applicable to the new generation projects proposed in EKPC's Application in this proceeding. The applicable rules under the Clean Air Act ("CAA"), Clean Water Act ("CWA"), Resource Conservation and Recovery Act ("RCRA") and the U.S. Army Corp of Engineers. Each project undergoes site specific legal and environmental review to determine applicability under the regulations. EKPC's new generation projects will require modifications to existing operating permits under the Title V of the Clean Air Act 1990 amendments, Prevention of Significant Deterioration ("PSD"), Title VI, provisions for protecting ozone layer, Section 402 of the Clean Water Act: National Pollutant Discharge Elimination System ("NPDES") as it was adopted in Kentucky as the KPDES program, water permit, Spill Prevention, Control, and Countermeasure ("SPCC") as established under CWA 1973, and the development of Environmental Assessments pursuant to the National Environmental Policy Act. EKPC as a federal borrower is required to complete the applications under the National Environmental Policy Act ("NEPA") for Rural Utility Service ("RUS") to review and make determinations of Findings of No Significant Impacts ("FONSI") or pursue an Environmental Impacts Statement for each project proposed. The RUS is a department under the United States Department of Agriculture ("USDA"). I will describe EKPC's current permitting activities related to these proposed projects, the permits required and how EKPC plans to comply with the new EPA regulations considering the proposed new generation projects.

Q. ARE YOU SPONSORING ANY ATTACHMENTS?

A. Yes. I am sponsoring the following attachments, which I ask to be incorporated into my testimony by reference: Attachment JBP-1, Cooper permit matrix, Attachment JBP-2, Spurlock permit matrix

II. Cooper Combined Cycle and Cooper Unit 2 Co-Firing Project

Q. PLEASE DESCRIBE THE PERMITTING REQUIREMENTS AND EFFORTS OF EKPC REGARDING PERMITTING FOR COOPER CO-FIRING UNIT 2 AND THE COMBINED CYCLE GAS TURBINE UNIT.

A. EKPC is preparing a permit application for this project since it will be considered a modified major source under the CAA Title V and EPA PSD program. Modification to major sources under the Title V / PSD program require an application that clearly determines the Best Available Control Technology ("BACT'), an air quality analysis, modeling PSD increment to ensure that the project proposed in the specific county will be below the National Ambient Air Quality Standards. Additional impacts analyses are required under Title V / PSD to assess the impacts of air, ground, water pollution on soils, vegetation, and visibility caused by any increase in emissions of any regulated pollutant from the source or modification under review. EKPC is developing the permit application to submit to the Kentucky Energy and Environmental Cabinet agencies who have been delegated the authority to make such determinations on behalf of and in coordination with EPA. The Kentucky Division for Air Quality will process this application, coordinating with the Federal Land Managers for Class I and II modeling and EPA under the PSD. The purpose of Title V and PSD is to protect the public health and welfare; preserve, protect, and enhance the air quality in national parks, national wildness areas, national monuments, seashores, and areas of special national or regional recreation, scenic, or historic value.

Q. WHAT NEW ENVIRONMENTAL REGULATIONS APPLY TO NEW, MODIFIED OR RECONSTRUCTED ELECTRIC GENERATING UNITS?

A. The federal Environmental Protection Agency ("EPA") finalized six (6) new regulations in 2024. On February 7, 2024, EPA lowered the standards for particulate matter ("PM2.5") less than 2.5 microns from 12.0 to 9.0 micrograms per cubic meter to reflect new science on harms caused by particle pollution. On April 25, 2024, the EPA announced final rules to reduce pollution from fossil-fired power plants to protect human health and the environment. The suite of final rules includes: a final rule for existing coal-fired and new natural gas-fired plants that would ensure that operators would be able to choose between short term "do nothing," medium term or long-term options to reduce carbon pollution, a final rule that strengthened and tightened emission standards for particulate matter and mercury emissions in lignite burning coal plants, a final rule to reduce pollutants discharged through waste water from coal-fired power plants and lastly, a final rule that would require the management of coal ash in unregulated until now, legacy surface impoundments at inactive facilities and a new category for ash management, Coal Combustion Management Units ("CCRMU"), a catch all category for ash on or in soils down to one ton. On April 25, 2024, under the Clean

Water Act, EPA published and finalized the Steam Electric Power Generating Effluent Guidelines thus strengthening wastewater discharge standards for coal-fired power plants. The rule established more stringent discharge standards for three wastewaters generated at coal fired power plants: flue gas desulfurization wastewater, bottom ash transport water and combustion residual leachate. The rule also establishes a new set of definitions and new effluent limitations for legacy surface wastewaters. On May 7, 2024, EPA finalized the National Emission Standards for Hazardous Air Pollutants for Coal- and Oil-fired Electric Utility Steam Generating Units ("EGUs"), also known as the Mercury and Air Toxics Standards ("MATS"). EPA set technology-based standards for mercury, Hazardous Air Pollutants ("HAPs") and particulate matter for units greater than 25 MWs. EGUs have up to 3 years with an extension by the delegated authority to comply with the MATS rule. On May 8, 2024, EPA finalized changes to the CCR regulations for inactive surface impoundments at inactive electric facilities now, referred to as "Legacy Surface Impoundments" ("LSI") and created another category for ash in soils down to 1 ton as CCRMU. LSIs must comply with all the existing requirements applicable to inactive CCR surface impoundments at active facilities, except for the location restrictions and liner design criteria. EPA established specific requirements for LSIs and CCRMU regarding groundwater monitoring, corrective action, closure and post- closure care requirements for all CCR management units regardless of how the CCR was placed or when. The effective date of the legacy CCR rule is November 8, 2024. On May 9, 2024, EPA finalized the New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions from Existing Fossil Fueled-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule. The rule is effective July 8, 2024. Lastly, EPA issued a final rule on March 15, 2023, for the Cross State Air Pollution Rule that implements via the "Good Neighbor" Federal Implementation Plan. This rule significantly reduces ozone forming emission of nitrogen oxides (NOx) from power plants and industrial facilities. The "Good Neighbor Plan" ensures that 23 states, one of which is Kentucky, reduce pollution of NOx during the ozone forming season, from May 31 until September 30 each year. EPA issues allowance budgets annually for electric generating sources to meet annually. EGUs must quality assure, and quality certify that for every one ton of NOx emitted during the zone season that it reconciles an EPA allowance for one ton NOx. EPA supplied the States with their budgets and unit-level allocations. On September 21, 2023, EPA issued "Group 3" ozone-season NOx control program to power plants for the following states: Illinois, Indian, Maryland, Michigan, New Jersey, New York, Ohio, Pennsylvania, Virginia, and Wisconsin. On January 16, 2024, EPA issued a proposed supplemental action. Pursuant to court orders staying the Agency's SIP Disapproval action to the following states, EPA is not currently implementing the Good Neighbor Plan "Group 3" ozone–season NOx control program for power plants in the following states: Alabama, Arkansas, Kentucky, Louisiana, Minnestoa, Mississippi, Missouri, Nevada, Oklahoma, Texas, Utah, and West Virginia. On January 16, 2024, EPA signed a proposal to partially approve and partially disapprove SIP submittals for Arizona, Iowa, Kansas, New Mexico, and Tennessee. EKPC coal fleet is one of the most well-controlled environmental performers in the country with regards to SOx, NOx, ozone season NOx, and particulate matter (PM). The EKPC fleet complies today with this rule. After the initial review of the proposed and final rule, the only coal-fired unit left in the EKPC fleet that does not have a Selective Catalytic Reactor ("SCR") is Cooper Unit 1. Once the Courts rule and EPA issues a response, EKPC will re-examine its position relative to compliance.

Q. PLEASE DESCRIBE THE STATUS OF THE GOOD NEIGHBOR PLAN AND THE GREEN HOUSE GAS RULE.

A. On June 5, 2023, EPA finalized the Good Neighbor FIP. On June 27, 2024, the Supreme Court granted an emergency stay of the requirements of EPA's Good Neighbor Federal Implementation Plan pending further judicial review.   Several parties challenged the Good Neighbor FIP in the D.C. Circuit, which is the case now held in abeyance. A briefing took place in the consolidated cases beginning on April 1, 2024. Final briefs were filed on August 22, 2024. The case is now fully briefed, but oral argument has not taken place.

On October 29, 2024, the EPA issued an interim final rule to administratively stay the effectiveness of the requirements for all sources covered by the Good Neighbor Rule. EPA is expected to work with the lower courts pending an outcome unknown at this time. The lower court's briefing schedule for this action is unknown currently.

For EPA's GHG rule, the Supreme Court denied the emergency stay from the applicants opposing EPA's GHG on October 16, 2024, leaving the rule in place.

The order stated that the lower courts, D.C. Circuit Court, will hear and decide the case from the applicants and EPA, leaving the door open to further appeal.

Q. IS EKPC STILL TAKING STEPS TO COMPLY WITH THE GOOD NEIGHBOR PLAN AND THE GREEN HOUSE GAS RULE?

A. Yes.

Q. WHY IS EKPC STILL TAKING STEPS TO COMPLY WITH THESE RULES SINCE THEY ARE BEING LITIGATED?

A. EPA and the Courts can decide in a day to remand, rescind, vacate or reinstate. EKPC must be able to make plans for any of those options decided by the Courts and EPA. Should EKPC need to build new environmental controls or a new generating resource as a capital project, the scope of work, technical feasibility studies, planning, design, costs estimate, procurement, regulatory permitting associated with a capital project of this scale takes 5-7 years to perform, implement, build, and commission. EKPC cannot sit and wait while the lower courts and EPA decide. A prudent electric utility must vet the options and be ready to comply with workable, doable, practicable, executable, economic plans to remain reliable, available and affordable to our owner-member distribution cooperatives. Should EPA and the Courts rescind a stay, or go forward with the rule as written, EKPC must be able to comport compliance to the date EPA and the Courts require compliance with little advance warning.

Q. IS THE COOPER UNIT 2 AND THE COMBINED CYCLE GAS TURBINE UNIT REQUIRED TO ASSIST EKPC IN COMPLIANCE WITH ANY

ENVIRONMENTAL RULES AND REGULATIONS? IF SO, PLEASE EXPLAIN.

A. The EPA GHG finalized rule allows operators of existing coal-fired power plants to elect by January 1, 2030, to choose between a "do nothing" option and retire the unit by January 1, 2032. For coal units that prefer to operate longer, they have the option to select "medium-term" that allows existing coal fired operators to elect to "co-fire coal" with 40% natural gas between January 1, 2032, until one day before January 1, 2039. For coal units that need to operate beyond January 1, 2039, they need to select adding carbon capture and sequestration. For Cooper Station, EKPC proposes to comply with the GHG rule by electing to co-fire Cooper Unit 2 on January 1, 2030. In addition, EKPC elects to propose in an air permit application to the Kentucky Division of Air Quality and EPA to build and authorize a new CCGT for Cooper Station. If KDAQ and EPA agree, the state will add this to its emission inventory for pollutants and set aside new ozone-season NOx allowances under the GNFIP or new CSAPR rule if federally applicable.

Q. PLEASE DESCRIBE EKPC'S EFFORTS TO ENSURE THAT THE PROJECT WILL BE IN COMPLIANCE WITH ALL APPLICABLE RULES WITH RESPECT TO THE NEW GENERATION PROJECTS.

A. The federal rules are applicable to our new generation projects as "new sources" for Combined Cycle Gas Turbine ("CCGT") and the Rule as "existing sources" at Cooper and Spurlock. For existing coal fired units at Cooper 2 and Spurlock's 1-4, EKPC plans to comply with this new rule by electing the medium-term option on January 1, 2030, to co-fire coal with 40% natural gas from 2032 through 2039.

Much uncertainty exists for the Rule. While the entire industry faces this level of uncertainty, EKPC must prudently plan to comply.

Q. PLEASE DESCRIBE THE PERMITTING REQUIREMENTS AND EFFORTS OF EKPC REGARDING PERMITTING FOR THE COOPER CO-FIRE PROJECT.

A. EKPC is developing an air permit application under the CAA Title V and PSD program for the Cooper Station co-firing project on unit 2. Since the permit actions are so close to one another, EKPC plans to submit one application for co-firing unit 2 and adding a new source of generation, the CCGT. Since this project involves bringing a gas transportation line to Cooper Station, EKPC is required to submit an Environmental Assessment ("EA") as a federal borrower to the RUS pursuant to NEPA for their decision with regards to impacts to the environment. EKPC is developing this EA and plans to submit it to the RUS in August 2025 and the air permit application to the KY Division for Air Quality in December 2024

Q. WHAT ENVIRONMENTAL REGULATIONS APPLY TO THE COOPER CO-FIRE PROJECT PROPOSED IN THIS PROCEEDING?

A. As Congressionally authorized by the Clean Air Act, EPA regulates air quality under the National Ambient Air Quality Standards, ("NAAQs") Hazardous Air Pollutants ("HAPs"), and New Source Review ("NSR"). Since EKPC plans to modify its air quality emissions at Cooper Station by co-firing Cooper Unit 2 and adding a CCGT as a new generation source, EKPC plans to submit an air permit application in December 2024 to the Kentucky Division of Air Quality ("KDAQ") to modify the boiler on Cooper Unit 2 to add the ability to burn natural gas to comply with the GHG rule and to add a CCGT to the station as a new generation resource. Due to the modifications to the existing facility EKPC will have to comply with the following: NAAQs, NSR, GHG Rule, PM2.5 NAAQs, title V / Prevention of Significant Deterioration (PSD) program, the Clean Water Acts' National Pollutant Discharge Elimination System (NPDES) or for Kentucky, the KY Pollutant Discharge Elimination System (KPDES), EPA Spill Prevention Control and Counter Measure (SPCC), the States coordination regulation under the CWA, the 401 Water Quality Certification (401 WQC) with the Corp of Engineers, and NEPA regulations. Since EKPC elects to co-fire Cooper unit 2 with natural gas and plans to add a new source of generation, a CCGT, that combusts natural gas, EPA's new rules for MATs, ELG, legacy CCR are not applicable. A permit matrix is provided as Attachment JBP-1 for review.

Q. IS THE COOPER CO-FIRE PROJECT REQUIRED TO ASSIST EKPC IN COMPLIANCE WITH ANY ENVIRONMENTAL RULES AND REGULATIONS? IF SO, PLEASE EXPLAIN.

A. The Cooper Station co-fire project supports compliance with the EPA's GHG Rule as a medium-term unit from 2032 to 2039 and will fold into the state plan tentatively due May 2025.

Q. PLEASE DESCRIBE EKPC'S EFFORTS TO ENSURE THAT THE COOPER CO-FIRE PROJECT WILL BE IN COMPLIANCE WITH ALL APPLICABLE PERMITTING RULES.

A. EKPC closely monitors EPA regulatory changes in the Unified Agenda put forth in the spring and fall by EPA. As new rules are proposed, EKPC works with its outside legal counsel and environmental consultants to identify risk and impacts. During the rulemaking process, EKPC comments on proposed rules to proactively participate in the rulemaking process to provide constructive materials for EPA to consider on behalf of our non-profit rural owner-member cooperatives. After much legal and environmental stakeholder work, EKPC develops a strategy offering the reasonable least cost, doable, practicable plan to comply.

Q. PLEASE DESCRIBE HOW CO-FIRING NATURAL GAS AT COOPER STATION HELPS EKPC COMPLY WITH THE GHG RULE?

A. EPA GHG Rule requires EKPC to co-fire 40% natural gas as a means to comply with the medium term, one of three compliance options, provided by the rule. The rule does not preclude EKPC from co-firing more natural gas but it sets a floor to the minimum standard of 40%. EPA assumes a 16% reduction as a result from co-firing 40% natural gas with coal. EKPC found that the rule assumes this across all loads and heat input and heat rate specific to the units. For EKPC to comply, EKPC Cooper Station will use the ability to burn natural gas (NG) to achieve the reductions, and burn the corresponding percentage and amount of NG to achieve compliance. Should NG be less expensive than coal, EKPC has the right under the rule to burn more NG fuel to lower its production power supply cost. The ability to burn NG at Cooper offers fuel diversity, fuel security and operational fuel flexibility. Bringing NG to Cooper Station brings new opportunities to lower its costs, provide operational flexibility, to sustain and preserve its capacity for its owner-members and its capacity in PJM. EKPC plans to use NG for the benefits of its owner-member distribution cooperatives and to reduce CO_2 emissions.

III. Spurlock Co-Fire Project

Q. PLEASE DESCRIBE THE PERMITTING REQUIREMENTS AND EFFORTS OF EKPC REGARDING PERMITTING FOR THE SPURLOCK CO-FIRE PROJECT.

A. EKPC is developing an air permit application under the CAA Title V and PSD program for Spurlock Station co-firing project on units 1,2,3 and 4. Since this project involves bringing a gas transportation line to Spurlock Station, EKPC must submit an EA as a federal borrower to the RUS pursuant to NEPA for their decision on environmental impacts. EKPC is developing this EA and plans to submit it to the RUS as a connected action in August 2025 and the air permit application to the KY Division for Air Quality July 2025.

Q. WHAT ENVIRONMENTAL REGULATIONS APPLY TO THE SPURLOCK CO-FIRE PROJECT PROPOSED IN THIS PROCEEDING?

A. EPA regulates air quality under the NAAQs, NSR and HAPs. Since EKPC is modifying the four (4) boilers to accommodate co-firing natural gas with coal, EKPC will have to comply with the NAAQs, NSR, HAPs, the GHG Rule, CAA Title V &PSD program, the CWA NPDES / KPDES, SPCC, 401 WQC with the Corp of Engineers, and as a federal borrower from RUS, the NEPA regulations. A permit matrix is provided as Attachment JBP-2 for Spurlock Station.

Q. IS THE SPURLOCK CO-FIRE PROJECT REQUIRED TO ASSIST EKPC IN COMPLIANCE WITH ANY ENVIRONMENTAL RULES AND REUGLATIONS? IF SO, PLEASE EXPLAIN.

A. The Spurlock Station Units 1-4 co-fire project supports compliance with the EPA's GHG Rule as a medium-term unit from 2032 to 2039 and will fold into the state plan tentatively due in May 2025.

Q. PLEASE DESCRIBE EKPC'S EFFORTS TO ENSURE THAT THE SPURLOCK CO-FIRE PROJECT WILL BE IN COMPLIANCE WITH ALL APPLICABLE PERMITTING RULES.

A. EKPC closely monitors EPA regulatory changes in the Unified Agenda put forth spring and fall by EPA. As new rules are proposed, EKPC works with its outside legal counsel and environmental consultants to identify risk and impact. During the rulemaking process, EKPC comments on proposed rules to provide constructive materials for EPA to consider on behalf of our rural owner-member non-profit cooperatives.

Q. PLEASE DESCRIBE HOW CO-FIRING NATURAL GAS AT SPURLOCK STATION HELPS EKPC COMPLY WITH THE GHG RULE?

A. EPA GHG Rule requires EKPC to co-fire 40% natural gas as a means to comply with the medium term, one of three compliance options, provided by the rule. The rule does not preclude EKPC from co-firing more natural gas but it sets a floor to the minimum standard of 40%. EPA assumes a 16% reduction as a result from co-firing 40% natural gas with coal. EKPC found that the rule assumes this across all loads and heat input and heat rate specific to the units. For EKPC to comply, EKPC Spurlock Station will use the ability to burn natural gas (NG) to achieve the reductions, and burn the corresponding percentage and amount of NG to achieve compliance. Since all boilers are not of the same design, the Spurlock units are expected to achieve 50% NG burn with coal exceeding EPA's minimum. Should NG be less expensive than coal, EKPC has the right under the rule to burn more NG fuel to lower its production power supply cost. The ability to burn NG at Spurlock Station offers fuel diversity, fuel security and operational fuel flexibility. Bringing NG to Spurlock Station may bring new opportunities to lower its costs, provide operational flexibility, to sustain and preserve its capacity for its owner-members and its capacity in PJM. EKPC plans to use NG for the benefits of its owner-member distribution cooperatives and to reduce CO2 emissions.

IV. Natural Gas Laterals

Q. PLEASE DESCRIBE THE PERMITTING REQUIREMENTS AND EFFORTS OF EKPC REGARDING PERMITTING FOR THE NATURAL GAS LATERAL PROJECTS PROPOSED IN THIS APPLICATION.

A. In accordance with NEPA requirements and regulations, EKPC will list the new natural gas lines to Cooper Station and Spurlock Station as connected actions in the EA's. The EA's will be submitted to RUS in order for the agency to determine if they can support a Finding of No Significant Impact ("FONSI") or require an Environmental Impact Statement. Since the natural gas lines are not built, owned, and operated by EKPC, EKPC does not have to perform a separate FERC permit action and EA under the NEPA regulations. The pipeline owner will perform all the environmental work, permit application as required under federal law for their project.

Q. WHAT ENVIRONMENTAL REGULATIONS APPLY TO THE NATURAL GAS LATERAL PROJECTS PROPOSED IN THIS PROCEEDING?

A. Since the pipeline owner will build, own, operate, and maintain the pipelines, it handles all the environmental permitting. EKPC is merely a purchaser of fuel.

Q. ARE THE NATURAL GAS LATERAL PROJECTS REQUIRED TO ASSIST EKPC IN COMPLIANCE WITH ANY ENVIRONMENTAL RULES AND REUGLATIONS? IF SO, PLEASE EXPLAIN.

A. Natural gas pipelines to Cooper and Spurlock Station enable the use of these generating assets beyond January 1, 2032, under the GHG Rule, otherwise, the generating assets must be retired.

Q. PLEASE DESCRIBE EKPC'S EFFORTS TO ENSURE THAT THE NATURAL GAS LATERAL PROJECTS WILL BE IN COMPLIANCE WITH ALL APPLICABLE PERMITTING RULES.

A. The pipeline owner will build, own, operate and maintain the natural gas pipelines in accordance with the Department of Transportation, FERC, and EPA. EKPC will receive a copy of the pipeline owner's FERC permit and provide it to the RUS. RUS will review the FERC pipeline permits to satisfy and complete their review of the EKPC Cooper and Spurlock's EAs as connected actions.

V. Conclusion

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. EKPC is applying for all the required federal, state, and local permits to co-fire Cooper Station Unit 2, co-fire Spurlock Units 1,2,3, and 4, and the new CCGT generating unit at Cooper Station. In addition, EKPC is developing the required NEPA documents required by RUS to fulfill their regulations and to successfully obtain financing.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

ATTACHMENT JBP-1

Item No.	Permit/Clearance	Regulatory Agency	Details	When Required	Comments
Federal					
1	Notice of Proposed Construction or Alteration	Federal Aviation Administration (FAA)	Must notify the FAA if structures will exceed 200 feet in height or if the structures (stacks & cranes) are located within the 100:1 (distance to height) ratio from the nearest point of the nearest FAA designated airport runway. Notifying the FAA includes completing Form 7460-1 for all required structures and providing a site layout map depicting structure locations.	Prior to construction	
2	Section 7 Threatened and Endangered Species Consultation and Clearance	U.S. Fish & Wildlife Service (FWS), Ecological Services	If the project will potentially impact protected species or their respective habitat, then the FWS must be contacted. The FWS will determine the level of effort needed for the project to proceed (e.g., habitat assessment, species surveys, avian impact studies, etc.).	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. USFWS IPaC indicates that 14 Special Status species have potential to occur within Project Area. Habitat assessments and/or species surveys may be required to determine presence/absence of protected plant and wildlife species, including bats. Seasonal tree clearing restrictions may be imposed to avoid bat roosting periods.
3	Migratory Bird Treaty Act / Bald and Golden Eagle Protection Act Compliance	U.S. Fish & Wildlife Service (USFWS), Ecological Services	Required when construction or operation of a proposed facility could impact migratory birds and bald and golden eagles and/or their nests, and especially threatened or endangered species	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. Nesting period for Migratory Birds within the Project Area is indicated by USFWS to be March 15 - August 31. If tree clearing must occur inside that window it is recommended that avian nest surveys be conducted no more than 5 days prior to clearing a given area. Bald Eagles are known to remain in nests year-round. Bald Eagle nests should be surveyed for during a site visit to determine if further consultation is required.
4	Spill Prevention, Control, and Countermeasure (SPCC) Plan	U.S. Environmental Protection Agency	Required if the facility will have 1,320 gallons or more of aboveground petroleum storage capacity in 55-gallon-sized or larger containers (or 42,000 gallons in underground storage not regulated by underground storage tank rules)	Prior to storage of petroleum products onsite in excess of SPCC thresholds	
5	Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act	U.S. Army Corps of Engineers (USACE) Nashville District	Nationwide Permit: Less than or equal to 0.5 acre of wetland impacts Individual Permit: Greater than 0.5 acre of wetland or stream impacts Section 10 Authorization for any structures within or over any navigable waters of the U.S.	Prior to construction start and activities within wetland areas. Section 404 authorization required to dredge or place fill in a jurisdictional water, including wetlands. Section 10 authorization required for crossings/activities within any navigable waterways.	A wetland delineation will be required to determine the extent of wetland and stream impacts associated with the Project. If permanent impacts to wetlands and streams are less than 0.5-acre total, Project would qualify for a Nationwide Permit. Mitigation credits would be required for cumulative permanent impacts of 0.10 acre or greater of wetlands and waterbodies. A pre-construction notification (PCN) will likely be required.
6	Prime Farmland Consultation under the Farmland Protection Policy Act (FPPA)	U.S. Department of Agriculture- Farm Service Agency and Natural Resources Conservation Service (NRCS)	FPPA consultation form AD-1006; coordination on erosion and sedimentation controls (ESC) and seed mixes; potential NRCS consultation for Conservation and/or Wetland Reserve Programs	Prior to construction	Contractor will fill out form AD-1006 and submit to NRCS for review and scoring (NRCS has 45 days to make determination and return the form). For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).
State - Kentucky					
7	National Environmental Policy Act (NEPA) Review	RUS, Project Lead Federal agency	Required pursuant to NEPA for public disclosure of environmental impacts resulting from Federal actions. Process can be a phased approach. The applicant typically prepares a preliminary Environmental Assessment (EA). The agency reviews the document and can either attach a Finding of No Significant Impact or require the preparation of an Environmental Impact Statement (EIS).	Prior to construction, unless applicant seeks private financing	Verify potential cooperating agencies with RUS during pre-planning activities.
8	Certificate of Public Convenience and Necessity	Kentucky Public Service Commission	Required for the construction of electric generating facilities	Prior to construction	A Notice of Intent must be submitted at least 30 days prior to submitting an application for a certificate.
9	Site Compatibility Certificate	Kentucky Public Service Commission	Required for the construction of electric generating facilities 10 MW or greater	Prior to construction	The site compatibility certificate application will include a site assessment report. Documentation of compliance with NEPA may be submitted in lieu of a site assessment report.
10	Air Quality Construction / Operating Permit (PSD and Title V permit Update)	Kentucky Department of Environmental Protection Division for Air Quality	New Source Review construction permit is required for new major stationary sources of air emissions, and Title V operating permit is required if more than 100 TPY of any non-hazardous regulated air pollutant is emitted	Prior to construction	Replacement of burner can only likely be accomplished with a State permit (Prevention of Significant Deterioration [PSD] minor). The addition of a new combined-cycle unit will likely trigger PSD major source permitting for at least one pollutant, although several pollutants should be able to "net out" of PSD. The existing Title V operating permit will need to be updated.
11	Noise Compliance	Kentucky Public Service Commission (as a part of a larger certificate application).	Required to demonstrate that facility operation will comply with State, county, and city noise regulations. The PSC may require/request additional noise mitigation measures.	Prior to construction	City has local regulations based on time of day and receiving land use that will need to be analyzed for the surrounding area and modeled to determine compliance. Review of County ordinances did not find any numerical noise limits. Any compressors along the pipeline and booster stations will be required to meet the FERC limit of an Ldn of 55 dBA.
12	Section 401 Water Quality Certification (WQC)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Authorizes work and placement of dredged or fill material within waters of the State. General 401 Certification with approved USACE Nationwide Permit assuming project meets conditions listed in the Kentucky Energy and Environment Cabinet DEP*General Certification--Nationwide Permit (NWP)* document for NWP 57. Individual 401 Certification required if Project is unable to meet conditions listed in the *General Certification--Nationwide Permit (NWP)* document.	Prior to construction	This permit provides Section 401 WQC and floodplain construction approval. The purpose of the WQC is to confirm that the discharge of fill materials will be in compliance with the State's applicable water quality standards. Assumes automatic Water Quality Certification authorization through a USACE Nationwide Permit. The permit application must be reviewed and signed by the local county floodplain coordinator(s) prior to submitting the application to the State.

Item No.	Permit/Clearance	Regulatory Agency	Details	When Required	Comments
13	Floodplain Development Permit	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Authorizes construction and development activities along, or adjacent to a stream, or within a floodway. General Permit KY FPGP if Project meets eligibility requirements listed in Section 2.2 of KY FPGP and does not increase the Base Flood Elevation Individual Permit if Project is unable to meet eligibility requirements in Section 2.2 of KY FPGP or has potential to increase the Base Flood Elevation.	Prior to construction	
14	Groundwater Protection Plan	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required for activities that have the potential to pollute groundwater. The Groundwater Protection Plan must define best management practices for groundwater protection.	Prior to operation	The Groundwater Protection Plan is not submitted for review unless requested by the State.
15	One-Time/Temporary Discharge Request for Off-Permit Authorization (hydrostatic testing)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required prior to discharging waters used for hydrostatic testing pipelines and/or tanks.	Prior to testing	
16	Water Withdrawal Permit (NOT REQUIRED)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	According to the Kentucky Department of Environmental Protection, withdrawals of water greater than 10,000 gallons per day from any surface, spring, or groundwater source, with the exception of water required for steam-powered electrical generating plants whose retail rates are regulated by the Kentucky Public Service Commission or for which facilities a certificate of environmental compatibility from such commission is required by law, require a Water Withdrawal Permit.		
17	General Permit for Stormwater Discharges Associated with Construction Activities	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required for all stormwater discharges from construction activities which will disturb of one or more total acres of land. The General Permit requires the development of a Stormwater Pollution Prevention Plan (SWPPP) prior to submitting a Notice of Intent for permit coverage.	Prior to construction	The permit also authorizes the discharge of construction dewatering waters if managed through the use of appropriate best management practices.
18	KPDES Operational Discharge Permit (Modification to KY0003611)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	A modification to NPDES Permit No. KY0003611 will be required if the quantity or quality of wastewater discharged from the plant site to Lake Cumberland will change as a result of project activities. Changes to existing outfalls or the need for additional outfalls would also require a permit modification.	Prior to operation	Project changes will also require a modification to the site's operational SWPPP.
19	National Historic Preservation Act (NHPA) – Section 106 Consultation	Kentucky Heritage Council - State Historic Preservation Office (SHPO)	Under Section 106 of the National Historic Preservation Act, Federal agencies must work with the State Historic Preservation Office to address historic preservation issues when planning projects or issuing funds or permits that may affect historic properties and archaeological resources listed in or determined eligible for the National Register of Historic Places.	Prior to approval of expenditure of federal funds or prior to issuance of a license	Because the facility site is previously disturbed, a Section 106 occurrence may only be required, if routed through undisturbed areas.
20	Threatened & Endangered Species Clearance (State)	Kentucky Department of Fish and Wildlife Resources, Office of Kentucky State Nature Preserves, Kentucky Energy and Environment Cabinet	Recommended for Projects with potential to impact state threatened and/or endangered species.	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. Desktop review conducted, 2 special status species have been historically observed within the Project footprint; 8 special status species have been observed within 1-mile of the Project footprint.
21	Right-of-Way Certification	Kentucky Transportation Cabinet	Required if any part of the facility (including pipelines) will be constructed within State road rights-of-way.	Prior to construction	
County					
22	Building Permit	Pulaski County	Required for non-residential projects	Prior to construction	
Tribal Permits					
23	Section 106 of the National Historic Preservation Act	Tribal Consultations	Coordination with local tribes required as part of Section 106 consultation	Prior to approval of expenditure of federal funds or prior to issuance of a license	

ATTACHMENT JBP-2

No.	Permit/Clearance	Regulatory Agency	Details	When Required	Comments
Federal					
1	Notice of Proposed Construction or Alteration	Federal Aviation Administration (FAA)	Must notify the FAA if structures will exceed 200 feet in height or if the structures (stacks & cranes) are located within the 100:1 (distance to height) ratio from the nearest point of the nearest FAA designated airport runway. Notifying the FAA includes completing Form 7460-1 for all required structures and providing a site layout map depicting structure locations.	Prior to construction	
2	Endangered Species Act (ESA) Section 7 Threatened and Endangered (T&E) Species Consultation and Clearance	U.S. Fish & Wildlife Service (USFWS), Ecological Services	If the project will potentially impact protected species or their respective habitat, or if a Section 404 and/or NPDES permit is required, then the FWS must be contacted. The FWS will determine the level of effort needed for the project to proceed (e.g., habitat assessment, species surveys, avian impact studies, etc.).	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. USFWS IPaC indicates that 15 Special Status species have potential to occur within Project Area. Habitat assessments and/or species surveys may be required to determine presence/absence of protected plant and wildlife species, including bats. Seasonal tree clearing restrictions may be imposed to avoid bat roosting periods.
3	Migratory Bird Treaty Act (MBTA) / Bald and Golden Eagle Protection Act (BGEPA)Compliance	U.S. Fish & Wildlife Service (USFWS), Ecological Services	Required when construction or operation of a proposed facility could impact migratory birds, their nests, and especially threatened or endangered species	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. Nesting period for Migratory Birds within the Project Area is indicated by USFWS to be March 15 - August 31. If tree clearing must occur inside that window it is recommended that avian nest surveys be conducted no more than 5 days prior to clearing a given area.
4	Spill Prevention, Control, and Countermeasures (SPCC) Plan	U.S. Environmental Protection Agency (EPA)	Required if the facility will have 1,320 gallons or more of aboveground petroleum storage capacity in 55-gallon-sized or larger containers (or 42,000 gallons in underground storage not regulated by underground storage tank rules)	Prior to storage of petroleum products onsite in excess of SPCC thresholds	
5	Permits under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act	U.S. Army Corps of Engineers (USACE) – Louisville District	Nationwide Permit: Less than or equal to 0.5 acre of wetland impacts Individual Permit: Greater than 0.5 acre of wetland or stream impacts Section 10 Authorization for any structures within or over any navigable waters of the U.S.	Prior to construction start and activities within wetland areas. Section 404 authorization required to dredge or place fill in a jurisdictional water, including wetlands. Section 10 authorization required for crossings/activities within any navigable waterways.	A wetland delineation will be required to determine the extent of wetland and stream impacts associated with the Project. If permanent impacts to wetlands and streams are less than 0.5-acre, Project should qualify for a Nationwide Permit. Mitigation credits would be required for cumulative permanent impacts of 0.10 acre or greater of wetlands and waterbodies. A pre-construction notification (PCN) will likely be required.
6	Prime Farmland Protection Policy Act (FPPA), and Conservation Reserve Program	U.S. Department of Agriculture- Farm Service Agency and Natural Resources Conservation Service (NRCS)	FPPA consultation form AD-1006; coordination on erosion and sedimentation controls (ESC) and seed mixes; potential NRCS consultation for Conservation and/or Wetland Reserve Programs	Prior to construction	Contractor will fill out form AD-1006 and submit to NRCS for review and scoring (NRCS has 45 days to make determination and return the form). For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).
State - Kentucky					
7	National Environmental Policy Act (NEPA) Review	Lead Federal agency (USDA-RUS)	Required pursuant to NEPA for public disclosure of environmental impacts resulting from Federal actions. Process can be a phased approach. The applicant typically prepares a preliminary Environmental Assessment (EA). The agency reviews the document and can either attach a Finding of No Significant Impact or require the preparation of an Environmental Impact Statement (EIS).	Prior to construction	Verify potential cooperating agencies with RUS during pre-planning activities.
8	Certificate of Public Convenience and Necessity	Kentucky Public Service Commission	Required for the construction of electric generating facilities	Prior to construction	A Notice of Intent must be submitted at least 30 days prior to submitting an application for a certificate.
9	Site Compatibility Certificate	Kentucky Public Service Commission	Required for the construction of electric generating facilities 10 MW or greater	Prior to construction	The site compatibility certificate application will include a site assessment report. Documentation of compliance with NEPA may be submitted in lieu of a site assessment report.
10	Air Quality Construction / Operating Permit (PSD and Title V permit Update)	Kentucky Department of Environmental Protection Division for Air Quality	New Source Review construction permit is required for new major stationary sources of air emissions, and Title V operating permit is required if more than 100 TPY of any non-hazardous regulated air pollutant is emitted	Prior to construction	Replacement of burner can only likely be accomplished with a State permit (Prevention of Significant Deterioration [PSD] minor). The addition of a new combined-cycle unit will likely trigger PSD major source permitting for at least one pollutant, although several pollutants should be able to "net out" of PSD. The existing Title V operating permit will need to be updated.
11	Noise Compliance	Kentucky Public Service Commission (PSC; as a part of a larger certificate application).	Required to demonstrate that facility operation will comply with State, county, and city noise regulations. The PSC may require/request additional noise mitigation measures.	Prior to construction	City of Maysville has local regulations based on time of day and receiving land use that will need to be analyzed for the surrounding area and modeled to determine compliance. Review of County ordinances did not find any numerical noise limits. Any compressors along the pipeline and booster stations will be required to meet the FERC limit of an Ldn of 55 dBA.

East Kentucky Power Cooperative (EKPC) Spurlock Generating Station
Coal to Gas Conversion Permit Matrix
10/15/24

No.	Permit/Clearance	Regulatory Agency	Details	When Required	Comments
12	Section 401 Water Quality Certification (WQC)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Authorizes work and placement of dredged or fill material within watesr of the State. General 401 Certification with approved USACE Nationwide Permit assuming project meets conditions listed in the Kentucky Energy and Environment Cabinet DEP *General Certification--Nationwide Permit (NWP)* document. Individual 401 Certification required if Project is unable to meet conditions listed in the *General Certification--Nationwide Permit (NWP)* document.	Prior to construction	This permit provides Section 401 WQC and floodplain construction approval. The purpose of the WQC is to confirm that the discharge of fill materials will be in compliance with the State's applicable water quality standards. Assumes automatic Water Quality Certification authorization through a USACE Nationwide Permit. The permit application must be reviewed and signed by the local county floodplain coordinator(s) prior to submitting the application to the State.
13	Floodplain Development Permit (NOT REQUIRED)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Authorizes construction and development activities along, or adjacent to a stream, or within a floodway. General Permit KY FPGP if Project meets eligibility requirements listed in Section 2.2 of KY FPGP and does not increase the Base Flood Elevation. Individual Permit (IP) if Project is unable to meet eligibility requirements in Section 2.2 of KY FPGP or has potential to increase the Base Flood Elevation.	Prior to construction	
14	Groundwater Protection Plan	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required for activities that have the potential to pollute groundwater. The Groundwater Protection Plan must define best management practices for groundwater protection.	Prior to operation	The Groundwater Protection Plan is not submitted for review unless requested by the State.
15	One-Time/Temporary Discharge Request for Off-Permit Authorization (hydrostatic testing)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required prior to discharging waters used for hydrostatic testing pipelines and/or tanks.	Prior to testing	
16	Water Withdrawal Permit (NOT REQUIRED)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	According to the Kentucky Department of Environmental Protection, withdrawals of water greater than 10,000 gallons per day from any surface, spring, or groundwater source, with the exception of water required for steam-powered electrical generating plants whose retail rates are regulated by the Kentucky Public Service Commission or for which facilities a certificate of environmental compatibility from such commission is required by law, require a Water Withdrawal Permit.		
17	General Permit for Stormwater Discharges Associated with Construction Activities	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required for all stormwater discharges from construction activities which will disturb of one or more total acres of land. The General Permit requires the development of a Stormwater Pollution Prevention Plan (SWPPP) prior to submitting a Notice of Intent for permit coverage.	Prior to construction	The permit also authorizes the discharge of construction dewatering waters if managed through the use of appropriate best management practices.
18	KPDES Operational Discharge Permit (Modification to KY0022250)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	A modification to KPDES Permit No. KY0022250 will be required if the quantity or quality of wastewater discharged from the plant site to the Ohio River and unnamed tributary to Lawrence Creek will change as a result of project activities. Changes to existing outfalls or the need for additional outfalls would also require a permit modification.	Prior to operation	Project changes will also require a modification to the site's operational SWPPP.
19	National Historic Preservation Act – Section 106 Clearance	Kentucky Heritage Council - State Historic Preservation Office	Under Section 106 of the National Historic Preservation Act, Federal agencies must work with the State Historic Preservation Office to address historic preservation issues when planning projects or issuing funds or permits that may affect historic properties and archaeological resources listed in or determined eligible for the National Register of Historic Places (NHRP).	Prior to construction	Because the facility site is previously disturbed, a Section 106 occurrence may only be required, if routed through undisturbed areas.
20	Threatened & Endangered Species Clearance (State)	Kentucky Department of Fish and Wildlife Resources, Office of Kentucky State Nature Preserves, Kentucky Energy and Environment Cabinet	Recommended for Projects with potential to impact state threatened and/or endangered species.	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. Desktop review conducted; three (3) special status species have been historically observed within the Project footprint. Three (3) special status species have been observed within 1-mile of the Project footprint.
21	Right-of-Way Certification	Kentucky Transportation Cabinet	Required if any part of the facility (including pipelines) will be constructed within State road rights-of-way.	Prior to construction	
County					
22	Building Permit	City of Maysville	Required prior to builing commercial/industrial/utilities infrastructure	Prior to construction	
23	Zoning Permit	City of Maysville	The site is zoned Heavy Industrial (I-2B), so the Project is a permitted use. Just a zoning permit is needed, no special use needed.	Prior to construction	
Tribal Permits					
24	Section 106 of the National Historic Preservation Act	Tribal Consultations	Coordination with local tribes required as part of Section 106 consultation	Prior to approval of expenditure of federal funds or prior to issuance of a license	

EXHIBIT 8

DIRECT TESTIMONY OF MARK HORN

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	**)**	
KENTUCKY POWER COOPERATIVE,	**)**	
INC. FOR 1) CERTIFICATES OF PUBLIC	**)**	
CONVENIENCE AND NECESSITY	**)**	**CASE NO.**
TO CONSTRUCT NEW GENERATION	**)**	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	**)**	
CERTIFICATE RELATING TO THE SAME;	**)**	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	**)**	
TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	

DIRECT TESTIMONY OF MARK HORN
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	)	**CASE NO. 2024-00370**

A F F I D A V I T

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Mark Horn, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Mark Horn

____

Subscribed and sworn before me on this 18th day of November 2024.

____

Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Mark Horn, my business address is 4775 Lexington Road, Winchester, Kentucky 40391. I am employed by EKPC as Director, Fuel and Emissions in the Power Supply Business Unit.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I have a Bachelor's Degree in Chemistry from Eastern Kentucky University. I have worked for EKPC for over 28 years. I was a Lab Technician at Dale Power Station from September 1996 to April 2000. A chemist at Central Lab from April 2000 to November 2002. I was promoted to Senior Chemist in November 2022 and was in that role until August 2008. I was a Fuel Buyer from August 2009 to December 2013, when I was promoted to Manager, Fuel & Emissions. I have had the title of Director, Fuel & Emissions since February 2024.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. I am responsible for overseeing the procurement of EKPC's fuel and fuel-related commodities.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to provide information about the natural gas supply for EKPC's natural gas generation projects located at Spurlock Power Station ("Spurlock") and Cooper Power Station ("Cooper"). Spurlock and Cooper have burned coal as a fuel source since their Commercial Operating Date utilizing coal that is physically stored on site and these generating assets are not currently connected to the natural gas infrastructure.

Q. ARE YOU SPONSORING ANY ATTACHMENTS?

A. Yes. The initial Gas Pipeline Lateral and Interconnect Requests for Proposal ("RFP") package distributed in December 2023 for the natural gas pipeline laterals and interconnection included a Pricing Form to be completed by the bidder is attached as Attachment MH-1). Initially, three (3) major Interstate Pipeline companies were selected by EKPC to be on the short list. On April 12, 2024, Bidder 3 made the decision not to participate in Phase 2 of the RFP. The two companies that remained on the short list, following the Phase 1 evaluations, received the Natural Gas Pipeline Lateral and Interconnect Phase 2 Proposal Requirements which is contained in Attachment MH-2 in June 2024 to serve as a guideline for the final bids that were due in July 2024. The EKPC Milestone Schedule for the natural gas projects details key milestones up until the project closeout is attached as Attachment MH-3. A summary of the Schedule Level and Cost Class as identified by the Association for Advancement of Cost Engineering (AACE) International Recommended Practice No. 37R-06 was provided by Burns & McDonnell (Attachment MH-4).

Q. PLEASE DESCRIBE THE REASONS NATURAL GAS IS NEEDED FOR THE PROJECTS PROPOSED.

A. Please see the Direct Testimony of Julia J. Tucker for a discussion of the overall need for the projects within EKPC's generation portfolio. Since EKPC has determined the most economical way to obtain additional generation to meet the long-term needs of the cooperative is through a natural gas combine cycle and the co-firing of Cooper Unit 2 and Spurlock Units 1-4, it is necessary to secure a supply of natural gas. EKPC is in the process of securing the natural gas transportation capacity necessary through a Precedent Agreement (”PA”) for each project that will result in the interconnection with the pipeline operator mainline and the construction of a natural gas pipeline lateral for Spurlock and a natural gas pipeline lateral for Cooper along with the respective M&R Stations. Later each PA will be replaced with firm transportation agreements for the mainline and for the laterals, where applicable.

Q. WERE THE PRECEDENT AGREEMENTS THE RESULT OF AN RFP?

A. Yes.

Q. PLEASE GENERALLY DESCRIBE THE RFP PROCESS.

A. The initial RFP was distributed December 5, 2023 for the natural gas pipeline laterals and interconnection to all of the qualified bidders on the Bidders List, which consisted of gas transmission companies and infrastructure development companies, that had executed the required Confidentiality and Non-Disclosure Agreement ("NDA"). One party received the RFP on December 13, 2023, due to their timeline of completing the NDA. Please see the Phase 1 RFP (Attachments

MH-1). Pre-bid meetings were held with all potential bidders during December 2023. Non-proprietary questions and answers were shared with all bidders prior to Phase 1 proposals due date. Phase 1 proposals were due January 31, 2024. Formal bid opening of Phase 1 proposals with EKPC Contracting Committee was held on February 1, 2024. Evaluation of the Phase 1 bids took place from February 1, 2024, to March 5, 2024. Short-list of bidders, which initially included 3 counterparties, for Phase 2 were informed on March 8, 2024, which included expectations for Phase 2. Due to the detailed update to schedule (Level 2) and cost (Class 4) estimates as detailed in Attachment MH-4, bidders stated that it would take approximately 12 weeks to provide a Phase 2 proposal. Bidder 3 informed EKPC in writing on April 12, 2024 that they would not participate in Phase 2. EKPC provided both remaining bidders the Natural Gas Pipeline Lateral and Interconnect Phase 2 Proposal Requirements on June 27, 2024, with Phase 2 proposals due to be submitted to the secure electronic lockbox on July 3, 2024. The quantitative evaluation was completed with indicative results on August 1, 2024. A series of meetings were held with EKPC's Executive Staff in regard to the full evaluation that included quantitative and qualitative parameters. The counterparties were informed of the final results of the Phase 2 evaluation and EKPC's decision for each natural gas project on August 27, 2024.

Q. HOW DID EKPC DEVELOP THE EVALUATION CRITERIA AND HOW WAS THAT INFORMATION USED TO EVALUATE THE PROPOSALS RECEIVED?

A. The full quantitative and qualitative criteria used to evaluate the bids received were developed prior to opening any of the sealed bids which were submitted to a secure electronic lock box. The full Phase 1 quantitative and qualitative evaluation was used to establish a short-list of bidders that would enter Phase 2. The RFP consisted of a number of options for Spurlock and Cooper that would be evaluated on behalf of the needs of the owner-members. Before bids were received, EKPC's Fuel & Emissions, with the assistance of member of EKPC's Executive Staff, Burns & McDonnell, and ACES held multiple pre-bid meetings with all the potential bidders via Microsoft Teams. The agenda for the pre-bid meetings included an introduction, review of the confidential nature of the projects, high level review of the overall project at each site, review of the RFP by section, discussion of project risks, final question and answer session, and the timeline for proposal submittal. EKPC responses to questions from individual bidders were shared with all potential bidders. These meetings were helpful to the bidders, but they also benefited EKPC as it identified drivers that may have a measurable impact on project schedules and/or costs. The intent of the evaluation criteria was to identify proposals that were economical, constructable, and mitigated risks. The evaluation criteria were ultimately developed in a concerted effort by EKPC's Fuel & Emissions, Power Production, Engineering and Construction, members of the Executive Staff, along with Burns & McDonnell, and ACES.

In Phase 1 the quantitative factors or economic analysis included the commodity price of physical natural gas, lateral reservation charge, mainline reservation charge, Annual Charge Adjustment, Fuel/Lost and Unaccounted for Gas ("LUFG"), capacity expansion reservation surcharge, commodity usage expansion surcharge, and potential services to flow gas as needed. The qualitative factors of Phase 1 had two (2) primary components. The first qualitative component in Phase 1 consisted of Risk Factors and Weightings. These predetermined bid analysis weighting factors included, but were not limited to regulatory jurisdiction, potential for project delays, mainline expansion requirements, and the type of company. The second qualitative component in Phase 1 consisted of favorable terms and conditions offered by the bidder in their proposals for the PAs.

In Phase 2 the quantitative factors or economic analysis was substantially similar to the process in Phase 1. The qualitative factors in Phase 2 addressed how they could impact key areas of operations, commercial terms and conditions, regulatory and permitting process, design factors of the pipe, corridor routes for the lateral(s), and actual construction of the projects.

All of the proposals were evaluated based on the same scope and using the same evaluation criteria. As more information was gained from the time the RFP was issued in December 2023 to Phase 2 bids being evaluated in July 2024, EKPC's projected project needs at each site evolved over time as well. EKPC requested clarifications from the final two bidders to compare competitive bids fairly and updates were made in the interest of an economic and timely decision for each project that was fair, just, and reasonable for the owner-members. The terms and conditions of the specific PAs were negotiated to meet the needs of EKPC after the counterparty was chosen based on the face value of the fully evaluated proposal for each project in Phase 2.

Q. PLEASE DESCRIBE HOW THE PRECEDENT AGREEMENT WILL CHANGE AFTER THE PIPELINE IS CONSTRUCTED.

A. After key milestones are met as defined as Conditions of Precedent for Shipper and Transporter, but before natural gas physically flows to the new generation facilities at the earlier of the Target In-Service Date or the In-Service Date, the PA will sunset as Service Agreements such as the corresponding Firm Mainline Transportation Agreements and Firm Lateral Transportation Agreements are executed.

Q. WHO WILL HAVE JURISDICTION OVER THE NATURAL GAS PIPELINE LATERALS WHEN CONSTRUCTED?

A. The Federal Energy Regulatory Commission ("FERC") has jurisdiction over regulated interstate natural gas transmission systems, including laterals owned and operated by the interstate pipeline companies.

Q. PLEASE PROVIDE THE SITING TIMELINE FOR THE NATURAL GAS PIPELINE PROJECTS.

A. Please see the EKPC Milestone Schedule (Attachment MH-3) .

Q. IS EKPC REQUESTING THE COMMISSION TO APPROVE THE PRECEDENT AGREEMENTS.

A. No. EKPC is not requesting the Commission approval of the PAs. The two (2) PAs, which are specific to each lateral project, need to be fully executed before the pipeline company requests approval from the pipeline company's internal Capital Allocation Committee on October 15, 2024. The natural gas interconnection and laterals being constructed are subject to the FERC approval. As a condition of the PAs, the company constructing the pipeline must receive all necessary FERC approvals. EKPC does not have an ownership agreement for the interconnection, laterals, or M&R Stations and the pipeline company does not require a CPCN from the Commission. EKPC is aware that when these firm transmission agreements are in place, these contracts may be subject to Commission oversight. When the final details of the firm transmission agreements have been negotiated and the contract signed, EKPC will follow the process for Commission approval, if necessary.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

ATTACHMENT MH-1

GAS PIPELINE LATERAL AND INTERCONNECT REQUEST FOR PROPOSAL

East Kentucky Power Cooperative

December 5, 2023

HIGHLY CONFIDENTIAL

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Executive Summary

East Kentucky Power Cooperative (EKPC) invites you to submit individual proposals for the construction and operation of a firm gas supply pipeline lateral and interconnect for providing firm gas transportation services from interstate pipelines operating in the region to three power plant sites within the state of Kentucky. These sites include two existing generation facilities and a new green field power generation station. Various options for maximum load and term length of the lateral gas transportation agreements are being considered. EKPC is requesting individual proposals for each site and will make the project award for each site independently of the other sites.

Request for Proposal Process

EKPC has released this RFP on December 5, 2023, for your consideration. EKPC will schedule individual meetings with each qualified and participating Bidder during the timeframe of December 5, 2023, through December 20, 2023, to explain the project in more detail and answer preliminary questions. Following the individual meetings, questions can be submitted by email to Mark Horn, Manager of Fuel Supply and Emissions at mark.horn@ekpc.coop, by January 19, 2024. Questions received from all Bidders and the responses by EKPC will be sent to all participating Bidders no later than January 24, 2024. EKPC requests Bidders submit their final proposals by January 31, 2024, at 5:00 PM EST. The final proposal shall be submitted to a secure electronic lockbox at system.proposal@ekpc.coop where they will be opened for the first time at a formal bid opening. EKPC expects to make a final decision for the winning bid for each plant site by February 29, 2024. The table below lays out this timeframe:

RFP Process Steps	Deadline
RFP Released to Qualified Bidders	December 5, 2023
Individual Bidder Meetings	By December 20, 2023
Final Date for Submitting Questions	January 19, 2024
Bidders Submit Final Proposals	January 31, 2024
EKPC Final Decision for Each Plant Site	February 29, 2024

Include in the proposal the following information for each project site:

- Pricing sheet (Attached excel file to this RFP)
- Preliminary routes (.kmz file)
- Level 3 project schedule
- Permits and certificates matrix
- Process flow diagram (PFD)
- Responses to questions and narratives requested in this RFP document
- Proposed Transportation Services (Tariffs) for pipeline lateral
- Transportation Services (Tariffs) for Interconnected Interstate Pipeline

- Executed Non-Disclosure Agreement (NDA)

This project is considered Highly Confidential, and Bidders will be required to execute Non-Disclosure Agreements (NDA) as part of this bidding process. The Confidentiality and Non-Disclosure Agreement is attached for reference and has been previously sent to the selected Bidders for review and execution prior to receiving the RFP.

Definitions

Supplier/Bidder – Companies invited to bid on the design, permitting, construction, operation, and maintenance of a natural gas pipeline lateral from the interconnected upstream interstate pipeline to the power plant M&R Station custody transfer point. The Supplier/Bidder can be a qualified interstate pipeline, gas utility, or energy infrastructure company.

Company – East Kentucky Power Cooperative (EKPC)

Scope of Work

EKPC is soliciting bids for the construction and operation of firm gas pipeline lateral systems for three power plant sites within the state of Kentucky to interconnect with interstate pipelines operating in the region (see *Figure 1: Map of EKPC Generation Facilities in Kentucky*). The power plants include two existing generation facilities and a new power station. For all projects the Supplier and their subcontractors will be responsible for the design, construction, operation, and maintenance of the gas supply pipeline lateral system from the upstream interstate transmission mainline tie-in(s) through to the custody transfer point at the new M&R Station located at the plant sites.

The three projects under consideration are:

- Spurlock Power Station
- Cooper Power Station
- New Power Station near Campbellsville, KY

Site work to convert these units at the stations will be completed by others. The new gas supply pipeline lateral systems will include tie-ins (multiple mainline taps) to the interstate pipeline, a new pipeline lateral sized for the respective load, and a Metering and Regulation (M&R) Station to deliver gas to the power station site from an interstate transmission pipeline.

Specific to the Cooper pipeline lateral there is an additional option to consider a pipeline extension from power station onwards to the City of Monticello, KY with a smaller diameter pipeline to serve the municipal gas utility and other end users in the vicinity. While this additional load is incorporated into this RFP process, the municipal gas utility and other potential industrial customers will hold firm transportation capacity on the extension lateral to the city and the main lateral back to the interstate pipeline. Please submit a lump sum bid for the total cost of this scope. The City of Monticello will directly reimburse the supplier for the construction of this lateral.

The power station near Campbellsville, KY will be a new “green field” facility which will be constructed by others. Immediately adjacent to the power station a new M&R Station will be required to deliver gas to the power station from an interstate transmission pipeline. The Supplier will be required to design and the construct the gas supply pipeline system from the upstream transmission mainline tie-in(s) through to the custody transfer point at the new M&R station located at the plant site.

Project Location Map

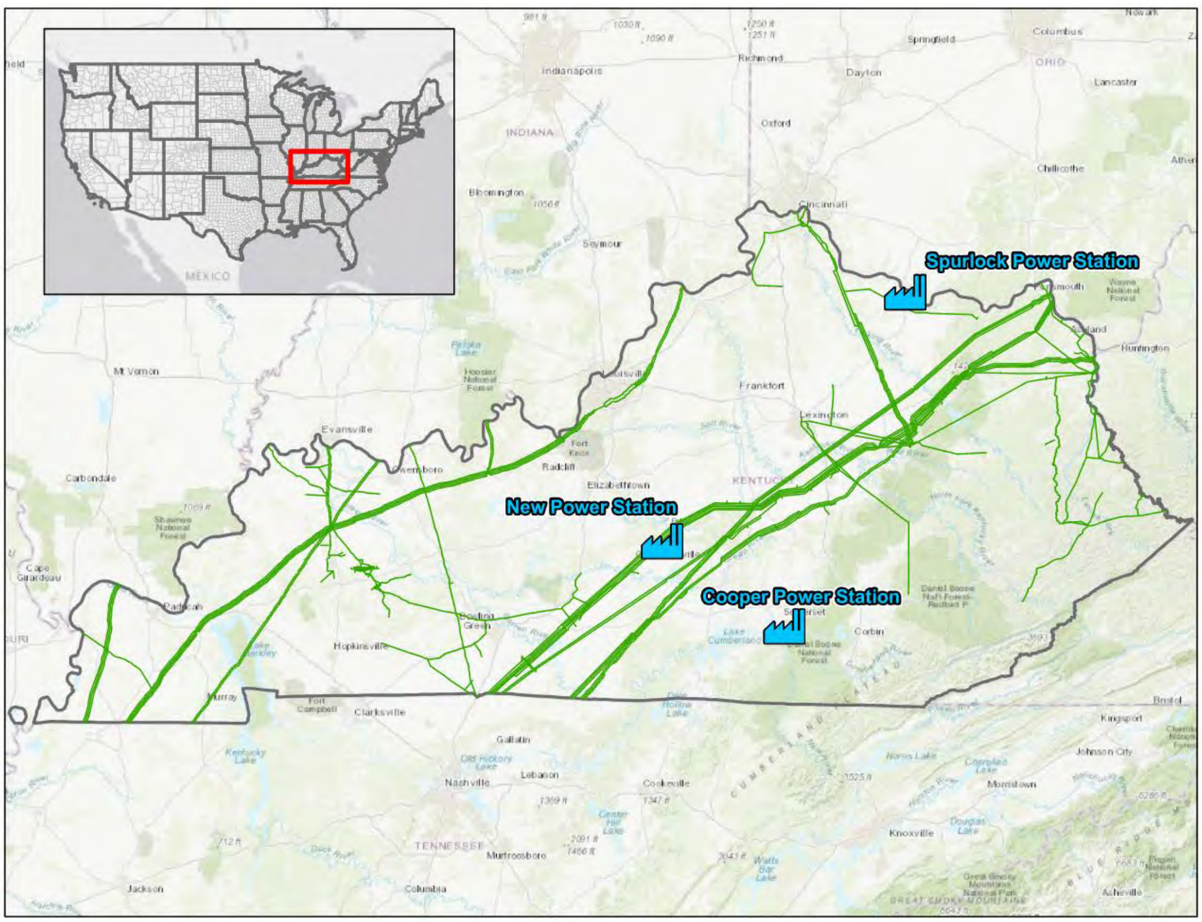

Figure 1: Map of EKPC Generation Facility Locations in Kentucky

Design Criteria

The natural gas pipeline system shall meet or exceed the following design criteria. Include with the proposal a Process Flow Diagram (PFD) which shows the major equipment in the gas supply pipeline lateral system and the custody transfer point. The PFD should also specify the pipeline size and material specifications as well as the approximate size for the required equipment. The gas supply systems must be designed, constructed, maintained, and operated in accordance with all applicable federal, state, and local regulations and industry codes (see the Section on Codes and Standards for details on applicable industry codes and standards).

Maximum Gas Demand

Spurlock Power Station

- 190,000 Dth/day (Option 1)
- 140,000 Dth/day (Option 2)
- 290,000 Dth/day (Option 3)

Cooper Power Station

- 200,000 Dth/day (Option 1)
- 140,000 Dth/day (Option 2)
- 190,000 Dth/day (Option 3)
- 260,000 Dth/day (Option 4)
- + 15,000 Dth/day (Adder to each option above for the Monticello expansion)

Campbellsville Power Station

- 48,000 Dth/day

Minimum Required Delivery Pressure

- Spurlock Option 1 = 200 psig (*)
- Spurlock Options 2 & 3 = 600 psig
- Cooper All Options = 600 psig
- Campbellsville = 200 psig

** EKPC wants to preserve the design capability of the Spurlock pipeline lateral system to increase this delivery pressure in the future to 600 psig and increase the capacity to 290,000 Dth/day (with additional compression if required at a future date).*

Required Equipment

- Coalescing Filter Separator (if required to meet gas quality standards)
- Pipeline Launcher & Receiver (at least one set of L&Rs for the Spurlock & Cooper projects)
- Custody transfer meter with SCADA connectivity for EKPC
- Gas Chromatograph
- Pressure regulation and heater (if required)

Natural Gas Quality Standards

All gas to be delivered from the supplier shall conform to the following specifications:

- Oxygen – Less than 0.2% by volume
- Hydrogen Sulfide – Less than 2.5 grain/Mscf
- Total Sulphur – Less than 200 grain/Mscf
- Carbon Dioxide – Less than 2.0% by volume
- Water – Less than 6 lb/MMscf
- Heating Value – Greater than 950 Btu/scf
- Particulates / Dust
    - Maximum particle size (d) = 10µm
    - d<5 µm = <18.5 ppm(wt)
    - d<5 µm = <1.5 ppm(wt)

Additional Design Criteria

- The pipelines shall be designed, built, and tested entirely to transmission line Area Class 3 requirements (0.5 design factor).
- It is preferred to utilize existing utility easements for pipeline routing where possible.
- Maximum mainline valve spacing shall be no greater than 8 miles. Mainline valves should be equipped with remote actuation and capable of rapid closure in the event of a pipeline rupture in accordance with the PHMSA Rupture Mitigation Valve (RMV) Rule.
- Pipeline materials of choice shall not exceed API 5L Grade X70 yield strength.
- If possible, it is preferred that the new pipeline lateral is supplied by two or more mainline taps on the upstream interstate transmission pipeline (if there are multiple parallel mainlines) to ensure gas supply to the facilities in the event that one main line is shutdown for maintenance or emergencies.
- Operating noise levels from all pipeline equipment should be kept to a minimum and must meet or exceed all local requirements.
- All equipment and materials shall be rated for the full ambient temperature range of -20 to 120 °F at a minimum.
- If necessary, heaters should be included to prevent icing.

- Stations and MLV sites should be equipped with security fencing and other site security measures commensurate for facilities supporting critical energy infrastructure.

Preliminary Pipeline Lateral Route

Please provide with the proposal at least one primary and two alternative pipeline routes for each project in a google earth (.kmz) file format. The geographic location of each facility is indicated below. Also include a proposed site layout for the Metering & Regulation facilities at the plant site. Consideration should be given to utilizing existing utility corridors for the pipeline route to minimize land disturbances and easement costs. EKPC can coordinate with Bidder for possible use of its existing EKPC HVAC power transmission corridors for co-location of the pipeline lateral where feasible. Design and construction considerations will be required to mitigate AC interference issues on the pipeline. A pipeline routing study will be required during Phase 1 of the pipeline projects to compare routing options and select the optimal route.

Spurlock Power Station Custody Transfer Site

A new M&R Station will be required at the existing Spurlock Power Station (38.6931°, -83.8114°) (see *Figure 2*).

Figure 2: EKPC Spurlock Power Station with M&R Station Highlighted

Cooper Power Station Custody Transfer Site

A new M&R Station will be required at the existing Cooper Power Station near the plant entrance approximately (37.0046°, -84.5973°) (see *Figure 3*).

Figure 3: EKPC Cooper Power Station with M&R Station Highlighted

With the potential lateral expansion to the city of Monticello (see *Figure 4*), a new M&R station would be required which could be located near the airport on the northwest side of town (See *Figure 5*).

Figure 4: City of Monticello and Cooper Power Station for Potential Lateral Extension

Figure 5: City of Monticello with M&R Station Highlighted

Campbellsville Power Station Custody Transfer Site

A new M&R Station will be required near Campbellsville, KY. The current preferred location for this facility is near EKPC's existing high voltage transmission lines in the northwest region of Taylor County or (37.436°, -85.373°) (See *Figure 6*).

Figure 6: Site of the Proposed EKPC Campbellsville Power Station with M&R Station Highlighted

Project Schedule

Please provide an estimated Level 3 schedule for the completion of each project. The following key milestones should be included in the proposed schedule with the desired maximum timeframe:

Spurlock Station Project Milestone Schedule	
Project Phase 1	
Award preliminary engineering and permitting / Project kickoff	April 2024
Preliminary design complete / Begin permitting process	October 2024
Project Phase 2	
Award remainder of scope / Procurement and Construction	Fourth Quarter of 2025
Final System Design	Second Quarter of 2026
Certificates and Permits Acquired / Order Material	First Quarter of 2027
Land Acquired	Fourth Quarter of 2027
Construction Kickoff	Second Quarter of 2028
System Startup	First Quarter of 2029

Cooper Station Project Milestone Schedule	
Project Phase 1	
Award preliminary engineering and permitting / Project kickoff	April 2024
Preliminary design complete / Begin permitting process	October 2024
Project Phase 2	
Award remainder of scope / Procurement and Construction	Fourth Quarter of 2025
Final System Design	Second Quarter of 2026
Certificates and Permits Acquired / Order Material	First Quarter of 2027
Land Acquired	Fourth Quarter of 2027
Construction Kickoff	Second Quarter of 2028
System Startup	First Quarter of 2029

Campbellsville Station Project Milestone Schedule	
Project Phase 1	
Award preliminary engineering and permitting / Project kickoff	April 2024
Preliminary design complete / Begin permitting process	October 2024
Project Phase 2	
Award remainder of scope / Procurement and Construction	Second Quarter of 2025
Final System Design	Fourth Quarter of 2025
Certificates and Permits acquired / Order material	Second Quarter of 2026
Land Acquired	Second Quarter of 2026
Construction Kickoff	Third Quarter of 2026
System Startup	Fourth Quarter of 2027

Construction Permitting

Include with the proposal a permit matrix for each project which indicates all Federal, State, and Local permits that will need to be acquired. The Supplier will be required to obtain all permits and certificates for the project. The Supplier will also be responsible for all environmental field survey costs including, but not limited to, biological and cultural field surveys as well as purchasing mitigation credits if required.

Land Acquisition

Include with the proposal an estimate for the acreage and number of land parcels that will need to be acquired. The Supplier will be required to obtain all land easements for the project and cover all costs including land acquisition costs, ROW field agents, cost per parcel, title reviews, easement negotiations and other related costs for securing the pipeline route land rights.

Regulatory Approvals

With the permit matrix please provide a description of the regulatory approvals and permits/certificates required to enable construction and operation of the pipeline laterals. Provide information if the laterals will be constructed under federal jurisdiction with the Federal Energy Regulatory Commission (FERC) or under state jurisdiction with the Kentucky Public Utilities Commission (KPUC).

For either regulatory jurisdiction, please provide the following information:

- Filing requirements for regulatory certificate describing any requirements from EKPC including executed agreements such as Precedent Agreements, Lateral Transportation Agreements, Interconnect Agreements, and other forms of project commitment and intent by EKPC.
- Regulatory schedule and timeline for obtaining all permits and certificates required for project.
- Initial project plan for landowner and public relations to ensure efficient project execution and to minimize landowner and public resistance.

Transportation Services on Pipeline Lateral

Please provide a description of the transportation services to be offered on the pipeline lateral including whether the transportation would be provided under federal or state jurisdiction. Provide any existing or proposed tariffs which would govern the lateral transportation services.

Interstate Transportation Capacity

For the upstream interstate pipeline that the lateral pipeline will be interconnected, provide the following information with respect to firm capacity availability. This information is being requested in this RFP is to understand the availability and rates (and potential discounts) for firm transportation capacity on the interconnected interstate pipeline system.

- The availability of firm transportation capacity to meet each of the load options specified by plant.
    - Provide associated transportation rates (reservation and commodity), fuel losses, and surcharges for this capacity.
    - Provide potential discounts or negotiated rates that may apply in conjunction with the pipeline lateral project and the new generation load.
- The primary path (primary receipt to primary delivery) of the firm transportation capacity which is available, and the production zone or basin being accessed.
- If insufficient firm transportation capacity is partially or not available, describe any mainline (looping) or facility (compression) expansions that may be required to support the firm capacity requirements.
    - If system expansions are required to provide the firm capacity, address the regulatory permits and certificates required and anticipated timelines for approvals.
    - Describe the rate impacts, if any, of the system expansions required to support the firm capacity.
- Describe balancing or storage services available to balance gas supply and generation demand on an hourly, daily, and monthly basis.
    - Are the services provided on a firm or interruptible basis.
    - Provide the availability of any firm balancing or storage services.
    - Provide the rates and charges for the balancing and storage services.

Pricing

Please submit pricing using the attached format as a fixed capacity reservation rate, and commodity use rate, Fuel/Lost & Unaccounted For Gas (LUFG) rate for three separate 20-, 25- and 30-year contract terms. Also include assumptions used for Fuel/Lost & Unaccounted for Gas (LUFG) and the primary source of the gas and whether or not an expansion would be required on the instate transmission system.

For the base Cooper pipeline options, size the piping and equipment with the assumption that the Monticello expansion moves forward and therefore will already be capable of meeting this additional 15,000 Dth/day gas demand. Price all costs associated specifically with this approximate 20-mile pipeline extension as a separate lump sum cost including all design, permitting, materials, equipment, and construction. For operations and maintenance costs include a commodity use charge necessary to recover these costs for the Supplier.

For bid comparison purposes all costs for the project design and construction are assumed to be covered by the Supplier and recouped over the length of the lateral transportation agreement. Further negotiations may be necessary with the preferred bidder(s) to determine an appropriate progress payment schedule to share the risks during the project development and regulatory approval phase.

After the primary contract term for the pipeline lateral expires, the contract may be extended at the option of EKPC at new rates that are established on the actual cost of service for providing firm transportation services on the lateral.

Request For Proposal ("RFP') Conditions:

1) All information in this RFP is the intellectual property of EKPC and should be treated as such. In addition, the information contained in any resulting contract from this solicitation is regarded as confidential and is not to be disclosed beyond the parties directly involved without the express written consent of EKPC or as may be required by applicable law.

2) In protecting any of bidder's confidential or proprietary information in a proposal, such information must be specifically and clearly marked as being confidential and proprietary.

3) EKPC reserves the right to accept and/or reject any and all proposals. Bidder may not claim any damages of any kind, nor may bidder contest for whatever reason, the choice made by EKPC.

4) EKPC is not under any obligations to award a contract and reserves the right to modify or terminate the RFP process at any time, and to withdraw from discussions with any or all of the bidders who have responded.

5) This RFP shall not be construed as an authorization to perform development work at the expense of EKPC. Any development work performed, or any expenses made by a bidder to respond to this RFP will be at the discretion and sole responsibility of the bidder. EKPC will not reimburse any expenses incurred by the bidder as a result of the bidder's participation in this solicitation. This RFP does not represent a commitment to purchase.

6) Bidder shall refrain from any publicity regarding this RFP or the contents thereof. Bidder shall not release any information to newspapers, magazines, journals, or any other medium about the acceptance of the tender or the award of the contract without the prior written approval of EKPC or as may be required by applicable law.

7) An agreement must be executed prior to commencement of any work. No obligations on the part of EKPC will be incurred until an award has been made by EKPC and a resulting agreement has been fully executed by both parties.

8) An authorized officer of the company submitting the proposal must sign all proposals.

9) Project decisions regarding contract awards will be based on an evaluated basis.

10) All options available to EKPC will be evaluated before any recommendation is made to management for approval.

11) Proposals may be for any of the options. EKPC also reserves the right to accept one or more proposal(s) for a portion or for all of the potential projects it seeks to evaluate with this request.

12) Any potential Agreement would be contingent upon senior management approval and mutually agreeable terms and conditions.

13) Any conditions of this RFP which cannot be fulfilled are to be specifically and clearly stated in bidder's proposal as a clarification or exception.

Codes and Standards

The design, construction, operations, and maintenance of these gas supply systems must conform to all applicable industry codes and standards. Title 49 CFR Part 192 shall be the governing federal regulatory code in addition to the latest edition of the following industry standards at a minimum:

- American Petroleum Institute (API):
  - Spec 5L – Line Pipe
  - API 6D – Specification for Pipeline Valves
  - API 6FA – Specification for Fire Test for Valves
  - STD 594 – Check Valves: Flanged, Lug, Wafer, and Butt-welding
  - STD 598 – Valve Inspection and Testing
  - STD 599 – Metal Plug Valves – Flanged, Threaded and Welding Ends
  - STD 607 – Fire Test for Soft Seated Quarter Turn Valves
  - STD 608 – Metal Ball Valves – Flanged, Threaded, and Welding Ends
  - STD 622 – Testing of Process Valve Packing for Fugitive Emissions
  - STD 641 – Testing of Quarter-turn Valves for Fugitive Emissions
  - STD 1104 – Standard for Welding Pipelines and Related Facilities
  - RP 500 - Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
  - MPMS 14.1 – Collecting and Handling of Natural Gas Samples for Custody Transfer

- American Society of Mechanical Engineers (ASME):
  - A13.1 – Scheme for the Identification of Piping Systems
  - B16.5 – Pipe Flanges and Flanged Fittings
  - B16.9 – Factory-Made Wrought Steel Buttwelding Fittings
  - B16.10 – Valve Face to Face/End to End Dimensions
  - B16.11 – Forged Steel Fittings, Socket-Welding and Threaded
  - B16.20 – Metallic Gaskets for Pipe Flanges - Ring-Joint, Spiral-Wound, and Jacketed
  - B16.21 – Non-metallic Flat Gaskets for Pipe Flanges
  - B16.25 – Buttwelding Ends
  - B16.34 – Valves - Flanged, Threaded and Welding End
  - B31.8 – Gas Transmission and Distribution Piping Systems

- American Gas Association (AGA)
  - Report No. 8, Compressibility Factors of Natural Gas and other Related Hydrocarbon Gases
  - Report No. 9 – Measurement of Gas by Multipath Ultrasonic Meters
  - XL 1001 – Classification of Locations for Electrical Installations in Gas Utility Areas

- American Society for Testing and Materials (ASTM):
  - A36 – Standard Specification for Carbon Structural Steel
  - A53 – Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
  - A105 – Carbon Steel Forgings for Piping Applications
  - A139 – Electric-Fusion (Arc) - Welded Steel Pipe
  - A193 – Alloy-Steel and Stainless-Steel Bolting Materials for High-Temperature Service
  - A194 – Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
  - A234 – Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
  - A269 – Seamless and Welded Austenitic Stainless-Steel Tubing for General Service
  - A694 – Carbon and Alloy Steel Forgings for Pipe Flanges, Fittings, Valves, and Parts for High-pressure Transmission Service

- Manufacturer's Standardization Society (MSS)
  - SP-25 – Standard Markings for Valves, Fittings, Flanges & Unions
  - SP-53, SP-54, SP-55 – Quality Standard for Steel Castings for Valves, Flanges, Fittings, and Other Piping Components
  - SP-71 – Gray Iron Swing Check Valves, Flanged and Threaded Ends
  - SP-72 – Ball Valves with Flanged or Butt-Welding Ends for General Service
  - SP-78 – Gray Iron Plug Valves, Flanged and Threaded Ends

- National Fire Protection Association (NFPS)
  - 56 – Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems

- 67 – Guide on Explosion Protection for Gaseous Mixtures in Pipe systems
- 70 - National Electric Code (NEC)

- National Association of Corrosion Engineers (NACE)
  - SP0206 – Internal Corrosion Direct Assessment Methodology for Pipelines Carrying Normally Dry Natural Gas
  - SP0113 – Pipeline Integrity Method Selection
  - TM0106 – Detection, Testing, and Evaluation of Microbiology Influenced Corrosion (MIC) on External Surfaces of Buried Pipelines
  - TM0109 – Aboveground Survey Techniques for the Evaluation of Underground Pipeline Coating Condition
  - TM0212 - Detection, Testing, and Evaluation of Microbiology Influenced Corrosion (MIC) on Internal Surfaces of Buried Pipelines
  - SP0169 – Control of External Corrosion on Underground or Submerged Metallic Piping Systems
  - SP0572 – Design, Installation, Operation, and Maintenance of Impressed Current Deep Goundbeds
  - SP0286 - Electrical Isolation of Cathodically Protected Pipelines

- All applicable Federal, State and Local requirements

EAST KENTUCKY POWER COOPERATIVE
A Touchstone Energy Cooperative

Gas Pipeline Lateral and Interconnect Pricing Form

Date: 5-Dec-23

Spurlock Power Station											
New Pipeline Lateral & Interconnect				**Interconnected Interstate Pipeline** *Firm Transportation Rates are Indicative Rates for the Interstate Pipeline*							
Option 1 - 190,000 Dekatherms/day (**)		**Lateral Mileage:**									
Contract Term Years	**Capacity Reservation Charge $/(Dth/day) each Month**	**Commodity Use Charge $/Dth**	**Fuel/LUFG**	**Interstate Pipeline**	**Interstate Firm Transportation Capacity Available**	**Firm Transportation Primary Path**	**Firm Transportation Reservation Charge $/(Dth/day) each Month**	**Firm Transportation Commodity Use Charge $/Dth**	**Fuel/LUFG**	**Interstate Capacity System Expansion Required?**	**Non-Rateable Flowrate Allowed (*) Dth/hr**
20											
25											
30											
Option 2 - 140,000 Dekatherms/day											
20											
25											
30											
Option 3 - 290,000 Dekatherms/day											
20											
25											
30											

* During critical periods will the supplier allow hourly flowrates that exceed the Maximum Daily Contract Quantity divided by 24 hours and to what maximum hourly flowrate would be allowed?

** EKPC wants to preserve the capability of the Spurlock pipeline lateral system to increase this delivery pressure in the future to 600 psig and increase the capacity to 290,000 Dth/day (with additional compression if required at a future date)

ATTACHMENT MH-2

NATURAL GAS PIPELINE LATERAL AND INTERCONNECT PHASE 2 PROPOSAL REQUIREMENTS

East Kentucky Power Cooperative

June 27, 2024

HIGHLY CONFIDENTIAL

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Executive Summary

East Kentucky Power Cooperative (EKPC) has invited your company to participate in the Phase 2 bidding process to submit final binding proposals for the construction and operation of a firm gas supply pipeline lateral and interconnect for providing firm gas transportation services from interstate pipelines operating in the region to three power plant sites within the state of Kentucky over an initial 20-year term agreement. These sites include two existing generation facilities and a new green field power station. Each facility has a forecasted gas load based on future generation plant configurations with the potential for future capacity expansions. EKPC is requesting individual proposals for each project and will award each project independently of the other sites.

Phase 2 Proposal Process

Following the Phase 1 proposal evaluations, two finalist bidders were selected to participate in the final binding RFP. EKPC will schedule recurring meetings with each of the participating Bidders during the timeframe of April through June to refine the project scope in greater detail and answer questions. EKPC requests Bidders submit their final proposals by July 3, 2024 at 5:00 PM EST. The final proposal shall be submitted to a secure electronic lockbox at system.proposal@ekpc.coop where they will be opened for the first time at a formal bid opening. EKPC expects to make a final decision for the winning bid for each plant site by July 31, 2024. Any questions can be submitted by email to Mark Horn (Director, Fuel and Emissions) at mark.horn@ekpc.coop. The table below lays out this timeframe:

RFP Process Steps	Deadline
Phase 2 Invitation to Final Bidders	March 8, 2024
Individual Bidder Project Scoping Meetings	April - June 2024
Bidders Submit Final Binding Proposals	July 3, 2024
EKPC Final Decision for Each Plant Site	July 31, 2024

Include in the proposal the following information for each project:

- Pipeline Lateral Transportation Rate
- Description of proposed Firm Transportation Services for pipeline lateral
- Mainline Transportation Rate
- Description of Firm Transportation Services for the upstream Interstate Pipeline
- Primary Pipeline Route (.kmz format)
- Project Schedule
- FERC Certificate Application Strategy
- Environmental and Other Required Project Permits Matrix
- Process Flow Diagram (PFD)
- Hydraulic Flow Calculations

- Any exceptions or clarifications taken to the requirements stated in this RFP document

Definitions

Supplier/Bidder – Companies invited to bid on the design, permitting, construction, operation, and maintenance of a natural gas pipeline lateral from the interconnected upstream interstate pipeline to the power plant M&R Station custody transfer point. The Supplier/Bidder will be a qualified interstate pipeline company.

Company – East Kentucky Power Cooperative (EKPC)

Scope of Work

EKPC is soliciting bids for the construction and operation of firm gas pipeline supply systems for three power plant sites within the state of Kentucky to interconnect with interstate pipelines operating in the region (see *Figure 1: Map of EKPC Generation Facilities in Kentucky*). The power plants include two existing generation facilities and a new power station. For all projects the Supplier and their subcontractors will be responsible for the design, permitting, construction, operations, and maintenance of the gas supply pipeline lateral system from the upstream interstate transmission mainline tie-in(s) through to the custody transfer point at the new M&R Station located at the plant sites.

The three projects under consideration are:

- Spurlock Power Station
- Cooper Power Station
- “New” Power Station of RICE units near Liberty, KY (facility will be named later)

Site work to convert these units to natural gas at the stations will be completed by others. The new gas supply pipeline lateral systems will include tie-ins (multiple mainline taps) to the interstate pipeline, a new pipeline lateral sized for the respective load, and a Metering and Regulation (M&R) Station to deliver gas to the power station site from an interstate transmission pipeline.

The power station near Liberty, KY will be a new “green field” facility which will be constructed by others. Immediately adjacent to the power station a new M&R Station will be required to deliver gas to the power station from an interstate transmission pipeline. The Supplier will be required to design and the construct the gas supply pipeline system from the upstream transmission mainline tie-in(s) through to the custody transfer point at the new M&R station located at the plant site.

Project Location Map

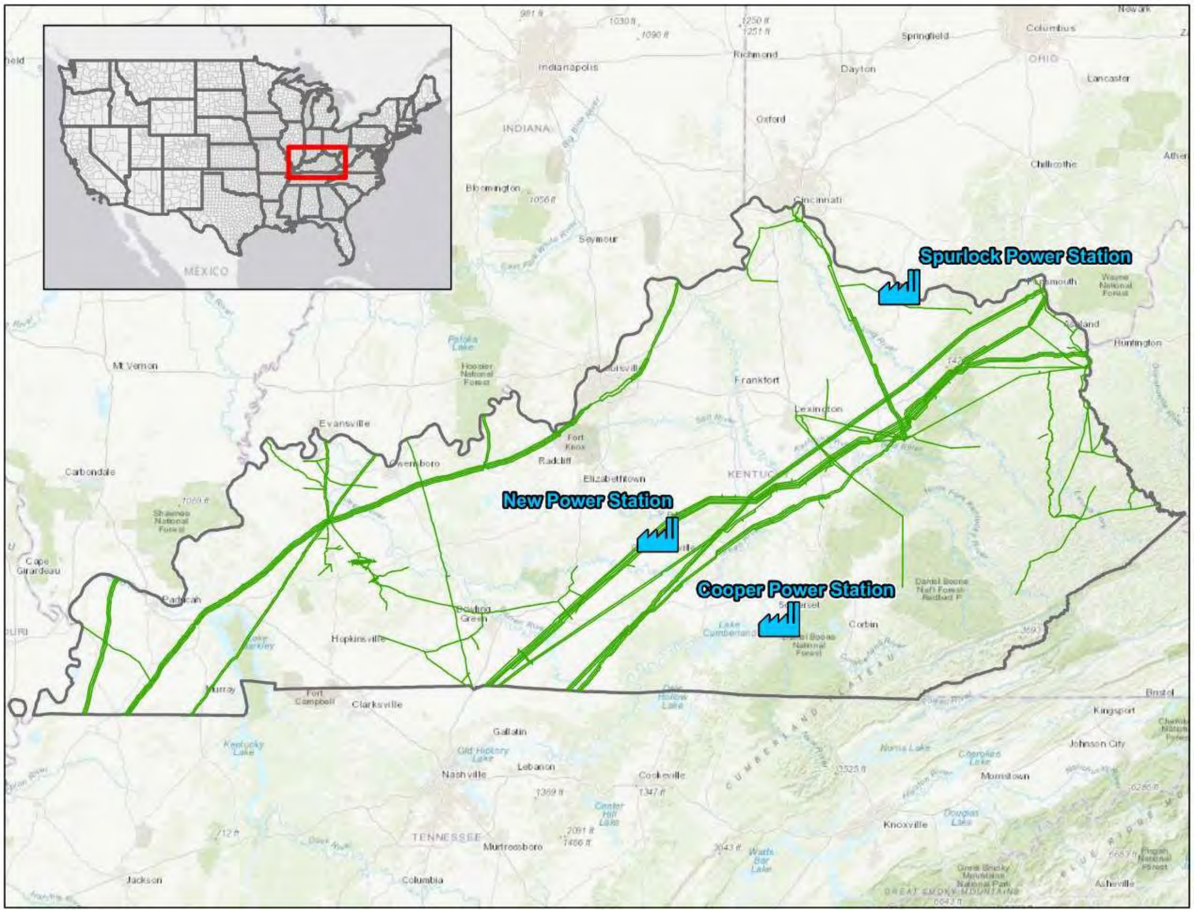


Figure 1: Map of EKPC Generation Facility Locations in Kentucky

Design Criteria

The natural gas pipeline system shall meet or exceed the following design criteria. The gas supply systems must be designed, constructed, maintained, and operated in accordance with all applicable federal, state, and local regulations and industry codes (see the Section on Codes and Standards for details on applicable industry codes and standards). For the future expansion cases additional compression may or may not be required, omit any costs associated with such an expansion from the base cases but ensure the selected pipeline size is capable of achieving this higher flowrate.

Maximum Natural Gas Demand

Spurlock Power Station

- 200,000 Dth/day (Base Case)
- 290,000 Dth/day (Future Expansion)

Cooper Power Station

- 200,000 Dth/day (Base Case)
- 260,000 Dth/day (Future Expansion)

RICE Units (Liberty) Power Station

- 50,000 Dth/day (Base Case)
- 100,000 Dth/day (Future Expansion)

Minimum Required Natural Gas Delivery Pressure

- Spurlock Base Case = 200 psig
- Spurlock Future Expansion = 600 psig
- Cooper Base Case = 200 psig or 600 psig (To Be Determined)
- Cooper Future Expansion = 600 psig (EKPC may forgo the 200 psig Base Case)
- RICE (Liberty) = 200 psig (Base and Expansion)

Required Equipment

- Coalescing Filter Separator (if required to meet gas quality standards)
- Pipeline Launcher & Receiver (at least one set of L&Rs for the Spurlock & Cooper projects)
- Custody transfer meter with SCADA connectivity for EKPC
- Gas Chromatograph
- Pressure regulation and line heater (if required)

Natural Gas Quality Standards

All gas to be delivered from the supplier shall conform to the following specifications:

- Oxygen – Less than 0.2% by volume
- Hydrogen Sulfide – Less than 2.5 grain/Mscf
- Total Sulphur – Less than 200 grain/Mscf
- Carbon Dioxide – Less than 2.0% by volume
- Water – Less than 7 lb/MMscf
- Heating Value – Greater than 950 Btu/scf
- Particulates / Dust
    - Maximum particle size (d) = 10µm
    - d < 5 µm = < 18.5 ppm(wt)
    - 5 < d < 10 µm = < 1.5 ppm(wt)

Additional Design Criteria

- The pipelines shall be designed, built, and tested to transmission line Area Class 2 requirements (0.6 design factor) or better where required.
- It is preferred to utilize existing utility easements for pipeline routing where possible.
- Maximum mainline valve spacing shall be no greater than 15 miles. Areas of higher-class rating will require shorter spacing. Mainline valves should be equipped with remote actuation and capable of rapid closure in the event of a pipeline rupture in accordance with the PHMSA Rupture Mitigation Valve (RMV) Rule.
- Pipeline materials of choice shall not exceed API 5L Grade X70 yield strength.
- If possible, it is preferred that the new pipeline lateral is supplied by two or more mainline taps on the upstream interstate transmission pipeline (if there are multiple parallel mainlines) to ensure gas supply to the facilities in the event that one main line is shut down for maintenance or emergencies.
- Operating noise levels from all pipeline equipment should be kept to a minimum and must meet or exceed all local requirements.
- All equipment and materials shall be rated for the full ambient temperature range of -20 to 120 °F at a minimum.
- If necessary, heaters should be included to prevent icing.
- Stations and MLV sites should be equipped with security fencing and other site security measures commensurate for facilities supporting critical energy infrastructure.

Preliminary Pipeline Lateral Route

Please provide with the proposal a primary pipeline route for each project in a google earth (.kmz) file format. The geographic location of each facility is indicated below. Also include a proposed site layout for the Metering & Regulation facilities at the plant site. Consideration should be given to utilizing existing utility corridors for the pipeline route to minimize land disturbances and easement costs. EKPC can coordinate with Bidder for possible use of its existing EKPC electric power transmission corridors for co-location of the pipeline lateral where feasible. Design and construction considerations will be required to mitigate AC interference issues on the pipeline. A pipeline routing study will be required during the design phase of the pipeline projects to compare routing options and finalize the optimal route.

Spurlock Power Station Custody Transfer Site

A new M&R Station will be required at the existing Spurlock Power Station (38.6931°, -83.8114°) (see *Figure 2*).

Figure 2: EKPC Spurlock Power Station with M&R Station Highlighted

Cooper Power Station Custody Transfer Site

A new M&R Station will be required at the existing Cooper Power Station near the plant entrance approximately (37.0046°, -84.5973°) (see *Figure 3*).

Figure 3: EKPC Cooper Power Station with M&R Station Highlighted

RICE units (Liberty) Power Station Custody Transfer Site

A new M&R Station will be required near Liberty, KY. The current preferred location for this facility is near EKPC's existing high voltage transmission lines in the northwest region of Casey County or (37.3685°, -84.9554°) (See *Figure 6*).

Figure 4: Site of the Proposed EKPC Liberty Power Station with M&R Station Highlighted

Project Schedule

Please provide an anticipated project delivery schedule for the completion of each project. A Precedent Agreement will be executed which will include a forecasted schedule for the project. A Reimbursement Agreement may be necessary between the successful bidder and the Company to accelerate the design and permitting phase of the pipeline projects in advance of the final project approval. Assuming the accelerated schedule and associated Reimbursement Agreement is agreed to, the following key milestones should be included in the proposed schedules with the desired maximum timeframe.

Spurlock & Cooper Station Projects Milestone Schedule	
Executed Precedent Agreement / Project kickoff	August 2024
30% Design	
60% Design	
FERC 7c Application	
90% Design	
FERC Certificate	
FERC Notice to Proceed	
Order Long Lead Material	
Final IFC System Design	
Land rights secured	
Construction Start	
Mechanical Completion	
In-Service Date	February 2029

RICE Units Project Milestone Schedule	
Executed Precedent Agreement / Project kickoff	August 2024
30% Design	
60% Design	
FERC Prior Notice Request	
90% Design	
FERC Authorization	
Order Long Lead Material	
Final IFC System Design	
Land Rights Secured	
Construction Start	
Mechanical Completion	
In-Service Date	August 2028

Construction Permitting

Include with the proposal a permit matrix for each project which indicates all Federal, State, and Local permits that will need to be acquired. The Supplier will be required to obtain all permits and certificates for the project. The Supplier will also be responsible for all environmental field survey costs including, but not limited to, biological and cultural field surveys as well as purchasing mitigation credits if required.

Land Acquisition

Include with the proposal an estimate for the acreage and number of land parcels that will need to be acquired. The Supplier will be required to obtain all land easements for the project and cover all costs including land acquisition costs, ROW field agents, cost per parcel, title reviews, easement negotiations and other related costs for securing the pipeline route land rights.

Regulatory Approvals

With the permit matrix please provide a description of the regulatory approvals and permits/certificates required to enable construction and operation of the pipeline laterals. Provide information for the laterals to be constructed under federal jurisdiction with the Federal Energy Regulatory Commission (FERC).

Please provide the following information:

- Filing requirements for regulatory certificate describing any requirements from EKPC including executed agreements such as Precedent Agreements, Lateral Transportation Agreements, Interconnect Agreements, and other forms of project commitment and intent by EKPC.
- Regulatory schedule and timeline for obtaining all permits and certificates required for project.
- Initial project plan for landowner and public relations to ensure efficient project execution and to minimize landowner and public resistance.

Process Flow Diagram

Include with the proposal a Process Flow Diagram (PFD) which shows the major equipment in the gas supply pipeline lateral system and the custody transfer point. Include lines greater than 2" NPS. The PFD should also specify the pipeline size and material specifications as well as the approximate size for the required equipment. Indicate the specific location of the custody transfer point between the Supplier and Company, which we anticipate will be a downstream flange after metering and pressure regulation.

Hydraulic Flow Calculations

In order to verify the selected pipeline size. Please provide hydraulic flow calculations that indicate the anticipated delivery pressure to each of the stations assuming a worst-case operational pressure scenario for both the base flow cases and the potential future expansion cases.

Transportation Services on Pipeline Lateral and Interstate Pipeline

For the upstream interstate pipeline and lateral capacity, provide the following information with respect to firm capacity being offered.

- The firm transportation capacity being offered.
    - Provide associated transportation rates (reservation and commodity), fuel losses, and surcharges for this capacity separately on the lateral and on the interstate pipeline.

  - Provide potential discounts or negotiated rates that will apply in conjunction with the pipeline lateral project and the new generation load.
  - Describe the proposed methodology to secure additional firm transportation capacity to meet the future expansion capacity needs of all three plant sites.
- The primary path (primary receipt to primary delivery) of the firm transportation capacity which is available, and the production zone or basin being accessed.
- If insufficient firm transportation capacity is partially or not available, describe any mainline (looping) or facility (compression) expansions that may be required to support the firm capacity requirements.
  - If system expansions are required to provide the firm capacity, address the regulatory permits and certificates required and anticipated timelines for approvals.
  - Describe the rate impacts, if any, of the system expansions required to support the firm capacity.
- Describe balancing or storage services available to balance gas supply and generation demand on an hourly, daily, and monthly basis.
  - Are the services provided on a firm or interruptible basis.
  - Provide the availability of any firm balancing or storage services.
  - Provide the rates and charges for the balancing and storage services.
  - Please describe any central delivery point or similar services to help balance plant generation requirements across all of EKPC's natural gas generation assets on a daily basis.

Pricing

Please submit pricing as a fixed capacity reservation rate, and commodity use rate for a 20-year contract term. Also include assumptions used for Fuel/Lost & Unaccounted for Gas (LUFG) and the primary proposed source(s) of the gas and whether an expansion would be required on the interstate transmission system for that source. Also, indicate any discounts being offered for being awarded multiple projects.

Assuming final approval for the project is granted by the EKPC Board of Directors, the initial Reimbursement Agreement for the initial at-risk design and permitting efforts will be superseded by the individual project's Precedent Agreement.

After the primary contract term for the pipeline lateral expires, please describe the methodology for EKPC to renew the Firm Transportation Agreements, the applicable rates, and any future ROFR rights.

Request For Proposal ("RFP") Conditions:

1) All information in this RFP is the intellectual property of EKPC and should be treated as such. In addition, the information contained in any resulting contract from this solicitation is regarded as confidential and is not to be disclosed beyond the parties directly involved without the express written consent of EKPC or as may be required by applicable law.

2) In protecting any of bidder's confidential or proprietary information in a proposal, such information must be specifically and clearly marked as being confidential and proprietary.

3) EKPC reserves the right to accept and/or reject any and all proposals. Bidder may not claim any damages of any kind, nor may bidder contest for whatever reason, the choice made by EKPC.

4) EKPC is not under any obligations to award a contract and reserves the right to modify or terminate the RFP process at any time, and to withdraw from discussions with any or all of the bidders who have responded.

5) This RFP shall not be construed as an authorization to perform development work at the expense of EKPC. Any development work performed, or any expenses made by a bidder to respond to this RFP will be at the discretion and sole responsibility of the bidder. EKPC will not reimburse any expenses incurred by the bidder as a result of the bidder's participation in this solicitation. This RFP does not represent a commitment to purchase.

6) Bidder shall refrain from any publicity regarding this RFP or the contents thereof. Bidder shall not release any information to newspapers, magazines, journals, or any other medium about the acceptance of the tender or the award of the contract without the prior written approval of EKPC or as may be required by applicable law.

7) An agreement must be executed prior to commencement of any work. No obligations on the part of EKPC will be incurred until an award has been made by EKPC and a resulting agreement has been fully executed by both parties.

8) An authorized officer of the company submitting the proposal must sign all proposals.

9) All options available to EKPC will be evaluated before any recommendation is made to management for approval.

10) Proposals may be for any of the options. EKPC also reserves the right to accept one or more proposal(s) for a portion or for all of the potential projects it seeks to evaluate with this request.

11) Any potential Agreement would be contingent upon senior management approval and mutually agreeable terms and conditions.

12) Any conditions of this RFP which cannot be fulfilled are to be specifically and clearly stated in bidder's proposal as a clarification or exception.

Codes and Standards

The design, construction, operations, and maintenance of these gas supply systems must conform to all applicable industry codes and standards. Title 49 CFR Part 192 shall be the governing federal regulatory code in addition to the latest edition of the following industry standards at a minimum:

- American Petroleum Institute (API):
  - Spec 5L – Line Pipe
  - API 6D – Specification for Pipeline Valves
  - API 6FA – Specification for Fire Test for Valves
  - STD 594 – Check Valves: Flanged, Lug, Wafer, and Butt-welding
  - STD 598 – Valve Inspection and Testing
  - STD 599 – Metal Plug Valves – Flanged, Threaded and Welding Ends
  - STD 607 – Fire Test for Soft Seated Quarter Turn Valves
  - STD 608 – Metal Ball Valves – Flanged, Threaded, and Welding Ends
  - STD 622 – Testing of Process Valve Packing for Fugitive Emissions
  - STD 641 – Testing of Quarter-turn Valves for Fugitive Emissions
  - STD 1104 – Standard for Welding Pipelines and Related Facilities
  - RP 500 - Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
  - MPMS 14.1 – Collecting and Handling of Natural Gas Samples for Custody Transfer
- American Society of Mechanical Engineers (ASME):
  - A13.1 – Scheme for the Identification of Piping Systems
  - B16.5 – Pipe Flanges and Flanged Fittings
  - B16.9 – Factory-Made Wrought Steel Buttwelding Fittings
  - B16.10 – Valve Face to Face/End to End Dimensions
  - B16.11 – Forged Steel Fittings, Socket-Welding and Threaded
  - B16.20 – Metallic Gaskets for Pipe Flanges - Ring-Joint, Spiral-Wound, and Jacketed
  - B16.21 – Non-metallic Flat Gaskets for Pipe Flanges
  - B16.25 – Buttwelding Ends
  - B16.34 – Valves - Flanged, Threaded and Welding End
  - B31.8 – Gas Transmission and Distribution Piping Systems

- American Gas Association (AGA)
  - Report No. 8, Compressibility Factors of Natural Gas and other Related Hydrocarbon Gases
  - Report No. 9 – Measurement of Gas by Multipath Ultrasonic Meters
  - XL 1001 – Classification of Locations for Electrical Installations in Gas Utility Areas

- American Society for Testing and Materials (ASTM):
  - A36 – Standard Specification for Carbon Structural Steel
  - A53 – Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
  - A105 – Carbon Steel Forgings for Piping Applications
  - A139 – Electric-Fusion (Arc) - Welded Steel Pipe
  - A193 – Alloy-Steel and Stainless-Steel Bolting Materials for High-Temperature Service
  - A194 – Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
  - A234 – Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
  - A269 – Seamless and Welded Austenitic Stainless-Steel Tubing for General Service
  - A694 – Carbon and Alloy Steel Forgings for Pipe Flanges, Fittings, Valves, and Parts for High-pressure Transmission Service

- Manufacturer's Standardization Society (MSS)
  - SP-25 – Standard Markings for Valves, Fittings, Flanges & Unions
  - SP-53, SP-54, SP-55 – Quality Standard for Steel Castings for Valves, Flanges, Fittings, and Other Piping Components
  - SP-71 – Gray Iron Swing Check Valves, Flanged and Threaded Ends
  - SP-72 – Ball Valves with Flanged or Butt-Welding Ends for General Service
  - SP-78 – Gray Iron Plug Valves, Flanged and Threaded Ends

- National Fire Protection Association (NFPS)
  - 56 – Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems
  - 67 – Guide on Explosion Protection for Gaseous Mixtures in Pipe systems
  - 70 - National Electric Code (NEC)

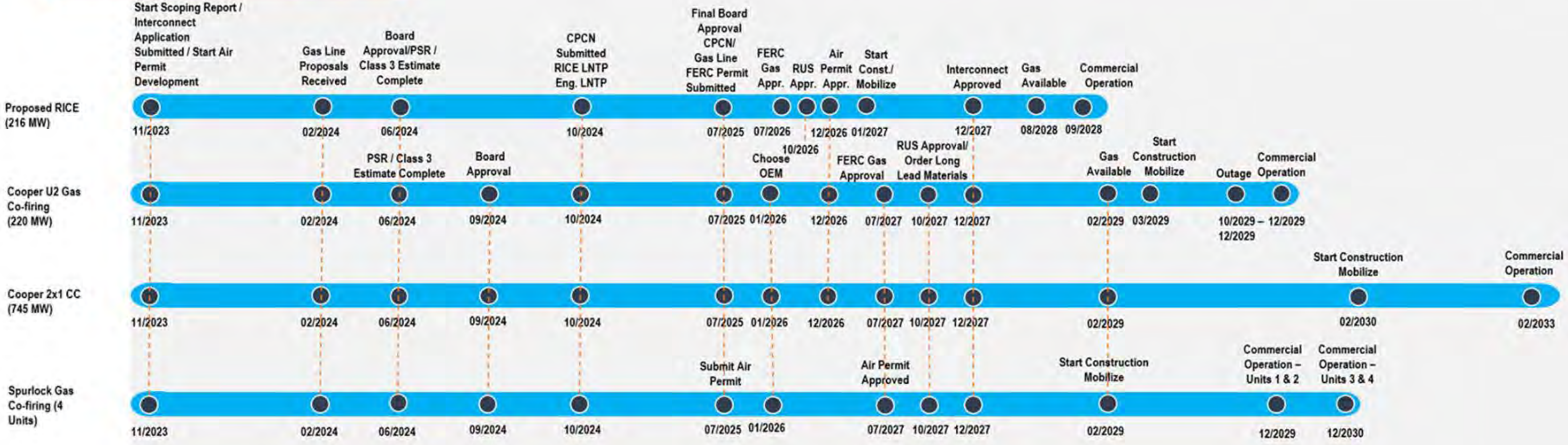
- National Association of Corrosion Engineers (NACE)
  - SP0206 – Internal Corrosion Direct Assessment Methodology for Pipelines Carrying Normally Dry Natural Gas
  - SP0113 – Pipeline Integrity Method Selection
  - TM0106 – Detection, Testing, and Evaluation of Microbiology Influenced Corrosion (MIC) on External Surfaces of Buried Pipelines
  - TM0109 – Aboveground Survey Techniques for the Evaluation of Underground Pipeline Coating Condition

- TM0212 - Detection, Testing, and Evaluation of Microbiology Influenced Corrosion (MIC) on Internal Surfaces of Buried Pipelines
- SP0169 – Control of External Corrosion on Underground or Submerged Metallic Piping Systems
- SP0572 – Design, Installation, Operation, and Maintenance of Impressed Current Deep Goundbeds
- SP0286 - Electrical Isolation of Cathodically Protected Pipelines

* All applicable Federal, State and Local requirements

ATTACHMENT MH-3

Gas Generation Projects



ATTACHMENT MH-4

Pipeline Lateral and Interconnects Project

Summary Worksheet for Project Schedule Level and Total Installed Cost (TIC) Estimate Class

Schedule Level *	Definition of Level	Typical Format	Audience
Level 1	The highest level (least detailed) schedule that reflects key milestones and major activities such as engineering, procurement, construction, and start-up activities.	Gantt Bar Chart	Client Senior Executives and General Managers
Level 2	Developed to communicate the integration of work through life cycle of project and interfaces between key deliverables and contractors.	Gantt Bar Chart	General Managers, Project Managers
Level 3	Developed to describe the execution of the deliverables for each contracting party and reflects the interfaces between key workgroups and crafts involved in the execution of each stage of the project.	Gantt Bar Chart or CPM	Project Managers, Owners Reps, Superintendents, and General Foreman
Level 4	Developed to communicate the production of work packages for each project deliverable. Schedule reflects all interfaces between key elements that drive completion of activities.	Gantt Bar Chart or CPM	Project Managers, Superintendents, and General Foreman
Level 5	Developed to communicate task requirements for completing activities from a detailed project schedule, typically on an hourly, daily, or weekly basis. Used to plan and schedule the utilization of resources (labor, equipment, and materials).	Activity Listing w/ Graphical Time Axis	Superintendents, General Foreman, Craft Foreman

** Association for Advancement of Cost Engineering (AACE) International Recommended Practice No. 37R-06*

Total Installed Cost Estimate Level *	Level of Project Definition (% of Complete Definition such as IFC Engineering)	Purpose	Expected Accuracy Range
Class 5	0% to 2%	Concept Screening	Low: -20% to -50% High: +30% to +100%
Class 4	1% to 15%	Feasibility Study	Low: -15% to -30% High: +20% to +50%
Class 3	10% to 40%	Budget	Low: -10 to -20% High: +10% to +30%
Class 2	30% to 70%	Controls and Bid	Low: -5% to- 15% High: +5% to +20%
Class 1	50% to 100%	Check and Bid/Tender	Low: -3% to -10% High: +3% to +15%

** AACE International Recommended Practice No. 18R-97*

EXHIBIT 9

DIRECT TESTIMONY OF RODNEY HITCH

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	**)**	
KENTUCKY POWER COOPERATIVE,	**)**	
INC. FOR 1) CERTIFICATES OF PUBLIC	**)**	
CONVENIENCE AND NECESSITY	**)**	**CASE NO.**
TO CONSTRUCT NEW GENERATION	**)**	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	**)**	
CERTIFICATE RELATING TO THE SAME;	**)**	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	**)**	
TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	

DIRECT TESTIMONY OF RODNEY HITCH
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF D EMAND SID E MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	)	**CASE NO. 2024-00370**

AFFIDAVIT

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Rodney Hitch, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Rodney A. Hitch

Subscribed and sworn before me on this 19th day of November 2024.

Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. Rodney Hitch, Director Economic Development at East Kentucky Power Cooperative, Inc. ("EKPC"). EKPC's business address is 4775 Lexington, Road, Winchester, Kentucky 40391.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I have a Physical Science degree and hold various economic development certifications. I have 35 years of experience with governmental entities and utilities in areas of business, industry, and community development.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. I am responsible for EKPC's Economic Development Department; this includes initiatives and related activities that assist our sixteen owner-member cooperatives to actively recruit, expand, and retain business, industry and community development for job creation and service area development.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. No.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. To provide information regarding the economic development for EKPC's proposed projects as part of this application.

Q. ARE YOU SPONSORING ANY ATTACHMENTS?

A. No.

Q. PLEASE DESCRIBE THE GENERAL AREA WHERE THE COMBINED CYCLE UNIT WILL BE CONSTRUCTED.

A. The south-central region of Kentucky is home to approximately 66,600 people and Lake Cumberland. Lake Cumberland has 1,255 miles of shoreline and 65,000 surface acres; it is the largest reservoir east of the Mississippi River and ninth-largest reservoir in the United States. The lake draws more recreational visitors (4.89 million) than Yellowstone National Park or Grand Canyon. The Somerset-Pulaski Economic Development Agency (“SPEDA”), KY Area Development District (“ADD”), South KY Economic Development Corporation (“SKED”) and KY Highlands Investment Corp. are all located in this area and provide economic development services ranging from site-selection to financing and training. Several industrial and business park buildings and properties ranging up to 100,000 sq. ft. and 100-acres are available. Education includes three top 40 public high schools, one private high school and a Kentucky Community and Technical College System (“KCTCS”) college. Agriculture is a multi-million-dollar industry. South central Kentucky is third in the state for cattle production, second in the state for beef cattle production, and third in the state for hay production. Abundant water, sewer capacity, low electricity and natural gas rates, a robust regional highway system, public-use airport, available industrial and business property, and a potential 29,000 workforce makes this a desirable region to locate business.

Q. PLEASE DESCRIBE THE LOAD SERVED BY EKPC'S OWNER-MEMBERS IN THAT AREA.

A. Over 2,400 businesses are located in the Pulaski County area providing 21,000 jobs. There are 88 manufacturers that employee approximately 1,886 people. Healthcare, education, retail, and food services are also top-ranking additional employers and investments.

Q. ARE THERE ANY POTENTIAL SITES IN THIS AREA THAT COULD RESULT IN ECONOMIC DEVELOPMENT OPPORTUNITIES IF THE COMBINED CYCLE UNIT IS CONSTRUCTED?

A. There are several industrial/business park properties currently owned by the SPEDA and the sites are promoted by the Kentucky Cabinet for Economic Development, Kentucky Touchstone Energy Cooperatives, EKPC, and SKED. These sites could accommodate several new investment projects in the region and the Somerset and Burnside economic agencies are eager to consider additional business park location investments for growth if this project comes to fruition.

Q. PLEASE GENERALLY DESCRIBE THE AREA WHERE THE COOPER CO-FIRE PROJECT WILL BE CONSTRUCTED.

A. The proposed project will be located in a south-central area of Pulaski County near the city of Somerset. The area has industrial/business park properties, regional transfer railroad yard, and the John S. Cooper Power Station ("Cooper Station"). This location is in a desirable proximity to encourage additional industrial and manufacturing growth and potentially serve the city of Burnside service areas with additional natural gas capacity.

Q. WHAT IS THE TYPICAL LOAD SERVED IN THIS AREA?

A. 2,400 businesses are in this area that include 88 manufacturers, medical centers and healthcare, education, retail, and food services ranking as top companies invested and employers.

Q. ARE THERE ANY POTENTIAL ECONOMIC DEVELOPMENT OPPORTUNITIES IN THE AREA?

A. SPEDA is considered one of Kentucky's most active agencies. Managed by an experienced director and Board of Directors that consist of regional business and governmental leadership, SPEDA is actively working to encourage businesses to locate in the area. The expansion of natural gas capacity for this region will open opportunities for new industry and business seeking the available capacity. Along with the region's current availability of property, rail infrastructure, quality of life, and business friendly environment the increased capacity that will be generated by EKPC's projects will greatly increase opportunities for new investments and employment. This area is a regional hub for employment, this project builds on its current success.

Q. PLEASE GENERALLY DESCRIBE THE AREA SURROUNDING THE PROPOSED CONSTRUCTION SITE FOR THE SPURLOCK CO-FIRE PROJECT.

A. Maysville, and Mason County, has a population of approximately 20,000 and is located on the banks of the Ohio River in northeastern Kentucky. This area is located within a one-hour drive from Cincinnati, Ohio; Lexington, Kentucky; and Huntington, West Virginia. The area has a tradition of offering regional employment, education, rail and river port access, outdoor activities, shopping, and vibrant arts community. Over 700 businesses are located in Mason County and provide over 7,000 jobs. Manufacturing, healthcare, education, professional, transportation, and food services rank as top investments and employers. Currently there are over 600 acres available across multiple industrial and business park properties. The county also has additional manufacturing space for sale or lease ranging from 15,000 sq. feet to 430,000 sq. feet. State analysis reflects 85% of the population has obtained a high school degree or higher and is also served by several workforce and area development district offices. Leadership promotes its proud past and historic downtown while embracing a new Twenty-First Century strategic vision for a progressive future.

Q. WHAT IS THE TYPICAL TYPE OF LOAD IN THIS AREA?

A. 702 businesses are located in Mason County providing 7,600 jobs. There are 33 manufacturers that employee 2,500 people. Healthcare, education, professional, utility, transportation, and food services also rank as top employers and investments.

Q. ARE THERE ANY POTENTIAL ECONOMIC DEVELOPMENT OPPORTUNITIES IN THE AREA?

A. **S**everal industrial/business park properties are currently owned and available from the Maysville and Mason County Economic Development Association. Over 600 acres and multiple vacant manufacturing spaces are routinely promoted by the Kentucky Cabinet for Economic Development and Kentucky Touchstone Energy Cooperatives, and EKPC. These sites could accommodate many new investment projects in the region. With the potential for additional natural gas capacity Mason County leadership and economic development agencies are eager to consider additional investments to ensure future growth when this project comes to fruition.

Q. PLEASE DESCRIBE THE ECONOMIC DEVELOPMENT OPPORTUNITES THAT COULD ARISE AS A RESULT OF THE GAS LATERALS PROPOSED IN THE APPLICATION.

A. Currently the lack of natural gas capacity in both regions prohibits many expansions and new industry investments from companies that require natural gas in their processes or manufacturing. With highway transportation networks, river, rail, and abundant properties already available in the area, the addition of natural gas capacity would elevate these regions' ability to compete for new investment, employment, and related quality of life improvements. Surrounding cities such as Burnside and Dover could also be elevated for future growth opportunities if additional natural gas capacity is available.

Q. PLEASE DESCRIBE THE EFFORTS THAT EKPC HAS UNDERTAKEN OVER THE PAST SEVERAL YEARS TO INCREASE ECONOMIC DEVELOPMENT OPPORTUNITIES WITHIN ITS SERVICE TERRITORY.

A. EKPC began a rebuild of the statewide economic development department and involvement in 2012. At that time, EKPC had no tools, influence, significant partnerships, or presence within Kentucky’s economic development organizations. Since that time, EKPC has worked hard to build strong relationships with the Kentucky Cabinet for Economic Development, many global partners, and organizations that increase the economic development for our owner-member Cooperatives. A list of current initiatives and programs are listed below. This also includes a summary of 2024 potential competitive projects, construction projects, and various success areas that have become reality since we re-energized our economic development efforts in 2015.

- Sixteen trained and active members are on the statewide owner-member economic development team. This includes one member from each owner-member Cooperative.
- Three dedicated EKPC staff members work out of EKPC's Winchester headquarters and assist our 16 owner-members, and 89 counties served in all areas of economic development activities.
- Routinely collaborate, and partner with, the Kentucky Cabinet for Economic Development, federal, state, and local governments on site visits, initiatives, and trade missions.
- Support local and regional industrial development authorities and economic development agencies.
- Assist our 16 owner-member Cooperatives and 89 counties with client requests for information, site development, project information, and client meetings.
- PowerMap, an EKPC developed an award-winning application that provides easy access to information related to owner-member territories, business/industrial park properties, demographics, boundaries, points of interest and incentives.
- PowerVision, an EKPC award winning initiative, dedicated to showcasing owner-member industrial and business park properties. There are 34 sites that are currently

listed with high-definition drone videography and digitized information easily accessible on PowerMap and by website.

- DataIsPower.org website houses links to all department information, resources, critical partners, and incentive programs.
- GURU WebTech is a feature, provided at no cost, that provides information on all areas of Kentucky and our 16 owner-member service territories for available sites, demographics, incentives, and state/federal resources.
- Statebook is another demographic tool incorporated into PowerMap that provides GIS information targeting client site visits, RFI's and service territory amenities.
- EKPC has an Economic Development Rider ("EDR") incentive that was developed offering a reduction in the demand rate calculation for companies that commit to sufficient load and job creation in our 16 owner-member service territories. EKPC offers additional incentives for high poverty and high unemployment in the areas of Kentucky.
- Over $30 million dollars obtained in USDA Rural Economic Development Loans ("REDLG") to assist economic development projects across owner-member territories.
- SOARSTEM is an education and workforce development initiative EKPC developed and managed with state of Kentucky and Morehead State University to increase the number of national board certified, rank one and STEM certified teachers across majority of highest poverty/unemployed regions of Eastern Kentucky. There have been two phases of the project completed with 81 teachers

graduating and over 14,000 students that benefited from the project with STEM education.

- CoopAPalooza are statewide and regional training events for improving the capabilities and potential for success from local and regional economic development agencies and government officials.
- EKPC is a Kentucky Product Development Initiative ("PDI") sponsor. Developing and improving business and industrial properties across Kentucky and our 89 service counties.
- EKPC is a Kentucky Institute for Economic Development ("KIED") sponsor. Training future Kentucky professionals in national economic development education and certifications.
- EKPC is a Kentucky Cabinet for Economic Development FAM tour sponsor. Bring national site selectors and key decision makers to Kentucky for enhancing relationships and future economic development opportunities.
- EKPC is working with the Kentucky Mega Industrial Park Development Initiative currently assisting six local governments in various areas of the state to identify, fund, and develop new industrial/business park properties from 500 to 1,500 acres.
- EKPC has presented at national and global conference engagements promoting Kentucky and its owner-member territories.
- EKPC has a representative that served on the board of directors for KAED, Kentucky Association for Manufacturing ("KAM"), Kentucky World Trade Center ("KWTC"), National Rural Economic Development Association ("NREDA"), Kentucky Wildlands, and Kentucky Workforce Board. EKPC also holds

memberships with additional national and global economic development organizations.

- National and global awards received for economic development efforts from 2017-2024.
  - Top 50 Economic Developers in North America;
  - Top 20 utilities in the U.S;
  - International Economic Development Council ("IEDC");
  - NREDA;
  - Southern Economic Development Corp. ("SEDC");
  - Global Site Selectors Guild;
  - American Council Engineering Corp. ("ACEC");
  - German/American Chamber of Commerce; and
  - Kentucky Association Economic Development ("KAED").
- 2024 has 66 Competitive Projects deemed active across 16 owner-member territories with potential new investment and/or expansions. Potentially $25B investments, 10,000+ jobs and 4,000+ MW of combined load. Nine additional AI projects are evaluating our service territories that will add significant investment, jobs, and load if successful.
- 77 Construction Projects announced across 12 owner-member territories with 52 new facilities and 25 expansions. $5.1B invested, 7,651 jobs and 366MW of combined load projected upon completion.

- 2015-2024 announced projects across 16 owner-member service territories. 381 total, 154 are new locations, 227 are expansions, $13B invested, 20,000+ jobs and 700+ MW of new load projected.
- A 44% increase in Industrial KWH usage from 1/1/2015 to today

Q. HOW WILL ANY OF THE PROPOSED GENERATION PROJECTS ASSIST IN ECONOMIC DEVELOPMENT OPPORTUNITIES?

A. The proposed generation projects greatly enhance opportunities for locating and expanding future investment, companies and employment into the regions served. Continuing to generate reliable and low-cost electricity from both power plants is significantly important to strengthen EKPC and the PJM network but will also assist in the local economic and community development across the owner-member territories and enable the state of Kentucky to compete for future projects. Expanding available electricity capacity for potential new loads along with additional benefits of lateral natural gas access is a winning combination for the communities served and Commonwealth.

Q. WHAT ARE SOME OF THE POTENTIAL ECONOMIC DEVELOPMENT BENEFITS THAT COULD BE REALIZED AS A RESULT OF THE PROJECTS?

A. These projects will add additional generating capacity, enhance system reliability, and maintain competitive electric rates. This will attract new industries and businesses to locate in these territories with investments, jobs, and new load. The Cities of Maysville and Somerset could potentially access available gas pipeline capacity for future growth and quality of life improvements that benefit the local and regions served.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

EXHIBIT 10

DIRECT TESTIMONY OF SCOTT DRAKE

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	)	
KENTUCKY POWER COOPERATIVE,	)	
INC. FOR 1) CERTIFICATES OF PUBLIC	)	
CONVENIENCE AND NECESSITY	)	**CASE NO.**
TO CONSTRUCT NEW GENERATION	)	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	)	
CERTIFICATE RELATING TO THE SAME;	)	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	)	
TARIFFS; AND, 4) OTHER GENERAL RELIEF	)	

DIRECT TESTIMONY OF SCOTT DRAKE
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	)	**CASE NO. 2024-00370**

<u>A F F I D A V I T</u>

STATE OF KENTUCKY)

)

COUNTY OF CLARK)

Scott Drake, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Scott Drake

____

Subscribed and sworn before me on this 18th day of November 2024.

Gwyn M. Willoughby

Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

I. Introduction

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. Scott Drake, P.E., Director of Business and Technical Services at East Kentucky Power Cooperative, Inc. (“EKPC”). EKPC’s business address is 4775 Lexington, Road, Winchester, Kentucky 40391.

Q. PLEASE STATE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I hold a Bachelor of Science degree in electrical engineering from the University of Kentucky. I have worked at EKPC for over 33 years in various roles including transmission line design, transmission planning, transmission system maintenance, research & development, and in my current position as Director of Business & Technical Services for Power Supply.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR DUTIES AT EKPC.

A. In my role as Director of Business and Technical Services, I am responsible for working in collaboration with EKPC’s owner-member cooperatives in developing and implementing Demand-Side Management and Energy Efficiency (“DSM-EE") programs. Additionally, I lead the development of industrial power agreements involving EKPC, as well as PURPA cogeneration & small power producer agreements. I have been responsible for DSM-EE program development for over 12 years.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. I have testified in general rate proceedings and certificate of public convenience and necessity proceedings before the Commission.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to provide information regarding the DSM-EE program plan and information about EKPC's proposed projects at issue herein.

Q. ARE YOU SPONSORING ANY ATTACHMENTS?

A. Yes.

1. SD-1 Meeting Agenda 3-20-24
2. SD-2 2024-03-20 Collaborative meeting notes
3. SD-3 2024-04-11 Collaborative followup meeting_NOTES
4. SD-4 2021 EKPC DSM DLC Annual Report (FINAL)
5. SD-5 2022 EKPC DSM DLC Annual Report
6. SD-6 2023 EKPC DMS DLC Annual Report (Final)
7. SD-7 EKPC 2024 DSM Study-Report_vFINAL_09-102024_wAppendices
8. SD-8 DSM Program Assumption Sheets
9. SD-9 DSM Program Summary Sheets
10. SD-10 Proposed DSM Tariffs
11. SD-11 Proposed DSM Tariffs - Redlined

II. History of DSM Program and Review Process

Q. PLEASE DESCRIBE THE HISTORY OF EKPC'S DSM-EE PROGRAM.

A. EKPC, in collaboration with its 16 owner-member Cooperatives, started developing DSM-EE programs in the 1980s when rebates were provided for geothermal HVAC installations and for new homes built to a higher energy performance standard. Since then, several diverse types of DSM-EE programs have been developed by EKPC and its owner-member cooperatives and utilized by the owner-member's end-use members. Typical programs offered today, and some previous programs, include new residential high-efficient home program, home weatherization, ENERGY STAR® equipment and appliances, low-income weatherization, commercial and industrial lighting, thermostats, and load control switches. All DSM-EE programs in recent years, with low-income programs as the lone exception occasionally, passed the Total Resource Cost ("TRC") cost-effectiveness test to assure these DSM-EE programs are justified resources. Some programs that were once cost-effective, in later years, were found to be no longer cost-effective and were discontinued.

Q. HOW HAVE EKPC'S DSM-EE PROGRAMS PERFORMED IN THE PAST.

A. EKPC produces an annual DSM-EE report that quantifies participation in each DSM-EE program. See Attachments SD-4 2021 EKPC DMS DLC Annual Report (FINAL).pdf, SD-5 2022 EKPC DSM DLC Annual Report.pdf, SD-6 2023 EKPC DMS DLC Annual Report (Final).pdf.

Q. HAS EKPC'S REVIEW OF ITS DSM-EE PROGRAMS CHANGED?

A. No.

Q. DOES EKPC REVIEW ITS DSM-EE PROGRAM ON AN ON-GOING BASIS?

A. Yes. EKPC's normal cadence, in collaboration with our owner-members, is to perform a thorough review every three (3) years of all measures and programs. This process aligns with, and is detailed in, EKPC's Integrated Resource Plan ("IRP") filings. In conjunction with the IRP filing, EKPC and its participating owner-members request Commission approval for DSM-EE program changes resulting from the thorough review.

Q. DESCRIBE THE PROCESS TAKEN BY EKPC TO DETERMINE APPROPRIATE DSM-EE PROGRAMS TO DEVELOP.

A. EKPC, and its owner-members, take multiple steps to determine cost-effective measures and DSM-EE programs to develop and implement. The first step every three (3) years is to perform a DSM Technical Potential Study. See Attachment SD-7 EKPC 2024 DSM Study - Report_vFINAL_09-10-2024_wAppendices.pdf for the "2024 Potential Study." The 2024 Potential Study was performed by GDS Associates, Inc ("GDS"). GDS performs this type of study for many utilities and has performed this study for EKPC for the last three (3) IRP filings. The 2024 Potential Study identifies all DSM-EE measures and performs a TRC cost-effectiveness analysis for each measure by comparing the program's cost to EKPC's avoided capacity and avoided energy forward cost curves. EKPC shares these cost-effectiveness results with the owner-members building science experts and member service staff. EKPC also shares these results with its Collaborative.

DSM-EE programs, some of which include many individual measures, are developed from input from the Collaborative and with guidance from the owner-member staff. EKPC's DSM-EE analyst John Farley, a consultant, then performs program level cost-effectiveness evaluations for programs identified by the owner–members' staff as needed by and appropriate for their end-use members. The consultant utilizes the DSMore software program to perform the cost-effectiveness evaluations. Lastly, budgets are created, and DSM-EE tariff changes are developed for Commission approvals.

The following are detailed steps in creating a DSM-EE program plan:

1. **Perform a Technical Potential Study.** This study identifies all possible residential, commercial, and industrial measures and evaluates those measures for cost-effectiveness using the TRC test of the California Standard Tests. The TRC measures the net costs of a DSM/EE program as a resource option based on the total costs of the program, including both the participants' and the utility's costs. GDS Associates, Inc. performed this study during the spring and summer of 2024. The 2024 Potential Study also estimates the potential energy and demand savings through multiple evaluations of DSM-EE potential:

    a. **Technical Potential –** The Technical Potential is the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end users to adopt the efficiency or demand response measures.

    b. **Economical Potential** - Economic potential refers to the subset of the technical potential that is economically cost-effective (based on screening with the TRC test) as compared to conventional supply-side energy resources.

c. **Achievable Potential** - Achievable potential is the amount of energy and demand that can realistically be saved given various market barriers. The potential study evaluates two achievable potential scenarios:

i. **Maximum Achievable Potential –** Maximum Achievable Potential (MAP) estimates potential on paying incentives to up to 100% of measure incremental costs and aggressive adoption rates.

ii. **Realistic Achievable Potential –** Realistic Achievable Potential estimates potential with EKPC paying incentive levels as a percentage of incremental measure costs closely calibrated to historical levels but not constrained by previously determined spending levels.

2. **Engage stakeholders.** The TRC results for all measures were provided to the EKPC Collaborative. The results are discussed openly with the Collaborative members. The Collaborative met twice to review, discuss, and recommend measures and programs for EKPC to consider.

3. **Engage owner-member and EKPC staff experts**. EKPC and the owner-members staff implement all energy efficiency programs and are directly involved in the demand response programs utilizing 3rd party implementers. Because of their dedication to assisting end-use members and their years of experience, these staff members are uniquely qualified to recommend DSM-EE programs for rural Kentucky. Through multiple meetings, this DSM-EE plan was recommended.

4. **Design a new DSM-EE Plan**. Redesign existing DSM-EE programs to include new cost-effective measures, and design new cost-effective DSM-EE programs. EKPC expert DSM consultant, John Farley, has decades of experience in program research, design, and program level evaluations. He performs the California Standard Tests on DSM-EE programs to determine cost-effectiveness of top priority DSM-EE programs as design or redesigned by EKPC, owner-member staff and with John Farley's suggestions.

5. **Obtain Approvals.** EKPC staff then seeks DSM-EE program approvals from executive staff from EKPC and the owner-members. Final DSM-EE program tariff approvals are then requested from the Commission. See Attachments SD-10 Proposed Tariffs and SD – 11 Proposed Tariffs – Redlined.

Q. DOES EKPC PARTICIPATE IN A COLLABORATIVE REGARDING ITS DSM-EE PROGRAMS?

A. EKPC has a Collaborative and DSM-EE programs are frequently discussed.

Q. PLEASE DESCRIBE THE COLLABORATIVE PROCESS.

A. EKPC established the current Collaborative in 2021. The Collaborative's charter identifies DSM-EE, renewable energy, beneficial electrifications as topics for collaboration. The Collaborative co-chairs, EKPC and a representative from the public interest groups, determine when to hold meetings to discuss the issues facing EKPC and the owner-members. Meetings are held both virtually and in person. All meeting agendas are set by the co-chairs. EKPC considers actions based on the input of the Collaborative members.

Q. PLEASE DESCRIBE THE COLLABORATIVE MEETINGS AND THE PARTICIPANTS.

A. The most recent Collaborative meetings have centered around DSM-EE because EKPC was performing thorough reviews of the DSM-EE program as it does every three (3) years in preparation for its IRP filing. See Attachments SD-1 Meeting Agenda 3-20-24.docx, SD-2 2024-03-20 Collaborative meeting notes.docx, and SD-3 2024-04-11 Collaborative followup meeting_NOTES.docx for the recent meeting agendas and meeting minutes.

Collaborative member organizations are:

- EKPC;
- Each of the 16 owner-members of EKPC;
- Nucor Gallatin Steel;
- Kentucky Industrial Utility Customers ("KIUC");
- Kentuckians for the Commonwealth;
- Kentucky Environmental Foundation;
- Mountain Association;
- Bluegrass GreenSource;
- Kentucky Interfaith Power and Light;
- Frontier Housing;
- Kentucky Conservation Commission:
- Kentucky Energy and Environment Cabinet (advisor); and
- Kentucky Center for Applied Science (advisor).

The Collaborative meeting on March 20, 2024, discussed several topics including DSM-EE measures. Collaborative members were provided with the Technical Potential Study TRC results for potential measures prior to the March 20, 2024, meeting. The Collaborative met again on April 11, 2024, for further discussions and feedback on DSM-EE measures and to make recommendations. Several recommendations from the Collaborative were incorporated into new DSM-EE program offerings including a new program providing incentives for high efficiency heat pumps and heat pump water heaters, and small commercial lighting and thermostats.

III. Proposed DSM-EE Programs and Changes

Q. PLEASE DESCRIBE THE NEW DSM-EE PROGRAMS AND PROGRAM CHANGES PROPOSED IN THIS PROCEEDING.

A. EKPC has five (5) existing DSM-EE programs, one (1) existing pilot demand response program, and four (4) new DSM-EE programs being proposed in this filing requesting Commission approval. All DSM-EE programs are cost-effective with a TRC benefit versus costs greater than 1.0.

- The Touchstone Energy® Home program is an existing DSM-EE program that provides home builders with an incentive to build a home 25% more energy efficient than standard. No changes to this program are recommended currently. Its program tariff does not need changing and is not included in this filing.
- The Button-Up Weatherization program is an existing DSM-EE program that provides incentives for existing homes to reduce heat loss by improving insulation and air sealing to reduce air leaks. Due to more measures being cost-effective,

EKPC is proposing to provide new incentives for insulating floors and walls and installing energy-efficient windows and doors. EKPC is also proposing an increase in the incentives paid per Btuh of heat loss reduced due to the increased cost for the participant to implement the measures. EKPC is requesting Commission approval for changes to this program.

- The Heat Pump Retrofit program is an existing DSM-EE program that provides incentives for existing homes converting the heat source from inefficient electric resistance heat to a heat pump. EKPC is proposing an increase in the incentive due to the increased cost for participants to implement the measures. EKPC is requesting Commission approval for changes to this program.
- The CARES is an existing low-income DSM-EE program that provides an incentive to Community Action Agencies (CAA) and Affordable Housing Organizations (AHO) non-profits that retrofit low-income eligible homes with improved insulation, air sealing, and heat pumps. EKPC is proposing an increase in the incentives due to the cost of the measures having risen recently. EKPC is requesting Commission approval for changes to this program.
- The Direct Load Control program is an existing demand response program that provides annual incentives to participants allowing EKPC to manage their water heaters, central air conditioners or heat pumps, or thermostats during peak load events. This program tariff does not need changing and is not included in this filing.
- The Electric Vehicle Home Charging program is an existing DSM-EE program that provides an incentive to electric vehicle owners to charge their EV during off-peak

hours. No changes to this pilot program are recommended currently and the tariff for this program is not included in this CPCN request.

- The High Efficiency Heat Pump program is a new DSM-EE program being proposed for approval by the Commission. This program provides incentives to homeowners replacing a heat pump with a unit that is more efficient than minimum government standards. EKPC is requesting Commission approval for this new DSM-EE program.
- The Commercial Advanced Lighting program is a new DSM-EE program being proposed for approval by the Commission. This program provides an incentive for small non-residential businesses that replace older inefficient bulbs or light fixtures with LEDs. EKPC is requesting Commission approval for this new DSM-EE program.
- The Commercial and Industrial Thermostat program is a new DSM-EE program being proposed for approval by the Commission. This program provides an incentive to qualifying businesses to replace traditional thermostats with new self-learning thermostats. EKPC is requesting Commission approval for this new DSM-EE program.
- The Back-up Generator Control program is a new DSM-EE program being proposed for approval by the Commission. This program provides an annual incentive to end-use members for allowing EKPC to operate their permanently installed whole-home back-up generator during peak energy events. EKPC is requesting Commission approval for this new DSM-EE program.

Q. PLEASE EXPLAIN WHY IT IS APPROPRIATE TO PROPOSE THE DSM-EE PROGRAMS RELATED TO THE PROPOSED PROJECTS HEREIN.

A. The load-forecast included in this CPCN request highlights the need for more supply-side resources to serve the growing energy needs of rural Kentucky. EKPC's goal is to develop cost-effective resources on both the supply-side and demand-side. In recent years when new supply-side resources were not needed by EKPC, EKPC's DSM avoided capacity cost was PJM's Base Residual Action ("BRA") costs. The PJM BRA costs in recent years have been incredibly low resulting in less DSM-EE programs that were cost-effective. EKPC eliminated several programs recently due to these avoided costs being so low. Now that EKPC has a need for supply-side resources, EKPC's avoided capacity cost changes from the PJM BRA to EKPC's cost to build supply-side resources. This new avoided cost is higher than the PJM BRA costs resulting in more DSM-EE programs becoming cost-effective. This allows EKPC to offer more cost-effective DSM-EE programs that end-use members could utilize to manage their energy bill. Developing and offering cost-effective demand-side resources utilized by the end-use member is EKPC's goal.

Q. WHEN A NEED FOR CAPACITY WAS IDENTIFIED, PLEASE EXPLAIN THE PROCESS TAKEN TO EVALUATE DSM-EE PROGRAMS?

A. The first step is to complete a DSM Technical Potential Study. See Attachment SD-7 EKPC 2024 DSM Study - Report_vFINAL_09-10-2024_wAppendices.pdf. This type of study identifies all DSM-EE measures and evaluates those measures for cost-effectiveness utilizing the TRC comparing overall costs of each measure to cost avoidance. The next step is to review these results with our owner-member's energy advisors and member services experts and with the EKPC Collaborative to gather an understanding of top priority DSM-EE cost-effective measures and programs. The next step is to develop DSM-EE programs and evaluate TRC cost-effectiveness at the program level. DSM-EE programs typically contain many individual measures. The next step is to develop a budget based on expected participation levels for the cost-effective programs and to seek approvals for the DSM-EE programs.

Q. ARE DSM-EE PROGRAMS INTERGAL TO EKPC'S RESOURCE PLANNING?

A. Yes. The first step in evaluating the need for added resources is to evaluate DSM-EE impacts on the load forecast. The load forecast utilized for this CPCN is net of expected annual energy and demand reductions resulting from all DSM-EE programs noted in this CPCN request.

Q. COULD DISPATCHABLE DSM ALONE AVOID THE NEED FOR SUPPLY-SIDE RESOURCES PROPOSED BY EKPC?

A. No. The cumulative reductions from the existing and proposed programs are 69,792 MWh and 38 MW winter by year 2030. These reductions are much smaller than the load identified in the load forecast. The reductions alone would result in EKPC being deficient in its goal to secure resources to meet the load forecast.

IV. Cost Benefit Analysis of DSM-EE Programs

Q. WHAT BENEFITS WILL BE DERIVED FROM THE DSM-EE PROGRAMS?

A. Reductions in energy and demand resulting from DSM-EE programs prolong the need for new supply-side resources, which saves capital investments. Additionally, the DSM-EE programs cost-effectively provide the end-use members with tools to improve the utilization of energy at their home or business resulting in a reduction of their electric bill.

Q. PLEASE DESCRIBE THE COST BENEFIT ANALYSIS PERFORMED TO DETERMINE THE MOST APPROPRIATE DSM-EE PROGRAMS?

A. For the existing and proposed DSM-EE measures and programs, the California Stand Practice cost-effectiveness tests were performed. The California Standard Tests evaluate cost-effectiveness from multiple perspectives. The California Standard Tests were completed by John Farley for each DSM-EE program of this plan. John Farley utilizes the DSMore software package to evaluate cost-effectiveness based on the following benefit to cost ratio tests:

a. The Total Resource Cost (TRC) Test – The TRC measures the net costs of a DSM/EE program as a resource option based on the total costs and benefits of the program, including both the participants' and the utility's costs. This test provides a cost-effective perspective for both program participants and non-participants.

b. The Participant Cost Test (PCT) – The PCT measures the quantifiable benefits and costs to an end-use member when participating in a program. It does not provide such benefits as improved comfort, etc.

c. The Ratepayer Impact Measurement (RIM) Test – The RIM measures the impact on rates for non-participants resulting from changes in utility revenues, utility avoided costs, and program operating costs. A RIM greater than 1.0 indicates that rates for non-participants will decrease, while a RIM less than 1.0 indicates that rates for non-participants will increase. The RIM result does not provide the magnitude of the change in rates; just the direction of that change.

d. The Utility Cost Test (UCT) – The UCT measures the net costs of each DSM-EE program as a resource based on costs and benefits to the utility. It excludes any costs incurred by the end-of-use participant.

Historically, the TRC cost-effectiveness test is utilized to evaluate cost-effectiveness of individual measures as determined by the 2024 Potential Study. From that information, DSM-EE programs are constructed, many having multiple measures, and a program level cost-effectiveness is evaluated utilizing TRC, PCT, and RIM.

Q. ARE THE PROPOSED PROGRAMS COST EFFECTIVE?

A. Yes. The following table provides the California Standard Test benefit-to-cost ratio results for all DSM-EE programs including existing programs not requiring tariff changes, existing programs requiring tariff changes, and new programs being proposed; collectively the DSM-EE program plan.

DSM-EE Program		PCT	TRC	UCT	RIM
Button-Up Weatherization					
	Home Shell	1.25	2.41	5.33	1.42
	Duct Sealing	1.67	2.33	2.77	1.23
CARES Low-Income		1.91	3.46	5.62	1.45
Heat Pump Retrofit					
	HPR - Federal Standard	8.94	6.72	5.92	0.66
	HPR - ENERGY STAR®	6.37	5.29	4.93	0.65
	HPR - Mini-split 1 Head	13.45	5.13	2.60	0.59
	HPR - Mini-split 2 Head	13.45	7.26	3.22	0.61
	HPR - Mini-split 3 Head	12.79	7.97	3.51	0.62
Touchstone Energy® Home		1.54	3.36	7.40	1.56
Direct Load Control					
	Air Conditioner Switch	~	1.2	0.86	0.85
	Water Heater Switch	~	1.61	1.35	1.31
	Thermostats	4.59	2.26	1.27	1.26
Residential EV Off-peak Home Charging Pilot		~	1.55	0.68	0.68
High Efficiency Heat Pump					
	ENERGY STAR® HP	2.59	2.12	1.38	0.58
	Cold Climate Air Source HP or GEO	1.66	2.92	5.01	1.95
	Heat Pump Water Heater	2.02	2.26	5.21	0.92
Residential Back-up Generator		4.70	5.96	2.69	2.54
Commercial Advanced Lighting		1.55	1.25	8.68	0.56
Commercial & Industrial Thermostat		3.73	1.86	2.76	0.47

The Participant Cost test is reviewed first because if the program fails this cost-effectiveness test, no one will participate. Next is a thorough review of the TRC cost-effectiveness test, which is the cost-effectiveness test historically preferred by the Commission. EKPC and its owner-member cooperatives also review the RIM cost-effectiveness test to make sure the programs have either no impact or a reasonable impact on rates. The consultant utilizes DSMore software program to perform the cost-effectiveness evaluations. See Attachment SD-8 DSM Program Assumption Sheets.zip for the input and assumptions for each program. Some programs use multiple cases for review. See Attachment SD-9 DSM Program Summary Sheets.zip for the summary of the DSM-EE program cost-effectiveness results summarized in the table above.

Q. WAS THE PROCESS TO DETERMINE APPROPRIATE DSM-EE REASONABLE?

A. Yes. All existing programs with changes and proposed new DSM-EE programs were determined to be cost-effective, which, over time, lowers overall cost of power to the end-use member. The identification of proposed DSM-EE program changes and the proposed new DSM-EE programs involved expert staff of the owner-member cooperatives and EKPC.

Q. PLEASE DESCRIBE THE PROJECTIONS OF THE IMPACT OF THE DSM-EE PROGRAMS ON THE PEAK DEMAND AND ENERGY REQUIREMENTS?

A. The following are the projected cumulative impacts of the new DSM-EE Program Plan

(negative value= reduction in load)

Year	Impact on Energy Requirements (MWh)	Impact on Winter Peak (MW)	Impact on Summer Peak (MW)
2025	-5,232	-7	-24
2026	-18,177	-13	-29
2027	-31,129	-19	-33
2028	-44,127	-25	-37
2029	-56,761	-31	-41
2030	-69,792	-38	-45
2031	-82,852	-44	-49
2032	-96,103	-50	-54
2033	-108,663	-56	-58
2034	-121,091	-60	-56
2035	-133,857	-66	-60
2036	-147,802	-72	-64
2037	-160,175	-78	-67
2038	-173,082	-83	-71
2039	-185,729	-89	-74

The load forecast provided in this CPCN request has been reduced by the amounts shown above.

Q. DID EKPC STUDY ALTERNATIVE DSM-EE PROGRAMS THAT WERE ULTIMATELY NOT SELECTED AS PART OF THE PLAN PROPOSED?

A. Yes. EKPC and its owner-member cooperatives reviewed all cost-effective measures as noted in the Technical Potential Study – Attachment SD-7 EKPC 2024 DSM Study - Report_vFINAL_09-10-2024_wAppendices.pdf. The Collaborative members, which includes staff from each owner-member and EKPC, met in-person and on a Teams meeting to review and discuss all cost-effective measures and potential DSM-EE programs. Additionally, a group of energy advisors and member service experts, along with EKPC staff, met in-person and on multiple Teams meetings discussing possible DSM-EE programs. EKPC staff recommends the DSM-EE programs proposed in this CPCN request based on input received from all meetings mentioned herein. DSM-EE programs selected were determined to not be top priority programs by the group.

V. DSM-EE Program Implementation and Proposed Tariffs

Q. PLEASE DESCRIBE HOW THE DSM-EE PROGRAMS WILL BE IMPLEMENTED.

A. All DSM-EE programs, with a couple of exceptions, will be implemented utilizing owner-member and EKPC staff. owner-members will promote the DSM-EE programs and are the initial contact for DSM-EE program participation. EKPC staff will assist with implementation when requested. Many of the DSM-EE programs include an administrative fee provided in the transfer payment, along with the end-use member incentive, from EKPC to the owner-member to help offset the owner-member's cost for the DSM-EE program implementation. Third parties are utilized to help implement the direct load control switches and thermostats program and the electric vehicle home charging pilot program.

Q. PLEASE DESCRIBE THE TIMELINE ASSOCIATED FOR THE DSM-EE PROGRAMS PROPOSED?

A. EKPC requests DSM-EE program tariff approvals to coincide with the approval of this CPCN request. Once Commission approval is received for EKPC’s DSM-EE tariffs, EKPC will assist participating owner-members with developing their DSM-EE tariffs conforming to EKPC’s tariffs. Participating owner-members will then seek Commission approval for their tariffs.

Q. PLEASE DESCRIBE THE AMOUNT EKPC WILL NEED TO SPEND TO IMPLEMENT THE PROPOSED PROGRAMS.

A. Per Attachment SD-6 2023 EKPC DMS DLC Annual Report (Final).pdf, the existing DSM-EE program cost was $3.4M excluding EKPC staff salaries. The forecasted expenditures for all DSM-EE program for the first 12 months of operation are estimated to be $7.8M excluding staff salaries. Neither EKPC nor its owner-member cooperatives participate in the DSM rider. The new forecasted expenditures are budgeted by EKPC.

Q. PLEASE DESCRIBE THE DSM-EE PROGRAMS OF THE NEW DSM-EE PLAN AND TARIFF CHANGES THAT ARE BEING REQUESTED FOR THE DSM-EE PROGRAMS.

A. Several new DSM-EE programs are being proposed, as well as additional measures are being proposed within some existing programs. The expansion of the DSM-EE slate of programs and measures includes many programs and measures that were not cost-effective three (3) years ago. EKPC has a need for new capacity in the winter. Therefore, EKPC's avoided cost, a benefit, changed from PJM's BRA to EKPC's cost to install Recipicating Internal Combustion Engines ("RICE") as noted in EKPC's CPCN case 2024-00310. The avoided cost of RICE is higher than the forward cost curve of PJM's BRA. Thus, EKPC realizes more benefits from DSM-EE program participation and that results in more DSM-EE measures and programs to be cost-effective than the last DSM-EE program review.

The following DSM-EE program descriptions detail the individual programs of this DSM-EE plan.

Existing Programs with Proposed Tariff Changes

- Button-Up Weatherization Program (Residential)
- CARES Low-Income Weatherization (Residential)
- Heat Pump Retrofit Program (Residential)

Existing Programs with NO Proposed Tariff Changes

- Touchstone Energy Program (Residential)
- Direct Load Control of Air Conditioners and Water Heaters: Switches and Bring Your Own Thermostat (BYOT) (Residential)
- Residential Electric Vehicle Off-Peak Charging Program (Pilot)

New (Proposed) Programs

- High Efficiency Heat Pump Program (Residential)
- Backup Generator Control Program (Residential)
- Commercial Advanced Lighting Program
- Commercial & Industrial Thermostat Program

A. Button-Up Weatherization Program

Program Description

The Button-up Weatherization (Button-up) Program is designed to incentivize end-use members with poor energy-performing homes to improve the energy efficiency of the home's shell and ductwork. The Button-up program is an important program to assist end-use members with high bills caused by excessive heat losses.

The Button-Up Program offers an incentive for reducing the heat loss of a home. The incentive is paid based on heat loss reduction measured in British thermal units per hour (Btuh). Heat loss calculations in Btuh are based on the winter design temperature. Heat loss calculation of Btuh reduced will be made by using either the Manual J 8th Edition or through other methods approved by EKPC. The Button-Up program encourages homeowners to improve the thermal envelope of their home through improved insulation, upgraded windows/doors, and air-sealing. The program offers a separate incentive for duct sealing. Eligibility requirements are detailed below and are available at each participating owner-member's office and on the owner-member's website.

The following is a list of proposed eligible Button-Up Program improvements.:

- Insulating basement walls
- Insulating floor over unconditioned space
- Encapsulating a crawlspace
- Insulating rim or band board
- Insulating or adding an air barrier to attic knee walls
- Retrofitting uninsulated exterior walls with insulation
- Insulating ceiling
- Converting to a conditioned attic
- Insulating attic accesses
- Upgrading windows and doors
- Air-sealing the home envelope
- Air-sealing ductwork

Air-sealing actions reduce air infiltration by sealing air leaks in the shell walls, floors, or ceiling. Electrical and plumbing protrusions as well as window and door seals are typical places where air leaks cause the home to lose heat in the winter. Typical air sealing measures include caulking, improved weather stripping, and sealing attic accesses. To receive this incentive either an EKPC approved contractor or an owner-member representative must perform a “pre” and “post” blower door test to measure actual Btuh reduced.

The HVAC duct sealing portion of the Button-Up is a standalone measure that can be utilized to air-seal HVAC duct systems located in unheated spaces. Air-sealing ducts with traditional mastic sealers is an effective way to lower energy costs.

- Limited to homes that have accessible centrally ducted heating systems in unconditioned areas.
- Initial duct leakage must be greater than 10cfm per $100ft^2$
- Contractors or owner-member representatives are required to conduct a "pre" and "post" blower door test to verify reductions. Contractors must be trained or pre-approved by EKPC or the owner-member.
- Duct leakage per system must be reduced to less than 8cfm per $100ft^2$ served. (Ex: Duct system serves $1200ft^2$. $1200ft^2/100ft^2$ x8cfm= 12 x 8cfm= Duct Seal Target of 96cfm)
- All joints in the duct system must be properly sealed with duct mastic. Foil tape does not qualify as properly sealing the duct system.

For homes having two or more separately heated systems, each system will qualify independently for the incentive.

Target Markets

This program is targeted at existing single-family, multi-family or manufactured dwellings. Eligibility requirements are:

- Home must be 2 years old or older to qualify for the incentive.
- The primary source of heat must be electricity.

Program and Tariff Changes

Several additional home energy efficiency measures are now cost-effective per the Technical Potential Study conducted by GDS Associates. Therefore, new incentives for new measures are proposed. Additionally, the incentive amount ($/kBtuh) is proposed to increase from $40 to $100 due to participants costs have risen significantly. An increased incentive for sealing home HVAC system ducts is also being proposed. See Attachments SD-10 Proposed Tariffs and SD-11 Proposed Tariffs - Relined for strike-through tariff edits and a clean tariff for all proposed changes.

B. CARES Low-Income Weatherization Program

Program Description

EKPC's Community Assistance Resources for Energy Savings (CARES) Low Income Program provides an incentive to enhance the weatherization and energy efficiency services provided to its end-use members by the Kentucky Community Action Agency's (CAA) network of not-for-profit community action agencies or by Kentucky's non-profit affordable housing organizations (AHO). EKPC and its owner-members provide an incentive to the CAA or AHO implementing the project on behalf of the end-use member. EKPC's program has two primary objectives. First, EKPC's incentive will enable the CAA or AHO to install more measures in each home. Second, the additional incentive from EKPC will assist CAA or AHO in weatherizing more homes.

Two types of homes are eligible for incentives:

- Heat Pump Eligible Homes are single family or multi-family residential dwellings that use electricity for their primary source of heat. The EKPC incentive can be used to upgrade the home to an air source heat pump and install weatherization improvements including insulation, air sealing, duct sealing, and a water heater blanket.
- Heat Pump Ineligible Homes are single family or multi-family residential dwellings that do not use electricity for their primary source of heat but do cool their home with central or window unit air conditioners. The EKPC incentive can be used to install weatherization improvements.

The maximum incentive per household is $3,000.

Target Market

The homeowner must be an end-use member of one of EKPC's 16 owner-member cooperatives.

The household must qualify for weatherization and energy efficiency services according to the guidelines of the Weatherization Assistance Program as administered by the local CAA or the AHO. Household income cannot exceed the designated poverty guidelines established by the CAA or AHO.

Program and Tariff Changes

Due to recent increased costs to weatherize homes and to install energy-efficient HVAC equipment, the only change being proposed is to increase the incentive from $2,000 per qualifying participant to $3,000. See Attachments SD-10 Proposed Tariffs and SD-11 Proposed Tariffs - Relined for strike-through tariff edits and a clean tariff for all proposed changes.

C. Heat Pump Retrofit Program

Program Description

The Heat Pump Retrofit Program provides incentives for end-use members to replace their existing resistance heat source (electric furnace, ceiling cable heat, baseboard heat, or electric thermal storage) with a more efficient heat pump. Most high bill complaints are from end-use members with homes that are heated with electric resistive heat instead of a heat pump. Installing an electric heat pump lowers electric bills significantly for those end-use members.

The program provides incentives for both ducted systems and mini-split systems.

Currently, the program provides incentives for two efficiency levels of ducted heat pump systems: DOE minimum standard heat pumps and ENERGY STAR® standard heat pumps.

In recent years, EKPC and the owner-members have seen a sizable increase in mini-split heat pump systems. This heat pump technology is highly efficient. This program provides incentives to install mini-split heat pump systems that replace resistance heat units. These installations must be ENERGY STAR® rated. The incentive will be paid per indoor head unit up to a maximum of three incentives.

Homeowners replacing their existing resistance heat source with a heat pump will qualify for the following incentive based on the equipment type:

<u>**Equipment Type**</u>	<u>**Incentive**</u>
Ducted Systems:	
Current Energy Conservation Standard established by the Federal Department of Energy "DOE"	\$750
Current ENERGY STAR® level equipment or greater	\$1000
Mini Split Systems:	
Ducted or Ductless Mini-Splits ENERGY STAR® level equipment or greater (per indoor head unit – max 3)	\$500

When Federal efficiency standards increase the required Seasonal Energy Efficiency Ratio (SEER2) and Heating Season Performance Factor (HSPF2) for heat pumps, these targets will be adjusted upward accordingly.

Target Markets

This program is targeted to end-use members who currently heat their home with a resistance heat source. This program is available to site-built homes, manufactured homes, and multi-family dwellings.

Eligibility requirements are:

- Incentive only applies when homeowner's primary source of heat is an electric resistance heat furnace, ceiling cable heat, baseboard heat, or electric thermal storage.
- The existing heat source must be at least 2 years old.
- New manufactured homes are eligible for the incentive.

- Two (2) maximum incentive payments per location, per lifetime for centrally ducted systems.
- Ducted and Ductless mini splits are eligible to receive incentives for up to a maximum of three head units per location, per lifetime.

Program and Tariff Changes

Due to recent increased costs to install energy-efficient HVAC equipment, the only change being proposed is to increase the incentive for each level of equipment efficiency. See Attachments SD – 10 Proposed Tariffs and SD – 11 Proposed Tariffs - Relined for strike-through tariff edits and a clean tariff for all proposed changes.

D. Touchstone Energy® Home

Program Description

To improve new residential home energy performance, EKPC has designed the Touchstone Energy® Home Program. The program is designed to encourage new homes to be built to higher standards for thermal integrity and equipment efficiency, as well as to choose a geothermal or an air source heat pump rather than less efficient forms of heating and cooling.

This program provides guidance during the building process to guarantee a home that is ≥25-30% more efficient than the Kentucky standard-built home.

A typical home built in rural Kentucky scores a 105 on the Home Energy Rating System (HERS) Index. The HERS testing and rating system is the industry-accepted standard for evaluating the energy efficiency of a new home. Therefore, EKPC and the owner-members will provide the incentive for a home that either scores a HERS of 75 or better for the Performance Path or completes a Prescriptive Path check list of energy saving measures that assure the home performs equivalently to a 75 HERS tested home.

Plans are submitted to the owner-member staff before the home is built, a pre-drywall inspection is made, and a blower door test is administered after the home is built to verify that the home meets the standard.

To qualify as a Touchstone Energy® Home under EKPC's program, the participating home must be in the service territory of a participating owner-member and must meet the program guidelines following one of the two available paths of approval.

All homes must receive a pre-drywall inspection and pass EKPC’s pre-drywall checklist. Homes must also receive a final inspection, pass a whole house air leakage, and duct leakage test.

All homes must be heated with an Air Source or Geothermal Heat Pump. To meet the prescriptive path requirements, the heat pump must meet or exceed current ENERGY STAR® requirements. Water heaters must be an electric storage tank water heater that meets or exceeds current Energy and Water Conservation standards established by the Federal Department of Energy (DOE).

In addition:

Prescriptive Path:

- Home must meet each prescriptive value on EKPC’s Touchstone Energy® Home Specifications.

Performance Path:

- Home must receive a HERS Index score of $\leq$75
- Home must pass 2009 International Energy Conservation Code performance path.

Target Markets

This program is designed to serve the new residential construction market. The incentives are available to any end-use member of participating EKPC owner-members. The primary market consists of end-use members who are constructing new stick-built homes. Multi-family dwellings pre-approved by EKPC may also be eligible.

Program and Tariff Changes

No changes are being proposed now, and the program tariff is not included in this CPCN submittal.

E. Direct Load Control Program: Residential Air Conditioners, Water Heaters Switches and Bring Your Own Thermostats

Program Description

The Direct Load Control Program is designed to reduce peak demands to provide load relief to the grid.

The program's objective is to reduce peak demand and energy usage through installing thermostats or load control switches controlling air conditioners or heat pumps and load control devices managing water heaters.

EKPC controls central ir conditioners and heat pumps during extreme peak hours during the summer.

Water heater control provides load relief in the winter and summer months.

EKPC may participate in PJM markets with these devices.

EKPC will not install new switches. All new enrollments will be Wi-Fi enabled thermostats provided by the end-use member under the “Bring Your Own Thermostat” (BYOT) option. Existing switches on air conditioners, heat pumps, and water heaters will continue to be controlled and incentives for those units paid for the technology's life.

Peak demand reduction is accomplished by cycling equipment on and off according to a predetermined control strategy. Central air conditioning and heat pump units are cycled on and off, while water heater loads are curtailed. For BYOT units, the cycling is done by raising the thermostat setting for the control event's duration. The typical control duration is four hours for switches and three hours for BYOT units. Participating customers receive an annual incentive.

EKPC plans to continue to rely on a third-party administrator to provide enrollment, installation, service calls, and measurement & verification services.

EKPC offers an incentive of $10 per year for each water heater under control, and $20 per year for each air conditioner or heat pump being controlled by a load control switch or a thermostat.

Target Markets

The program targets homes with central air conditioning (including heat pumps). The incentives are available to any end-use member of a participating EKPC owner-member who has a qualifying central air conditioner or heat pump.

Program and Tariff Changes

No changes are being proposed now, and the program tariff is not included in this CPCN submittal.

F. Residential Electric Vehicle Off-Peak Charging Program

Program Description

The Residential Electric Vehicle ("EV") Off-Peak Charging Program is designed to reduce the growth in peak demand resulting from the adoption of electric vehicles, thereby allowing EKPC to utilize its system more efficiently. EKPC provides a monthly incentive for all registered electric vehicle charging energy (kWh) that occurs during the off-peak hours.

The program includes energy reporting from electric vehicles or compatible electric vehicle supply equipment ("EVSE").

Prior to joining the program, the owner-members may inspect the end-usemember's electrical equipment to ensure compatibility with the energy software program, but the owner-members shall not be responsible for the installation, repair, or maintenance of the electrical equipment or the electric vehicle.

End-use members may join the program at any time during the year.

Target Markets

This program is available to residential end-use members in the service territories of EKPC member-owners. To qualify for this program, the end-use member's residence must be in the service territory of a participating owner-member. The end-use member must utilize a level 2 EVSE.

Eligibility may be denied when the EV or the EVSE is not compatible with, or does not function properly with, the energy software platform utilized for this program.

The end-use member may either own or rent the residence where the qualifying EVSE or EV will be charging. The end-use member is responsible for obtaining the permission of the owner of the rented residence to participate in the program.

Program and Tariff Changes

No changes are being proposed now, and the program tariff is not included in this CPCN submittal.

G. High Efficiency Heat Pump Program

Program Description

Modern technology in heat pumps provides increased performance characteristics and efficiency levels. These improvements are making heat pumps among the safest and most affordable types of HVAC and water heating available on the market. The High Efficiency Heat Pump (HEHP) Program offers two incentive levels to end-use members for choosing to install either an air source heat pump (ASHP) that meets or exceeds the current ENERGY STAR®

Program requirements product specification for heat pump equipment established by the Environmental Protection Agency (EPA), or by installing a heat pump that has received the EPA cold climate air source heat pump (ccASHP) designation.

Heat pump technology has also become available in domestic hot water. The HEHP Program also provides an incentive for end-use members to choose a HEHP water heater over the standard conventional tank or instantaneous water heater.

Target Markets

This program is targeted to end-use members who are installing a new heat pump or new water heater. The end-use member can qualify for this incentive by purchasing a heat pump that meets the efficiency guidelines below by equipment type.

The program is targeted to new single or multi-family homes, existing single or multi-family homes or manufactured homes. Eligibility requirements and incentive levels are detailed below.

ENERGY STAR® ASHP Level

- Must be ducted and the primary source of heat for the home.
- Must meet the SEER[2] and HSPF[2] specifications of the current EPA ENERGY STAR® Standard.
- End-use members may apply for up to two HEHP incentives per calendar year per premise/location. A maximum of six incentives lifetime within this appliance category will be allowed per premise/location.

ENERGY STAR® certified ccASHP or Geothermal Heat Pump Level

- Must be ducted and the primary source of heat for the home.
- CcASHP must meet the current EPA standard for ccASHP and be listed as ccASHP certified on EPA's ENERGY STAR® product finder website.
- Geothermal heat pumps must meet the EER and COP specifications of the current EPA ENERGY STAR® standard.

- End-use members may apply for up to two HEHP incentives per calendar year per premise/location. A maximum of six (6) incentives lifetime within this appliance category will be allowed per premise/location.

ENERGY STAR® Heat Pump Water Heaters

- End-use members may apply for two ENERGY STAR® certified heat pump water heater incentives per calendar year per premise/location. A maximum of four incentives within this appliance category (Heat Pump Water Heaters) will be allowed per premise/location.
- Heat pump water heaters in new manufactured housing are not eligible for the incentive.

Equipment	**Incentive to End-Use Member**	**EKPC Admin Payment To Owner-Member**	**EKPC Lost Margin Payment to Owner-Member**
ENERGY STAR® HP	$500	$90	$51
ccASHP or Geothermal	$1,000	$90	$158
Heat Pump Water Heater	$250	$90	$213

When Federal efficiency standards increase the required Seasonal Energy Efficiency Ratio ($SEER^2$) and Heating Season Performance Factor ($HSPF^2$) for heat pumps, these targets will be adjusted upward accordingly.

New Program Tariff

See Attachments SD – 10 Proposed Tariffs for this new energy efficiency program tariff being proposed for Commission approval.

H. Backup Generator Control Program

Program Description

The Backup Generator Control Program incentivizes residential end-use members who own backup generators to participate in EKPC's demand response initiatives. Generators must meet certain eligibility criteria, including a minimum capacity of 14 kW, the ability to operate for at least 30 continuous hours, carry the entire load of the residence at any time of the year, and the capability for remote control by EKPC. In return, participants will receive an annual availability incentive of $350 and a performance incentive of $100 if the generator is dispatched by EKPC for 25 or more hours.

Generators may be dispatched during peak demand periods and in emergency scenarios to alleviate strain on the grid. Participants will receive advance notice when possible, and dispatch events will be limited to 50 hours per year to ensure the long-term reliability of the generators. The program is voluntary, with members allowed to withdraw with 30 days' notice, though they must wait six months before reapplying. Participation requires adherence to terms regarding generator control, testing, and maintenance, and the end-use member assumes responsibility for any risks or damages associated with generator operation.

Target Markets

The target market for the Backup Generator Control Program is residential end use members who own or are willing to install backup generators and who live within the service areas of EKPC's participating owner-member cooperatives. Participating end-use members will need to have the capacity to meet the program's operational criteria, including a generator that can be remotely controlled and used during peak demand or emergency grid situations.

New Program Tariff

See Attachments SD – 10 Proposed Tariffs for this new energy efficiency program tariff being proposed for Commission approval.

I. Commercial Advanced Lighting

Program Description

The Commercial Advanced Lighting Program promotes energy efficiency by incentivizing non-residential end-use members to install high-efficiency LED lighting.

This program is available to businesses within EKPC's service territory whose facilities did not exceed 3,000,000 kWh of energy usage in the previous calendar year. This program employs a prescriptive approach, ensuring participants understand the specific incentives available for each type of lighting upgrade.

Participants can take advantage of four prescriptive measures to receive incentives for upgrading non-LED lighting fixtures to energy-efficient LEDs:

- **Measure 1:** Indoor ceilings over 15 feet using multi-lamp or metal halide fixtures converted to LED ($35 incentive per fixture).
- **Measure 2:** Indoor ceilings 15 feet or lower converting multi-lamp non-LED fixtures to LED ($18 incentive per fixture).
- **Measure 3:** Outdoor lighting, such as high-pressure sodium or metal halide fixtures, converted to LED ($37 incentive per fixture).

- **Measure 4:** Replacement of non-LED screw-in bulbs or single-light fixtures with LED equivalents ($10 incentive per fixture).

In total, end-use members are eligible for up to $5,000 in incentives annually per facility. The program is ongoing, and EKPC or owner-member cooperative personnel will verify non-LED fixture replacements and review purchase receipts to ensure compliance with the program requirements.

Target Market

The target market for the Commercial Advanced Lighting Program includes non-residential businesses such as small commercial businesses and larger businesses with moderate energy demands, such as high schools, large retail centers, or grocery stores.

The program limits participation to those with an annual energy consumption not exceeding 3,000,000 kWh, ensuring that large-industrial loads cannot participate as potential free-riders.

New Program Tariff

See Attachment DS -10 Proposed Tariffs for this new energy efficiency program tariff being proposed for Commission approval.

J. Commercial & Industrial Thermostat Program

Program Description

The Commercial & Industrial Thermostat Program is designed to promote energy efficiency by encouraging commercial and industrial end-use members to upgrade to self-learning thermostats. These thermostats can automatically adjust temperature settings to optimize energy use, leading to significant reductions in heating and cooling costs. The program is available to non-residential end-use members within the service areas of participating EKPC owner-member cooperatives. To qualify, businesses must have a ducted air-source air conditioner or heat pump with a capacity of at least two (2) tons, controlled by a single non-self-learning thermostat. Zoned systems are not eligible for the incentive.

Participants are eligible for an incentive of $100 for each self-learning thermostat. To ensure compliance, EKPC or owner-member cooperative staff will verify the presence of non-self-learning thermostats before installation and confirm the retrofit after completion.

The program is ongoing and continues to offer incentives to businesses looking to enhance energy efficiency through advanced thermostat technology.

Target Market

The target market for the Commercial & Industrial Thermostat Program includes commercial businesses and industrial facilities that utilize residential-type HVAC systems with ducted air-source air conditioners or heat pumps. These systems are commonly found in settings like small office buildings, retail spaces, and light industrial facilities, where energy savings from self-learning thermostats can make a significant impact on operating costs.

New Program Tariff

See Attachment DS -10 Proposed Tariffs for this new energy efficiency program tariff being proposed for Commission approval.

VI. Conclusion

Q. WILL THE PROPOSED DSM-EE PROGRAMS RESULT IN ANY UNREASONABLE PREJUDICE OR DISADVANTAGE TO ANY CLASS OF CUSTOMERS?

A. No the proposed DSM-EE programs will not result in any unreasonable prejudice or disadvantage to any class of customers.

Q. WHAT IS YOUR RECOMMENDATION REGARDING THE DSM-EE PROGRAMS PROPOSED?

A. The proposed DSM-EE programs are programs recommended by the owner-members and EKPC's expert staff who are knowledgeable of end-use members' needs in rural Kentucky. All existing and proposed DSM-EE programs are cost-effective. The recommendation is for the Commission to approve the new program tariffs and existing program tariff changes proposed in this CPCN. See Attachment SD-10 Tariffs.zip for strike through and clean DSM tariffs.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

ATTACHMENT SD-1

AGENDA

March 20, 2024

Embassy Suites, Lexington

9:00-9:15	Welcome, Introductions, Safety Moment (EKPC)
9:15-9:30	Ice Breaker (Carrie Ray)
9:30-10:00	IIJA, IRA, New ERA, LOI (Joe Settles)
10:00-10:15	EV Pilot Update (Josh Littrell)
10:15-10:30	Break
10:30-12:00	DSM EE & DR Benefit/Cost Review (Scott Drake)
12:00	Adjourn

ATTACHMENT SD-2

Collaborative
3/20/24
Meeting minutes

Carrie Ray, Mountain Association
Chris Woolery, Mountain Association
Josh Bills, Mountain Association
Hope Broecker, Mountain Association
Kenya Stump, Kentucky Office of Energy Policy
Shiela Medina, UK Center for Applied Energy Research
Scott Drake, EKPC
Joe Settles, EKPC
Josh Littrell, EKPC
David Crews, EKPC
Julie Tucker, EKPC
Tom Castle, EKPC
Chris Adams, EKPC
Nick Comer, EKPC
Denise Cronin, EKPC
Jake Campbell, Blue Grass Energy
Rich Prewitt, CVRECC
Christina Perkins, Owen Electric
Caralyne Pennington, Farmers RECC
Tim Sharp, Salt River Electric
Dan Hitchcock, Inter-County
Charlie Pasley, Clark Energy
John May, LVRECC
Jason Mattingly, Nolin RECC
Tim Pease, Fleming-Mason Energy
Alan Coffey, SKRECC

<u>Federal IIJA/IRA, Joe Settles</u>

Infrastructure Investment and Jobs Act (2021)

- Consortium of co-ops applied for funding through Grid Resilience and Innovations Partnership (GRIP).
- EKPC sought funding for SCADA for four cooperatives.
- Consortium was not funded but EKPC is developing a proposal for funding for a microgrid and a transmission project.
- Stump commented that KEEC is administering 40101D funding; SCADA projects should be eligible and co-ops have already compiled info for federal application.

Inflation Reduction Act (2022)

- Investment tax credits
    - Direct pay to co-ops makes this value available to co-ops for the first time.
- New Empowering Rural America (ERA)
    - Co-ops have been engaged since Congress approved funding in late 2022.
    - Notice of funding opportunity released in May; EKPC submitted a letter of interest (LOI) in September; expected response by October, but co-ops are awaiting word on invitation to submit formal application.
    - LOI and application are confidential. Don't want to get ahead of CPCN/IRP processes.
    - Proposals scored on greenhouse gas reductions.
    - LOI and application are competitive processes; much more money requested than is available.
    - Projects must be in operation by 2031.
- Stump noted that state is seeing delays of up to 2 years in awards.

Electric Vehicle pilot, Josh Littrell

- Approved by Kentucky PSC in July 2023.
- Three-year pilot; up to 500 participants; currently ~50 signed up.
- Provides $0.02/kWh bill credit for charging EVs during off-peak hours (10 p.m. to 6 a.m.)
- Charging data is collected directly from EVs by third-party vendor.
- No conflict with net metering.
- In addition to peak reduction, this is first step in building trust with EV owners for possible related programs in the future.

EE/DSM cost-effectiveness scoring

- EKPC preparing DSM portion of the next IRP.
- Total resource cost (TRC) test results per measure were shared with group; test gives indication of cost-effectiveness of potential energy efficiency (EE)/demand side management (DSM) measures.
- Test looks at costs and benefits of potential programs from a high level.
- TRC score of 1.0 or greater indicates potential program might be cost-effective.
- Among changes in scoring, many tax credits were included this time; in past, some tax credits were only available for just a few years, then renewed on an annual basis and could not be counted upon to be available over long run. Latest tax credits approved for 10 years or more.
- Programs are aimed at incentivizing energy/capacity reductions that would not happen otherwise; must minimize "free riders," or participants taking advantage of incentives for actions they would have taken without an incentive.
- Ray asked about opportunities to target rebates to nonprofits, especially churches; governments and schools. Drake said EKPC would consider by is cautious do to burden on co-ops staffing to verify/administer tightly targeted types of programs. Stump commented that DOE's Industrial Assessment Centers have received expanded funding; $2.1 million available for local governments, with floor of $0.5 million.
- Plan to get back together in a few weeks after participants have had a chance to review the TRC scoring data.

ATTACHMENT SD-3

Collaborative DSM follow-up
Teams meeting
4/11/2024
NOTES – second discussion of TRC results from initial run of the Technical Potential Study

26 participants

High level numbers from Total Resource Cost evaluation.

Will take feedback into account as EKPC develops the next Integrated Resource Plan, which will be submitted in spring 2025.

First step of the IRP process

Chris Woolery
Reviewed Carrie's notes
C&I

- LED lighting scored high and should talk about free riders
- Occupancy and light sensors score well
- Why wasn't heating evaluated on thermostats?
- PHP was high
- Cooling rooftop
- PTHC and PTAC difference?
    - PTAC is wall unit
    - Package terminal heat pump

Drake – On C&I lighting
Trying to thread needle; narrow down to specific cross-section that will benefit, without free riders
EKPC hears your suggestions on lighting; understand small commercials would benefit
Trying to minimize administrative time/cost; each co-ops has different resources and rates; makes qualification challenging

Bills
KU-LGE is looks at using NAICS codes to qualify businesses; includes nonprofits

Woolery
Sorted data high to low TRC

- Air rater
- Heat pump
- LEDs
- Heat pump water heaters
- Smart thermostat

Incent and aggregate smart thermostats and Water heaters for controllable DSM

People are not using thermostats right; having direct contact provides opportunity for education

Drake
EKPC is seeing the same themes and looking at adjusting program in those areas

Bills
Small business direct install; might not have capacity to do right away
What about DSM providers that work across utilities?
KU-LGE now has small business direct install, about $700 package
Includes energy audits and thermostat
Could at least have conversation with KU-LGE's contractor, Resource Innovations

Drake
Did that with appliance recyclers; worked well, economies of scale; not opposed to that
Heat pumps; very interested; a lot out there that could be replaced
Heat pump water heaters are of interest

Woolery
Heat pump retrofit, upgrade incentive?
Resistance heat upgrades: larger incentives for low income?

Drake
Will consider, will look at the RIM results
Looking at size of rebates for several programs
Size of rebate usually has to do with amount that effects purchasing decision
Right-size based on decision to go from one resource to another; generally needs to be 30-50% of cost to decision-maker
TRC does not take into account amount of rebate
Rebate from heat pump to heat pump is new to us; don't know what will happen as we continue evaluations

Corey Dutton
SKRECC member
Looked at ductless heat pump, but just costs too much

Drake
We assume that heat pump is broken and person is going to replace it; not really incentivizing replacing an operating heat pump with a new more efficient one

Woolery
Resistance heat is a big problem; feel like I should have asked for RIM numbers two weeks ago then cross them
Numbers aren't as important as need

Incent resistance heat upgrade however we can

Drake
When it gets really cold, heat pumps use resistance heat
Can we install cold-climate heat pumps and get some benefit by eliminating some heat strips?
What's the HVAC code?
Contractors don't want callback complaints

Woolery
Smart appliances and VPPs
Duct sealing; could we pay for some contractors?

Drake
Duct sealing will be incentivized

<u>**DEMAND RESPONSE**</u>

Lane Boldman
EV Residential vs. C&I charging rate? How does that work?

Drake
Can use TOU for residential and some smaller commercials – they don't have the demand component

Battery
Was a rebate to purchase; we're going to look at "bring your own" to see if TRC is better

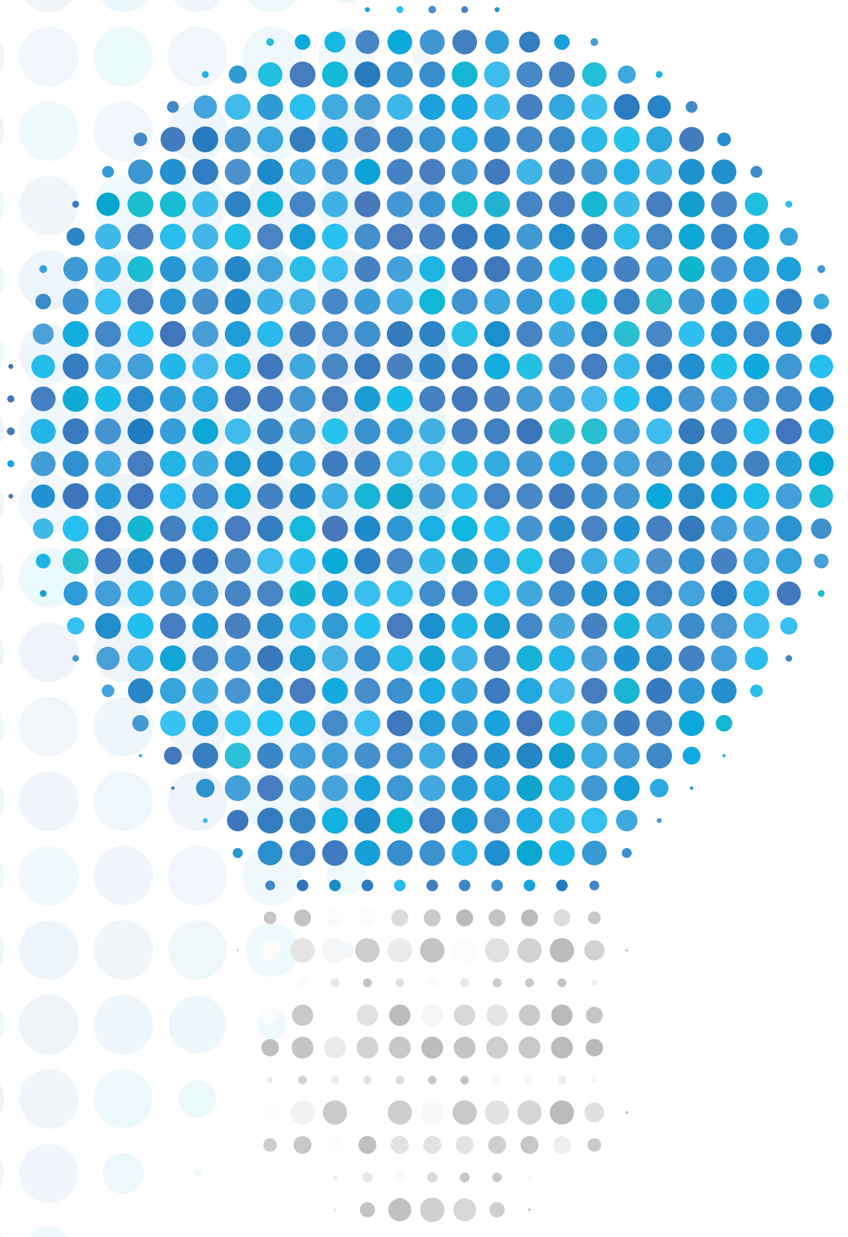
Big three are:
Heating/cooling; have programs and will evaluate new
Water heater; looking at programs
EVs; doing charging pilot

ATTACHMENT SD-4

DSM

Demand Side Management

2021 Annual Report



EAST KENTUCKY POWER COOPERATIVE

A Touchstone Energy® Cooperative

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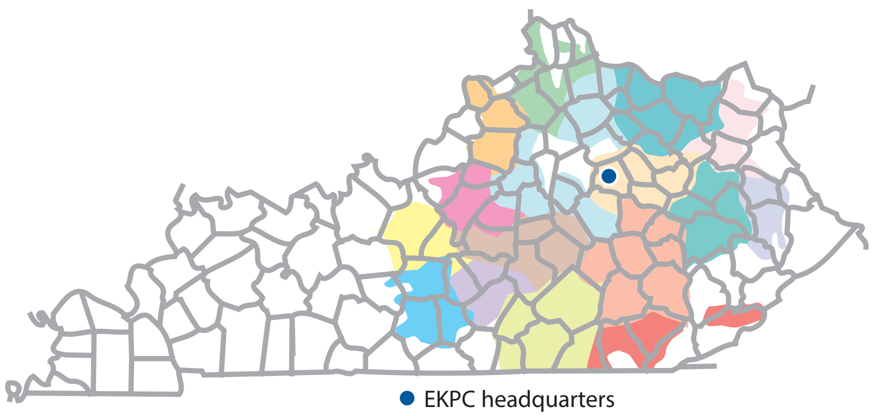
Who We Are

Located in the heart of the Bluegrass state, East Kentucky Power Cooperative is a not-for-profit generation and transmission (G&T) electric utility with headquarters in Winchester, Ky. Our cooperative has a vital mission: to safely generate and deliver affordable, reliable, sustainable electric power to 16 owner-member cooperatives serving more than one million Kentuckians.

Together, with our 16 owner-members, we're known as Kentucky's Touchstone Energy Cooperatives. The member co-ops distribute energy to over 554,000 Kentucky homes, farms, businesses and industries across 87 counties. We're leaders in energy efficiency and environmental stewardship. And we're committed to providing power to improve the lives of people in Kentucky.



● EKPC headquarters

Sixteen distribution cooperatives, which are called the member systems, own EKPC. The 16 co-ops include:

- Big Sandy RECC
- Blue Grass Energy Cooperative
- Clark Energy Cooperative
- Cumberland Valley Electric
- Farmers RECC
- Fleming-Mason Energy Cooperative
- Grayson RECC
- Inter-County Energy
- Jackson Energy Cooperative
- Licking Valley RECC
- Nolin RECC
- Owen Electric Cooperative
- Salt River Electric Cooperative
- Shelby Energy Cooperative
- South Kentucky RECC
- Taylor County RECC

East Kentucky Power Generation

Coal	**Generation**
Spurlock	1,346 net MW
Cooper	341 net MW
Total	**1,687 net MW**

Hydro	**Generation**
Southeastern Power Adm. (SEPA)	170 MW

Natural Gas	**Generation**
Smith Combustion Turbine Units	Summer 753 net MW Winter 989 net MW
Bluegrass Combustion Turbine Units	Summer 501 net MW Winter 567 net MW
Total Natural Gas Summer	**1,254 net MW**
Total Natural Gas Winter	**1,556 net MW**

Landfill	**Generation**
Bavarian	4.6 net MW
Laurel Ridge	3.0 net MW
Green Valley	2.3 net MW
Hardin	2.3 net MW
Pendleton	3.0 net MW
Glasgow*	0.9 net MW
Total Landfill	**16.1 net MW**

SolarGeneration	
Cooperative Solar	8.5 net MW

* Under an existing agreement, a third party receives the output of Glasgow in a 10-year power purchase agreement.

Button-Up Weatherization:

Since the early 1990s, EKPC and its owner-member cooperatives have offered this program to improve a home's energy efficiency, comfort, and reduce energy use. This program offers incentives to members who air seal the shell of their home with the end goal of reducing heat loss in the home. Any member who resides in a site-built or manufactured home that is at least two years old and uses electricity as their primary source of heat is eligible.

Button-Up Weatherization with Air Sealing:
The Button-Up encourages members to air seal the envelope of their home. Air sealing is one of the most cost effective ways to improve the efficiency of a home. A blower door test is required before and after air sealing is completed to demonstrate the impact in kW demand reduction, and an incentive is paid based on that reduction. An additional incentive is paid for increased ceiling insulation.

In 2021, 29 Button-Up rebates were provided to members, resulting in a lifetime savings of 1,225 MWh and 2,449,873 pounds of carbon dioxide emissions.

ENERGY STAR™ Manufactured Home:

The ENERGY STAR™ Manufactured Home Program began in 2014. End use members who purchase and install an ENERGY STAR™ Manufactured Home are eligible for a rebate. ENERGY STAR™ Manufactured Homes are certified by a third-party administrator, Systems Building Research Alliance (SBRA) in order to ensure quality control.

An ENERGY STAR™ certified manufactured home is a home that has been designed, produced and installed by the home manufacturer to meet ENERGY STAR™ requirements for energy efficiency. These manufactured homes feature efficient heating and cooling equipment, water heaters, properly installed insulation, high-performance windows, tight construction and sealed ducts.

This program is available to all end-use members who qualify.

In 2021, 6 rebates were provided to members, resulting in a lifetime savings of 365 MWh and 730,800 pounds of carbon dioxide emissions.

Touchstone Energy Home:

Since 2003, EKPC and its owner-member cooperatives have offered this program to increase energy efficiency in new-home construction. This program is designed to encourage new homes to be built to higher standards for thermal integrity and equipment efficiency, as well as to choose a geothermal or an air-source heat pump, rather than less efficient forms of heating and cooling. Homes built to Touchstone Energy Home standards typically use 30 percent less energy than the same home built to typical construction standards. Plans are submitted before the home is built, a pre-drywall inspection is made, and a blower door test is administered after the home is built to verify that the home meets the standard.

This program is targeted towards the residential new construction market and members who are constructing new site-built homes.

In 2021, 304 Touchstone Energy Home rebates were provided to members, resulting in a lifetime savings of 19,286 MWh and 38,571,520 pounds of carbon dioxide emissions.

EKPC's owner-members have also used this program to partner with Kentucky's affordable housing builders. Relationships with these organizations have led to improved efficiency in affordable housing and lower monthly energy costs for recipients of these homes.

Heat Pump Retrofit:

For decades, EKPC and its owner-member cooperatives have offered this program to lower the cost of heating homes and increase comfort. This program provides incentives for members to replace their existing resistance heat source with a high-efficiency heat pump through two levels of rebates.

Level 1 offers a rebate for a 14 SEER/8.2 HSPF heat pump. Level 2 offers a rebate for a 15 SEER/8.5 HSPF heat pump or higher heat pump. Popularity of mini-split ductless heat pumps has risen in recent years. The retrofit program also offers a special incentive for mini-split systems. The existing heating system must be two years or older to qualify for incentives unless the heat pump is being installed in a new manufactured home. New manufactured homeowners who install a heat pump qualify based on the levels above.

The program is targeted to members who currently use a resistance heat source. Incentives are offered when the homeowner's primary source of heat is an electric resistance furnace, ceiling cable heat, or baseboard heat in both site-built and manufactured homes.

In 2021, 288 Heat Pump Retrofit rebates were provided to members, resulting in a lifetime savings of 42,236 MWh and 87,471,360 pounds of carbon dioxide emissions.

Direct Load Control:

Since 2008, EKPC and its owner-member cooperatives have offered this program to manage peak usage. This program offers incentives to members who enroll central air-conditioners. Switches are installed and, during periods of high demand, the utility briefly cycles the appliance off in order to reduce system peaks and save on costs for peak power. Although EKPC's system typically peaks in winter, member's heating appliances are not interrupted to lower peak. Member comfort and safety are top priority.

This program is targeted to any member with central air-conditioning or heat pump. Beginning in 2019, EKPC also began offering a thermostat program that includes a qualifying Wi-Fi enabled thermostat so that end use members could enroll their smart thermostats in direct load control events. Enrollees in this program help lower energy demand during EKPC's system peaks.

Residential Lighting:

Since 2003, EKPC and its owner-member cooperatives have provided more than one million compact fluorescent lights (CFL) and light-emitting diodes (LED) bulbs to members.

In 2021, cooperatives provided 86,012 LEDs to its members. Each member who participated in a free, online energy audit called Virtual Energy Assessment received an LED, along with Annual Meeting attendees. These LEDs are expected to result in a lifetime savings of 16,514 MWh and 33,028,608 pounds of carbon dioxide emissions.

CARES:

The Community Assistance Resources for Energy Savings (CARES) program began in early 2015, and provides an incentive to enhance the weatherization and energy efficiency services provided to the end-use members by the Kentucky Community Action Agencies (CAA) network. EKPC and its owner-members provide an incentive to the CAA implementing the project on behalf of the end-use member.

This program is available to end-use members who qualify for weatherization and energy-efficiency services through their local CAA in all service territories of participating cooperatives. The maximum incentive possible per household is $2,000.

In 2021, 61 CARES incentives were provided, resulting in a lifetime savings of 4,329 MWh and 8,657,730 pounds of carbon dioxide emissions.

Impact Measures:

System summary of 2021 DSM program savings

DSM program totals (totals for installed energy-efficiency measures and total DLC participation for 2021)

All programs	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Lifetime energy savings (MWh)	Cost of demand saved ($/kW)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
All DSM Programs	118,198	5,511	26.159	7.694	3,712,282	81,969	$59	0.027	163,938,215

Button-Up Weatherization

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
Button-Up	29	82	0.019	0.063	$23,560	15	1,225	$0.02	2,449,873

CARES

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
CARES	61	289	0.044	0.088	$154,915	15	4,329	$0.04	8,657,730

* Includes $835,972 program administration and promotional expenses.

Energy Audits

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
Online	34	16	0.000	0.000	$133,000	5	78	$1.70	156,900

ENERGY STAR® Manufactured Home

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
ES Manufactured Home	6	24	0.003	0.006	$12,840	15	365	$0.04	730,800

Heat Pump Retrofit

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
Heat Pump	288	2,112	0.099	0.000	$493,017	20	42,236	$0.01	84,471,360

Residential Lighting

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
LEDs	86,012	1,806	0.206	0.344	$77,659	8	14,450	$0.01	28,900,032

Touchstone Energy Home

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
TSE Home Prescriptive	39	124	0.028	0.102	$56,550	20	2,474	$0.02	4,948,320
TSE Home Performance	265	841	0.188	0.692	$384,250	20	16,812	$0.02	33,623,200

Direct Load Control Cumulative

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Cost of Demand saved ($/KW)
DLC Air Conditioner	16,054	80	16.054	0.000	$681,671.00	$42.46
DLC Water Heater	12,307	123	4.554	6.400	$499,734.00	$109.75
Thermostats	3,103	16	4.965	0.000	$338,228.00	$68.13
Totals	31,464	218.855	25.572	6.400	$1,519,633.00	$59.42

2021 Basic Program Assumptions [1]

Measure: Button-Up Weatherization with Air Sealing

Annual kWh Saved:	2,205
Winter Demand Savings:	1.71
Summer Demand Savings:	0.52
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC: [2]	1.45

Measure: Heat Pump SEER 14

From Electric Furnace to ENERGY STAR
SEER 14, HSPF 8.2

Annual kWh Saved:	7,533
Winter Demand Savings:	0
Summer Demand Savings:	0 .32
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: [2]	1.55

Measure: Heat Pump SEER 15

From Electric Furnace to ENERGY STAR
SEER 15, HSPF 8.5

Annual kWh Saved:	7,978
Winter Demand Savings:	0
Summer Demand Savings:	0.45
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: [2]	1.55

Measure: Touchstone Energy Home

Prescriptive and Performance – Encourages new homes to be built to a standard of at least SEER 15, HSPF 8.5; HERS Rating of 75 and below

Annual kWh Saved:	3,172
Winter Demand Savings:	2.61
Summer Demand Savings:	0.71
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC:	1.60

Measure: LEDs

Annual kWh Saved:	24
Winter Demand Savings:	0.0040
Summer Demand Savings:	0.0024
Lifetime of Savings:	8 years
Installation Rate:	80%
TRC:	2.78

Measure: Wi-fi Enabled Thermostat

Annual kWh Saved:	36
Winter Demand Savings:	0.00
Summer Demand Savings:	1.20
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	3.96

Measure: CARES

Annual kWh Saved:	4,731
Winter Demand Savings:	1.44
Summer Demand Savings:	0.72
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	0.96

Measure: ENERGY STAR® Manufactured Home

Annual kWh Saved:	4,060
Winter Demand Savings:	0.93
Summer Demand Savings:	0.47
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	1.71

1 Savings numbers are "ex ante" or as planned gross savings except where noted.
2 Total Resource Cost (TRC) is an overall program benefits/costs analysts ratio.

EAST KENTUCKY POWER COOPERATIVE

A Touchstone Energy® Cooperative

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ATTACHMENT SD-5

DSM

Demand Side Management

2022 Annual Report

EAST KENTUCKY
POWER COOPERATIVE

A Touchstone Energy® Cooperative

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Who We Are

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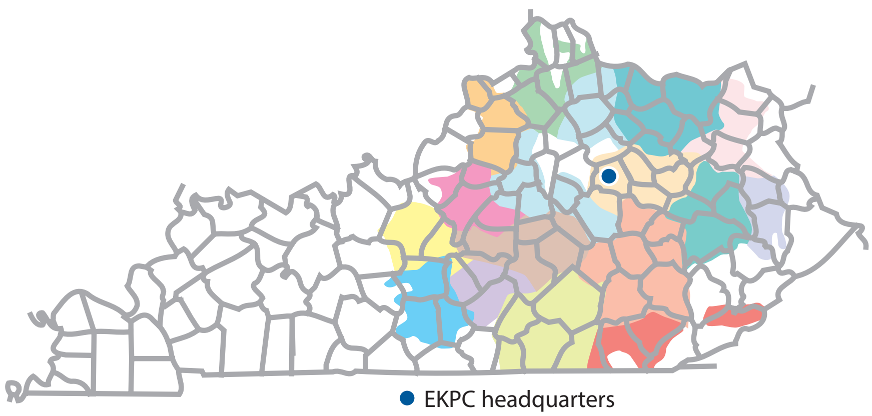
Together, with our 16 owner-members, we're known as Kentucky's Touchstone Energy Cooperatives. The member co-ops distribute energy to over 554,000 Kentucky homes, farms, businesses and industries across 87 counties. We're leaders in energy efficiency and environmental stewardship. And we're committed to providing power to improve the lives of people in Kentucky.



Sixteen distribution cooperatives, which are called the member systems, own EKPC. The 16 co-ops include:

- Big Sandy RECC
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- Clark Energy Cooperative
- Cumberland Valley Electric
- Farmers RECC
- Fleming-Mason Energy Cooperative
- Grayson RECC
- Inter-County Energy
- Jackson Energy Cooperative
- Licking Valley RECC
- Nolin RECC
- Owen Electric Cooperative
- Salt River Electric Cooperative
- Shelby Energy Cooperative
- South Kentucky RECC
- Taylor County RECC

East Kentucky Power Generation

Coal	Generation
Spurlock	1,346 net MW
Cooper	341 net MW
Total	**1,687 net MW**

Hydro	Generation
Southeastern Power Adm. (SEPA)	170 MW

Natural Gas	Generation
Smith Combustion Turbine Units	Summer 753 net MW Winter 989 net MW
Bluegrass Combustion Turbine Units	Summer 501 net MW Winter 567 net MW
Total Natural Gas Summer	**1,254 net MW**
Total Natural Gas Winter	**1,556 net MW**

Landfill	Generation
Bavarian	4.6 net MW
Laurel Ridge	3.0 net MW
Green Valley	2.3 net MW
Hardin	2.3 net MW
Pendleton	3.0 net MW
Glasgow*	0.9 net MW
Total Landfill	**16.1 net MW**

SolarGeneration	
Cooperative Solar	8.5 net MW

* Under an existing agreement, a third party receives the output of Glasgow in a 10-year power purchase agreement.

Button-Up Weatherization:

Since the early 1990s, EKPC and its owner-member cooperatives have offered this program to improve a home's energy efficiency, comfort, and reduce energy use. This program offers incentives to members who air seal the shell of their home with the end goal of reducing heat loss in the home. Any member who resides in a site-built or manufactured home that is at least two years old and uses electricity as their primary source of heat is eligible.

Button-Up Weatherization with Air Sealing:
The Button-Up encourages members to air seal the envelope of their home. Air sealing is one of the most cost effective ways to improve the efficiency of a home. A blower door test is required before and after air sealing is completed to demonstrate the impact in kW demand reduction, and an incentive is paid based on that reduction. Additional incentives are paid for increasing ceiling insulation and/or sealing ductwork.

In 2022, 39 Button-Up rebates were provided to members, resulting in a lifetime savings of 2,157 MWh and 4,314,185 pounds of carbon dioxide emissions.

ENERGY STAR® Manufactured Home:

The ENERGY STAR® Manufactured Home Program began in 2014. End use members who purchase and install an ENERGY STAR® Manufactured Home are eligible for a rebate. ENERGY STAR® Manufactured Homes are certified by a third-party administrator, Systems Building Research Alliance (SBRA) in order to ensure quality control.

An ENERGY STAR® certified manufactured home is a home that has been designed, produced and installed by the home manufacturer to meet ENERGY STAR® requirements for energy efficiency. These manufactured homes feature efficient heating and cooling equipment, water heaters, properly installed insulation, high-performance windows, tight construction and sealed ducts.

This program is available to all end-use members who qualify.

In 2022, 2 rebates were provided to members, resulting in a lifetime savings of 122 MWh and 243,600 pounds of carbon dioxide emissions.

Touchstone Energy Home:

Since 2003, EKPC and its owner-member cooperatives have offered this program to increase energy efficiency in new-home construction. This program is designed to encourage new homes to be built to higher standards for thermal integrity and equipment efficiency, as well as to choose a geothermal or an air-source heat pump, rather than less efficient forms of heating and cooling. Homes built to Touchstone Energy Home standards typically use 30 percent less energy than the same home built to typical construction standards. Plans are submitted before the home is built, a pre-drywall inspection is made, and a blower door test is administered after the home is built to verify that the home meets the standard.

This program is targeted towards the residential new construction market and members who are constructing new site-built homes.

In 2022, 438 Touchstone Energy Home rebates were provided to members, resulting in a lifetime savings of 27,787 MWh and 55,573,440 pounds of carbon dioxide emissions.

EKPC's owner-members have also used this program to partner with Kentucky's affordable housing builders. Relationships with these organizations have led to improved efficiency in affordable housing and lower monthly energy costs for recipients of these homes.

Heat Pump Retrofit:

For decades, EKPC and its owner-member cooperatives have offered this program to lower the cost of heating homes and increase comfort. This program provides incentives for members to replace their existing resistance heat source with a high-efficiency heat pump through two levels of rebates.

Level 1 offers a rebate for a 14 SEER/8.2 HSPF heat pump. Level 2 offers a rebate for a 15 SEER/8.5 HSPF heat pump or higher heat pump. Popularity of mini-split ductless heat pumps has risen in recent years. The retrofit program also offers a special incentive for mini-split systems. The existing heating system must be two years or older to qualify for incentives unless the heat pump is being installed in a new manufactured home. New manufactured homeowners who install a heat pump qualify based on the levels above.

The program is targeted to members who currently use a resistance heat source. Incentives are offered when the homeowner's primary source of heat is an electric resistance furnace, ceiling cable heat, or baseboard heat in both site-built and manufactured homes.

In 2022, 325 Heat Pump Retrofit rebates were provided to members, resulting in a lifetime savings of 48,399 MWh and 96,797,560 pounds of carbon dioxide emissions.

Direct Load Control:

Since 2008, EKPC and its owner-member cooperatives have offered this program to manage peak usage. This program offers incentives to members who enroll central air-conditioners. Switches are installed and, during periods of high demand, the utility briefly cycles the appliance off in order to reduce system peaks and save on costs for peak power. Although EKPC's system typically peaks in winter, member's heating appliances are not interrupted to lower peak. Member comfort and safety are top priority.

This program is targeted to any member with central air-conditioning or heat pump. Beginning in 2019, EKPC also began offering a thermostat program that includes a qualifying Wi-Fi enabled thermostat so that end use members could enroll their smart thermostats in direct load control events. Enrollees in this program help lower energy demand during EKPC's system peaks.

Residential Lighting:

Since 2003, EKPC and its owner-member cooperatives have provided more than one million compact fluorescent lights (CFL) and light-emitting diodes (LED) bulbs to members.

In 2022, cooperatives provided 63,701 LEDs to its members. Each member who participated in a free, online energy audit called Virtual Energy Assessment received an LED, along with Annual Meeting attendees. These LEDs are expected to result in a lifetime savings of 10,702 MWh and 21,403,536 pounds of carbon dioxide emissions.

CARES:

The Community Assistance Resources for Energy Savings (CARES) program began in early 2015, and provides an incentive to enhance the weatherization and energy efficiency services provided to the end-use members by the Kentucky Community Action Agencies (CAA) network and Kentucky's Affordable Housing Organizations (AHO). EKPC and its owner-members provide an incentive to the CAA implementing the project on behalf of the end-use member.

This program is available to end-use members who qualify for weatherization and energy-efficiency services through their local CAA in all service territories of participating cooperatives. The maximum incentive possible per household is $2,000.

In 2022, 55 CARES incentives were provided, resulting in a lifetime savings of 3,903 MWh and 7,806,150 pounds of carbon dioxide emissions.

CARES

Impact Measures:

System summary of 2022 DSM program savings

DSM program totals (totals for installed energy-efficiency measures and total DLC participation for 2021)

All programs	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2022 program costs	Lifetime energy savings (MWh)	Cost of demand saved ($/kW)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
All DSM Programs	95,496	5,773	26.278	7.795	3,947,026	93,069	$64	0.025	186,138,471

Button-Up Weatherization

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
Button-Up	39	144	0.034	0.111	$38,230	15	2,157	$0.02	4,314,185

CARES

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
CARES	55	260	0.040	0.079	$140,617	15	3,903	$0.04	7,806,150

* Includes $835,972 program administration and promotional expenses.

ENERGY STAR® Manufactured Home

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
ES Manufactured Home	2	8	0.001	0.002	$4,280	15	122	$0.04	243,600

Heat Pump Retrofit

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
Heat Pump	325	2,420	0.111	0.000	$561,032	20	48,399	$0.01	96,797,560

Residential Lighting

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
LEDs	63,701	1,338	0.153	0.255	$48,635	-	10,702	$0.005	21,403,536

Touchstone Energy Home

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
TSE Home Prescriptive	25	79	0.018	0.065	$36,250	20	1,586	$0.02	3,172,000
TSE Home Performance	413	1,310	0.293	1.078	$598,850	20	26,201	$0.02	52,401,440

Direct Load Control Cumulative

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2022 program costs	Cost of Demand saved ($/KW)
DLC Air Conditioner	15,319	77	15.319	0.000	$681,671.00	$44.50
DLC Water Heater	11,933	119	4.415	6.205	$499,734.00	$113.18
Thermostats	3,684	18	5.894	0.000	$457,862.00	$77.68
Totals	30,936	214.345	25.629	6.2.5	$1,639,267.00	$63.96

2022 Basic Program Assumptions [1]

Measure: Button-Up Weatherization with Air Sealing

Annual kWh Saved:	2,253
Winter Demand Savings:	1.74
Summer Demand Savings:	0.53
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: [2]	1.68

Measure: Heat Pump SEER 14

From Electric Furnace to ENERGY STAR
SEER 14, HSPF 8.2

Annual kWh Saved:	7,533
Winter Demand Savings:	0
Summer Demand Savings:	0 .32
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: [2]	1.60

Measure: Heat Pump SEER 15

From Electric Furnace to ENERGY STAR
SEER 15, HSPF 8.5

Annual kWh Saved:	7,978
Winter Demand Savings:	0
Summer Demand Savings:	0.45
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: [2]	1.60

Measure: Touchstone Energy Home

Prescriptive or Performance

Annual kWh Saved:	3,172
Winter Demand Savings:	2.94
Summer Demand Savings:	0.70
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC:	2.10

Measure: LEDs

Annual kWh Saved:	24
Winter Demand Savings:	0.0040
Summer Demand Savings:	0.0024
Lifetime of Savings:	8 years
Installation Rate:	80%
TRC:	2.78

Measure: Wi-fi Enabled Thermostat

Annual kWh Saved:	36
Winter Demand Savings:	0.00
Summer Demand Savings:	1.20
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	2.17

Measure: CARES

Annual kWh Saved:	4,495
Winter Demand Savings:	1.34
Summer Demand Savings:	0.66
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	1.15

Measure: ENERGY STAR® Manufactured Home

Annual kWh Saved:	4,060
Winter Demand Savings:	0.93
Summer Demand Savings:	0.47
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	1.62

1 Savings numbers are "ex ante" or as planned gross savings except where noted.
2 Total Resource Cost (TRC) is an overall program benefits/costs analysts ratio.

EAST KENTUCKY POWER COOPERATIVE

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ATTACHMENT SD-6

DSM

Demand Side Management

2023 Annual Report

EAST KENTUCKY
POWER COOPERATIVE

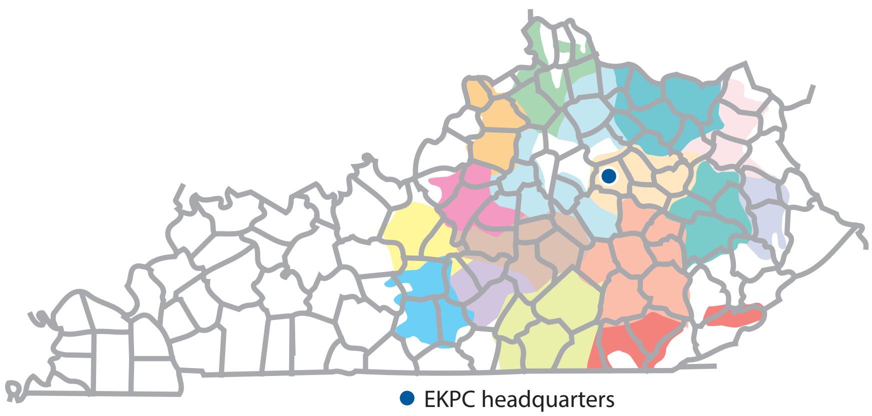
A Touchstone Energy Cooperative

Table of Contents

Who We Are

Located in the heart of the Bluegrass state, East Kentucky Power Cooperative is a not-for-profit generation and transmission (G&T) electric utility with headquarters in Winchester, Ky. Our cooperative has a vital mission: to safely generate and deliver affordable, reliable, sustainable electric power to 16 owner-member cooperatives serving more than one million Kentuckians.

Together, with our 16 owner-members, we're known as Kentucky's Touchstone Energy Cooperatives. The member co-ops distribute energy to over 554,000 Kentucky homes, farms, businesses and industries across 87 counties. We're leaders in energy efficiency and environmental stewardship. And we're committed to providing power to improve the lives of people in Kentucky.



● EKPC headquarters

Sixteen distribution cooperatives, which are called the member systems, own EKPC. The 16 co-ops include:

- Big Sandy RECC
- Blue Grass Energy Cooperative
- Clark Energy Cooperative
- Cumberland Valley Electric
- Farmers RECC
- Fleming-Mason Energy Cooperative
- Grayson RECC
- Inter-County Energy
- Jackson Energy Cooperative
- Licking Valley RECC
- Nolin RECC
- Owen Electric Cooperative
- Salt River Electric Cooperative
- Shelby Energy Cooperative
- South Kentucky RECC
- Taylor County RECC

East Kentucky Power Generation

Coal	Generation
Spurlock	1,346 net MW
Cooper	341 net MW
Total	**1,687 net MW**

Hydro	Generation
Southeastern Power Adm. (SEPA)	170 MW

Natural Gas	Generation
Smith Combustion Turbine Units	Summer 753 net MW Winter 989 net MW
Bluegrass Combustion Turbine Units	Summer 501 net MW Winter 567 net MW
Total Natural Gas Summer	**1,254 net MW**
Total Natural Gas Winter	**1,556 net MW**

Landfill	Generation
Bavarian	4.6 net MW
Green Valley	2.3 net MW
Hardin	2.3 net MW
Pendleton	3.0 net MW
Glasgow*	0.9 net MW
Total Landfill	**13.1 net MW**

SolarGeneration	
Cooperative Solar	8.5 net MW

* Under an existing agreement, a third party receives the output of Glasgow in a 10-year power purchase agreement.

Button-Up Weatherization:

Since the early 1990s, EKPC and its owner-member cooperatives have offered this program to improve a home's energy efficiency, comfort, and reduce energy use. This program offers incentives to members who air seal the shell of their home with the end goal of reducing heat loss in the home. Any member who resides in a site-built or manufactured home that is at least two years old and uses electricity as their primary source of heat is eligible.

Button-Up Weatherization with Air Sealing:
The Button-Up encourages members to air seal the envelope of their home. Air sealing is one of the most cost effective ways to improve the efficiency of a home. A blower door test is required before and after air sealing is completed to demonstrate the impact in kW demand reduction, and an incentive is paid based on that reduction. Additional incentives are paid for increasing ceiling insulation and/or sealing ductwork.

In 2023, 28 Button-Up rebates were provided to members, resulting in a lifetime savings of 1,016 MWh and 2,032,831 pounds of carbon dioxide emissions.

ENERGY STAR® Manufactured Home:

The ENERGY STAR® Manufactured Home Program began in 2014. End-use members who purchase and install an ENERGY STAR® Manufactured Home are eligible for a rebate. ENERGY STAR® Manufactured Homes are certified by a third-party administrator, Systems Building Research Alliance (SBRA) in order to ensure quality control.

An ENERGY STAR® certified manufactured home is a home that has been designed, produced and installed by the home manufacturer to meet ENERGY STAR® requirements for energy efficiency. These manufactured homes feature efficient heating and cooling equipment, water heaters, properly installed insulation, high-performance windows, tight construction and sealed ducts.

This program is available to all end-use members who qualify.

In 2023, 23 rebates were provided to members, resulting in a lifetime savings of 1,401 MWh and 2,801,400 pounds of carbon dioxide emissions.

Touchstone Energy Home:

Since 2003, EKPC and its owner-member cooperatives have offered this program to increase energy efficiency in new-home construction. This program is designed to encourage new homes to be built to higher standards for thermal integrity and equipment efficiency, as well as to choose a geothermal or an air-source heat pump, rather than less efficient forms of heating and cooling. Homes built to Touchstone Energy Home standards typically use 30 percent less energy than the same home built to typical construction standards. Plans are submitted before the home is built, a pre-drywall inspection is made, and a blower door test is administered after the home is built to verify that the home meets the standard.

This program is targeted towards the residential new construction market and members who are constructing new site-built homes.

In 2023, 494 Touchstone Energy Home rebates were provided to members, resulting in a lifetime savings of 31,340 MWh and 62,678,720 pounds of carbon dioxide emissions.

EKPC's owner-members have also used this program to partner with Kentucky's affordable housing builders. Relationships with these organizations have led to improved efficiency in affordable housing and lower monthly energy costs for recipients of these homes.

Heat Pump Retrofit:

For decades, EKPC and its owner-member cooperatives have offered this program to lower the cost of heating homes and increase comfort. This program provides incentives for members to replace their existing resistance heat source with a high-efficiency heat pump through two levels of rebates.

Level 1 offers a rebate for a federal minimum standard heat pump. Level 2 offers a rebate for a ENERGY STAR© level heat pump or higher heat pump. Popularity of mini-split ductless heat pumps has risen in recent years. The retrofit program also offers a special incentive for mini-split systems. The existing heating system must be two years or older to qualify for incentives unless the heat pump is being installed in a new manufactured home. New manufactured homeowners who install a heat pump qualify based on the levels above.

The program is targeted to members who currently use a resistance heat source. Incentives are offered when the homeowner's primary source of heat is an electric resistance furnace, ceiling cable heat, or baseboard heat in both site-built and manufactured homes.

In 2023, 361 Heat Pump Retrofit rebates were provided to members, resulting in a lifetime savings of 53,247 MWh and 106,494,560 pounds of carbon dioxide emissions.

Direct Load Control:

Since 2008, EKPC and its owner-member cooperatives have offered this program to manage peak usage. This program offers incentives to members who enroll central air-conditioners. Switches are installed and, during periods of high demand, the utility briefly cycles the appliance off in order to reduce system peaks and save on costs for peak power. Although EKPC's system typically peaks in winter, member's heating appliances are not interrupted to lower peak. Member comfort and safety are top priority.

This program is targeted to any member with central air-conditioning or heat pump. Beginning in 2019, EKPC also began offering a thermostat program that includes a qualifying Wi-Fi enabled thermostat so that end use members could enroll their smart thermostats in direct load control events. Enrollees in this program help lower energy demand during EKPC's system peaks.

CARES:

The Community Assistance Resources for Energy Savings (CARES) program began in early 2015, and provides an incentive to enhance the weatherization and energy efficiency services provided to the end-use members by the Kentucky Community Action Agencies (CAA) network and Kentucky's Affordable Housing Organizations (AHO). EKPC and its owner-members provide an incentive to the CAA implementing the project on behalf of the end-use member.

This program is available to end-use members who qualify for weatherization and energy-efficiency services through their local CAA in all service territories of participating cooperatives. The maximum incentive possible per household is $2,000.

In 2023, 120 CARES incentives were provided, resulting in a lifetime savings of 8,374 MWh and 16,747,740 pounds of carbon dioxide emissions.

Impact Measures:

System summary of 2023 DSM program savings

DSM program totals (totals for installed energy-efficiency measures and total DLC participation for 2023)

All programs	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2023 program costs*	Lifetime energy savings (MWh)	Cost of demand saved ($/kW)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
All DSM Programs	32,140	5,162	27.019	7.559	$4,396,489	95,378	$68	0.027	190,755,251

Button-Up Weatherization

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2023 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
Button-Up	28	68	0.016	0.052	$29,044	15	1,016	$0.03	2,032,831

CARES

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2023 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
CARES	120	558	0.085	0.170	$293,840	15	8,374	$0.04	16,747,740

* Includes $903,561 program administration and promotional expenses.

ENERGY STAR® Manufactured Home

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2023 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
ES Manufactured Home	23	93	0.011	0.021	$49,220	15	1,401	$0.04	2,801,400

Heat Pump Retrofit

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2023 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
Heat Pump	361	2,662	0.122	0.000	$616,645	20	53,247	$0.01	106,494,560

Touchstone Energy Home

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2023 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved ($/kWh)	Lifetime CO2 savings (lbs)
TSE Home Prescriptive	24	76	0.017	0.063	$34,800	20	1,523	$0.02	3,045,120
TSE Home Performance	470	1,491	0.334	1.227	$681,500	20	29,817	$0.02	59,633,600

Direct Load Control Cumulative

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2023 program costs	Cost of Demand saved ($/KW)
DLC Air Conditioner	15,157	76	15.157	0.000	$708,185.37	$46.72
DLC Water Heater	11,588	116	4.288	6.026	$509,550.28	$118.84
Thermostats	4,369	22	6.990	0.000	$570,143.32	$81.56
Totals	31,114	213.51	26.435	6.026	$1,787,878.97	$69.63

2023 Basic Program Assumptions [1]

Measure: Button-Up Weatherization with Air Sealing

Annual kWh Saved:	2,253
Winter Demand Savings:	1.74
Summer Demand Savings:	0.53
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: [2]	1.68

Measure: Heat Pump Federal Standard

From Electric Furnace & CAC to
Heat Pump Federal Standard

Annual kWh Saved:	7,533
Winter Demand Savings:	0
Summer Demand Savings:	0 .32
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: [2]	1.60

Measure: Heat Pump ENERGY STAR®

From Electric Furnace & CAC to
ENERGY STAR Heat Pump

Annual kWh Saved:	7,978
Winter Demand Savings:	0
Summer Demand Savings:	0.45
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: [2]	1.60

Measure: Touchstone Energy Home

Prescriptive or Performance

Annual kWh Saved:	3,172
Winter Demand Savings:	2.94
Summer Demand Savings:	0.70
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC:	2.10

Measure: Wi-fi Enabled Thermostat

Annual kWh Saved:	36
Winter Demand Savings:	0.00
Summer Demand Savings:	1.20
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	2.17

Measure: CARES

Annual kWh Saved:	4,495
Winter Demand Savings:	1.34
Summer Demand Savings:	0.66
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	1.15

Measure: ENERGY STAR® Manufactured Home

Annual kWh Saved:	4,060
Winter Demand Savings:	0.93
Summer Demand Savings:	0.47
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	1.62

1 Savings numbers are "ex ante" or as planned gross savings except where noted.
2 Total Resource Cost (TRC) is an overall program benefits/costs analysts ratio.

Kentucky's Touchstone Energy® Cooperatives

Big Sandy RECC   Blue Grass Energy   Clark Energy   Cumberland Valley Electric   Farmers RECC
Fleming-Mason Energy   Grayson RECC   Inter-County Energy   Jackson Energy   Licking Valley RECC   Nolin RECC
Owen Electric   Salt River Electric   Shelby Energy   South Kentucky RECC   Taylor County RECC

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ATTACHMENT SD-7

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ENGINEERS & CONSULTANTS
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prepared for

EAST KENTUCKY POWER COOPERATIVE

EAST KENTUCKY POWER COOPERATIVE
A Touchstone Energy Cooperative

2024 POTENTIAL STUDY

FINAL REPORT

September

2024

prepared by

GDS ASSOCIATES INC

Contents

LIST OF ACRONYMS

AC	Air conditioning
ACEEE	American Council for an Energy Efficient Economy
AEO	Annual Energy Outlook
BTM	Behind the meter
CBECS	Commercial Buildings Energy Consumption Survey
CP	Coincident Peak
CPP	Critical Peak Pricing
DLC	Direct Load Control
DR	Demand Response
DSM	Demand-side Management
EIA	Energy Information Administration
EKPC	East Kentucky Power Cooperative
EM&V	Evaluation, Measurement & Verification
EP	Economic Potential
EV	Electric Vehicle
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
HVAC	Heating, Ventilation and Cooling
MAP	Maximum Achievable Potential
MECS	Manufacturing Energy Consumption Survey
MW	Megawatt
MWh	Megawatt-hour
NAPEE	National Action Plan for Energy Efficiency
NPV	Net present value
PEV	Plug-in electric vehicle
RAP	Realistically Achievable Potential
RECS	Residential Energy Consumption Survey
TP	Technical Potential
TRC	Total Resource Cost Test
TRM	Technical Reference Manual
WTP	Willingness-to-participate

1 EXECUTIVE SUMMARY

1.1 BACKGROUND

This energy efficiency and demand response potential study for East Kentucky Power Cooperative (EKPC) provides a roadmap and identifies the energy efficiency and demand response measures having the greatest potential savings and the measures that are the most cost-effective. In addition to technical and economic potential estimates, the development of achievable potential estimates for a range of feasible energy efficiency measures is useful for program planning and modification purposes. Unlike achievable potential estimates, technical and economic potential estimates do not include customer acceptance considerations for energy efficiency measures, which are often among the most key factors when estimating the likely customer response to new programs.

All energy efficiency results were developed using customized residential, commercial, and industrial sector-level energy efficiency potential assessment Excel models and Company-specific cost effectiveness criteria including the most recent EKPC avoided energy and capacity cost projections for electricity. Demand response results were calculated in a separate model.

The results of this study provide detailed information on measures that are cost-effective and have potential kWh and kW savings. The data referenced in this report were the best available at the time this analysis was developed. As building and appliance codes and energy efficiency standards change, and as energy prices fluctuate, additional opportunities for energy efficiency may occur while current practices may become outdated. Actual energy and demand savings will depend upon the level and degree of voluntary member system participation in DSM programs.

1.2 STUDY SCOPE

This study examines the potential to reduce electric consumption and peak demand through the implementation of DSM technologies and practices in residential, commercial, and industrial facilities. The study assessed energy efficiency potential and demand response throughout EKPC Members' service territories over fifteen years, from 2024 through 2038.

The scope of this study distinguishes three types of energy efficiency potential: (1) technical, (2) economic, and (3) achievable.

- ***Technical Potential*** is the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end users to adopt the efficiency measures. Technical potential is constrained only by factors such as technical feasibility and applicability of measures.
- ***Economic Potential*** refers to the subset of the technical potential that is economically cost-effective as compared to conventional supply-side energy resources. Economic potential follows the same adoption rates as technical potential. Like technical potential, the economic scenario ignores market barriers to ensuring actual implementation of efficiency. Finally, economic potential only considers the costs of efficiency measures themselves, ignoring any programmatic costs (e.g., marketing, analysis, administration) that would be necessary to capture them.[1]
- ***Achievable Potential*** is the amount of energy use that efficiency can realistically be expected to displace, assuming the most aggressive program scenario possible (e.g., providing end users with payments for the entire incremental cost of more efficient equipment). Achievable potential considers real-world barriers to encouraging end users to adopt efficiency measures, the non-measure costs of delivering programs (for

[1] National Action Plan for Energy Efficiency, "Guide for Conducting Energy Efficiency Potential Studies" (November 2007), page 2-4.

administration, marketing, tracking systems, and monitoring and evaluation), and the capability of programs and administrators to boost program activity over time. The study assessed two types of achievable potential: maximum (MAP) and realistic (RAP).

1.3 ENERGY EFFICIENCY POTENTIAL

Figure 1-1 and Table 1-1 provide the technical, economic, MAP and RAP results for the 5-year, 10-year, and 15-year timeframes. The cumulative annual 5-year technical potential is 13% of the forecasted sales, and the economic potential is 12% of forecasted sales. The cumulative annual 5-year MAP is 3.8% and the RAP is 2.7%, as a percentage of forecasted sales. Over the duration of the study timeframe the technical potential rises to 26% and the economic potential rises to 24% of forecasted sales. The MAP and RAP rise respectively to 13% and 10% of forecasted sales over the study timeframe. The gap between economic potential and MAP/RAP represents market barriers to prospective program participants, both financial and non-financial, to achieving the full amount of economic potential.

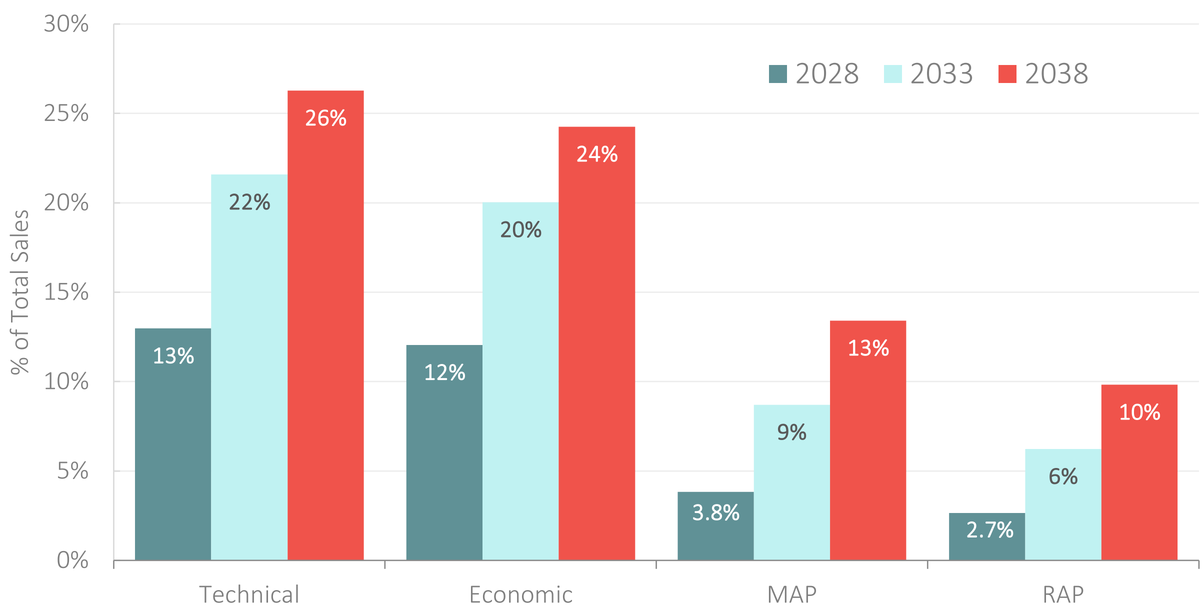

FIGURE 1-1: OVERVIEW OF ENERGY EFFICIENCY POTENTIAL

TABLE 1-1 CUMULATIVE ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY – ALL SECTORS

	2024	2025	2026	2033	2038
Energy (MWh)					
Technical	535,966	938,592	1,319,426	3,492,640	4,450,626
Economic	501,287	868,860	1,215,577	3,242,935	4,108,887
MAP	105,646	224,259	346,882	1,408,945	2,271,412
RAP	71,923	153,688	238,970	1,008,898	1,664,094
Energy Savings (as % of Forecast)					
Technical	3.5%	6.1%	8.6%	21.6%	26.3%
Economic	3.3%	5.7%	7.9%	20.0%	24.3%
MAP	0.7%	1.5%	2.2%	8.7%	13.4%
RAP	0.5%	1.0%	1.5%	6.2%	9.8%

Table 1-2 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sales forecast.[2] The incremental MAP ranges from 0.7% to 2.2% per year over the study horizon. The incremental RAP ranges from 0.5% to 1.8% per year over the study horizon.

TABLE 1-2 INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY – ALL SECTORS

	2024	2025	2026	2033	2038
Energy (MWh)					
Technical	535,966	539,576	542,124	569,718	554,248
Economic	501,287	503,740	506,475	528,203	514,874
MAP	105,646	121,567	130,366	283,668	374,025
RAP	71,923	84,577	92,565	226,101	309,996
Energy Savings (as % of Forecast)					
Technical	3.5%	3.5%	3.5%	3.5%	3.3%
Economic	3.3%	3.3%	3.3%	3.3%	3.0%
MAP	0.7%	0.8%	0.8%	1.8%	2.2%
RAP	0.5%	0.6%	0.6%	1.4%	1.8%

1.4 DEMAND RESPONSE POTENTIAL

Figure 1-2 provides the technical, economic, summer MAP, winter MAP, summer RAP, and winter RAP results for the 5-year, 10-year, and 15-year timeframes. The cumulative annual 5-year summer MAP is 24%, winter MAP is 28%, summer RAP is 14%, and winter RAP is 16% as a percentage of forecasted demand.

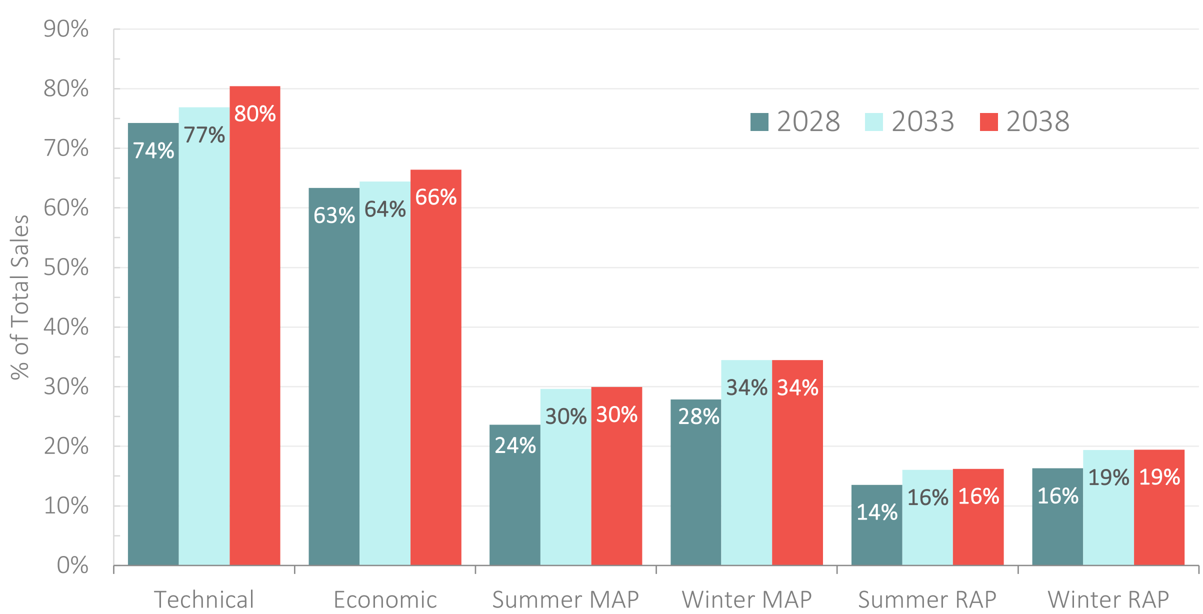

FIGURE 1-2: OVERVIEW OF DEMAND RESPONSE POTENTIAL

[2] The savings shown in Table 1-2 show the savings associated with measure installations in the years shown in the table. This compares to Table 1-1, which shows the cumulative annual savings for all measures installed to date in the years shown (e.g. 2033 shows the cumulative savings in that year associated with all measure installations in the 2024-2033 timeframe.

Table 1-3 provides 15-year summer MAP and RAP potential by residential program. The DLC Thermostat and CPP with Enabling Technology programs provide the most MAP and RAP potential, accounting for a combined 3.9% peak savings in the summer RAP scenario.

TABLE 1-3 SUMMER DEMAND RESPONSE MAP & RAP POTENTIAL – RESIDENTIAL PROGRAMS

	MAP (MW)	RAP (MW)	MAP (% of Forecast	RAP (% of Forecast
DLC Central AC Switch	0.0	0.0	0.0%	0.0%
DLC Thermostat	164.5	53.4	5.7%	1.9%
DLC Water Heaters	0.0	0.0	0.0%	0.0%
CPP with Enabling Technology	190.7	56.6	6.6%	2.0%
CPP without Enabling Technology	51.7	22.4	1.8%	0.8%
Generators	0.0	19.9	0.0%	0.7%
Total	**407.0**	**152.3**	**14.1%**	**5.3%**

Table 1-4 provides 15-year winter MAP and RAP potential by C/I program. The Interruptible Rate program provides the most MAP and RAP potential, accounting for 9.0% peak savings in the summer RAP scenario.

TABLE 1-4 SUMMER DEMAND RESPONSE MAP & RAP POTENTIAL – C/I PROGRAMS

	MAP (MW)	RAP (MW)	MAP (% of Forecast	RAP (% of Forecast
DLC Thermostat	11.2	9.1	0.4%	0.3%
DLC Water Heaters	3.3	2.4	0.1%	0.1%
DLC Agricultural Irrigation	8.3	0.0	0.3%	0.0%
Interruptible Rate	321.4	258.6	11.2%	9.0%
CPP with Enabling Technology	66.4	21.8	2.3%	0.8%
CPP without Enabling Technology	17.5	11.4	0.6%	0.4%
Demand Buyback	2.2	0.0	0.1%	0.0%
Golf Cart Charging Rate	1.4	0.0	0.0%	0.0%
Capacity Bidding	1.0	0.0	0.0%	0.0%
Generators	15.1	7.6	0.5%	0.3%
Total	**447.8**	**310.9**	**15.6%**	**10.8%**

Table 1-5 provides 15-year winter MAP and RAP potential by residential program. The DLC Thermostat and CPP with Enabling Technology programs provide the most MAP and RAP potential, accounting for a combined 2.8% peak savings in the winter RAP scenario.

TABLE 1-5 WINTER DEMAND RESPONSE MAP & RAP POTENTIAL – RESIDENTIAL PROGRAMS

	MAP (MW)	RAP (MW)	MAP (% of Forecast)	RAP (% of Forecast)
DLC Thermostat	66.9	22.5	1.8%	0.6%
DLC Water Heaters	0.0	0.0	0.0%	0.0%
CPP with Enabling Technology	199.8	59.3	5.3%	1.6%
CPP without Enabling Technology	74.1	32.1	2.0%	0.9%
Generators	0.0	19.9	0.0%	0.5%
Total	**340.8**	**133.8**	**9.1%**	**3.6%**

Table 1-6 provides 15-year winter MAP and RAP potential by C/I program. The Interruptible Rate program provides the most MAP and RAP potential, accounting for 9.0% peak savings in the winter RAP scenario.

TABLE 1-6 WINTER DEMAND RESPONSE MAP & RAP POTENTIAL – C/I PROGRAMS

	MAP (MW)	RAP (MW)	MAP (% of Forecast)	RAP (% of Forecast)
DLC Thermostat	9.5	7.7	0.3%	0.2%
DLC Water Heaters	6.6	4.9	0.2%	0.1%
Interruptible Rate	423.2	335.0	11.3%	9.0%
CPP with Enabling Technology	86.9	28.5	2.3%	0.8%
CPP without Enabling Technology	22.9	14.9	0.6%	0.4%
Demand Buyback	2.9	0.0	0.1%	0.0%
Golf Cart Charging Rate	1.4	0.0	0.0%	0.0%
Capacity Bidding	1.4	0.0	0.0%	0.0%
Generators	15.1	7.6	0.4%	0.2%
Total	**569.8**	**398.6**	**15.3%**	**10.7%**

2 BASELINE FORECAST

The chapter provides updated forecast information on electricity consumption, consumption by market segment and by energy end use in EKPC's member service territories. This chapter also provides an overview of the number of households and housing units in EKPC's service area. Developing this information is a fundamental part of any energy efficiency potential study. It is necessary to understand how energy is consumed in a state or region before one can assess the energy efficiency savings potential that remains to be tapped.

2.1 EKPC MEMBER SERVICE TERRITORIES

EKPC member service territories are in an area from central Kentucky to eastern Kentucky. Figure 2-1 shows a map of the 16 cooperatives in EKPC's service area. Note that the size of service areas varies.

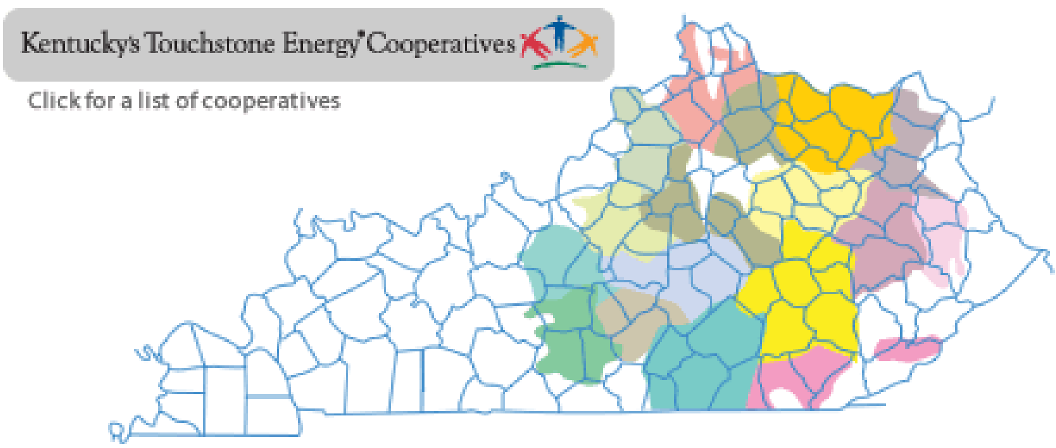

FIGURE 2-1. MAP OF THE 16 COOPERATIVES IN THE EKPC SERVICE TERRITORY

2.2 SECTOR-LEVEL FORECASTS AND MARKET SEGMENTATION

Table 2-1 provides the sales by sector across the 2024-2038 timeframe. Sales are forecasted to gradually increase over the timeframe of the study in both the residential and C/I sectors. Total sales are forecasted to be nearly 17 million MWh by 2038.

TABLE 2-1 15-YR SALES FORECASTS BY SECTOR (MWH)

Year	Residential	Commercial	Industrial	Total
2024	7,402,322	2,051,899	5,701,182	15,115,753
2025	7,428,973	2,051,899	5,786,966	15,232,214
2026	7,489,821	2,051,899	5,868,476	15,382,271
2027	7,562,150	2,051,899	5,883,552	15,477,658
2028	7,667,946	2,051,899	5,908,442	15,625,311
2029	7,718,946	2,051,899	5,939,702	15,715,369
2030	7,782,382	2,051,899	5,970,474	15,815,189
2031	7,846,863	2,051,899	5,994,749	15,909,480
2032	7,958,099	2,051,899	6,010,626	16,051,163
2033	8,023,613	2,051,899	6,034,403	16,145,427

Year	Residential	Commercial	Industrial	Total
2034	8,123,071	2,051,899	6,065,247	16,281,789
2035	8,220,988	2,051,899	6,114,680	16,438,529
2036	8,350,740	2,051,899	6,167,473	16,636,664
2037	8,431,932	2,051,899	6,192,363	16,748,365
2038	8,540,446	2,051,899	6,218,017	16,895,311

2.2.1 C&I Sector

In the C&I sector, disaggregated forecast data provides the foundation for the development of energy efficiency potential estimates. GDS received a base case sales forecast from EKPC for the residential, commercial, and industrial sectors. The forecast was further segmented into end-uses by building type using CBECS 2020 end-use survey data. Figure 2-2 provides a breakdown of commercial electric sales by building type.[3] Lodging, retail, and offices sales account for nearly 40% of sales. Assembly, education and warehouses account for approximately another 25% of sales in the commercial sector.

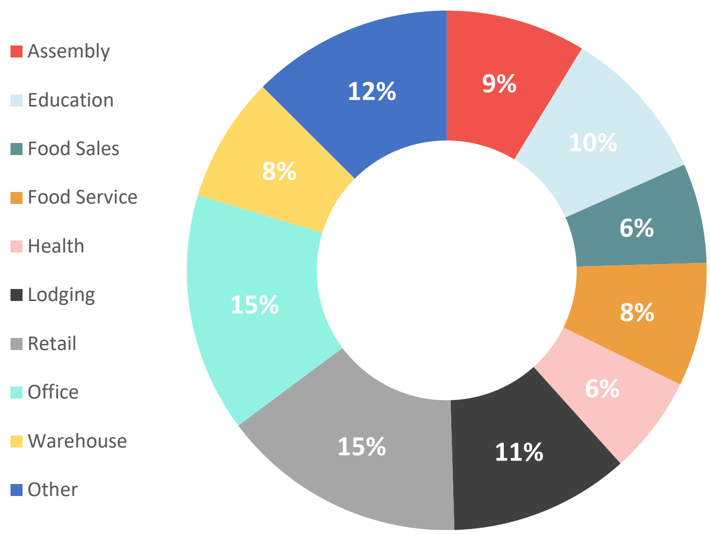

FIGURE 2-2: COMMERCIAL ELECTRIC SALES BREAKDOWN BY BUILDING TYPE

Figure 2-3 provides an illustration of the leading end-uses across all building types in the commercial sector. Lighting, space cooling, and ventilation are the primary end-uses with a significant share of load across most building types. Shares of refrigeration and office/computing are often dependent on the type of building, with refrigeration loads greatest in food sales and food service while office/computing loads are greatest in offices and education.

3 "Other" commercial building types include buildings that engage in several different activities.

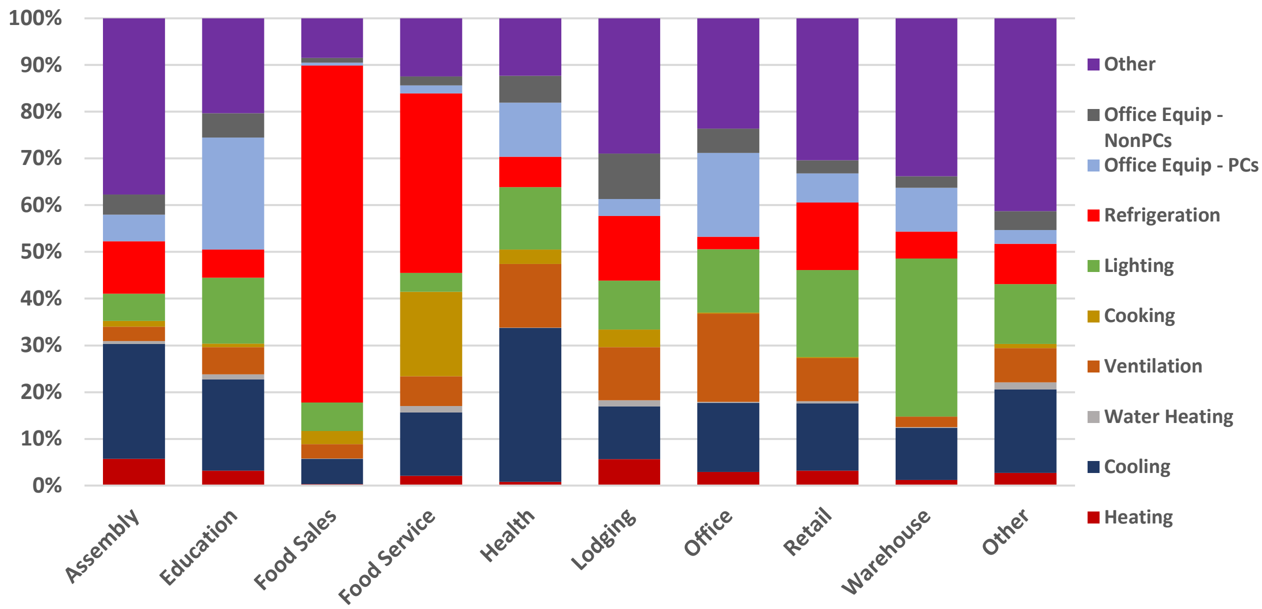

FIGURE 2-3: COMMERCIAL ELECTRIC END-USE BREAKDOWN BY BUILDING TYPE

Figure 2-4 provides a breakdown of industrial electric sales by end use. Motors and Process Heat account for more than half of the end-use consumption. HVAC and Lighting account for about a quarter of the consumption, with process related end uses and Compressed Air also each accounting for some of the end-use consumption in the industrial sector.

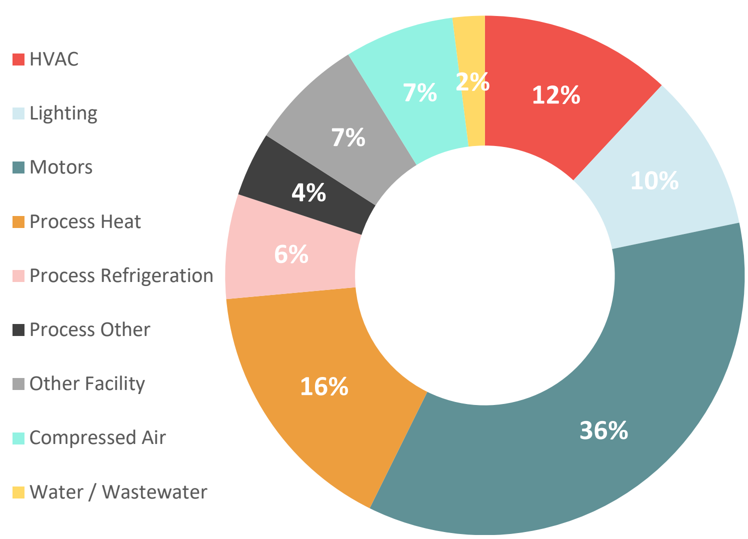

FIGURE 2-4: INDUSTRIAL ELECTRIC SALES BREAKDOWN BY BUILDING TYPE

3 METHODOLOGY

This section describes the overall methodology utilized to assess the electric energy efficiency potential in the EKPC service area. The main objectives of the study were to estimate the technical, economic, maximum, and realistic achievable potential savings from energy efficiency and demand response (see Chapter 6 for demand response methodology details) in the EKPC territory; and to quantify these estimates of potential in terms of MWh and MW savings, for each level of energy efficiency potential. This document describes the general steps and methods that were used at each stage of the analytical process necessary to produce the various estimates of energy efficiency potential. GDS did not examine delivery approaches for energy efficiency programs as this task was not included in the scope of work for this study.

Energy efficiency potential studies involve several analytical steps to produce estimates of each type of energy efficiency potential: technical, economic, and achievable. This study utilizes benefit/cost screening tools for the residential and non-residential sectors to assess the cost effectiveness of energy efficiency measures. These cost effectiveness screening tools are Excel-based models that integrate technology-specific impacts and costs, customer characteristics, utility avoided cost forecasts and more. Excel was used as the modeling platform to provide transparency to the estimation process and allow for simple customization based on EKPC's unique characteristics and the availability of specific model input data. The major analytical steps and an overview of the potential savings are summarized below, and specific changes in methodology from one sector to another have been noted throughout this section.

3.1 OVERVIEW OF APPROACH

For the residential sector, GDS took a bottom-up approach to the modeling, whereby measure-level estimates of costs, savings, and useful lives were used as the basis for developing the technical, economic, and achievable potential estimates. The measure data was used to build up the technical potential, by applying the data to each relevant market segment. The measure data allowed for benefit-cost screening to assess economic potential, which was in turn used as the basis for achievable potential, which took into consideration incentives and estimates of annual adoption rates.

For the commercial and industrial sectors, GDS took a bottom-up modeling approach to first estimate measure-level savings and costs as well as cost-effectiveness, and then applied cost-effective measure savings to all applicable shares of energy load. Disaggregated forecast data served as the foundation for the development of the energy efficiency potential estimates. The disaggregated forecast was developed using regional data from the Energy Information Administration's (EIA) Annual Energy Outlook (AEO).

3.2 MARKET CHARACTERIZATION

The initial step in the analysis was to gather a clear understanding of the current market segments in the EKPC service area. The GDS team coordinated with EKPC to gather utility sales and customer data and existing market research to define appropriate market sectors and market segments. This information served as the basis for completing a forecast disaggregation and market characterization of both the residential and nonresidential sectors.

In the commercial and industrial sectors, disaggregated forecast data provides the foundation for the development of energy efficiency potential estimates. GDS disaggregated the commercial sector sales into building type using data from the US Energy Information Administration (EIA) 2022 Annual Energy Outlook data for the East South-Central Census region. For the industrial sector, the baseline electric forecasts were disaggregated by industry type using estimates from EIA Manufacturing Energy Consumption Survey (MECS) for the same region.

GDS further disaggregated sales for each of the segments into end uses. For commercial segments, GDS again primarily used EIA data for the East South-Central Census region. For the industrial sector, the analysis relied on the EIA's Manufacturing Energy Consumption survey to disaggregate industry-specific estimates of electric consumption into end uses.

- *Residential.* The residential forecast was broken out by housing type between existing income qualified[4] and market-rate customers as well as new construction.
- *Commercial.* Typically based on major EIA business types: assembly, retail, warehouse, food sales, office, lodging, health, food service, education, and miscellaneous.
- *Industrial.* As determined by actual load consumption shares and major industry types as defined by EIA's Manufacturing Energy Consumption Survey (MECS) data.

Within the residential, commercial, and industrial market segments, the sector level disaggregated forecasts were further segmented by the major end uses shown in Table 3-1.

TABLE 3-1: ELECTRIC END-USE LOADS

Residential	Commercial/Industrial
Heating	Interior Lighting
Cooling	Exterior Lighting
Water Heating	Refrigeration
Cooking	Space Cooling
Refrigerator	Space Heating
Freezer	Ventilation
Dishwasher	Water Heating
Clothes Washer	Plug Loads / Office Equipment
Dryer	Cooking
TV	Other
Light	Whole Building / Behavioral
Miscellaneous	Compressed Air Motors
	Industrial Process

3.3 MEASURE CHARACTERIZATION

This section of the report provides an overview of the measure lists used in the study as well as the assumptions and sources used to characterize these measures.

3.3.1 Measure Lists

The energy efficiency measures included in this study cover energy efficiency measures currently included in EKPC's energy efficiency programs, as well as additional measures suggested by the GDS Team based on existing knowledge and current databases of electric end-use technologies and energy efficiency measures. The study scope includes measures and practices that are currently commercially available as well as emerging technologies. The commercially available measures are of the most immediate interest to EKPC. However, a small number of well documented emerging technologies were considered for each sector. Emerging technology research was focused on measures that are commercially available but may not be widely accepted at the current time. These measure lists were then reviewed, discussed, and updated as necessary. A complete listing of the energy efficiency measures included in this study is provided in the Appendices of this report.

[4] Income-qualified for this study is defined as 200% of the Federal Poverty Level. The study assumed 46% of the residential customers were income-qualified based on a review of Census data for counties served by EKPC.

In addition, this study includes measures that could be relatively easily substituted for, or applied to, existing technologies on a retrofit or replace-on-burnout basis. Replace-on-burnout applies to equipment replacements that are normally made in the market when a piece of equipment is at the end of its useful life. A retrofit measure is eligible to be replaced at any time in the life of the equipment or building. Replace-on-burnout measures are generally characterized by incremental measure costs and savings (e.g. the costs and savings of a high-efficiency versus standard efficiency air conditioner); whereas retrofit measures are generally characterized by full costs and savings (e.g. the full costs and savings associated with adding ceiling insulation into an existing attic). For new construction, energy efficiency measures can be implemented when each new home or building is constructed, thus the rate of availability is a direct function of the rate of new construction.

In total, GDS analyzed 281 measure types for EKPC. Many measures required multiple permutations for different applications, such as different building types, efficiency levels, and replacement options. GDS developed a total of 1,954 measure permutations for this study. Table 3-2 provides a breakdown of the sector-level number of measures and permutations.

TABLE 3-2 MEASURE COUNTS BY SECTOR

Sector	# of Measures	Total Permutations
Residential	127	656
C/I	154	1,298
Total	281	1,954

3.3.2 Assumptions and Sources

A significant amount of data is needed to estimate the kWh and kW savings potential for individual energy efficiency and demand response measures or programs across the entire existing residential and non-residential sectors for EKPC. GDS used Kentucky specific data wherever it was available and up to date. Considerable effort was expended to identify, review, and document all available data sources.

This review has allowed the development of reasonable and supportable assumptions regarding measure lives; measure installed incremental or full costs (as appropriate); and electric savings and saturations for each energy efficiency measure included in the final list of measures in this study.

Costs and savings for new construction and replace on burnout measures are calculated as the incremental difference between the code minimum equipment and the energy efficiency measure. This approach is utilized because the consumer must select an efficiency level that is at least the code minimum equipment. The incremental cost is calculated as the difference between the cost of high efficiency and standard (code compliant) equipment. However, for retrofit measures, the measure cost is considered the “full” cost of the measure, as the baseline scenario assumes the consumer would do nothing. In general, the savings for retrofit measures are calculated as the difference between the energy use of the removed equipment and the energy use of the new high efficiency equipment (until the removed equipment would have reached the end of its useful life). For measures like insulation, the savings are calculated based on the consumption before and after the installation of improved insulation levels.

Measure Savings: GDS utilized several sources including the Illinois TRM to inform calculations supporting estimates of annual measure savings as a percentage of base equipment usage. Other sources used include:

- Mid-Atlantic TRM, Maine TRM, Minnesota TRM, and other existing deemed savings databases
- Secondary sources such as the American Council for an Energy-Efficient Economy (ACEEE), Department of Energy (DOE), Energy Information Administration (EIA), ENERGY STAR©, and other technical potential studies

Measure Costs: Measure costs represent either incremental or full costs. These costs typically include the incremental cost of measure installation, when appropriate based on the measure definition. For purposes of this study, nominal measure costs held constant over time.

GDS obtained measure cost estimates from a variety of sources, starting with the 2021 Ill TRM. Other sources leveraged include:

- Mid-Atlantic TRM, Indiana TRM, Maine TRM, Minnesota TRM, and other existing deemed savings databases
- Secondary sources such as the ACEEE, ENERGY STAR, National Renewable Energy Lab (NREL), California Database for Energy Efficient Resources (DEER) database, Northeast Energy Efficiency Partnership (NEEP) Incremental Cost Study, and other technical potential studies

Measure Life: Measure life represents the number of years that energy using equipment is expected to operate. GDS obtained measure life estimates from the 2021 Ill TRM, and used the following other data sources:

- TRMs in other states
- Manufacturer data
- Savings calculators and life-cycle cost analyses
- The California DEER database
- Other consultant research or technical reports

Building/Equipment Saturation Data: To assess the amount of electric energy efficiency savings still available, estimates of the current saturation of baseline equipment and energy efficiency measures, or for the non-residential sector, the amount of energy use that is associated with a specific end-use (such as HVAC) and percent of that energy use that is associated with energy efficient equipment are necessary. Up-to-date measure saturation data were primarily obtained from the following recent studies:

- 2022 and 2020 EKPC Member System End-Use Surveys
- 2015 EIA Residential Energy Consumption Survey (RECS)
- Energy Star Unit Shipment Data
- 2022 EIA Annual Energy Outlook
- EIA Baseline Energy Calculator
- 2023 Pennsylvania Baseline Study

3.4 ENERGY EFFICIENCY POTENTIAL

This section provides an overview of the types of potential and key considerations in assessing each level of energy efficiency potential.

3.4.1 Types of Potential

This section reviews the types of potential analyzed in this report, as well as some key methodological considerations in the development of technical, economic, and achievable potential.

The first two types of potential, technical and economic, provide a theoretical upper bound for energy savings from energy efficiency measures. Still, even the best-designed portfolio of programs is unlikely to capture 100% of the technical or economic potential. Therefore, achievable potential attempts to estimate what savings can be realistically achieved through market interventions, when it can be captured, and how much it would cost to do so. Figure 1-1 illustrates the types of energy efficiency potential considered in this analysis.

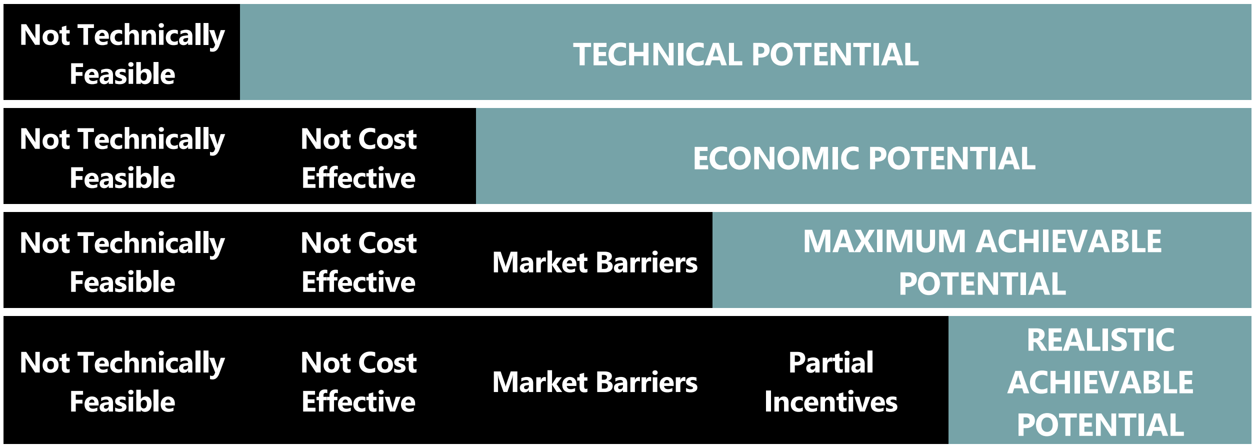

FIGURE 3-1 TYPE OF ENERGY EFFICIENCY POTENTIAL[5]

3.4.2 Technical Potential

Technical potential is the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end users to adopt the efficiency measures. Technical potential is only constrained by factors such as technical feasibility and applicability of measures. Under technical potential, GDS assumed that 100% of new construction and market opportunity measures are adopted as those opportunities become available (e.g., as new buildings are constructed, they immediately adopt efficiency measures, or as existing measures reach the end of their useful life). For retrofit measures, implementation was assumed to be resource constrained and that it was not possible to install all retrofit measures all at once. Rather, retrofit opportunities were assumed to be replaced incrementally until 100% of stock was converted to the efficient measure over a period of no more than 20 years.

The core equation used in the residential sector energy efficiency technical potential analysis for each individual efficiency measure is shown in Equation 3-1 below. The C&I sector employs a similar analytical approach.

EQUATION 3-1 CORE EQUATION FOR RESIDENTIAL SECTOR TECHNICAL POTENTIAL

$$\text{TECHNICAL POTENTIAL OF EFFICIENT MEASURES} = \textit{Total Number of Households} \times \textit{Base Case End Use Intensity (kWh/unit)} \times \textit{Saturation Share} \times \textit{Remaining Factor} \times \textit{Feasibility Factor} \times \textit{Savings Factor}$$

Where…

Base Case Equipment End-Use Intensity = the electricity used per customer per year by each base-case technology in each market segment. In other words, the base case equipment end-use intensity is the consumption of the electrical energy using equipment that the efficient technology replaces or affects.

Saturation Share = the fraction of the end-use electrical energy that is applicable for the efficient technology in each market segment. For example, for residential water heating, the saturation share would be the fraction of all residential electric customers that have electric water heating in their household.

5 Reproduced from "Guide to Resource Planning with Energy Efficiency." November 2007. US Environmental Protection Agency (EPA). Figure 2-1. Modified to depict the additional levels of achievable and program potential included in this study.

Remaining Factor = the fraction of equipment that is not considered to already be energy efficient. To extend the example above, the fraction of electric water heaters that is not already energy efficient.

Feasibility Factor = (also functions as the applicability factor) the fraction of the applicable units that is technically feasible for conversion to the most efficient available technology from an engineering perspective (e.g., it may not be possible to install heat pump water heaters in all homes because of space limitations).

Savings Factor = the percentage reduction in electricity consumption resulting from the application of the efficient technology.

Competing Measures & Interactive Effects Adjustments

GDS prevents double-counting of savings, and accounts for competing measures and interactive savings effects, through three primary adjustment factors:

Baseline Saturation Adjustment. Competing measure shares are factored into the baseline saturation estimates. For example, nearly all homes can receive insulation. To account for this, GDS' analysis used multiple measure permutations that account for varying impacts of different heating/cooling combinations and baseline saturations were applied to reflect the proportions of households with each heating/cooling combination.

Applicability Factor Adjustment. Combined measures into measure groups, where total applicability factor across measures is set to 100%. For example, homes cannot receive a programmable thermostat, connected thermostat, and smart thermostat. In general, the models assign the measure with the most savings the greatest applicability factor in the measure group, with competing measures picking up any remaining share.

Interactive Savings Adjustment. As savings are introduced from select measures, the per-unit savings from other measures need to be adjusted (downward) to avoid over-counting. The analysis typically prioritizes market opportunity equipment measures (versus retrofit measures that can be installed at any time). For example, the savings from a smart thermostat and other HVAC related weatherization measures like insulation and air sealing are adjusted down to reflect the efficiency gains of installing an efficient air source heat pump.

3.4.3 Economic Potential

Economic potential refers to the subset of the technical potential that is economically cost-effective (based on screening with the TRC test) as compared to conventional supply-side energy resources.

3.4.4 Achievable Potential

Achievable potential is the amount of energy that can realistically be saved given various market barriers. Achievable potential considers real-world barriers to encouraging end users to adopt efficiency measures; the non-measure costs of delivering programs (for administration, marketing, analysis, and EM&V); and the capability of programs and administrators to boost program activity over time. Barriers include financial, customer awareness and willingness-to-participate ("WTP") in programs, technical constraints, and other barriers the "program intervention" is modeled to overcome. Additional considerations include political and/or regulatory constraints. The potential study evaluated two achievable potential scenarios:

- ***MAP*** estimates achievable potential on paying incentives equal to up to 100% of measure incremental costs and aggressive adoption rates.[6]
- ***RAP*** estimates achievable potential with EKPC paying incentive levels (as a percentage of incremental measure costs) closely calibrated to historical levels but is not constrained by any previously determined spending levels.

3.4.4.1 Market Adoption Rates

GDS assessed achievable potential on a measure-by-measure basis. In addition to accounting for the natural replacement cycle of equipment in the achievable potential scenario, GDS estimated measure specific maximum

[6] ibid.

adoption rates that reflect the presence of possible market barriers and associated difficulties in achieving the 100% market adoption assumed in the technical and economic scenarios.

The initial step was to assess the long-term market adoption potential for energy efficiency technologies. Due to the wide variety of measures across multiple end-uses, GDS employed varied measure and end-use-specific ultimate adoption rates versus a singular universal market adoption curve. These long-term market adoption estimates were based on aggregated WTP market research across several recent GDS studies. The WTP research included questions to residential homeowners and nonresidential facility managers regarding their perceived willingness to purchase and install energy efficient technologies across various end uses and incentive/payback performance levels. One caveat to this approach is that the WTP adoption score is generally a simple function of incentive levels and/or payback performance.

GDS utilized likelihood and willingness-to-participate data to estimate the long-term market adoption potential for both the maximum and realistic achievable scenarios. Table 3-3 presents the long-term market adoption rates at varied incentive levels used for the residential sector. Most end-uses are based on the WTP market research.

TABLE 3-3 RESIDENTIAL LONG-TERM MARKET ADOPTION RATES AT DISCRETE INCENTIVE LEVELS

End Use	0% Incentive	30% Incentive	50% Incentive	80% Incentive	100% Incentive
Water Heating	15.0%	26.4%	38.5%	53.8%	75.7%
HVAC Equipment	17.9%	35.8%	52.3%	66.2%	79.8%
HVAC Shell	13.9%	23.4%	35.7%	49.7%	73.9%
Appliances	18.8%	32.3%	49.9%	63.4%	79.7%

Table 3-4 presents the long-term market adoption rates used in the nonresidential sector.

TABLE 3-4 NONRESIDENTIAL LONG-TERM MARKET ADOPTION RATES AT DISCRETE PAYBACK INTERVALS

End-Use	10 Year Payback Period	5 Year Payback Period	3 Year Payback Period	1 Year Payback Period	0 Year Payback Period
Lighting	27%	43%	52%	64%	73%
HVAC	24%	38%	50%	60%	66%
Refrigeration	31%	38%	44%	53%	58%
Water Heat	30%	37%	46%	55%	62%

In the maximum achievable potential scenario, incentives were assumed to represent 100% of the measure cost (0-year payback).

GDS then estimated initial year adoption rates by reviewing the current saturation levels of efficient technologies and (if necessary) calibrating the estimates of 2022 annual potential to recent historical levels achieved by EKPC. GDS then assumed a non-linear ramp rate from the initial year market adoption rate to the various long-term market adoption rates for each specific end-use.

3.4.4.2 Non-Incentive Costs

Consistent with National Action Plan for Energy Efficiency (NAPEE) guidelines,[7] utility non-incentive costs were included in the overall assessment of cost-effectiveness at the RAP scenario. Non-incentive costs were calibrated to recent EKPC levels. Non-incentive costs were then escalated annually at the rate of inflation.[8]

[7] National Action Plan for Energy Efficiency (2007). Guide for Conducting Energy Efficiency Potential Studies. Prepared by Optimal Energy. This study notes that economic potential only considers the cost of efficiency measures themselves, ignoring programmatic costs. Conversely, achievable potential should consider the non-measures costs of delivering programs. Pg. 2-4.

[8] As noted earlier in the report, measure costs and utility incentives were not escalated over the 20-year analysis timeframe to keep those costs constant in nominal dollars.

4 RESIDENTIAL ENERGY EFFICIENCY POTENTIAL FINDINGS

This chapter provides the potential results for technical, economic, and achievable potential for the residential sector. The chapter breaks down the potential by sector, end use and market segment. The results are provided on a five, ten and fifteen-year basis. Budget and benefit-cost data are provided for the achievable potential scenarios.

Figure 4-1 and Table 4-1 provide the technical, economic, MAP and RAP results for the 5-year, 10-year, and 15-year timeframes. The cumulative annual 5-year technical potential is 27% of the residential forecasted sales, and the economic potential is 25% of forecasted sales. The cumulative annual 5-year MAP is 11% and the RAP is 8%, as a percentage of forecasted residential sales. Over the duration of the study timeframe the technical potential rises to 32% and the economic potential rises to 30% of forecasted sales. The MAP and RAP rise respectively to 17% and 13% of forecasted sales over the study timeframe. The gap between economic potential and MAP/RAP represents market barriers to prospective program participants, both financial and non-financial, to achieving the full amount of economic potential.

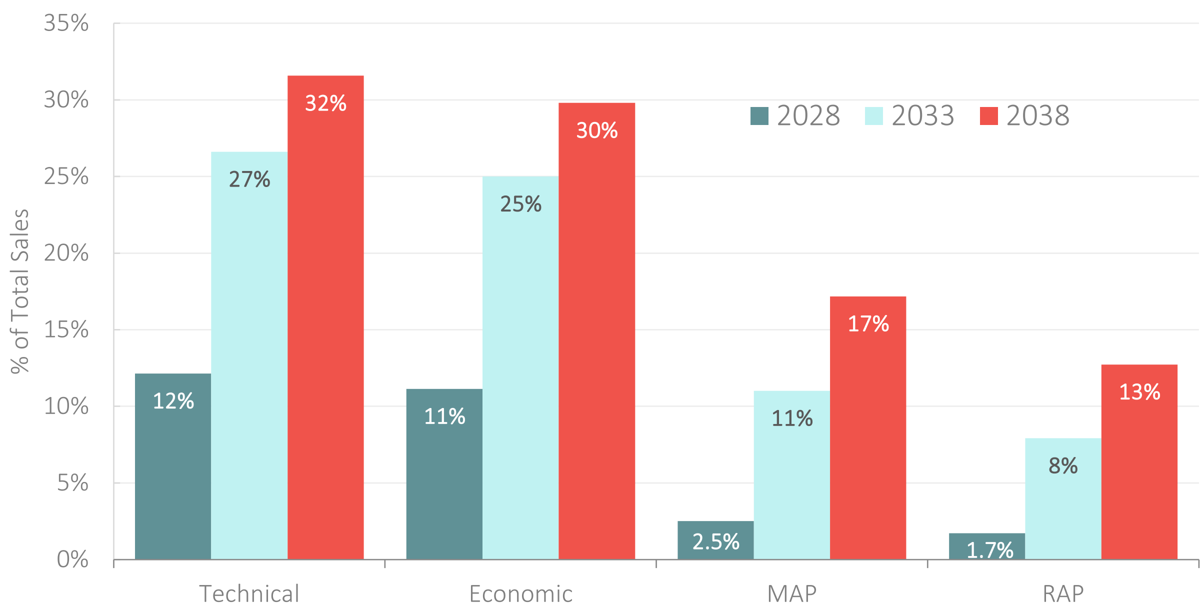

FIGURE 4-1: OVERVIEW OF RESIDENTIAL POTENTIAL

TABLE 4-1 RESIDENTIAL CUMULATIVE ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

	2024	2025	2026	2033	2038
Energy (MWh)					
Technical	407,913	673,327	909,532	2,135,185	2,696,508
Economic	381,456	621,778	834,442	2,005,906	2,545,153
MAP	52,908	117,592	188,203	883,598	1,467,394
RAP	35,631	79,882	128,620	635,232	1,087,505
Energy Savings (as % of Forecast)					
Technical	5.5%	9.1%	12.1%	26.6%	31.6%
Economic	5.2%	8.4%	11.1%	25.0%	29.8%
MAP	0.7%	1.6%	2.5%	11.0%	17.2%
RAP	0.5%	1.1%	1.7%	7.9%	12.7%

Table 4-2 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast.[9] The incremental MAP ranges from 0.7% to 3.1% per year over the study horizon. The incremental RAP ranges from 0.5% to 2.6% per year over the study horizon.

TABLE 4-2 RESIDENTIAL INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

	2024	2025	2026	2033	2038
Energy (MWh)					
Technical	407,913	402,363	397,496	380,789	372,944
Economic	381,456	376,489	372,422	356,431	348,002
MAP	52,908	67,639	78,354	197,971	262,201
RAP	35,631	47,063	56,021	160,195	221,269
Energy Savings (as % of Forecast)					
Technical	5.5%	5.4%	5.3%	4.7%	4.4%
Economic	5.2%	5.1%	5.0%	4.4%	4.1%
MAP	0.7%	0.9%	1.0%	2.5%	3.1%
RAP	0.5%	0.6%	0.7%	2.0%	2.6%

4.1 TECHNICAL/ECONOMIC POTENTIAL

Figure 4-2 shows the cumulative annual technical potential for energy savings. TP energy savings approach 2.7 million MWh by 2038.

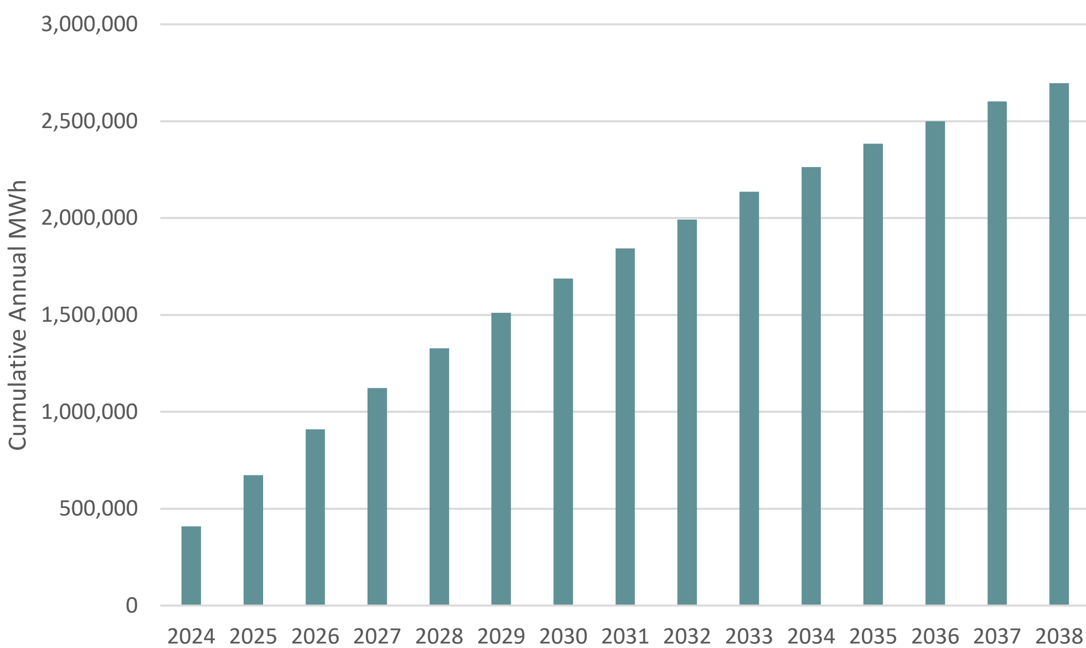

FIGURE 4-2: 15-YR RESIDENTIAL TECHNICAL POTENTIAL

Figure 4-3 shows the cumulative annual economic potential for energy savings. EP energy savings exceeds 2.5 million MWh by 2038.

[9] The savings shown in Table 4-2 show the savings associated with measure installations in the years shown in the table. This compares to Table 4-1, which shows the cumulative annual savings for all measures installed to date in the years shown (e.g. 2033 shows the cumulative savings in that year associated with all measure installations in the 2024-2033 timeframe.

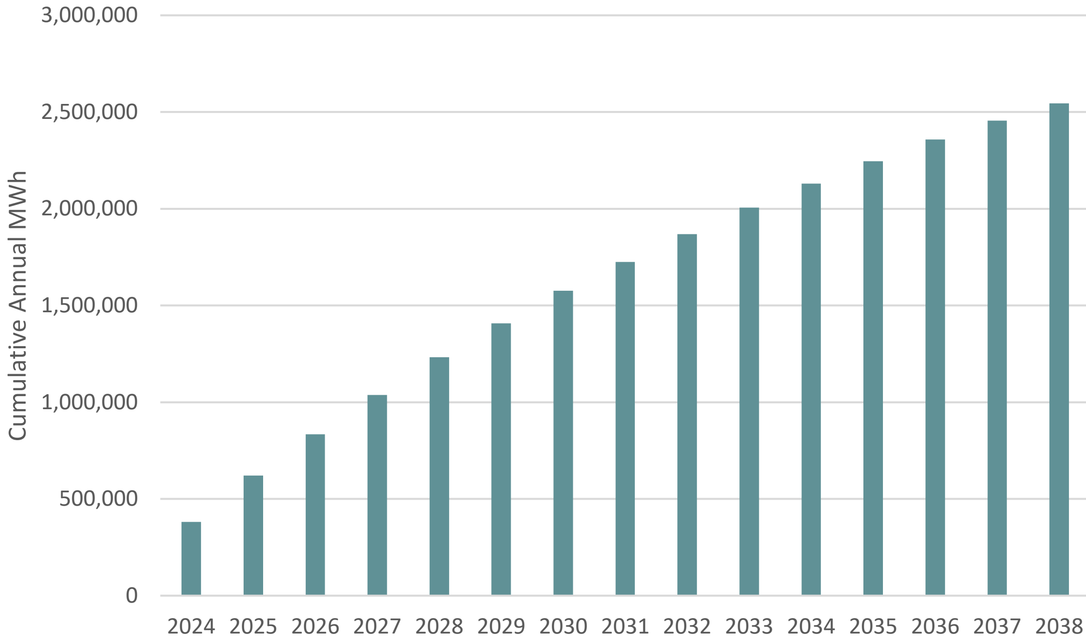

FIGURE 4-3: 15-YR RESIDENTIAL ECONOMIC POTENTIAL

4.2 ACHIEVABLE POTENTIAL

Figure 4-4 provides the MAP and RAP across the 15-yr timeframe of the study. The blue and red bars provide the respective incremental annual MAP and RAP in MWh per year energy savings. The blue and orange lines provide the corresponding cumulative annual MAP and RAP as a percentage of forecasted annual residential sector sales. The MAP rises to 17% by 2038, and the RAP rises to 13%.

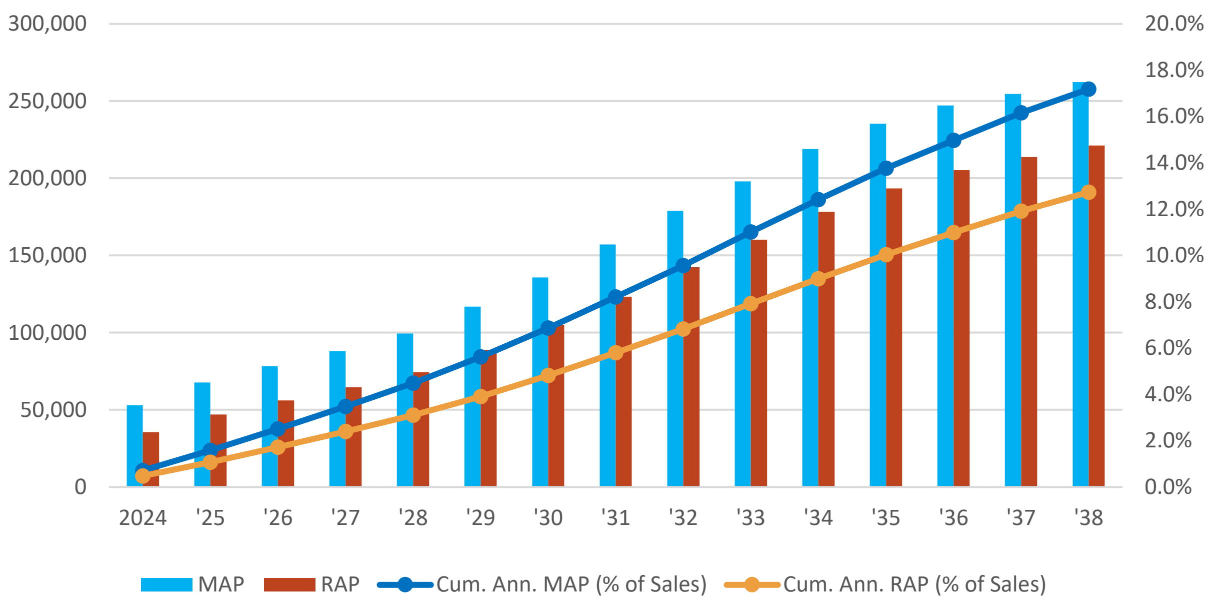

FIGURE 4-4: OVERVIEW OF RESIDENTIAL POTENTIAL – RAP 2038

Figure 4-5 provides a breakdown of the RAP potential in 2038 across residential end-uses and building type market segments.[10] In the RAP scenario, Shell and HVAC Equipment are the leading end-uses, accounting for more than 50% of the potential. Across building types and income types, residential non-low-income single-family existing homes account for 40% of the achievable potential, with non-low-income manufactured/mobile homes accounting for 7% and new construction accounting for 13%. Low-income households account for 40% of the potential (across all home types and construction vintages).

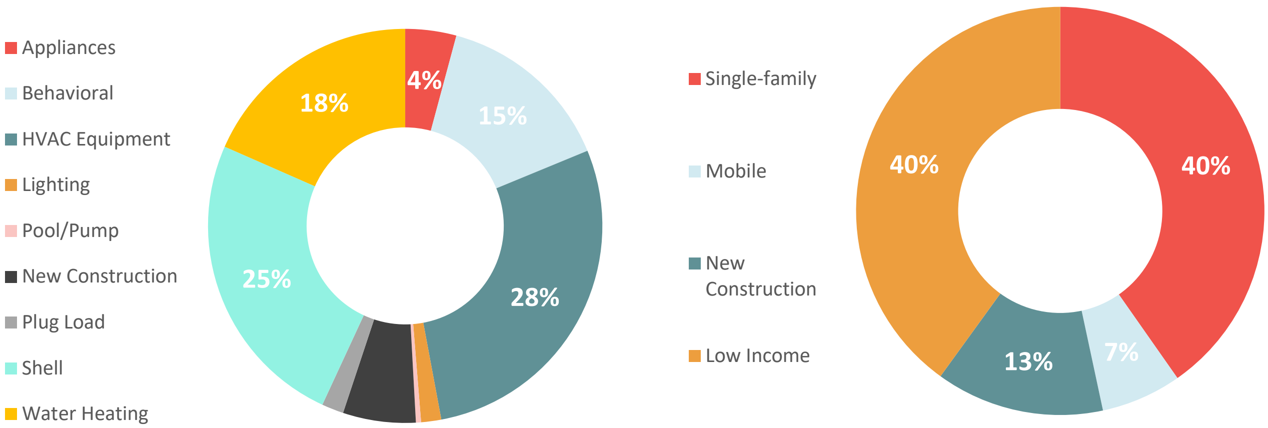

FIGURE 4-5: RESIDENTIAL POTENTIAL BY END-USE AND BUILDING TYPE – RAP 2038

Table 4-3 provides incremental and cumulative annual residential sector energy and demand savings for MAP and RAP across the next three years as well as over the 10-yr and 15-yr time horizons. Incremental RAP energy savings begin at roughly 36,000 MWh in 2024 and then grow to over 220,000 by 2038. Cumulative RAP energy savings rise to approximately 1 million MWh by 2038.

TABLE 4-3 RESIDENTIAL SECTOR MAP & RAP POTENTIAL

	2024	2025	2026	2033	2038
Incremental Annual Energy (MWh)					
MAP	52,908	67,639	78,354	197,971	262,201
RAP	35,631	47,063	56,021	160,195	221,269
Incremental Annual Demand (MW)					
MAP	6	9	11	30	40
RAP	4	6	8	24	32
Cumulative Annual Energy (MWh)					
MAP	52,908	117,592	188,203	883,598	1,467,394
RAP	35,631	79,882	128,620	635,232	1,087,505
Cumulative Annual Demand (MW)					
MAP	6	15	25	131	229
RAP	4	10	17	94	167

4.3 RESIDENTIAL BENEFITS AND COSTS

This section provides benefits and costs information for the residential sector. Table 4-4 provided the NPV benefits and costs for the MAP and RAP scenarios.[11] In the MAP scenario the NPV benefits are more than $1.1

[10] Segments with less than 4% of total end-use or building type share do not display a data label (%) in pie-charts to improve readability of data.

[11] Costs are in nominal dollars, but the non-incentive costs increase annually at the rate of inflation.

billion over the study timeframe with a TRC ratio of 2.40. In the RAP scenario, the NPV benefits are more than $750 million over the study timeframe with a TRC ratio of 2.23.

TABLE 4-4 NPV BENEFITS AND COSTS MAP & RAP POTENTIAL – 2038

	NPV Benefits	NPV Costs	TRC Ratio
MAP	$1,946	$812	2.40
RAP	$1,361	$610	2.23

Figure 4-6 provides a breakdown of the MAP and RAP annual budgets over the study timeframe. RAP budgets increase early from $12 million to $65 million over the study timeframe.

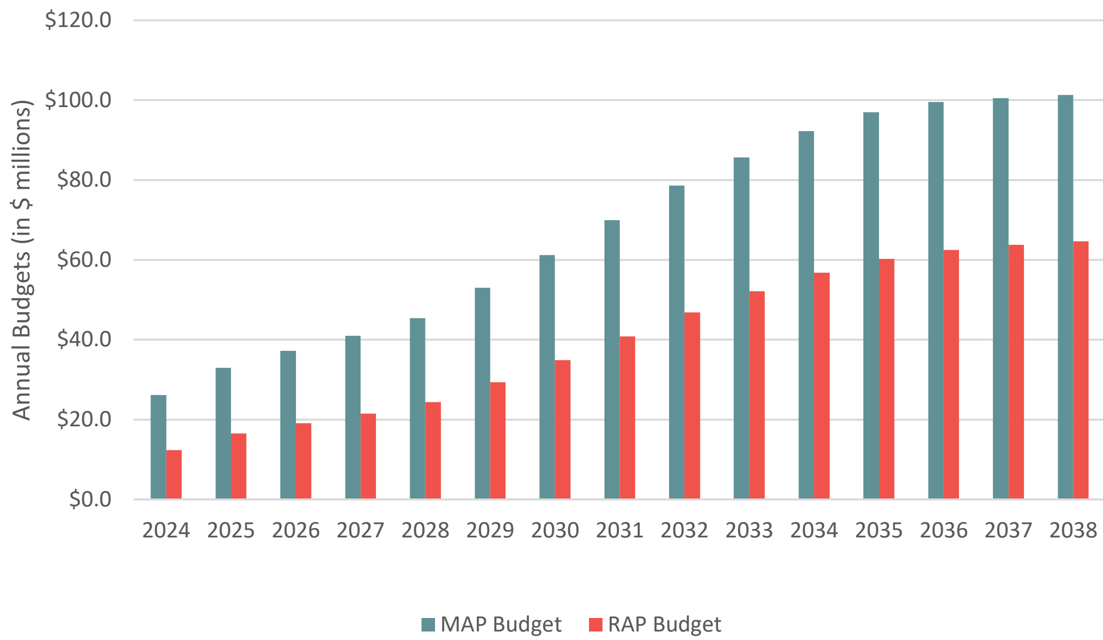

FIGURE 4-6: RESIDENTIAL ANNUAL BUDGETS FOR MAP AND RAP ($, MILLIONS)

5 COMMERCIAL AND INDUSTRIAL ENERGY EFFICIENCY POTENTIAL

This chapter provides the potential results for technical, economic, and achievable potential for the commercial and industrial sectors. The chapter breaks down the potential by sector, end use and market segment. The results are provided on a five, ten and fifteen-year basis. Budget and benefit-cost data are provided for the achievable potential scenarios.

Figure 5-1 and Table 5-1 provide the technical, economic, MAP and RAP results for the 5-year, 10-year, and 15-year timeframes. The cumulative annual 5-year technical potential is 17% of the combined commercial and industrial ("C/I") forecasted sales, and the economic potential is 10% of forecasted C/II sales. The cumulative annual 5-year MAP is 6% and the RAP is 5%, as a percentage of forecasted C/I sales. Over the duration of the study timeframe the technical potential rises to 21% and the economic potential rises to 19% of forecasted sales. The nearly identical technical and economic potential indicate that most measures are cost-effective. The MAP and RAP rise respectively to 10% and 7% of forecasted sales over the study timeframe. The gap between economic potential and MAP/RAP represents market barriers to prospective program participants, both financial and non-financial, to achieving the full amount of economic potential.

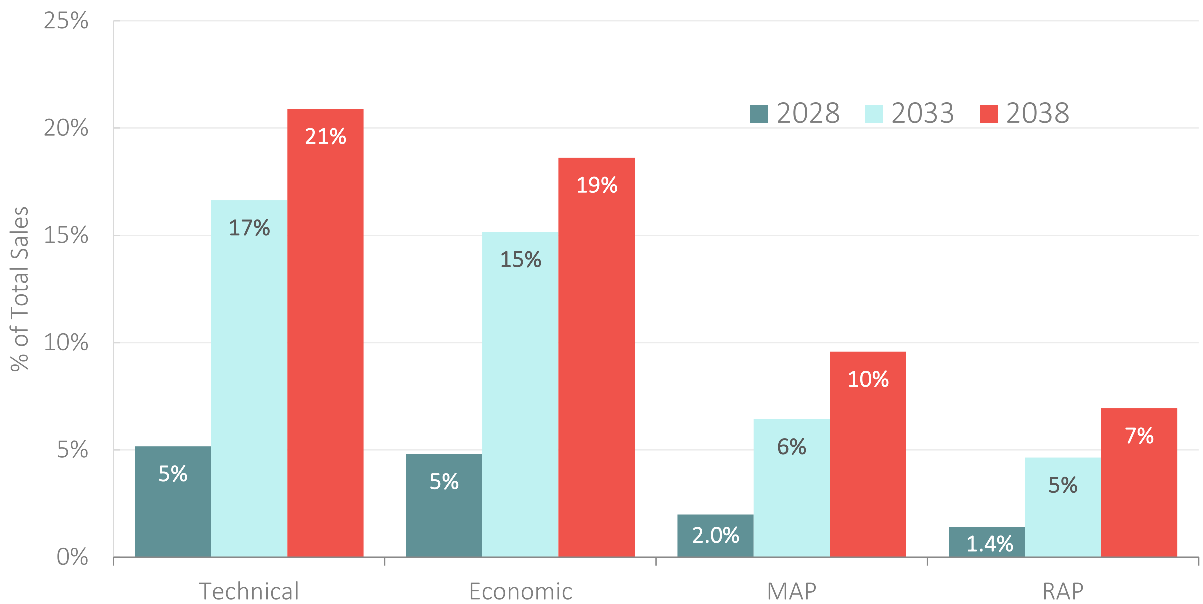

FIGURE 5-1: OVERVIEW OF C/I POTENTIAL

TABLE 5-1 C/I CUMULATIVE ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

	2024	2025	2026	2033	2038
Energy (MWh)					
Technical	128,053	265,266	409,893	1,357,455	1,754,118
Economic	119,831	247,081	381,134	1,237,029	1,563,734
MAP	52,738	106,667	158,679	525,347	804,018
RAP	36,292	73,806	110,350	373,666	576,589
Energy Savings (as % of Forecast)					
Technical	1.7%	3.4%	5.2%	16.6%	20.9%
Economic	1.5%	3.2%	4.8%	15.2%	18.6%
MAP	0.7%	1.4%	2.0%	6.4%	9.6%
RAP	0.5%	0.9%	1.4%	4.6%	6.9%

Table 5-2 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast. The incremental MAP ranges from 0.7% to 1.3% per year over the study horizon. The incremental RAP ranges from 0.5% to 1.1% per year over the study horizon.

TABLE 5-2 C/I INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

	2024	2025	2026	2033	2038
Energy (MWh)					
Technical	128,053	137,212	144,628	188,929	181,304
Economic	119,831	127,250	134,053	171,772	166,871
MAP	52,738	53,928	52,012	85,697	111,824
RAP	36,292	37,514	36,544	65,906	88,727
Energy Savings (as % of Forecast)					
Technical	1.7%	1.7%	1.8%	2.3%	2.2%
Economic	1.5%	1.6%	1.7%	2.1%	2.0%
MAP	0.7%	0.7%	0.7%	1.0%	1.3%
RAP	0.5%	0.5%	0.5%	0.8%	1.1%

5.1 TECHNICAL/ECONOMIC POTENTIAL

Figure 5-2 shows the cumulative annual technical potential for energy savings. TP energy savings approach 1.8 million MWh by 2038.

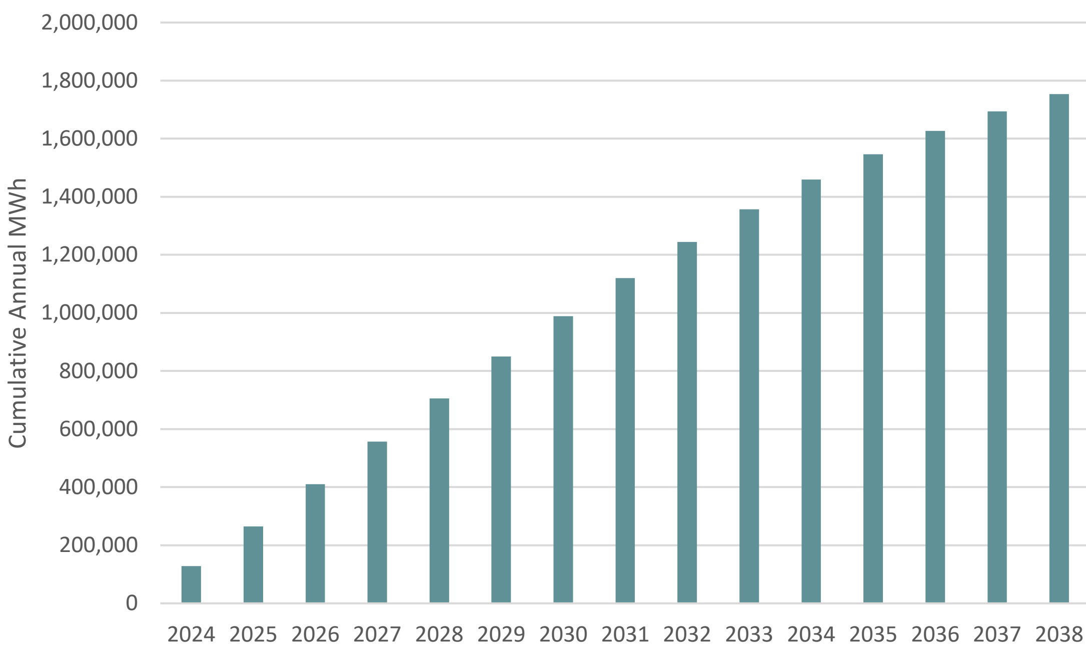

FIGURE 5-2: 15-YR C&I TECHNICAL POTENTIAL

Figure 5-3 shows the cumulative annual technical potential for energy savings. EP energy savings exceeds 1.5 million MWh by 2038.

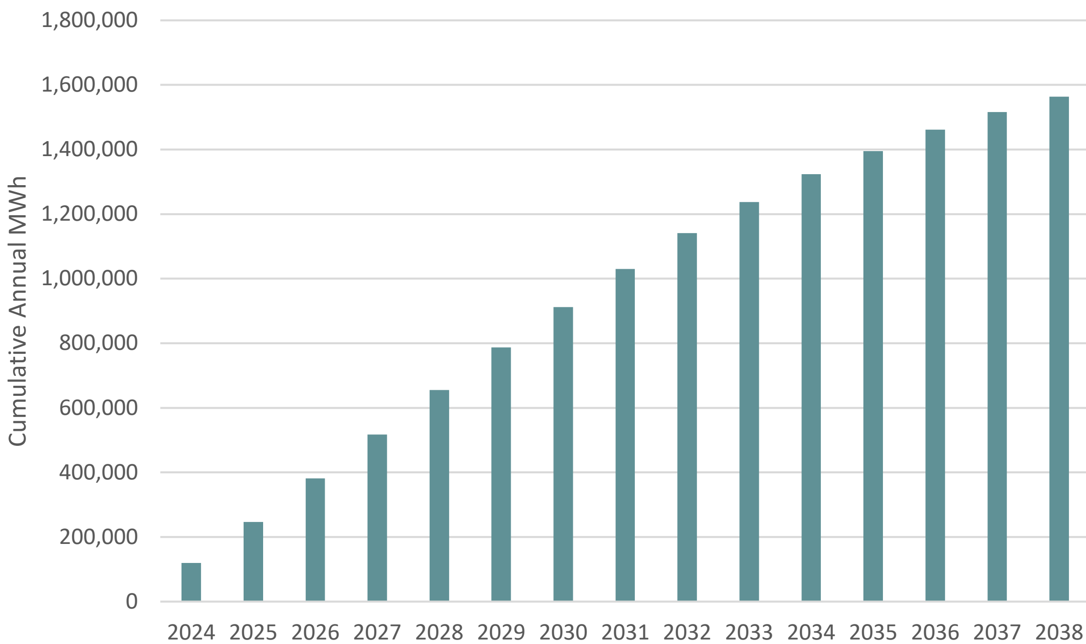

FIGURE 5-3: 15-YR C&I ECONOMIC POTENTIAL

5.2 ACHIEVABLE POTENTIAL

Figure 5-4 provides the MAP and RAP across the 15-yr timeframe of the study. The blue and red bars provide the respective incremental annual MAP and RAP in MWh per year energy savings. The blue and orange lines provide the corresponding cumulative annual MAP and RAP as a percentage of forecasted annual commercial and industrial sector sales. The MAP rises to 10% by 2038, and the RAP rises to 7%.

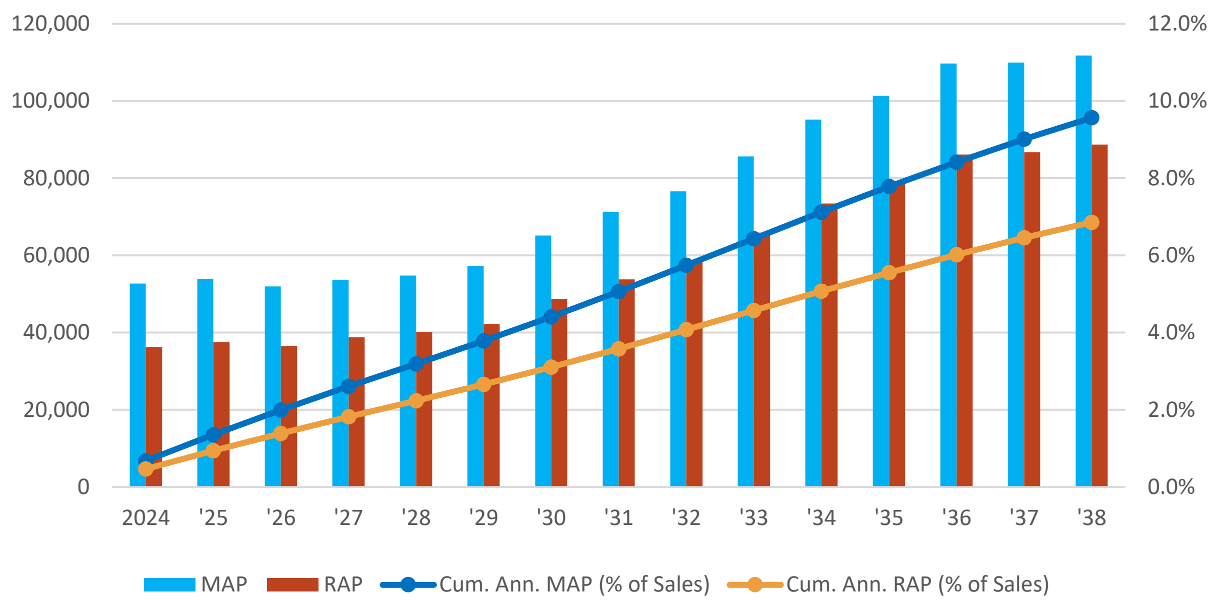

FIGURE 5-4: OVERVIEW OF C/I POTENTIAL – RAP 2038

Figure 5-5 provides a breakdown of the RAP potential in 2038 across commercial and industrial end-uses and building type market segments.[12] In the RAP scenario, Whole Building, Lighting Motors account for more than 60% of the potential. Across building types, Industrial buildings themselves account for nearly 60% of the achievable potential.

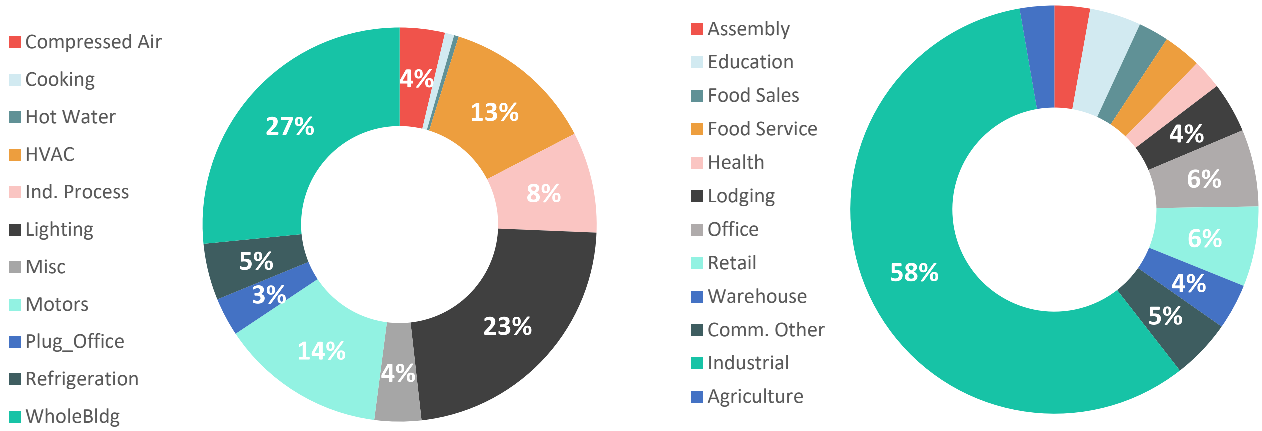

FIGURE 5-5: C/I POTENTIAL BY END-USE AND BUILDING TYPE – RAP 2038

Table 5-3 provides incremental and cumulative annual commercial and industrial sector energy and demand savings for MAP and RAP across the next three years as well as over the 10-yr and 20-yr time horizons. Incremental RAP energy savings begin at roughly 37,000 MWh in 2024 and rise to more than 88,000 MWh by 2038. Cumulative RAP energy savings rise to approximately 582,000 MWh by 2038.

TABLE 5-3 C/I SECTOR MAP & RAP POTENTIAL

	2024	2025	2026	2033	2038
Incremental Annual Energy (MWh)					
MAP	52,738	53,928	52,012	85,697	111,824
RAP	36,292	37,514	36,544	65,906	88,727
Incremental Annual Demand (MW)					
MAP	7	7	7	12	16
RAP	5	5	5	9	13
Cumulative Annual Energy (MWh)					
MAP	52,738	106,667	158,679	525,347	804,018
RAP	36,292	73,806	110,350	373,666	576,589
Cumulative Annual Demand (MW)					
MAP	7	14	21	71	112
RAP	5	10	15	51	81

5.3 BENEFITS AND COSTS

This section provides benefits and costs information for the C&I sector. Table 4-4 provided the NPV benefits and costs for the MAP and RAP scenarios. In the MAP scenario the NPV benefits are more than $640 million

[12] Segments with less than 5% of total end-use or building type share do not display a data label (%) in pie-charts to improve readability of data.

over the study timeframe with a TRC ratio of 2.76. In the RAP scenario, the NPV benefits are more than $450 million over the study timeframe with a TRC ratio of 2.61.

TABLE 5-4 NPV BENEFITS AND COSTS MAP & RAP POTENTIAL – 2038 ($ MILLIONS)

	NPV Benefits	NPV Costs	TRC Ratio
MAP	$863	$211	4.10
RAP	$588	$135	4.35

Figure 5-6 provides a breakdown of the MAP and RAP annual budgets over the study timeframe. RAP budgets increase early from $3 million to $12 million over the study timeframe.

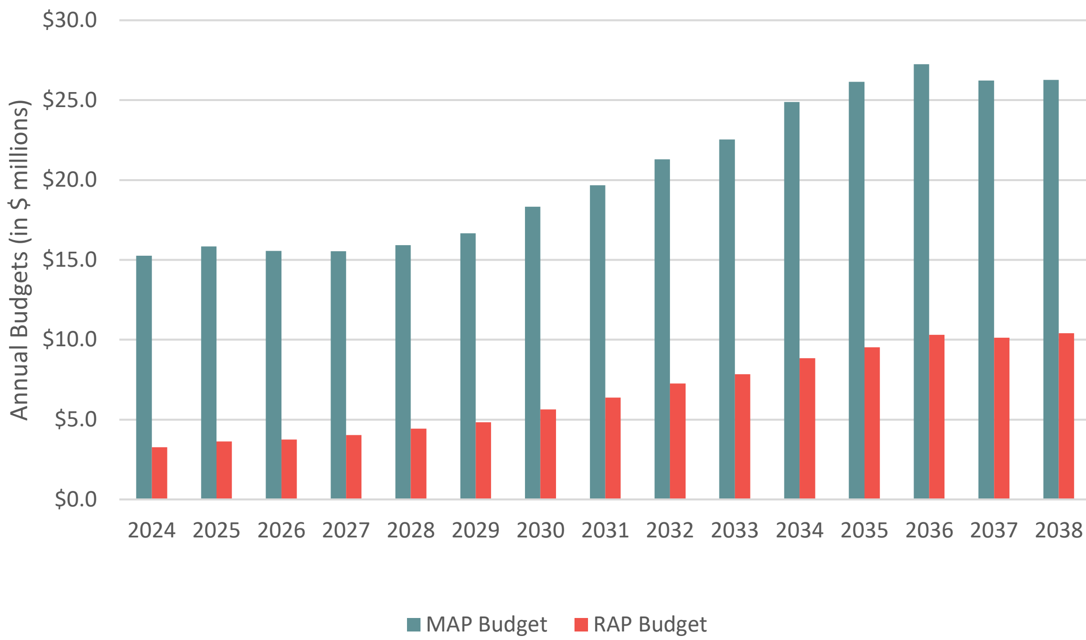

FIGURE 5-6: C&I ANNUAL BUDGETS FOR MAP AND RAP ($, MILLIONS)

6 DR POTENTIAL RESULTS

6.1 ANALYSIS APPROACH

This section provides an overview of the demand response potential methodology. Summary results of the demand response analysis are provided in Section 6.2.

6.1.1 Definition of Demand Response

According to the Federal Energy Regulatory Commission (FERC), demand response is defined as changes in electric usage by demand-side resources from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized. FERC's definition of demand response conforms to the North American Electric Reliability Corporation (NERC) definition developed by a consortium of utilities and end users.

This study uses the FERC definition of demand response so that all potential DR, including rate options, are identified. East Kentucky's integrated resource planning team will analyze and adjust as necessary the identified DR potential for how DR potential will be used to construct alternative resource plans.

6.1.2 Demand Response Program Options

Table 6-1 provides a brief description of the demand response (DR) program options that were considered as part of the base analysis and identifies the eligible customer segment for each demand response program to be considered in this study. The list of DR options was determined based on a review of the 2021 East Kentucky MPS, East Kentucky's current and/or planned offerings, DR programs run by other utilities in the region, as well as new programs that East Kentucky is considering. The base case analysis includes direct load control (DLC), rate design, and aggregator options.

TABLE 6-1 DEMAND RESPONSE BASE CASE PROGRAM OPTIONS AND ELIGIBLE MARKETS

DR Program Option	Program Description	Eligible Markets
DLC AC Switch	The compressor of the air conditioner is remotely shut off (cycled) by the system operator for periods that may range from 7 ½ to 15 minutes during every 30-minute period (i.e., 25%-50% duty cycle).	Residential and Small Non-Residential Customers
DLC Thermostat	The system operator can remotely raise the AC's or lower the furnace's thermostat set point during peak load conditions, lowering HVAC load.	Residential and Small Non-Residential Customers
DLC Pool Pumps	The swimming pool pump is remotely shut off by the system operator for periods normally ranging from 2 to 4 hours.	Residential Customers
DLC Water Heaters	The water heater is remotely shut off by the system operator for periods normally ranging from 2 to 8 hours.	Residential and Small Non-Residential Customers
DLC Agricultural Irrigation	The irrigation pump is remotely shut off by the system operator for periods normally ranging from 2 to 4 hours.	Farms

DR Program Option	Program Description	Eligible Markets
Interruptible Rate	A discounted rate is offered to the customer for agreeing to interrupt or curtail load during peak period. The interruption is mandatory. No buy-through options are available on mandatory interruptions. Buy-through options are allowed for energy market interruptions.	Large Non-Residential Customers
Capacity Bidding	Flexible bidding program offering qualified businesses payments for agreeing to reduce load when an event is called. Participants make monthly nominations and receive capacity payments based on the amount of capacity reduction nominated each month, plus energy payments based on actual kilowatt-hour (kWh) energy reduction when an event is called. The amount of capacity nomination can be adjusted on a monthly basis. The program can be Internet-based, providing ready access to program information and ease-of-use. Penalties occur if load nominations are not met.	Large Non-Residential Customers
Demand Buyback	A year-round, flexible, Internet-based bidding program that offers business customers credits for voluntarily reducing power when an event is called.	Large Non-Residential Customers
Critical Peak Pricing with Enabling Technology	A retail rate at which an extra-high price for electricity is provided during a limited number of critical periods (e.g. 100 hours) of the year. Market-based prices are typically provided on a day-ahead basis, or an hour-ahead basis. Includes enabling technology that connects technologies within building. Only for customers with AC.	Residential and Non-Residential Customers
Critical Peak Pricing without Enabling Technology	A retail rate at which an extra-high price for electricity is provided during a limited number of critical periods (e.g. 100 hours) of the year. Market-based prices are typically provided on a day-ahead basis, or an hour-ahead basis.	Residential and Non-Residential Customers
PEV Off Peak Charging Rate	Special rate service for electric vehicles that charge off-peak.	Residential and Non-Residential Customers
Thermal Energy Storage Rate	The use of a cold storage medium such as ice, chilled water, or other liquids. Off-peak energy is used to produce chilled water or ice for use in cooling during peak hours. The cool storage process is limited to off-peak periods.	Non-Residential Customers
Golf Cart Charging Rate	Special rate service for golf courses that charge electric golf carts off-peak.	Golf courses
DR Generators	Allows the utility to turn customer's generator on and off for short periods of time during specific times of the day. The goal of DR is to enable the utility to reduce pressure on the grid and avoid rolling black outs during times of high usage.	Residential and Non-Residential Customers

DR Program Option	Program Description	Eligible Markets
Battery Storage	Customer-sited stationary storage systems that are connected to the distribution system on the customer's side of the utility's service meter. The systems are installed on customer premises, provide savings or other benefits to the customers, and customers are typically the principal investors in the system. The primary drivers for customer adoption of BTM are opportunities for bill reductions, improving energy resilience, and mitigating power quality.	Residential Customers

6.1.3 Demand Response Potential Assessment Approach Overview

The analysis of DR, where possible, closely follows the approach outlined for energy efficiency. The framework for assessing the cost-effectiveness of demand response programs is based *on A Framework for Evaluating the Cost-Effectiveness of Demand Response, prepared for the National Forum on the National Action Plan (NAPDR) on Demand Response*.[13] Additionally, GDS reviewed the National Standard Practice Manual published by the National Efficiency Screening Project.[14] GDS utilized this guide to define avoided ancillary services and energy and/or capacity prices.

The demand response analysis was conducted using the GDS Demand Response Model. The DR Model determines the estimated savings for each demand response program by performing a review of all benefits and costs associated with each program. GDS developed the model such that the value of future programs could be determined and will help facilitate demand response program planning strategies. The model contains approximately 50 required inputs for each program including: expected life, coincident peak ("CP") kW load reductions, proposed rebate levels, program related expenses such as vendor service fees, marketing and evaluation cost and on-going O&M expenses. This model and future program planning features can be used to standardize the cost-effectiveness screening process between East Kentucky departments interested in the deployment of demand response resources.

The TRC Test was used to determine the cost-effectiveness of each demand response program. Benefits are based on avoided generation capacity, energy (including load shifting) and T&D infrastructure costs. Costs include incremental program equipment costs (such as control switches or smart thermostats), fixed program capital costs (such as the cost of a central controller), program administrative, marketing and evaluation costs. Incremental equipment program costs are included for both new and replacement units (such as control switches) to account for units that are replaced at the end of their useful life.

The demand response analysis includes estimates of technical, economic, achievable, and program potential. Achievable potential is broken into maximum and realistic potential in this study:

MAP represents an estimate of the maximum cost-effective demand response potential that can be achieved over the study period. For this study, this will be defined as customer participation in demand response program options that reflect a "best practices" estimate of what could eventually be achieved. MAP assumes no barriers to effective delivery of programs.

RAP represents an estimate of the amount of demand response potential that can be realistically achieved over the study period. For this study, this will be defined as achieving customer participation in demand response program options that reflect a realistic estimate of what could eventually be achieved assuming typical or "average" industry experience. RAP is a discounted MAP, by considering program barriers that limit participation, therefore reducing savings that could be achieved.

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[13] Study was prepared by Synapse Energy Economics and the Regulatory Assistance Project, February 2013.
[14] National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources, May 18, 2017, Prepared by The National Efficiency Screening Project

6.1.4 Avoided Costs

Demand response avoided costs are consistent with those utilized in the energy efficiency potential analysis and were provided by East Kentucky. The primary benefit of demand response is avoided generation capacity, resulting from a reduction in the need for new peaking generation capacity. Demand response can also produce energy related benefits. Demand response programs can also potentially delay the construction of new transmission and distribution lines and facilities, which is reflected in avoided T&D costs. If the demand response option is considered "load shifting," such as direct load control of electric water heating, the consumption of energy is shifted from the control period to the period immediately following the period of control. If the program is not considered to be "load shifting" the measure is turned off during peak control hours, and the energy is saved altogether. The number of seasonal control hours for all direct load control programs was determined by GDS. Table 6-2 provides the seasonal number of control hours assumed for DR programs.

TABLE 6-2 DEMAND RESPONSE SEASONAL NUMBER OF CONTROL HOURS

Program	Seasonal Hours of Control	Assumptions
Direct Load Control Programs	60	4 hour events, 15 events/season
Interruptible Rate	80	Based on review of other similar interruptible rate programs around the country
Critical Peak Pricing Rate	60	4 hour events, 15 events/season
Demand Buyback	80	Based on review of other similar demand buyback programs around the country
EV Off-Peak Charging Rate	640	8 hour events, 5 days/week, 16 weeks/season
Golf Cart Charging Rate	640	8 hour events, 5 days/week, 16 weeks/season
Thermal Storage Cooling Rate	640	8 hour events, 5 days/week, 16 weeks/season
Capacity Bidding	80	Based on review of other similar capacity bidding programs around the country
Battery Storage	80	Based on review of other similar battery storage programs around the country

Program	Seasonal Hours of Control	Assumptions
DR Generators	50	Based on review of other generator programs around the country

6.1.5 Demand Response Program Assumptions

This section briefly discusses the general assumptions and sources that will be used to complete the demand response potential analysis.

Load Reduction: Demand reductions were based on various secondary data sources including evaluation studies, FERC and other industry reports, and other demand response potential studies that conducted primary research. Some programs were calculated based on a per-unit kW demand reduction and other program options were assumed to reduce a percentage of the total facility peak load. These load reductions can be found in Table 6-3.

TABLE 6-3 DEMAND RESPONSE LOAD REDUCTION IMPACTS

Program	Residential Load Reduction (kW)	Non-Residential Load Reduction (kW)
DLC Central AC Switch	1 kW (Summer only)	N/A
DLC Thermostat	1.6 kW in Summer; 1.4 kW in Winter	4.1 kW in Summer; 3.5 kW in Winter
DLC Water Heating	0.37 kW in Summer; 0.52 kW in Winter	0.6 kW in Summer; 1.2 kW in Winter
DLC Pool Pumps	1.36 kW	N/A
Interruptible Rate	N/A	48% of CP Billing Demand in Summer; 50% in Winter
DLC Agricultural Irrigation	N/A	44 kW
Critical Peak Pricing with Enabling Tech	31% of CP Billing Demand in Summer; 25% in Winter	9% of CP Billing Demand
Critical Peak Pricing without Enabling Tech	12% of CP Billing Demand in Summer; 13% in Winter	6% of CP Billing Demand
Capacity Bidding	N/A	31 kW in Summer, 40 kW in Winter
Demand Buyback	N/A	7% of CP Billing Demand
Electric Vehicle Charging Rate	0.52 kW in Summer; 0.55 kW in Winter	0.02 kW in Summer; 0.03 kW in Winter
Golf Cart Charging	N/A	54 kW
Thermal Electric Storage Rate	N/A	19.4 kW
Battery Storage	3 kW	N/A

Program	Residential Load Reduction (kW)	Non-Residential Load Reduction (kW)
DR Generators	6 kW	22 kW

Eligible Control Units: The number of control units (or demand response equipment) per participant were calculated based on the average number of units in homes in the East Kentucky territory. This was used to determine the total equipment cost.

Useful Life: The useful life of equipment used in demand response programs, such as load control switches, smart thermostats, or batteries, was determined using TRMs and data from manufacturers. This useful life was used to determine when equipment needs to be re-installed in the study after the device has failed, therefore adding a second equipment cost for some participants in the study. GDS used a useful life of 11 years for smart thermostats[15], 10 years for level 2 EV chargers[16], 10 years for battery storage[17], 19 years for generators[18], and 10 years for load switches.[19]

Equipment and Incentive Costs: Equipment costs were included for each new participant. Annual incentives were included either on a per participant, per kW or per kWh basis (noted in Table 6-4). For a few of the programs, the utility is incentivizing the customer by paying for a portion of the equipment cost.

TABLE 6-4 ASSUMED BASE CASE EQUIPMENT AND INCENTIVE COSTS

	DR Program Option	Incentive Costs	Equipment Costs
Residential	DLC Central AC Switch	$20/participant-year	$188 for equipment, $300 for labor
	DLC Thermostat	$20/participant-year + one-time $110 incentive	$140
	DLC Swimming Pool Pumps	$10/participant-year	$188 for equipment, $300 for labor
	DLC Water Heating	$10/participant-year	$188 for equipment, $300 for labor
	Critical Peak Pricing with Enabling Technology	$0	$150
	Critical Peak Pricing without Enabling Technology	$0	$0
	Electric Vehicle Charging Rate	Utility pays 25% of Level 2 charger cost	$1000 for new Level 2 charger (for those that don't already have one)
	Battery Storage	Utility pays 25% of battery cost	Starts at $16,630 in 2024; decreases to $11,539 in 2043
	DR Generators	$350/participant-year	Assumed EKPC does not pay any equipment cost

15 Illinois Technical Reference Manual 2023
16 US DOE, Costs Associated with Non-Residential EV Supply Equipment, 2015
17 Tesla Warranty
18 FEMA
19 Comverge

	DR Program Option	Incentive Costs	Equipment Costs
Non-Residential	DLC Thermostat	$50/participant-year + one-time $110 incentive	$140
	DLC Water Heaters	$25/participant-year	$188 for equipment, $300 for labor
	DLC Agricultural Irrigation	$41/kW-year	$1,804
	Interruptible Rate	$5.6/kW-year	$0
	Critical Peak Pricing with Enabling Technology	$0	$150
	Critical Peak Pricing without Enabling Technology	$0	$0
	Capacity Bidding	$21.50/kW-year	$0
	Demand Buyback	$0.5/kWh-year	$0
	Electric Vehicle Charging Rate	Utility pays 25% of Level 2 charger cost	$1000 for new Level 2 charger (for those that don't already have one)
	Golf Cart Charging Rate	$8.5/kW-year	$9,000
	Thermal Electric Storage Cooling Rate	$8.5/kW-year	$46,500
	DR Generators	$79/kW-year	Assumed EKPC does not pay any equipment cost

Program Costs: One-time program development costs of $400,000 were included in the first year of the analysis for new programs[20]. This cost was split between similar programs[21]. No program development costs are assumed for programs that already exist. Each program includes an evaluation cost, marketing cost (higher for MAP than RAP), and administration cost. All program costs were escalated each year by the general rate of inflation assumed for this study.

Eligible Market Size: For direct load control programs, the size of the eligible market was determined by multiplying the forecast of East Kentucky's customers by the saturation of the end use to be controlled. End use saturations were obtained from the 2022 Residential Appliance Saturation Survey Report as well as 2016 End Use Survey Data for data that was not included in the 2022 Report.

6.1.6 DR Program Adoption Levels

Long-term program adoption levels (or "steady state" participation) represent the enrollment rate once the fully achievable participation has been reached. GDS has reviewed industry data and program adoption levels from several utilities' DR programs.

Customer participation in new demand response programs is assumed to reach the steady state adoption rate over a five-year period. The path to steady state customer participation follows an "S-shaped" curve, in which participation growth accelerates over the first half of the five-year period, and then slows over the second half of the period (Figure 6-1). GDS used other research or potential studies to determine steady state participation rates. Table 6-5 provides the Base Case long-term adoption rates for MAP and RAP.

[20] Tennessee Valley Authority Potential Study Vol. 3: Demand Response Potential Study, Global Energy partners, December 2011

[21] These program development costs were split: $400,000 between CPP with Enabling Technology and Without Enabling Technology; $400,000 between Demand Buyback and Capacity Bidding; and $400,000 between EV Off-Peak Charging Rate, Golf Cart Charging Rate, and TES Rate.

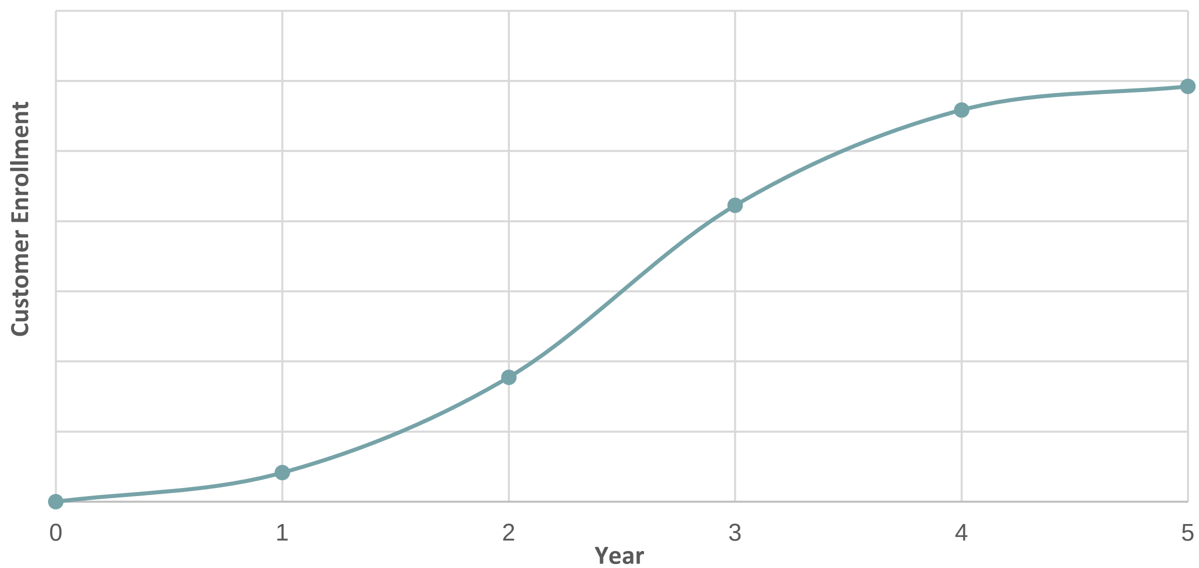

FIGURE 6-1 ILLUSTRATION OF S-SHAPED MARKET ADOPTION CURVE

TABLE 6-5 BASE CASE ADOPTION RATES

Sector	Program	Steady State MAP Adoption Rate	Steady State RAP Adoption Rate
Residential	DLC Central AC Switch	0% (Existing participants decreasing to 0 over time)	0% (Existing participants decreasing to 0 over time)
	DLC Thermostat	35%	11%
	DLC Pool Pumps	38%	19%
	DLC Water Heaters	0% (Existing participants decreasing to 0 over time)	0% (Existing participants decreasing to 0 over time)
	Critical Peak Pricing with Enabling Technology	91%	22%
	Critical Peak Pricing without Enabling Technology	82%	17%
	Electric Vehicle Charging Rate	94%	20%
	Battery Storage	10%	5%
	DR Generators	10%	5%
Non-Residential	DLC Thermostat	10%	8%
	DLC Water Heaters	30%	22%
	DLC Agricultural Irrigation	30%	15%
	Interruptible Rate	30%	15%
	Critical Peak Pricing with Enabling Technology	69%	20%
	Critical Peak Pricing without Enabling Technology	63%	18%
	Capacity Bidding	21%	3%

Sector	Program	Steady State MAP Adoption Rate	Steady State RAP Adoption Rate
	Demand Buyback	9%	1%
	Electric Vehicle Charging Rate	94%	20%
	Golf Cart Charging Rate	81%	16%
	Thermal Electric Storage Cooling Rate	81%	16%
	DR Generators	10%	5%

Double-counting savings from demand response programs that affect the same end uses is a common issue that must be addressed when calculating the demand response savings potential. For example, a customer cannot elect to participate in both DLC programs and rate programs and claim savings from both programs for curtailing the same end use. One cannot save a kW of load in a specific hour more than once. In general, the hierarchy of demand response programs is accounted for by subtracting the number participants in a higher priority program from the eligible market for a lower priority program. Table 6-6 shows the hierarchy for each sector, with 1 being the top priority.

TABLE 6-6 BASE CASE DR HIERARCHY FOR EACH SECTOR

Order	Residential Hierarchy	Small Non-Residential Hierarchy	Large Non-Residential Hierarchy
1	Direct Load Control	Generators	Interruptible Rate
2	Generators	Direct Load Control	Generators
3	Critical Peak Pricing	Demand Buyback	Capacity Bidding
4		Critical Peak Pricing	Critical Peak Pricing

6.2 DEMAND RESPONSE POTENTIAL

This section provides the potential results for technical, economic, and achievable demand response potential for all sectors. The section breaks down the potential by sector, end use, season (summer or winter) and market segment. The results are provided on a 3-, 10-, and 15-year basis. Budget and benefit-cost data are provided for the achievable potential scenarios.

Figure 6-2 provides the technical, economic, summer MAP, winter MAP, summer RAP, and winter RAP results for the 5-year, 10-year, and 15-year timeframes. The annual 5-year summer MAP is 24%, winter MAP is 28%, summer RAP is 14%, and winter RAP is 16% as a percentage of forecasted demand.

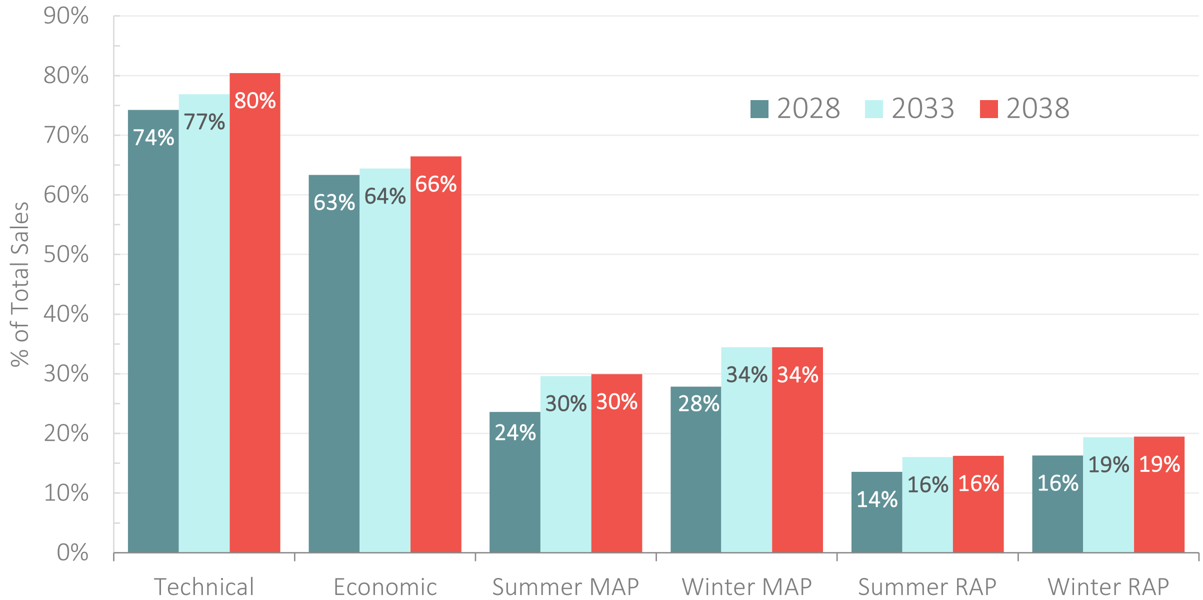

FIGURE 6-2: OVERVIEW OF DEMAND RESPONSE POTENTIAL

6.2.1 Technical/Economic Potential

Table 6-7 provides annual technical and economic potential results across the for the 1-year, 2-year, 3-year, 10-year, and 15-year timeframes. The technical potential is nearly 2,700 MW by 2038. Economic potential rises to more than 2,200 MW by 2024 as well.

TABLE 6-7 TECHNICAL & ECONOMIC DEMAND RESPONSE POTENTIAL

	2024	2025	2026	2033	2038
Peak Demand (MW)					
Technical	2,553	2,521	2,486	2,574	2,694
Economic	2,202	2,164	2,122	2,157	2,225

6.2.2 Achievable Potential

Table 6-8 and Table 6-9 provides 15-yr summer and winter MAP and RAP potential by residential program. The DLC Thermostat and CPP with Enabling Technology programs provide the most MAP and RAP potential, accounting for a combined 3.7% peak savings in the summer RAP scenario and 2.8% savings in the winter RAP scenario.

TABLE 6-8 SUMMER DEMAND RESPONSE MAP & RAP POTENTIAL – RESIDENTIAL PROGRAMS

Residential Program	MAP (MW)	RAP (MW)	MAP (% of Forecast	RAP (% of Forecast
DLC Central AC Switch	0.0	0.0	0.0%	0.0%
DLC Thermostat	164.5	53.4	5.7%	1.9%
DLC Water Heaters	0.0	0.0	0.0%	0.0%
CPP with Enabling Technology	190.7	56.6	6.6%	2.0%
CPP without Enabling Technology	51.7	22.4	1.8%	0.8%
Generators	0.0	19.9	0.0%	0.7%
Total	**407.0**	**152.3**	**14.1%**	**5.3%**

TABLE 6-9 WINTER DEMAND RESPONSE MAP & RAP POTENTIAL – RESIDENTIAL PROGRAMS

	MAP (MW)	RAP (MW)	MAP (% of Forecast)	RAP (% of Forecast)
DLC Thermostat	66.9	22.5	1.8%	0.6%
DLC Water Heaters	0.0	0.0	0.0%	0.0%
CPP with Enabling Technology	199.8	59.3	5.3%	1.6%
CPP without Enabling Technology	74.1	32.1	2.0%	0.9%
Generators	0.0	19.9	0.0%	0.5%
Total	**340.8**	**133.8**	**9.1%**	**3.6%**

Table 6-10 and Table 6-11 provides provide 15-year summer and winter MAP and RAP potential by C/I program. The Interruptible Rate program provides the most MAP and RAP potential, accounting for 9.1% peak savings in the summer RAP scenario and 9.0% in the winter RAP scenario.

TABLE 6-10 SUMMER DEMAND RESPONSE MAP & RAP POTENTIAL – C/I PROGRAMS

	MAP (MW)	RAP (MW)	MAP (% of Forecast)	RAP (% of Forecast)
DLC Thermostat	11.2	9.1	0.4%	0.3%
DLC Water Heaters	3.3	2.4	0.1%	0.1%
DLC Agricultural Irrigation	8.3	0.0	0.3%	0.0%
Interruptible Rate	321.4	258.6	11.2%	9.0%
CPP with Enabling Technology	66.4	21.8	2.3%	0.8%
CPP without Enabling Technology	17.5	11.4	0.6%	0.4%
Demand Buyback	2.2	0.0	0.1%	0.0%
Golf Cart Charging Rate	1.4	0.0	0.0%	0.0%
Capacity Bidding	1.0	0.0	0.0%	0.0%
Generators	15.1	7.6	0.5%	0.3%
Total	**447.8**	**310.9**	**15.7%**	**10.8%**

TABLE 6-11 WINTER DEMAND RESPONSE MAP & RAP POTENTIAL – C/I PROGRAMS

	MAP (MW)	RAP (MW)	MAP (% of Forecast)	RAP (% of Forecast)
DLC Thermostat	9.5	7.7	0.3%	0.2%
DLC Water Heaters	6.6	4.9	0.2%	0.1%
Interruptible Rate	423.2	335.0	11.3%	9.0%
CPP with Enabling Technology	86.9	28.5	2.3%	0.8%
CPP without Enabling Technology	22.9	14.9	0.6%	0.4%
Demand Buyback	2.9	0.0	0.1%	0.0%
Golf Cart Charging Rate	1.4	0.0	0.0%	0.0%
Capacity Bidding	1.4	0.0	0.0%	0.0%
Generators	15.1	7.6	0.4%	0.2%

	MAP (MW)	RAP (MW)	MAP (% of Forecast)	RAP (% of Forecast)
Total	**569.8**	**398.6**	**15.4%**	**10.7%**

6.3 DEMAND RESPONSE POTENTIAL BENEFITS AND COSTS

This section provides benefits and costs information for the demand response analysis. Table 6-12 provided the NPV benefits and costs for the MAP and RAP scenarios. In the MAP scenario, the NPV benefits are more than $1.5 billion over the study timeframe with a TRC ratio of 4.23. In the RAP scenario, the NPV benefits are more than $800 million over the study timeframe with a TRC ratio of 4.05.

TABLE 6-12 NPV BENEFITS AND COSTS MAP & RAP DEMAND RESPONSE POTENTIAL – 2038

	NPV Benefits	NPV Costs	TRC Ratio
MAP	$2,018	$513	3.94
RAP	$1,178	$304	3.87

Figure 6-3 provides a breakdown of the MAP and RAP annual budgets over the study timeframe. RAP budgets fluctuate over time but rise from $17 million to over $34 million in 2035.

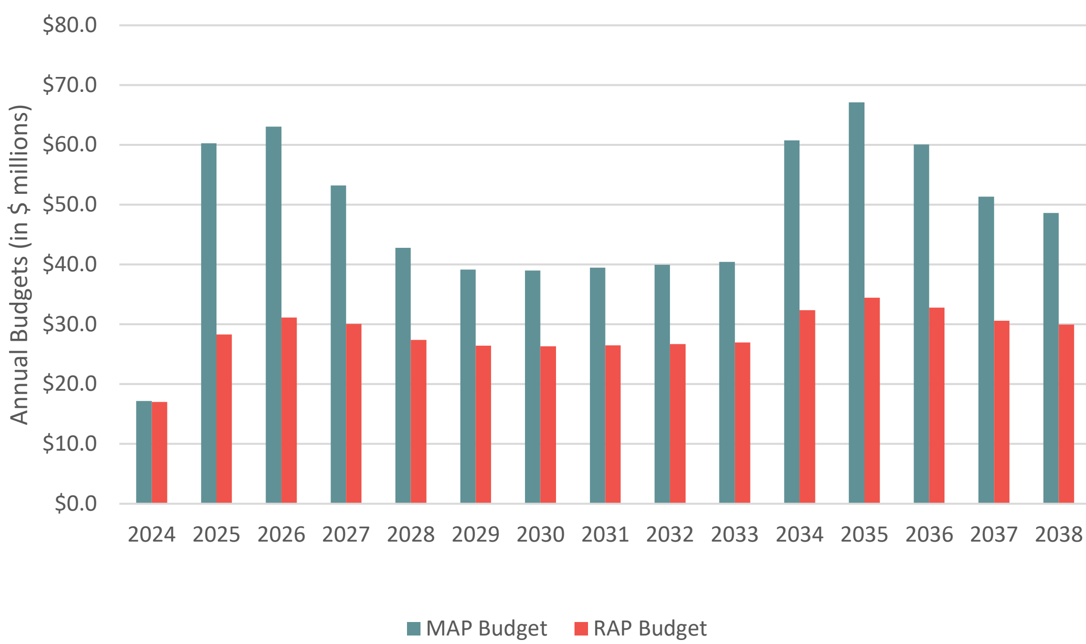

FIGURE 6-3: DEMAND RESPONSE ANNUAL BUDGETS FOR MAP AND RAP ($, MILLIONS)

7 PROGRAM SCENARIOS

The GDS Team calculated estimated savings for each EKPC program at three different spending scenarios: $7.4 million (Base), $5.4 million (Low), and $11.4 million (High). Each scenario is an increase over what EKPC spent in 2023. The first establishes program-level budgets and a total overall budget of $7.4 million, which represents a nearly $4 million increase over the 2023 spending of $3.4 million. The second scenario represents a 50% increase over the 2023 spending levels, and the third scenario represents a 200% increase over the 2023 spending levels. For each scenario, the estimated savings are based on the results of the RAP scenarios from the MPS as discussed in the preceding chapters, with the level of savings informed by the corresponding budgets in each of these three program funding scenarios. The tables below provide summary results for the savings and spending associated with each program in each funding scenario. Additional program-level detail is provided in Appendix D of the report.

Table 7-1 provides the annual energy and demand savings across all programs by funding scenario.[22] In the Base funding scenario, the annual energy savings start at 13,261 MWh in 2024 and rise to 14,715 MWh by 2026. In the Low scenario, the annual energy savings start at 9,668 MWh in 2024 and rise to 10,729 MWh by 2026. In the High scenario, the annual energy savings start at 20,446 MWh in 2024 and rise to 22,688 MWh by 2026.

TABLE 7-1 ANNUAL ENERGY AND DEMAND SAVINGS – BY PROGRAM FUNDING SCENARIO

	2024	2025	2026	2027	2028
Base					
Energy (MWh)	13,261	13,612	13,974	14,344	14,715
Demand (MW)	10.1	10.6	11.1	11.4	11.7
Low					
Energy (MWh)	9,668	9,925	10,188	10,459	10,729
Demand (MW)	3.0	3.0	3.1	3.2	3.3
High					
Energy (MWh)	20,446	20,987	21,544	22,116	22,688
Demand (MW)	23.9	27.4	30.8	33.3	34.6

Table 7-2 provides the 2024 budgets by program for each spending scenario. The program budgets are inclusive of incentives, admin, and net lost revenues, as applicable.

TABLE 7-2 2024 PROGRAM BUDGETS – BY SPENDING SCENARIO

Program	Base	Low	High
Residential Weatherization	$1,522,950	$1,115,429	$2,337,993
CARES Efficiency Program	$444,000	$325,191	$681,617
Residential HVAC Equipment	$2,494,798	$1,827,223	$3,829,949
Residential Home New Construction	$716,300	$524,627	$1,099,645
Commercial & Industrial	$614,850	$450,324	$943,902
Residential Electric Vehicle Off-peak Charging Program	$22,115	$16,197	$33,950
Direct Load Control	$1,581,080	$1,163,680	$2,415,990
Residential DR Other	$12,500	$3,500	$30,500
Total	$7,408,593	$5,426,171	$11,373,546

[22] Demand savings are Winter only and only represent savings from DR programs.

APPENDIX A: RESIDENTIAL MEASURE DETAIL

Residential Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
1001	Appliances	ENERGY STAR Refrigerator	No program	SF	MO	349	10%	35	0.005	0.005	15	$28.00	25%	126%	57%	65%	1.1	4.5	1.7	0.64
1002	Appliances	ENERGY STAR Refrigerator	No program	SF	MO	349	10%	35	0.005	0.005	15	$28.00	25%	126%	57%	65%	1.1	4.5	1.7	0.64
1003	Appliances	ENERGY STAR Refrigerator	No program	SF	NC	349	10%	35	0.005	0.005	15	$28.00	25%	126%	0%	29%	1.1	4.5	1.7	0.64
1004	Appliances	ENERGY STAR Refrigerator	No program	MH	MO	349	10%	35	0.005	0.005	15	$28.00	25%	126%	57%	65%	1.1	4.5	1.7	0.64
1005	Appliances	ENERGY STAR Refrigerator	No program	MH	MO	349	10%	35	0.005	0.005	15	$28.00	25%	126%	57%	65%	1.1	4.5	1.7	0.64
1006	Appliances	ENERGY STAR Refrigerator	No program	MH	NC	349	10%	35	0.005	0.005	15	$28.00	25%	126%	0%	29%	1.1	4.5	1.7	0.64
1007	Appliances	CEE Tier 2 Refrigerator	No program	SF	MO	349	15%	52	0.008	0.008	15	$112.00	25%	126%	57%	65%	0.4	1.7	0.8	0.53
1008	Appliances	CEE Tier 2 Refrigerator	No program	SF	MO	349	15%	52	0.008	0.008	15	$112.00	25%	126%	57%	65%	0.4	1.7	0.8	0.53
1009	Appliances	CEE Tier 2 Refrigerator	No program	SF	NC	349	15%	52	0.008	0.008	15	$112.00	25%	126%	0%	29%	0.4	1.7	0.8	0.53
1010	Appliances	CEE Tier 2 Refrigerator	No program	MH	MO	349	15%	52	0.008	0.008	15	$112.00	25%	126%	57%	65%	0.4	1.7	0.8	0.53
1011	Appliances	CEE Tier 2 Refrigerator	No program	MH	MO	349	15%	52	0.008	0.008	15	$112.00	25%	126%	57%	65%	0.4	1.7	0.8	0.53
1012	Appliances	CEE Tier 2 Refrigerator	No program	MH	NC	349	15%	52	0.008	0.008	15	$112.00	25%	126%	0%	29%	0.4	1.7	0.8	0.53
1013	Appliances	CEE Tier 3 Refrigerator	No program	SF	MO	349	20%	70	0.011	0.011	15	$134.00	25%	126%	57%	65%	0.5	1.9	0.9	0.55
1014	Appliances	CEE Tier 3 Refrigerator	No program	SF	MO	349	20%	70	0.011	0.011	15	$134.00	25%	126%	57%	65%	0.5	1.9	0.9	0.55
1015	Appliances	CEE Tier 3 Refrigerator	No program	SF	NC	349	20%	70	0.011	0.011	15	$134.00	25%	126%	0%	29%	0.5	1.9	0.9	0.55
1016	Appliances	CEE Tier 3 Refrigerator	No program	MH	MO	349	20%	70	0.011	0.011	15	$134.00	25%	126%	57%	65%	0.5	1.9	0.9	0.55
1017	Appliances	CEE Tier 3 Refrigerator	No program	MH	MO	349	20%	70	0.011	0.011	15	$134.00	25%	126%	57%	65%	0.5	1.9	0.9	0.55
1018	Appliances	CEE Tier 3 Refrigerator	No program	MH	NC	349	20%	70	0.011	0.011	15	$134.00	25%	126%	0%	29%	0.5	1.9	0.9	0.55
1019	Appliances	Refrigerator Recycling	No program	SF	Recycle	901	100%	901	0.111	0.111	7	$170.00	25%	4%	0%	29%	2.4	9.7	3.7	0.66
1020	Appliances	Refrigerator Recycling	No program	SF	Recycle	901	100%	901	0.111	0.111	7	$170.00	25%	4%	0%	29%	2.4	9.7	3.7	0.66
1021	Appliances	Refrigerator Recycling	No program	MH	Recycle	901	100%	901	0.111	0.111	7	$170.00	25%	4%	0%	29%	2.4	9.7	3.7	0.66
1022	Appliances	Refrigerator Recycling	No program	MH	Recycle	901	100%	901	0.111	0.111	7	$170.00	25%	4%	0%	29%	2.4	9.7	3.7	0.66
1023	Appliances	ENERGY STAR Clothes Washer	No program	SF	MO	590	24%	140	0.018	0.018	14	$87.00	25%	96%	57%	65%	3.6	5.4	5.3	0.66
1024	Appliances	ENERGY STAR Clothes Washer	No program	SF	MO	590	24%	140	0.018	0.018	14	$87.00	25%	96%	57%	65%	3.6	5.4	5.3	0.66
1025	Appliances	ENERGY STAR Clothes Washer	No program	SF	NC	590	24%	140	0.018	0.018	14	$87.00	25%	96%	0%	29%	3.6	5.4	5.3	0.66
1026	Appliances	ENERGY STAR Clothes Washer	No program	MH	MO	590	24%	140	0.018	0.018	14	$87.00	25%	96%	57%	65%	3.6	5.4	5.3	0.66
1027	Appliances	ENERGY STAR Clothes Washer	No program	MH	MO	590	24%	140	0.018	0.018	14	$87.00	25%	96%	57%	65%	3.6	5.4	5.3	0.66
1028	Appliances	ENERGY STAR Clothes Washer	No program	MH	NC	590	24%	140	0.018	0.018	14	$87.00	25%	96%	0%	29%	3.6	5.4	5.3	0.66
1029	Appliances	ENERGY STAR Clothes Washer (CEE Tier 2)	No program	SF	MO	590	43%	255	0.033	0.033	14	$85.00	25%	96%	57%	65%	6.1	10.2	8.8	0.69
1030	Appliances	ENERGY STAR Clothes Washer (CEE Tier 2)	No program	SF	MO	590	43%	255	0.033	0.033	14	$85.00	25%	96%	57%	65%	6.1	10.2	8.8	0.69
1031	Appliances	ENERGY STAR Clothes Washer (CEE Tier 2)	No program	SF	NC	590	43%	255	0.033	0.033	14	$85.00	25%	96%	0%	29%	6.1	10.2	8.8	0.69
1032	Appliances	ENERGY STAR Clothes Washer (CEE Tier 2)	No program	MH	MO	590	43%	255	0.033	0.033	14	$85.00	25%	96%	57%	65%	6.1	10.2	8.8	0.69
1033	Appliances	ENERGY STAR Clothes Washer (CEE Tier 2)	No program	MH	MO	590	43%	255	0.033	0.033	14	$85.00	25%	96%	57%	65%	6.1	10.2	8.8	0.69
1034	Appliances	ENERGY STAR Clothes Washer (CEE Tier 2)	No program	MH	NC	590	43%	255	0.033	0.033	14	$85.00	25%	96%	0%	29%	6.1	10.2	8.8	0.69
1035	Appliances	ENERGY STAR Clothes Washer (CEE Tier 3)	No program	SF	MO	590	47%	276	0.036	0.036	14	$99.00	25%	96%	57%	65%	5.7	9.4	8.2	0.69
1036	Appliances	ENERGY STAR Clothes Washer (CEE Tier 3)	No program	SF	MO	590	47%	276	0.036	0.036	14	$99.00	25%	96%	57%	65%	5.7	9.4	8.2	0.69
1037	Appliances	ENERGY STAR Clothes Washer (CEE Tier 3)	No program	SF	NC	590	47%	276	0.036	0.036	14	$99.00	25%	96%	0%	29%	5.7	9.4	8.2	0.69
1038	Appliances	ENERGY STAR Clothes Washer (CEE Tier 3)	No program	MH	MO	590	47%	276	0.036	0.036	14	$99.00	25%	96%	57%	65%	5.7	9.4	8.2	0.69
1039	Appliances	ENERGY STAR Clothes Washer (CEE Tier 3)	No program	MH	MO	590	47%	276	0.036	0.036	14	$99.00	25%	96%	57%	65%	5.7	9.4	8.2	0.69
1040	Appliances	ENERGY STAR Clothes Washer (CEE Tier 3)	No program	MH	NC	590	47%	276	0.036	0.036	14	$99.00	25%	96%	0%	29%	5.7	9.4	8.2	0.69
1041	Appliances	ENERGY STAR Dishwasher	No program	SF	MO	307	13%	40	0.003	0.003	11	$75.67	25%	68%	57%	65%	0.7	1.2	1.3	0.42
1042	Appliances	ENERGY STAR Dishwasher	No program	SF	MO	307	13%	40	0.003	0.003	11	$75.67	25%	68%	57%	65%	0.7	1.2	1.3	0.42
1043	Appliances	ENERGY STAR Dishwasher	No program	SF	NC	307	13%	40	0.003	0.003	11	$75.67	25%	68%	0%	29%	0.7	1.2	1.3	0.42
1044	Appliances	ENERGY STAR Dishwasher	No program	MH	MO	307	13%	40	0.003	0.003	11	$75.67	25%	68%	57%	65%	0.7	1.2	1.3	0.42
1045	Appliances	ENERGY STAR Dishwasher	No program	MH	MO	307	13%	40	0.003	0.003	11	$75.67	25%	68%	57%	65%	0.7	1.2	1.3	0.42
1046	Appliances	ENERGY STAR Dishwasher	No program	MH	NC	307	13%	40	0.003	0.003	11	$75.67	25%	68%	0%	29%	0.7	1.2	1.3	0.42
1047	Appliances	ENERGY STAR Dehumidifier	No program	SF	MO	1,095	12%	134	0.030	0.030	12	$35.00	25%	25%	84%	87%	3.6	14.4	4.1	0.87
1048	Appliances	ENERGY STAR Dehumidifier	No program	SF	MO	1,095	12%	134	0.030	0.030	12	$35.00	25%	25%	84%	87%	3.6	14.4	4.1	0.87
1049	Appliances	ENERGY STAR Dehumidifier	No program	SF	NC	1,095	12%	134	0.030	0.030	12	$35.00	25%	25%	0%	29%	3.6	14.4	4.1	0.87
1050	Appliances	ENERGY STAR Dehumidifier	No program	MH	MO	1,095	12%	134	0.030	0.030	12	$35.00	25%	25%	84%	87%	3.6	14.4	4.1	0.87
1051	Appliances	ENERGY STAR Dehumidifier	No program	MH	MO	1,095	12%	134	0.030	0.030	12	$35.00	25%	25%	84%	87%	3.6	14.4	4.1	0.87
1052	Appliances	ENERGY STAR Dehumidifier	No program	MH	NC	1,095	12%	134	0.030	0.030	12	$35.00	25%	25%	0%	29%	3.6	14.4	4.1	0.87
1053	Appliances	ENERGY STAR Most Efficient Dehumidifier	No program	SF	MO	1,095	17%	188	0.043	0.043	12	$100.00	25%	25%	84%	87%	1.8	7.2	2.2	0.83

Residential Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
1054	Appliances	ENERGY STAR Most Efficient Dehumidifier	No program	SF	MO	1,095	17%	188	0.043	0.043	12	$100.00	25%	25%	84%	87%	1.8	7.2	2.2	0.83
1055	Appliances	ENERGY STAR Most Efficient Dehumidifier	No program	SF	NC	1,095	17%	188	0.043	0.043	12	$100.00	25%	25%	0%	29%	1.8	7.2	2.2	0.83
1056	Appliances	ENERGY STAR Most Efficient Dehumidifier	No program	MH	MO	1,095	17%	188	0.043	0.043	12	$100.00	25%	25%	84%	87%	1.8	7.2	2.2	0.83
1057	Appliances	ENERGY STAR Most Efficient Dehumidifier	No program	MH	MO	1,095	17%	188	0.043	0.043	12	$100.00	25%	25%	84%	87%	1.8	7.2	2.2	0.83
1058	Appliances	ENERGY STAR Most Efficient Dehumidifier	No program	MH	NC	1,095	17%	188	0.043	0.043	12	$100.00	25%	25%	0%	29%	1.8	7.2	2.2	0.83
1059	Appliances	ENERGY STAR Freezer	No program	SF	MO	277	10%	28	0.004	0.003	21	$5.00	25%	75%	32%	45%	5.8	23.1	8.7	0.67
1060	Appliances	ENERGY STAR Freezer	No program	SF	MO	277	10%	28	0.004	0.003	21	$5.00	25%	75%	32%	45%	5.8	23.1	8.7	0.67
1061	Appliances	ENERGY STAR Freezer	No program	SF	NC	277	10%	28	0.004	0.003	21	$5.00	25%	75%	0%	29%	5.8	23.1	8.7	0.67
1062	Appliances	ENERGY STAR Freezer	No program	MH	MO	277	10%	28	0.004	0.003	21	$5.00	25%	75%	32%	45%	5.8	23.1	8.7	0.67
1063	Appliances	ENERGY STAR Freezer	No program	MH	MO	277	10%	28	0.004	0.003	21	$5.00	25%	75%	32%	45%	5.8	23.1	8.7	0.67
1064	Appliances	ENERGY STAR Freezer	No program	MH	NC	277	10%	28	0.004	0.003	21	$5.00	25%	75%	0%	29%	5.8	23.1	8.7	0.67
1065	Appliances	Freezer Recycling	No program	SF	Recycle	905	100%	905	0.106	0.090	7	$170.00	25%	3%	0%	29%	2.3	9.2	3.7	0.62
1066	Appliances	Freezer Recycling	No program	SF	Recycle	905	100%	905	0.106	0.090	7	$170.00	25%	3%	0%	29%	2.3	9.2	3.7	0.62
1067	Appliances	Freezer Recycling	No program	MH	Recycle	905	100%	905	0.106	0.090	7	$170.00	25%	3%	0%	29%	2.3	9.2	3.7	0.62
1068	Appliances	Freezer Recycling	No program	MH	Recycle	905	100%	905	0.106	0.090	7	$170.00	25%	3%	0%	29%	2.3	9.2	3.7	0.62
1069	Appliances	ENERGY STAR Clothes Dryer	No program	SF	MO	769	21%	160	0.022	0.022	16	$152.00	25%	93%	35%	48%	1.0	4.0	1.6	0.64
1070	Appliances	ENERGY STAR Clothes Dryer	No program	SF	MO	769	21%	160	0.022	0.022	16	$152.00	25%	93%	35%	48%	1.0	4.0	1.6	0.64
1071	Appliances	ENERGY STAR Clothes Dryer	No program	SF	NC	769	21%	160	0.022	0.022	16	$152.00	25%	93%	0%	29%	1.0	4.0	1.6	0.64
1072	Appliances	ENERGY STAR Clothes Dryer	No program	MH	MO	769	21%	160	0.022	0.022	16	$152.00	25%	93%	35%	48%	1.0	4.0	1.6	0.64
1073	Appliances	ENERGY STAR Clothes Dryer	No program	MH	MO	769	21%	160	0.022	0.022	16	$152.00	25%	93%	35%	48%	1.0	4.0	1.6	0.64
1074	Appliances	ENERGY STAR Clothes Dryer	No program	MH	NC	769	21%	160	0.022	0.022	16	$152.00	25%	93%	0%	29%	1.0	4.0	1.6	0.64
2001	Behavioral	Home Energy Management System	No program	SF	MO	13,791	5%	690	0.079	0.079	5	$100.00	25%	100%	0%	100%	2.4	9.6	3.6	0.67
2002	Behavioral	Home Energy Management System	No program	SF	MO	13,791	5%	690	0.079	0.079	5	$100.00	25%	100%	0%	100%	2.4	9.6	3.6	0.67
2003	Behavioral	Home Energy Management System	No program	SF	NC	13,791	5%	690	0.079	0.079	5	$100.00	25%	100%	0%	100%	2.4	9.6	3.6	0.67
2004	Behavioral	Home Energy Management System	No program	MH	MO	13,791	5%	690	0.079	0.079	5	$100.00	25%	100%	0%	100%	2.4	9.6	3.6	0.67
2005	Behavioral	Home Energy Management System	No program	MH	MO	13,791	5%	690	0.079	0.079	5	$100.00	25%	100%	0%	100%	2.4	9.6	3.6	0.67
2006	Behavioral	Home Energy Management System	No program	MH	NC	13,791	5%	690	0.079	0.079	5	$100.00	25%	100%	0%	100%	2.4	9.6	3.6	0.67
2007	Behavioral	Online Energy Audit	Residential Energy Audit	SF	MO	13,791	2%	276	0.031	0.031	1	$7.00	100%	100%	0%	100%	2.8	2.8	5.1	0.56
2008	Behavioral	Online Energy Audit	Residential Energy Audit	SF	MO	13,791	2%	276	0.031	0.031	1	$7.00	100%	100%	0%	100%	2.8	2.8	5.1	0.56
2009	Behavioral	Online Energy Audit	Residential Energy Audit	SF	NC	13,791	2%	276	0.031	0.031	1	$7.00	100%	100%	0%	100%	2.8	2.8	5.1	0.56
2010	Behavioral	Online Energy Audit	Residential Energy Audit	MH	MO	13,791	2%	276	0.031	0.031	1	$7.00	100%	100%	0%	100%	2.8	2.8	5.1	0.56
2011	Behavioral	Online Energy Audit	Residential Energy Audit	MH	MO	13,791	2%	276	0.031	0.031	1	$7.00	100%	100%	0%	100%	2.8	2.8	5.1	0.56
2012	Behavioral	Online Energy Audit	Residential Energy Audit	MH	NC	13,791	2%	276	0.031	0.031	1	$7.00	100%	100%	0%	100%	2.8	2.8	5.1	0.56
3001	HVAC Equipment	ASHP Tune Up	No program	SF	Retrofit	5,074	5%	254	0.127	0.046	3	$225.00	25%	40%	49%	60%	0.3	1.2	0.6	0.52
3002	HVAC Equipment	ASHP Tune Up	No program	SF	Retrofit	5,074	5%	254	0.127	0.046	3	$225.00	25%	40%	49%	60%	0.3	1.2	0.6	0.52
3003	HVAC Equipment	ASHP Tune Up	No program	SF	NC	5,074	5%	254	0.127	0.046	3	$225.00	25%	40%	0%	32%	0.3	1.2	0.6	0.52
3004	HVAC Equipment	ASHP Tune Up	No program	MH	Retrofit	4,228	5%	211	0.106	0.038	3	$225.00	25%	40%	49%	60%	0.3	1.0	0.5	0.48
3005	HVAC Equipment	ASHP Tune Up	No program	MH	Retrofit	4,228	5%	211	0.106	0.038	3	$225.00	25%	40%	49%	60%	0.3	1.0	0.5	0.48
3006	HVAC Equipment	ASHP Tune Up	No program	MH	NC	4,228	5%	211	0.106	0.038	3	$225.00	25%	40%	0%	32%	0.3	1.0	0.5	0.48
3007	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	MO	5,074	10%	507	0.125	0.091	16	$636.00	100%	40%	36%	80%	3.4	0.7	4.5	0.39
3008	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	10%	507	0.125	0.091	16	$636.00	100%	40%	36%	80%	4.0	0.8	5.1	0.42
3009	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	NC	5,074	10%	507	0.125	0.091	16	$636.00	100%	40%	0%	80%	3.4	0.7	4.5	0.39
3010	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	MO	4,228	10%	422	0.104	0.076	16	$530.00	100%	40%	36%	80%	3.3	0.6	4.4	0.35
3011	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	10%	422	0.104	0.076	16	$530.00	100%	40%	36%	80%	4.6	0.8	5.8	0.42
3012	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	NC	4,228	10%	422	0.104	0.076	16	$530.00	100%	40%	0%	80%	3.3	0.6	4.4	0.35

Residential Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
3013	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	MO	5,074	18%	890	0.247	0.160	16	$1,273.00	59%	40%	36%	56%	2.3	1.3	3.0	0.51
3014	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	18%	890	0.247	0.160	16	$1,273.00	100%	40%	36%	80%	2.3	0.8	3.4	0.40
3015	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	NC	5,074	18%	890	0.247	0.160	16	$1,273.00	59%	40%	0%	56%	2.3	1.3	3.0	0.51
3016	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	MO	4,228	18%	742	0.206	0.133	16	$1,061.00	71%	40%	36%	62%	2.6	1.1	3.5	0.48
3017	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	18%	742	0.206	0.133	16	$1,061.00	100%	40%	36%	80%	2.6	0.8	3.8	0.40
3018	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	NC	4,228	18%	742	0.206	0.133	16	$1,061.00	71%	40%	0%	62%	2.6	1.1	3.5	0.48
3019	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	MO	5,074	26%	1,329	0.345	0.239	16	$1,909.00	39%	40%	36%	48%	1.8	1.9	2.3	0.59
3020	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	26%	1,329	0.345	0.239	16	$1,909.00	100%	40%	36%	80%	1.8	0.7	2.9	0.40
3021	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	NC	5,074	26%	1,329	0.345	0.239	16	$1,909.00	39%	40%	0%	43%	1.8	1.9	2.3	0.59
3022	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	MO	4,228	26%	1,107	0.287	0.199	16	$1,591.00	47%	40%	36%	50%	2.0	1.6	2.6	0.55
3023	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	26%	1,107	0.287	0.199	16	$1,591.00	100%	40%	36%	80%	2.0	0.7	3.1	0.40
3024	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	NC	4,228	26%	1,107	0.287	0.199	16	$1,591.00	47%	40%	0%	50%	2.0	1.6	2.6	0.55
3025	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	MO	5,074	31%	1,583	0.442	2.381	16	$2,546.00	29%	40%	36%	48%	3.1	7.9	1.9	2.15
3026	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	31%	1,583	0.442	2.381	16	$2,546.00	100%	40%	36%	80%	3.1	2.3	2.6	1.30
3027	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	NC	5,074	31%	1,583	0.442	2.381	16	$2,546.00	29%	40%	0%	35%	3.1	7.9	1.9	2.15
3028	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	MO	4,228	31%	1,319	0.368	1.984	16	$2,122.00	35%	40%	36%	48%	3.3	6.5	2.1	2.04
3029	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	31%	1,319	0.368	1.984	16	$2,122.00	100%	40%	36%	80%	3.3	2.3	2.7	1.30
3030	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	NC	4,228	31%	1,319	0.368	1.984	16	$2,122.00	35%	40%	0%	41%	3.3	6.5	2.1	2.04
3031	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	MO	5,074	35%	1,798	0.521	2.705	16	$3,182.00	24%	40%	36%	48%	2.7	8.9	1.6	2.23
3032	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	35%	1,798	0.521	2.705	16	$3,182.00	100%	40%	36%	80%	2.7	2.1	2.3	1.23
3033	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	NC	5,074	35%	1,798	0.521	2.705	16	$3,182.00	24%	40%	0%	31%	2.7	8.9	1.6	2.23
3034	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	MO	4,228	35%	1,499	0.434	2.254	16	$2,652.00	28%	40%	36%	48%	2.9	7.4	1.7	2.12
3035	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	35%	1,499	0.434	2.254	16	$2,652.00	100%	40%	36%	80%	2.9	2.1	2.5	1.23
3036	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	NC	4,228	35%	1,499	0.434	2.254	16	$2,652.00	28%	40%	0%	34%	2.9	7.4	1.7	2.12
3037	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	MO	5,074	39%	1,991	0.600	2.995	16	$3,819.00	20%	40%	36%	48%	2.5	9.9	1.4	2.29
3038	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	39%	1,991	0.600	2.995	16	$3,819.00	100%	40%	36%	80%	2.5	1.9	2.2	1.18
3039	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	SF	NC	5,074	39%	1,991	0.600	2.995	16	$3,819.00	20%	40%	0%	28%	2.5	9.9	1.4	2.29
3040	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	MO	4,228	39%	1,660	0.500	2.496	16	$3,182.00	24%	40%	36%	48%	2.6	8.3	1.5	2.19
3041	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	39%	1,660	0.500	2.496	16	$3,182.00	100%	40%	36%	80%	2.6	1.9	2.3	1.18
3042	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Heat pump baseline	HP High Efficiency Heat Pump	MH	NC	4,228	39%	1,660	0.500	2.496	16	$3,182.00	24%	40%	0%	31%	2.6	8.3	1.5	2.19
3043	HVAC Equipment	Ground Source Heat Pump 20 SEER - Heat pump baseline	No program	SF	MO	5,074	39%	1,991	0.359	0.358	25	$3,509.00	21%	40%	36%	48%	1.8	3.7	2.2	0.67
3044	HVAC Equipment	Ground Source Heat Pump 20 SEER - Heat pump baseline	No program	SF	MO	5,074	39%	1,991	0.359	0.358	25	$3,509.00	21%	40%	36%	48%	1.8	3.7	2.2	0.67

Residential Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
3045	HVAC Equipment	Ground Source Heat Pump 20 SEER - Heat pump baseline	No program	SF	NC	5,074	39%	1,991	0.359	0.358	25	$3,509.00	21%	40%	0%	29%	1.8	3.7	2.2	0.67
3046	HVAC Equipment	Ground Source Heat Pump 20 SEER - Heat pump baseline	No program	MH	MO	4,228	39%	1,660	0.299	0.298	25	$1,830.50	41%	40%	36%	48%	3.2	3.1	3.9	0.65
3047	HVAC Equipment	Ground Source Heat Pump 20 SEER - Heat pump baseline	No program	MH	MO	4,228	39%	1,660	0.299	0.298	25	$1,830.50	41%	40%	36%	48%	3.2	3.1	3.9	0.65
3048	HVAC Equipment	Ground Source Heat Pump 20 SEER - Heat pump baseline	No program	MH	NC	4,228	39%	1,660	0.299	0.298	25	$1,830.50	41%	40%	0%	44%	3.2	3.1	3.9	0.65
3049	HVAC Equipment	Ground Source Heat Pump 21.5 SEER - Heat pump baseline	No program	SF	MO	5,074	40%	2,054	0.370	0.369	25	$3,509.00	21%	40%	36%	48%	1.8	3.8	2.2	0.68
3050	HVAC Equipment	Ground Source Heat Pump 21.5 SEER - Heat pump baseline	No program	SF	MO	5,074	40%	2,054	0.370	0.369	25	$3,509.00	21%	40%	36%	48%	1.8	3.8	2.2	0.68
3051	HVAC Equipment	Ground Source Heat Pump 21.5 SEER - Heat pump baseline	No program	SF	NC	5,074	40%	2,054	0.370	0.369	25	$3,509.00	21%	40%	0%	29%	1.8	3.8	2.2	0.68
3052	HVAC Equipment	Ground Source Heat Pump 21.5 SEER - Heat pump baseline	No program	MH	MO	4,228	40%	1,711	0.308	0.307	25	$1,830.50	41%	40%	36%	48%	3.2	3.2	3.9	0.65
3053	HVAC Equipment	Ground Source Heat Pump 21.5 SEER - Heat pump baseline	No program	MH	MO	4,228	40%	1,711	0.308	0.307	25	$1,830.50	41%	40%	36%	48%	3.2	3.2	3.9	0.65
3054	HVAC Equipment	Ground Source Heat Pump 21.5 SEER - Heat pump baseline	No program	MH	NC	4,228	40%	1,711	0.308	0.307	25	$1,830.50	41%	40%	0%	44%	3.2	3.2	3.9	0.65
3055	HVAC Equipment	Ground Source Heat Pump 23.5 SEER - Heat pump baseline	No program	SF	MO	5,074	42%	2,124	0.383	0.382	25	$3,509.00	21%	40%	36%	48%	1.9	3.9	2.2	0.68
3056	HVAC Equipment	Ground Source Heat Pump 23.5 SEER - Heat pump baseline	No program	SF	MO	5,074	42%	2,124	0.383	0.382	25	$3,509.00	21%	40%	36%	48%	1.9	3.9	2.2	0.68
3057	HVAC Equipment	Ground Source Heat Pump 23.5 SEER - Heat pump baseline	No program	SF	NC	5,074	42%	2,124	0.383	0.382	25	$3,509.00	21%	40%	0%	29%	1.9	3.9	2.2	0.68
3058	HVAC Equipment	Ground Source Heat Pump 23.5 SEER - Heat pump baseline	No program	MH	MO	4,228	42%	1,770	0.319	0.318	25	$1,830.50	41%	40%	36%	48%	3.3	3.3	4.0	0.66
3059	HVAC Equipment	Ground Source Heat Pump 23.5 SEER - Heat pump baseline	No program	MH	MO	4,228	42%	1,770	0.319	0.318	25	$1,830.50	41%	40%	36%	48%	3.3	3.3	4.0	0.66
3060	HVAC Equipment	Ground Source Heat Pump 23.5 SEER - Heat pump baseline	No program	MH	NC	4,228	42%	1,770	0.319	0.318	25	$1,830.50	41%	40%	0%	44%	3.3	3.3	4.0	0.66
3061	HVAC Equipment	Ground Source Heat Pump 29 SEER - Heat pump baseline	No program	SF	MO	5,074	45%	2,268	0.409	0.407	25	$3,509.00	21%	40%	36%	48%	1.9	4.2	2.3	0.69
3062	HVAC Equipment	Ground Source Heat Pump 29 SEER - Heat pump baseline	No program	SF	MO	5,074	45%	2,268	0.409	0.407	25	$3,509.00	21%	40%	36%	48%	1.9	4.2	2.3	0.69
3063	HVAC Equipment	Ground Source Heat Pump 29 SEER - Heat pump baseline	No program	SF	NC	5,074	45%	2,268	0.409	0.407	25	$3,509.00	21%	40%	0%	29%	1.9	4.2	2.3	0.69
3064	HVAC Equipment	Ground Source Heat Pump 29 SEER - Heat pump baseline	No program	MH	MO	4,228	45%	1,890	0.340	0.340	25	$1,830.50	41%	40%	36%	48%	3.4	3.5	4.1	0.67
3065	HVAC Equipment	Ground Source Heat Pump 29 SEER - Heat pump baseline	No program	MH	MO	4,228	45%	1,890	0.340	0.340	25	$1,830.50	41%	40%	36%	48%	3.4	3.5	4.1	0.67
3066	HVAC Equipment	Ground Source Heat Pump 29 SEER - Heat pump baseline	No program	MH	NC	4,228	45%	1,890	0.340	0.340	25	$1,830.50	41%	40%	0%	44%	3.4	3.5	4.1	0.67
3067	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline	Mini-split	SF	MO	5,074	11%	536	0.131	0.096	16	$186.00	100%	40%	36%	80%	3.4	0.8	4.6	0.40
3068	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	11%	536	0.131	0.096	16	$186.00	100%	40%	36%	80%	13.8	3.1	15.4	0.66
3069	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline	Mini-split	SF	NC	5,074	11%	536	0.131	0.096	16	$186.00	100%	40%	0%	80%	3.4	0.8	4.6	0.40
3070	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline	Mini-split	MH	MO	4,228	11%	447	0.109	0.080	16	$155.00	100%	40%	36%	80%	3.3	0.6	4.4	0.36
3071	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	11%	447	0.109	0.080	16	$155.00	100%	40%	36%	80%	16.0	3.1	17.5	0.66
3072	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline	Mini-split	MH	NC	4,228	11%	447	0.109	0.080	16	$155.00	100%	40%	0%	80%	3.3	0.6	4.4	0.36
3073	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline	Mini-split	SF	MO	5,074	19%	942	0.260	0.169	16	$672.00	100%	40%	36%	80%	4.0	1.4	5.2	0.52
3074	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	19%	942	0.260	0.169	16	$672.00	100%	40%	36%	80%	4.5	1.5	5.7	0.55
3075	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline	Mini-split	SF	NC	5,074	19%	942	0.260	0.169	16	$672.00	100%	40%	0%	80%	4.0	1.4	5.2	0.52
3076	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline	Mini-split	MH	MO	4,228	19%	785	0.217	0.141	16	$560.00	100%	40%	36%	80%	3.8	1.1	5.0	0.49

Residential Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
3077	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	19%	785	0.217	0.141	16	$560.00	100%	40%	36%	80%	5.1	1.5	6.3	0.55
3078	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline	Mini-split	MH	NC	4,228	19%	785	0.217	0.141	16	$560.00	100%	40%	0%	80%	3.8	1.1	5.0	0.49
3079	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline	Mini-split	SF	MO	5,074	28%	1,406	0.363	0.252	16	$1,002.00	75%	40%	36%	64%	3.5	2.0	4.5	0.60
3080	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	28%	1,406	0.363	0.252	16	$1,002.00	100%	40%	36%	80%	3.5	1.5	4.8	0.54
3081	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline	Mini-split	SF	NC	5,074	28%	1,406	0.363	0.252	16	$1,002.00	75%	40%	0%	64%	3.5	2.0	4.5	0.60
3082	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline	Mini-split	MH	MO	4,228	28%	1,172	0.302	0.210	16	$835.00	90%	40%	36%	73%	3.9	1.7	5.1	0.56
3083	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	28%	1,172	0.302	0.210	16	$835.00	100%	40%	36%	80%	3.9	1.5	5.2	0.54
3084	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline	Mini-split	MH	NC	4,228	28%	1,172	0.302	0.210	16	$835.00	90%	40%	0%	73%	3.9	1.7	5.1	0.56
3085	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline	Mini-split	SF	MO	5,074	33%	1,675	0.455	0.301	16	$1,980.00	38%	40%	36%	48%	1.9	2.4	2.5	0.63
3086	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline	CARES Efficiency	SF	MO	5,074	33%	1,675	0.455	0.301	16	$1,980.00	100%	40%	36%	80%	1.9	0.9	3.1	0.44
3087	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline	Mini-split	SF	NC	5,074	33%	1,675	0.455	0.301	16	$1,980.00	38%	40%	0%	42%	1.9	2.4	2.5	0.63
3088	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline	Mini-split	MH	MO	4,228	33%	1,396	0.379	0.251	16	$1,650.00	45%	40%	36%	48%	2.1	2.0	2.7	0.60
3089	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline	CARES Efficiency	MH	MO	4,228	33%	1,396	0.379	0.251	16	$1,650.00	100%	40%	36%	80%	2.1	0.9	3.3	0.44
3090	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline	Mini-split	MH	NC	4,228	33%	1,396	0.379	0.251	16	$1,650.00	45%	40%	0%	48%	2.1	2.0	2.7	0.60
3091	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	SF	MO	5,074	4%	179	0.044	0.032	16	$62.00	100%	40%	36%	80%	2.2	0.3	3.2	0.20
3092	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline (1-ton offset)	CARES Efficiency	SF	MO	5,074	4%	179	0.044	0.032	16	$62.00	100%	40%	36%	80%	26.3	3.1	27.9	0.66
3093	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	SF	NC	5,074	4%	179	0.044	0.032	16	$62.00	100%	40%	0%	80%	2.2	0.3	3.2	0.20
3094	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	MH	MO	4,228	4%	179	0.044	0.032	16	$62.00	100%	40%	36%	80%	2.2	0.3	3.2	0.20
3095	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline (1-ton offset)	CARES Efficiency	MH	MO	4,228	4%	179	0.044	0.032	16	$62.00	100%	40%	36%	80%	26.3	3.1	27.9	0.66
3096	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	MH	NC	4,228	4%	179	0.044	0.032	16	$62.00	100%	40%	0%	80%	2.2	0.3	3.2	0.20
3097	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	SF	MO	5,074	6%	314	0.087	0.056	16	$224.00	100%	40%	36%	80%	2.6	0.5	3.7	0.30
3098	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline (1-ton offset)	CARES Efficiency	SF	MO	5,074	6%	314	0.087	0.056	16	$224.00	100%	40%	36%	80%	8.7	1.5	9.9	0.55
3099	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	SF	NC	5,074	6%	314	0.087	0.056	16	$224.00	100%	40%	0%	80%	2.6	0.5	3.7	0.30
3100	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	MH	MO	4,228	7%	314	0.087	0.056	16	$224.00	100%	40%	36%	80%	2.6	0.5	3.7	0.30
3101	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline (1-ton offset)	CARES Efficiency	MH	MO	4,228	7%	314	0.087	0.056	16	$224.00	100%	40%	36%	80%	8.7	1.5	9.9	0.55
3102	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	MH	NC	4,228	7%	314	0.087	0.056	16	$224.00	100%	40%	0%	80%	2.6	0.5	3.7	0.30
3103	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	SF	MO	5,074	9%	469	0.121	0.084	16	$334.00	100%	40%	36%	80%	3.0	0.7	4.1	0.37
3104	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline (1-ton offset)	CARES Efficiency	SF	MO	5,074	9%	469	0.121	0.084	16	$334.00	100%	40%	36%	80%	6.6	1.5	7.9	0.54
3105	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	SF	NC	5,074	9%	469	0.121	0.084	16	$334.00	100%	40%	0%	80%	3.0	0.7	4.1	0.37
3106	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	MH	MO	4,228	11%	469	0.121	0.084	16	$334.00	100%	40%	36%	80%	3.0	0.7	4.1	0.37
3107	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline (1-ton offset)	CARES Efficiency	MH	MO	4,228	11%	469	0.121	0.084	16	$334.00	100%	40%	36%	80%	6.6	1.5	7.9	0.54
3108	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	MH	NC	4,228	11%	469	0.121	0.084	16	$334.00	100%	40%	0%	80%	3.0	0.7	4.1	0.37

Residential Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
3109	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	SF	MO	5,074	11%	558	0.152	0.100	16	$660.00	100%	40%	36%	80%	3.5	0.8	4.6	0.41
3110	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline (1-ton offset)	CARES Efficiency	SF	MO	5,074	11%	558	0.152	0.100	16	$660.00	100%	40%	36%	80%	3.9	0.9	5.1	0.44
3111	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	SF	NC	5,074	11%	558	0.152	0.100	16	$660.00	100%	40%	0%	80%	3.5	0.8	4.6	0.41
3112	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	MH	MO	4,228	13%	558	0.152	0.100	16	$660.00	100%	40%	36%	80%	3.5	0.8	4.6	0.41
3113	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline (1-ton offset)	CARES Efficiency	MH	MO	4,228	13%	558	0.152	0.100	16	$660.00	100%	40%	36%	80%	3.9	0.9	5.1	0.44
3114	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Heat pump baseline (1-ton offset)	Mini-split	MH	NC	4,228	13%	558	0.152	0.100	16	$660.00	100%	40%	0%	80%	3.5	0.8	4.6	0.41
3115	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Electric furnace baseline	HP Retrofit	SF	MO	10,839	59%	6,341	0.125	1.139	16	$636.00	100%	17%	36%	80%	10.8	8.2	14.3	0.70
3116	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Electric furnace baseline	CARES Efficiency	SF	MO	10,839	59%	6,341	0.125	1.139	16	$636.00	100%	17%	36%	80%	12.8	9.6	16.7	0.71
3117	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Electric furnace baseline	HP Retrofit	SF	NC	10,839	59%	6,341	0.125	1.139	16	$636.00	100%	17%	0%	80%	10.8	8.2	14.3	0.70
3118	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Electric furnace baseline	HP Retrofit	MH	MO	9,032	59%	5,284	0.104	0.949	16	$530.00	100%	17%	36%	80%	9.5	6.8	12.5	0.69
3119	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Electric furnace baseline	CARES Efficiency	MH	MO	9,032	59%	5,284	0.104	0.949	16	$530.00	100%	17%	36%	80%	13.4	9.6	17.3	0.71
3120	HVAC Equipment	Air Source Heat Pump 15.2 SEER2 - Electric furnace baseline	HP Retrofit	MH	NC	9,032	59%	5,284	0.104	0.949	16	$530.00	100%	17%	0%	80%	9.5	6.8	12.5	0.69
3121	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Electric furnace baseline	HP Retrofit	SF	MO	10,839	62%	6,724	0.247	1.208	16	$1,273.00	59%	17%	36%	56%	6.7	8.7	8.8	0.71
3122	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Electric furnace baseline	CARES Efficiency	SF	MO	10,839	62%	6,724	0.247	1.208	16	$1,273.00	100%	17%	36%	80%	6.7	5.1	9.2	0.67
3123	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Electric furnace baseline	HP Retrofit	SF	NC	10,839	62%	6,724	0.247	1.208	16	$1,273.00	59%	17%	0%	56%	6.7	8.7	8.8	0.71
3124	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Electric furnace baseline	HP Retrofit	MH	MO	9,032	62%	5,604	0.206	1.006	16	$1,061.00	71%	17%	36%	62%	7.0	7.3	9.2	0.70
3125	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Electric furnace baseline	CARES Efficiency	MH	MO	9,032	62%	5,604	0.206	1.006	16	$1,061.00	100%	17%	36%	80%	7.0	5.1	9.5	0.67
3126	HVAC Equipment	Air Source Heat Pump 16.2 SEER2 - Electric furnace baseline	HP Retrofit	MH	NC	9,032	62%	5,604	0.206	1.006	16	$1,061.00	71%	17%	0%	62%	7.0	7.3	9.2	0.70
3127	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Electric furnace baseline	HP Retrofit	SF	MO	10,839	66%	7,163	0.345	1.286	16	$1,909.00	39%	17%	36%	48%	4.7	9.4	6.2	0.72
3128	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Electric furnace baseline	CARES Efficiency	SF	MO	10,839	66%	7,163	0.345	1.286	16	$1,909.00	100%	17%	36%	80%	4.7	3.7	6.8	0.64
3129	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Electric furnace baseline	HP Retrofit	SF	NC	10,839	66%	7,163	0.345	1.286	16	$1,909.00	39%	17%	0%	43%	4.7	9.4	6.2	0.72
3130	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Electric furnace baseline	HP Retrofit	MH	MO	9,032	66%	5,969	0.287	1.072	16	$1,591.00	47%	17%	36%	50%	4.9	7.8	6.4	0.71
3131	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Electric furnace baseline	CARES Efficiency	MH	MO	9,032	66%	5,969	0.287	1.072	16	$1,591.00	100%	17%	36%	80%	4.9	3.7	7.0	0.64
3132	HVAC Equipment	Air Source Heat Pump 17.1 SEER2 - Electric furnace baseline	HP Retrofit	MH	NC	9,032	66%	5,969	0.287	1.072	16	$1,591.00	47%	17%	0%	50%	4.9	7.8	6.4	0.71
3133	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Electric furnace baseline	HP Retrofit	SF	MO	10,839	68%	7,417	0.442	4.655	16	$2,546.00	29%	17%	36%	48%	6.3	18.6	4.7	1.38
3134	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Electric furnace baseline	CARES Efficiency	SF	MO	10,839	68%	7,417	0.442	4.655	16	$2,546.00	100%	17%	36%	80%	6.3	5.5	5.4	1.17
3135	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Electric furnace baseline	HP Retrofit	SF	NC	10,839	68%	7,417	0.442	4.655	16	$2,546.00	29%	17%	0%	35%	6.3	18.6	4.7	1.38
3136	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Electric furnace baseline	HP Retrofit	MH	MO	9,032	68%	6,181	0.368	3.879	16	$2,122.00	35%	17%	36%	48%	6.4	15.5	5.0	1.36
3137	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Electric furnace baseline	CARES Efficiency	MH	MO	9,032	68%	6,181	0.368	3.879	16	$2,122.00	100%	17%	36%	80%	6.4	5.5	5.6	1.17
3138	HVAC Equipment	Air Source Heat Pump 18.1 SEER2 - Electric furnace baseline	HP Retrofit	MH	NC	9,032	68%	6,181	0.368	3.879	16	$2,122.00	35%	17%	0%	41%	6.4	15.5	5.0	1.36
3139	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Electric furnace baseline	HP Retrofit	SF	MO	10,839	70%	7,633	0.521	4.790	16	$3,182.00	24%	17%	36%	48%	5.1	19.2	3.9	1.39
3140	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Electric furnace baseline	CARES Efficiency	SF	MO	10,839	70%	7,633	0.521	4.790	16	$3,182.00	100%	17%	36%	80%	5.1	4.5	4.6	1.13

Residential Measure Summary:

Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
EKPC																				
3141	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Electric furnace baseline	HP Retrofit	SF	NC	10,839	70%	7,633	0.521	4.790	16	$3,182.00	24%	17%	0%	31%	5.1	19.2	3.9	1.39
3142	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Electric furnace baseline	HP Retrofit	MH	MO	9,032	70%	6,361	0.434	3.992	16	$2,652.00	28%	17%	36%	48%	5.3	16.0	4.0	1.37
3143	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Electric furnace baseline	CARES Efficiency	MH	MO	9,032	70%	6,361	0.434	3.992	16	$2,652.00	100%	17%	36%	80%	5.3	4.5	4.8	1.13
3144	HVAC Equipment	Air Source Heat Pump 19 SEER2 - Electric furnace baseline	HP Retrofit	MH	NC	9,032	70%	6,361	0.434	3.992	16	$2,652.00	28%	17%	0%	34%	5.3	16.0	4.0	1.37
3145	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Electric furnace baseline	HP Retrofit	SF	MO	10,839	72%	7,826	0.600	4.911	16	$3,819.00	20%	17%	36%	48%	4.4	19.7	3.3	1.40
3146	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Electric furnace baseline	CARES Efficiency	SF	MO	10,839	72%	7,826	0.600	4.911	16	$3,819.00	100%	17%	36%	80%	4.4	3.9	4.1	1.08
3147	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Electric furnace baseline	HP Retrofit	SF	NC	10,839	72%	7,826	0.600	4.911	16	$3,819.00	20%	17%	0%	28%	4.4	19.7	3.3	1.40
3148	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Electric furnace baseline	HP Retrofit	MH	MO	9,032	72%	6,521	0.500	4.093	16	$3,182.00	24%	17%	36%	48%	4.5	16.4	3.4	1.38
3149	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Electric furnace baseline	CARES Efficiency	MH	MO	9,032	72%	6,521	0.500	4.093	16	$3,182.00	100%	17%	36%	80%	4.5	3.9	4.2	1.08
3150	HVAC Equipment	Air Source Heat Pump 20 SEER2 - Electric furnace baseline	HP Retrofit	MH	NC	9,032	72%	6,521	0.500	4.093	16	$3,182.00	24%	17%	0%	31%	4.5	16.4	3.4	1.38
3151	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline	Mini-split	SF	MO	10,839	62%	6,714	0.131	1.206	16	$186.00	100%	17%	36%	80%	11.3	8.7	14.9	0.71
3152	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline	CARES Efficiency	SF	MO	10,839	62%	6,714	0.131	1.206	16	$186.00	100%	17%	36%	80%	45.7	34.9	57.1	0.75
3153	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline	Mini-split	SF	NC	10,839	62%	6,714	0.131	1.206	16	$186.00	100%	17%	0%	80%	11.3	8.7	14.9	0.71
3154	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline	Mini-split	MH	MO	9,032	62%	5,595	0.109	1.005	16	$155.00	100%	17%	36%	80%	9.9	7.2	13.0	0.70
3155	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline	CARES Efficiency	MH	MO	9,032	62%	5,595	0.109	1.005	16	$155.00	100%	17%	36%	80%	47.8	34.9	59.2	0.75
3156	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline	Mini-split	MH	NC	9,032	62%	5,595	0.109	1.005	16	$155.00	100%	17%	0%	80%	9.9	7.2	13.0	0.70
3157	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline	Mini-split	SF	MO	10,839	66%	7,119	0.260	1.279	16	$672.00	100%	17%	36%	80%	11.9	9.2	15.6	0.72
3158	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline	CARES Efficiency	SF	MO	10,839	66%	7,119	0.260	1.279	16	$672.00	100%	17%	36%	80%	13.3	10.3	17.3	0.72
3159	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline	Mini-split	SF	NC	10,839	66%	7,119	0.260	1.279	16	$672.00	100%	17%	0%	80%	11.9	9.2	15.6	0.72
3160	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline	Mini-split	MH	MO	9,032	66%	5,933	0.217	1.065	16	$560.00	100%	17%	36%	80%	10.4	7.7	13.6	0.71
3161	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline	CARES Efficiency	MH	MO	9,032	66%	5,933	0.217	1.065	16	$560.00	100%	17%	36%	80%	13.9	10.3	17.9	0.72
3162	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline	Mini-split	MH	NC	9,032	66%	5,933	0.217	1.065	16	$560.00	100%	17%	0%	80%	10.4	7.7	13.6	0.71
3163	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline	Mini-split	SF	MO	10,839	70%	7,583	0.363	1.362	16	$1,002.00	75%	17%	36%	64%	9.4	9.9	12.2	0.72
3164	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline	CARES Efficiency	SF	MO	10,839	70%	7,583	0.363	1.362	16	$1,002.00	100%	17%	36%	80%	9.4	7.4	12.5	0.71
3165	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline	Mini-split	SF	NC	10,839	70%	7,583	0.363	1.362	16	$1,002.00	75%	17%	0%	64%	9.4	9.9	12.2	0.72
3166	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline	Mini-split	MH	MO	9,032	70%	6,319	0.302	1.135	16	$835.00	90%	17%	36%	73%	9.8	8.2	12.8	0.71
3167	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline	CARES Efficiency	MH	MO	9,032	70%	6,319	0.302	1.135	16	$835.00	100%	17%	36%	80%	9.8	7.4	12.9	0.71
3168	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline	Mini-split	MH	NC	9,032	70%	6,319	0.302	1.135	16	$835.00	90%	17%	0%	73%	9.8	8.2	12.8	0.71
3169	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline	Mini-split	SF	MO	10,839	72%	7,852	0.455	1.410	16	$1,980.00	38%	17%	36%	48%	4.9	10.3	6.4	0.73
3170	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline	CARES Efficiency	SF	MO	10,839	72%	7,852	0.455	1.410	16	$1,980.00	100%	17%	36%	80%	4.9	3.9	7.0	0.65
3171	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline	Mini-split	SF	NC	10,839	72%	7,852	0.455	1.410	16	$1,980.00	38%	17%	0%	42%	4.9	10.3	6.4	0.73
3172	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline	Mini-split	MH	MO	9,032	72%	6,543	0.379	1.175	16	$1,650.00	45%	17%	36%	48%	5.1	8.6	6.6	0.72

Residential Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
3173	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline	CARES Efficiency	MH	MO	9,032	72%	6,543	0.379	1.175	16	$1,650.00	100%	17%	36%	80%	5.1	3.9	7.2	0.65
3174	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline	Mini-split	MH	NC	9,032	72%	6,543	0.379	1.175	16	$1,650.00	45%	17%	0%	48%	5.1	8.6	6.6	0.72
3175	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	SF	MO	10,839	21%	2,238	0.044	0.402	16	$62.00	100%	17%	36%	80%	4.8	2.9	6.7	0.61
3176	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline (1-ton offset)	CARES Efficiency	SF	MO	10,839	21%	2,238	0.044	0.402	16	$62.00	100%	17%	36%	80%	58.2	34.9	69.6	0.75
3177	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	SF	NC	10,839	21%	2,238	0.044	0.402	16	$62.00	100%	17%	0%	80%	4.8	2.9	6.7	0.61
3178	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	MH	MO	9,032	25%	2,238	0.044	0.402	16	$62.00	100%	17%	36%	80%	4.8	2.9	6.7	0.61
3179	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline (1-ton offset)	CARES Efficiency	MH	MO	9,032	25%	2,238	0.044	0.402	16	$62.00	100%	17%	36%	80%	58.2	34.9	69.6	0.75
3180	HVAC Equipment	Ductless Heat Pump 8.5 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	MH	NC	9,032	25%	2,238	0.044	0.402	16	$62.00	100%	17%	0%	80%	4.8	2.9	6.7	0.61
3181	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	SF	MO	10,839	22%	2,373	0.087	0.426	16	$224.00	100%	17%	36%	80%	5.2	3.1	7.1	0.62
3182	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline (1-ton offset)	CARES Efficiency	SF	MO	10,839	22%	2,373	0.087	0.426	16	$224.00	100%	17%	36%	80%	17.5	10.3	21.5	0.72
3183	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	SF	NC	10,839	22%	2,373	0.087	0.426	16	$224.00	100%	17%	0%	80%	5.2	3.1	7.1	0.62
3184	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	MH	MO	9,032	26%	2,373	0.087	0.426	16	$224.00	100%	17%	36%	80%	5.2	3.1	7.1	0.62
3185	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline (1-ton offset)	CARES Efficiency	MH	MO	9,032	26%	2,373	0.087	0.426	16	$224.00	100%	17%	36%	80%	17.5	10.3	21.5	0.72
3186	HVAC Equipment	Ductless Heat Pump 9.4 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	MH	NC	9,032	26%	2,373	0.087	0.426	16	$224.00	100%	17%	0%	80%	5.2	3.1	7.1	0.62
3187	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	SF	MO	10,839	23%	2,528	0.121	0.454	16	$334.00	100%	17%	36%	80%	5.6	3.3	7.5	0.63
3188	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline (1-ton offset)	CARES Efficiency	SF	MO	10,839	23%	2,528	0.121	0.454	16	$334.00	100%	17%	36%	80%	12.5	7.4	15.6	0.71
3189	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	SF	NC	10,839	23%	2,528	0.121	0.454	16	$334.00	100%	17%	0%	80%	5.6	3.3	7.5	0.63
3190	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	MH	MO	9,032	28%	2,528	0.121	0.454	16	$334.00	100%	17%	36%	80%	5.6	3.3	7.5	0.63
3191	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline (1-ton offset)	CARES Efficiency	MH	MO	9,032	28%	2,528	0.121	0.454	16	$334.00	100%	17%	36%	80%	12.5	7.4	15.6	0.71
3192	HVAC Equipment	Ductless Heat Pump 10.8 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	MH	NC	9,032	28%	2,528	0.121	0.454	16	$334.00	100%	17%	0%	80%	5.6	3.3	7.5	0.63
3193	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	SF	MO	10,839	24%	2,617	0.152	0.470	16	$660.00	100%	17%	36%	80%	6.1	3.4	8.0	0.64
3194	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline (1-ton offset)	CARES Efficiency	SF	MO	10,839	24%	2,617	0.152	0.470	16	$660.00	100%	17%	36%	80%	6.9	3.9	9.0	0.65
3195	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	SF	NC	10,839	24%	2,617	0.152	0.470	16	$660.00	100%	17%	0%	80%	6.1	3.4	8.0	0.64
3196	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	MH	MO	9,032	29%	2,617	0.152	0.470	16	$660.00	100%	17%	36%	80%	6.1	3.4	8.0	0.64
3197	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline (1-ton offset)	CARES Efficiency	MH	MO	9,032	29%	2,617	0.152	0.470	16	$660.00	100%	17%	36%	80%	6.9	3.9	9.0	0.65
3198	HVAC Equipment	Ductless Heat Pump 11.7 HSPF2 - Electric resistance baseline (1-ton offset)	Mini-split	MH	NC	9,032	29%	2,617	0.152	0.470	16	$660.00	100%	17%	0%	80%	6.1	3.4	8.0	0.64
3199	HVAC Equipment	AC Tune Up	No program	SF	Retrofit	1,324	5%	66	0.086	0.000	3	$225.00	25%	43%	49%	60%	0.1	0.3	0.3	0.20
3200	HVAC Equipment	AC Tune Up	No program	SF	Retrofit	1,324	5%	66	0.086	0.000	3	$225.00	25%	43%	49%	60%	0.1	0.3	0.3	0.20
3201	HVAC Equipment	AC Tune Up	No program	SF	NC	1,324	5%	66	0.086	0.000	3	$225.00	25%	43%	0%	32%	0.1	0.3	0.3	0.20
3202	HVAC Equipment	AC Tune Up	No program	MH	Retrofit	1,104	5%	55	0.072	0.000	3	$225.00	25%	43%	49%	60%	0.1	0.2	0.3	0.17
3203	HVAC Equipment	AC Tune Up	No program	MH	Retrofit	1,104	5%	55	0.072	0.000	3	$225.00	25%	43%	49%	60%	0.1	0.2	0.3	0.17
3204	HVAC Equipment	AC Tune Up	No program	MH	NC	1,104	5%	55	0.072	0.000	3	$225.00	25%	43%	0%	32%	0.1	0.2	0.3	0.17
3205	HVAC Equipment	Central Air Conditioner 15.2 SEER2	No program	SF	MO	1,324	6%	74	0.125	0.000	18	$636.00	25%	43%	23%	38%	1.1	0.7	1.4	0.41
3206	HVAC Equipment	Central Air Conditioner 15.2 SEER2	No program	SF	MO	1,324	6%	74	0.125	0.000	18	$636.00	25%	43%	23%	38%	1.1	0.7	1.4	0.41
3207	HVAC Equipment	Central Air Conditioner 15.2 SEER2	No program	SF	NC	1,324	6%	74	0.125	0.000	18	$636.00	25%	43%	0%	32%	1.1	0.7	1.4	0.41
3208	HVAC Equipment	Central Air Conditioner 15.2 SEER2	No program	MH	MO	1,104	6%	62	0.104	0.000	18	$530.00	25%	43%	23%	38%	1.3	0.7	1.5	0.41

Residential Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
3209	HVAC Equipment	Central Air Conditioner 15.2 SEER2	No program	MH	MO	1,104	6%	62	0.104	0.000	18	$530.00	25%	43%	23%	38%	1.3	0.7	1.5	0.41
3210	HVAC Equipment	Central Air Conditioner 15.2 SEER2	No program	MH	NC	1,104	6%	62	0.104	0.000	18	$530.00	25%	43%	0%	32%	1.3	0.7	1.5	0.41
3211	HVAC Equipment	Central Air Conditioner 16.2 SEER2	No program	SF	MO	1,324	11%	146	0.247	0.000	18	$1,273.00	25%	43%	23%	38%	0.6	0.7	0.9	0.41
3212	HVAC Equipment	Central Air Conditioner 16.2 SEER2	No program	SF	MO	1,324	11%	146	0.247	0.000	18	$1,273.00	25%	43%	23%	38%	0.6	0.7	0.9	0.41
3213	HVAC Equipment	Central Air Conditioner 16.2 SEER2	No program	SF	NC	1,324	11%	146	0.247	0.000	18	$1,273.00	25%	43%	0%	32%	0.6	0.7	0.9	0.41
3214	HVAC Equipment	Central Air Conditioner 16.2 SEER2	No program	MH	MO	1,104	11%	122	0.206	0.000	18	$1,061.00	25%	43%	23%	38%	0.7	0.7	1.0	0.41
3215	HVAC Equipment	Central Air Conditioner 16.2 SEER2	No program	MH	MO	1,104	11%	122	0.206	0.000	18	$1,061.00	25%	43%	23%	38%	0.7	0.7	1.0	0.41
3216	HVAC Equipment	Central Air Conditioner 16.2 SEER2	No program	MH	NC	1,104	11%	122	0.206	0.000	18	$1,061.00	25%	43%	0%	32%	0.7	0.7	1.0	0.41
3217	HVAC Equipment	Central Air Conditioner 17.1 SEER2	No program	SF	MO	1,324	15%	204	0.345	0.000	18	$1,909.00	25%	43%	23%	38%	0.5	0.6	0.7	0.39
3218	HVAC Equipment	Central Air Conditioner 17.1 SEER2	No program	SF	MO	1,324	15%	204	0.345	0.000	18	$1,909.00	25%	43%	23%	38%	0.5	0.6	0.7	0.39
3219	HVAC Equipment	Central Air Conditioner 17.1 SEER2	No program	SF	NC	1,324	15%	204	0.345	0.000	18	$1,909.00	25%	43%	0%	32%	0.5	0.6	0.7	0.39
3220	HVAC Equipment	Central Air Conditioner 17.1 SEER2	No program	MH	MO	1,104	15%	170	0.287	0.000	18	$1,591.00	25%	43%	23%	38%	0.5	0.6	0.8	0.39
3221	HVAC Equipment	Central Air Conditioner 17.1 SEER2	No program	MH	MO	1,104	15%	170	0.287	0.000	18	$1,591.00	25%	43%	23%	38%	0.5	0.6	0.8	0.39
3222	HVAC Equipment	Central Air Conditioner 17.1 SEER2	No program	MH	NC	1,104	15%	170	0.287	0.000	18	$1,591.00	25%	43%	0%	32%	0.5	0.6	0.8	0.39
3223	HVAC Equipment	Central Air Conditioner 18.1 SEER2	No program	SF	MO	1,324	20%	262	0.442	0.000	18	$2,546.00	25%	43%	23%	38%	0.4	0.6	0.6	0.38
3224	HVAC Equipment	Central Air Conditioner 18.1 SEER2	No program	SF	MO	1,324	20%	262	0.442	0.000	18	$2,546.00	25%	43%	23%	38%	0.4	0.6	0.6	0.38
3225	HVAC Equipment	Central Air Conditioner 18.1 SEER2	No program	SF	NC	1,324	20%	262	0.442	0.000	18	$2,546.00	25%	43%	0%	32%	0.4	0.6	0.6	0.38
3226	HVAC Equipment	Central Air Conditioner 18.1 SEER2	No program	MH	MO	1,104	20%	218	0.368	0.000	18	$2,122.00	25%	43%	23%	38%	0.4	0.6	0.7	0.38
3227	HVAC Equipment	Central Air Conditioner 18.1 SEER2	No program	MH	MO	1,104	20%	218	0.368	0.000	18	$2,122.00	25%	43%	23%	38%	0.4	0.6	0.7	0.38
3228	HVAC Equipment	Central Air Conditioner 18.1 SEER2	No program	MH	NC	1,104	20%	218	0.368	0.000	18	$2,122.00	25%	43%	0%	32%	0.4	0.6	0.7	0.38
3229	HVAC Equipment	Central Air Conditioner 19 SEER2	No program	SF	MO	1,324	23%	309	0.521	0.000	18	$3,182.00	25%	43%	23%	38%	0.3	0.6	0.6	0.37
3230	HVAC Equipment	Central Air Conditioner 19 SEER2	No program	SF	MO	1,324	23%	309	0.521	0.000	18	$3,182.00	25%	43%	23%	38%	0.3	0.6	0.6	0.37
3231	HVAC Equipment	Central Air Conditioner 19 SEER2	No program	SF	NC	1,324	23%	309	0.521	0.000	18	$3,182.00	25%	43%	0%	32%	0.3	0.6	0.6	0.37
3232	HVAC Equipment	Central Air Conditioner 19 SEER2	No program	MH	MO	1,104	23%	257	0.434	0.000	18	$2,652.00	25%	43%	23%	38%	0.4	0.6	0.6	0.37
3233	HVAC Equipment	Central Air Conditioner 19 SEER2	No program	MH	MO	1,104	23%	257	0.434	0.000	18	$2,652.00	25%	43%	23%	38%	0.4	0.6	0.6	0.37
3234	HVAC Equipment	Central Air Conditioner 19 SEER2	No program	MH	NC	1,104	23%	257	0.434	0.000	18	$2,652.00	25%	43%	0%	32%	0.4	0.6	0.6	0.37
3235	HVAC Equipment	Central Air Conditioner 20 SEER2	No program	SF	MO	1,324	27%	356	0.600	0.000	18	$3,819.00	25%	43%	23%	38%	0.3	0.5	0.5	0.36
3236	HVAC Equipment	Central Air Conditioner 20 SEER2	No program	SF	MO	1,324	27%	356	0.600	0.000	18	$3,819.00	25%	43%	23%	38%	0.3	0.5	0.5	0.36
3237	HVAC Equipment	Central Air Conditioner 20 SEER2	No program	SF	NC	1,324	27%	356	0.600	0.000	18	$3,819.00	25%	43%	0%	32%	0.3	0.5	0.5	0.36
3238	HVAC Equipment	Central Air Conditioner 20 SEER2	No program	MH	MO	1,104	27%	296	0.500	0.000	18	$3,182.00	25%	43%	23%	38%	0.3	0.5	0.6	0.36
3239	HVAC Equipment	Central Air Conditioner 20 SEER2	No program	MH	MO	1,104	27%	296	0.500	0.000	18	$3,182.00	25%	43%	23%	38%	0.3	0.5	0.6	0.36
3240	HVAC Equipment	Central Air Conditioner 20 SEER2	No program	MH	NC	1,104	27%	296	0.500	0.000	18	$3,182.00	25%	43%	0%	32%	0.3	0.5	0.6	0.36
3241	HVAC Equipment	Central Air Conditioner 21 SEER2	No program	SF	MO	1,324	30%	398	0.671	0.000	18	$4,455.00	25%	43%	23%	38%	0.3	0.5	0.5	0.35
3242	HVAC Equipment	Central Air Conditioner 21 SEER2	No program	SF	MO	1,324	30%	398	0.671	0.000	18	$4,455.00	25%	43%	23%	38%	0.3	0.5	0.5	0.35
3243	HVAC Equipment	Central Air Conditioner 21 SEER2	No program	SF	NC	1,324	30%	398	0.671	0.000	18	$4,455.00	25%	43%	0%	32%	0.3	0.5	0.5	0.35
3244	HVAC Equipment	Central Air Conditioner 21 SEER2	No program	MH	MO	1,104	30%	332	0.560	0.000	18	$4,455.00	25%	43%	23%	38%	0.2	0.4	0.5	0.31
3245	HVAC Equipment	Central Air Conditioner 21 SEER2	No program	MH	MO	1,104	30%	332	0.560	0.000	18	$4,455.00	25%	43%	23%	38%	0.2	0.4	0.5	0.31
3246	HVAC Equipment	Central Air Conditioner 21 SEER2	No program	MH	NC	1,104	30%	332	0.560	0.000	18	$4,455.00	25%	43%	0%	32%	0.2	0.4	0.5	0.31
3247	HVAC Equipment	Ductless AC	No program	SF	MO	1,324	15%	198	0.334	0.000	16	$1,002.00	25%	43%	23%	38%	2.3	1.0	2.5	0.52
3248	HVAC Equipment	Ductless AC	No program	SF	MO	1,324	15%	198	0.334	0.000	16	$1,002.00	25%	43%	23%	38%	2.3	1.0	2.5	0.52
3249	HVAC Equipment	Ductless AC	No program	SF	NC	1,324	15%	198	0.334	0.000	16	$1,002.00	25%	43%	0%	32%	2.3	1.0	2.5	0.52
3250	HVAC Equipment	Ductless AC	No program	MH	MO	1,104	15%	165	0.279	0.000	16	$835.00	25%	43%	23%	38%	2.7	1.0	2.9	0.52
3251	HVAC Equipment	Ductless AC	No program	MH	MO	1,104	15%	165	0.279	0.000	16	$835.00	25%	43%	23%	38%	2.7	1.0	2.9	0.52
3252	HVAC Equipment	Ductless AC	No program	MH	NC	1,104	15%	165	0.279	0.000	16	$835.00	25%	43%	0%	32%	2.7	1.0	2.9	0.52
3253	HVAC Equipment	Ductless AC (1-ton offset)	No program	SF	MO	1,324	5%	66	0.111	0.000	16	$334.00	25%	43%	23%	38%	5.4	1.0	5.6	0.52
3254	HVAC Equipment	Ductless AC (1-ton offset)	No program	SF	MO	1,324	5%	66	0.111	0.000	16	$334.00	25%	43%	23%	38%	5.4	1.0	5.6	0.52
3255	HVAC Equipment	Ductless AC (1-ton offset)	No program	SF	NC	1,324	5%	66	0.111	0.000	16	$334.00	25%	43%	0%	32%	5.4	1.0	5.6	0.52
3256	HVAC Equipment	Ductless AC (1-ton offset)	No program	MH	MO	1,104	6%	66	0.111	0.000	16	$334.00	25%	43%	23%	38%	5.4	1.0	5.6	0.52
3257	HVAC Equipment	Ductless AC (1-ton offset)	No program	MH	MO	1,104	6%	66	0.111	0.000	16	$334.00	25%	43%	23%	38%	5.4	1.0	5.6	0.52
3258	HVAC Equipment	Ductless AC (1-ton offset)	No program	MH	NC	1,104	6%	66	0.111	0.000	16	$334.00	25%	43%	0%	32%	5.4	1.0	5.6	0.52
3259	HVAC Equipment	Smart Thermostat - Heat pump baseline	No program	SF	Retrofit	5,074	8%	430	0.240	0.077	11	$129.00	25%	40%	43%	55%	3.0	11.9	3.4	0.87
3260	HVAC Equipment	Smart Thermostat - Heat pump baseline	No program	SF	Retrofit	5,074	8%	430	0.240	0.077	11	$129.00	25%	40%	43%	55%	3.0	11.9	3.4	0.87
3261	HVAC Equipment	Smart Thermostat - Heat pump baseline	No program	SF	NC	5,074	8%	430	0.240	0.077	11	$129.00	25%	40%	0%	32%	3.0	11.9	3.4	0.87

Residential Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
3262	HVAC Equipment	Smart Thermostat - Heat pump baseline	No program	MH	Retrofit	4,228	8%	358	0.200	0.064	11	$129.00	25%	40%	43%	55%	2.5	9.9	2.9	0.86
3263	HVAC Equipment	Smart Thermostat - Heat pump baseline	No program	MH	Retrofit	4,228	8%	358	0.200	0.064	11	$129.00	25%	40%	43%	55%	2.5	9.9	2.9	0.86
3264	HVAC Equipment	Smart Thermostat - Heat pump baseline	No program	MH	NC	4,228	8%	358	0.200	0.064	11	$129.00	25%	40%	0%	32%	2.5	9.9	2.9	0.86
3265	HVAC Equipment	Smart Thermostat - Furnace baseline	No program	SF	Retrofit	10,839	8%	920	0.240	0.165	11	$129.00	25%	17%	43%	55%	5.7	22.9	7.0	0.82
3266	HVAC Equipment	Smart Thermostat - Furnace baseline	No program	SF	Retrofit	10,839	8%	920	0.240	0.165	11	$129.00	25%	17%	43%	55%	5.7	22.9	7.0	0.82
3267	HVAC Equipment	Smart Thermostat - Furnace baseline	No program	SF	NC	10,839	8%	920	0.240	0.165	11	$129.00	25%	17%	0%	32%	5.7	22.9	7.0	0.82
3268	HVAC Equipment	Smart Thermostat - Furnace baseline	No program	MH	Retrofit	9,032	8%	767	0.200	0.138	11	$129.00	25%	17%	43%	55%	4.8	19.1	5.9	0.81
3269	HVAC Equipment	Smart Thermostat - Furnace baseline	No program	MH	Retrofit	9,032	8%	767	0.200	0.138	11	$129.00	25%	17%	43%	55%	4.8	19.1	5.9	0.81
3270	HVAC Equipment	Smart Thermostat - Furnace baseline	No program	MH	NC	9,032	8%	767	0.200	0.138	11	$129.00	25%	17%	0%	32%	4.8	19.1	5.9	0.81
3271	HVAC Equipment	Smart Thermostat - Gas/CAC baseline	No program	SF	Retrofit	2,095	5%	111	0.240	0.001	11	$129.00	25%	16%	43%	55%	2.3	3.7	4.7	0.88
3272	HVAC Equipment	Smart Thermostat - Gas/CAC baseline	No program	SF	Retrofit	2,095	5%	111	0.240	0.001	11	$129.00	25%	16%	43%	55%	2.3	3.7	4.7	0.88
3273	HVAC Equipment	Smart Thermostat - Gas/CAC baseline	No program	SF	NC	2,095	5%	111	0.240	0.001	11	$129.00	25%	16%	0%	32%	2.3	3.7	4.7	0.88
3274	HVAC Equipment	Smart Thermostat - Gas/CAC baseline	No program	MH	Retrofit	1,874	5%	93	0.200	0.001	11	$129.00	25%	16%	43%	55%	2.1	3.1	4.6	0.84
3275	HVAC Equipment	Smart Thermostat - Gas/CAC baseline	No program	MH	Retrofit	1,874	5%	93	0.200	0.001	11	$129.00	25%	16%	43%	55%	2.1	3.1	4.6	0.84
3276	HVAC Equipment	Smart Thermostat - Gas/CAC baseline	No program	MH	NC	1,874	5%	93	0.200	0.001	11	$129.00	25%	16%	0%	32%	2.1	3.1	4.6	0.84
3277	HVAC Equipment	ENERGY STAR Room Air Conditioner	No program	SF	MO	499	9%	44	0.034	0.000	12	$40.00	25%	12%	53%	62%	0.8	3.2	1.4	0.58
3278	HVAC Equipment	ENERGY STAR Room Air Conditioner	No program	SF	MO	499	9%	44	0.034	0.000	12	$40.00	25%	12%	53%	62%	0.8	3.2	1.4	0.58
3279	HVAC Equipment	ENERGY STAR Room Air Conditioner	No program	SF	NC	499	9%	44	0.034	0.000	12	$40.00	25%	12%	0%	32%	0.8	3.2	1.4	0.58
3280	HVAC Equipment	ENERGY STAR Room Air Conditioner	No program	MH	MO	499	9%	44	0.034	0.000	12	$40.00	25%	12%	53%	62%	0.8	3.2	1.4	0.58
3281	HVAC Equipment	ENERGY STAR Room Air Conditioner	No program	MH	MO	499	9%	44	0.034	0.000	12	$40.00	25%	12%	53%	62%	0.8	3.2	1.4	0.58
3282	HVAC Equipment	ENERGY STAR Room Air Conditioner	No program	MH	NC	499	9%	44	0.034	0.000	12	$40.00	25%	12%	0%	32%	0.8	3.2	1.4	0.58
3283	HVAC Equipment	Room Air Conditioner Recycling	No program	SF	Recycle	336	100%	336	0.260	0.000	4	$64.89	25%	12%	0%	32%	1.3	5.4	2.3	0.59
3284	HVAC Equipment	Room Air Conditioner Recycling	No program	SF	Recycle	336	100%	336	0.260	0.000	4	$64.89	25%	12%	0%	32%	1.3	5.4	2.3	0.59
3285	HVAC Equipment	Room Air Conditioner Recycling	No program	MH	Recycle	336	100%	336	0.260	0.000	4	$64.89	25%	12%	0%	32%	1.3	5.4	2.3	0.59
3286	HVAC Equipment	Room Air Conditioner Recycling	No program	MH	Recycle	336	100%	336	0.260	0.000	4	$64.89	25%	12%	0%	32%	1.3	5.4	2.3	0.59
4001	Lighting	9W LED	No program	SF	MO	8	37%	3	0.000	0.001	20	$1.45	25%	3003%	76%	81%	2.6	10.2	3.1	0.83
4002	Lighting	9W LED	No program	SF	MO	8	37%	3	0.000	0.001	20	$1.45	25%	3003%	76%	81%	2.6	10.2	3.1	0.83
4003	Lighting	9W LED	No program	SF	NC	8	37%	3	0.000	0.001	20	$1.45	25%	3003%	0%	29%	2.6	10.2	3.1	0.83
4004	Lighting	9W LED	No program	MH	MO	8	37%	3	0.000	0.001	20	$1.45	25%	3003%	76%	81%	2.6	10.2	3.1	0.83
4005	Lighting	9W LED	No program	MH	MO	8	37%	3	0.000	0.001	20	$1.45	25%	3003%	76%	81%	2.6	10.2	3.1	0.83
4006	Lighting	9W LED	No program	MH	NC	8	37%	3	0.000	0.001	20	$1.45	25%	3003%	0%	29%	2.6	10.2	3.1	0.83
4007	Lighting	13W LED	No program	SF	MO	11	31%	3	0.000	0.001	20	$1.45	25%	3003%	76%	81%	3.1	12.4	3.7	0.84
4008	Lighting	13W LED	No program	SF	MO	11	31%	3	0.000	0.001	20	$1.45	25%	3003%	76%	81%	3.1	12.4	3.7	0.84
4009	Lighting	13W LED	No program	SF	NC	11	31%	3	0.000	0.001	20	$1.45	25%	3003%	0%	29%	3.1	12.4	3.7	0.84
4010	Lighting	13W LED	No program	MH	MO	11	31%	3	0.000	0.001	20	$1.45	25%	3003%	76%	81%	3.1	12.4	3.7	0.84
4011	Lighting	13W LED	No program	MH	MO	11	31%	3	0.000	0.001	20	$1.45	25%	3003%	76%	81%	3.1	12.4	3.7	0.84
4012	Lighting	13W LED	No program	MH	NC	11	31%	3	0.000	0.001	20	$1.45	25%	3003%	0%	29%	3.1	12.4	3.7	0.84
4013	Lighting	LED 5W Globe	No program	SF	MO	12	44%	5	0.006	0.001	20	$1.65	25%	738%	76%	81%	6.0	24.1	4.9	1.24
4014	Lighting	LED 5W Globe	No program	SF	MO	12	44%	5	0.006	0.001	20	$1.65	25%	738%	76%	81%	6.0	24.1	4.9	1.24
4015	Lighting	LED 5W Globe	No program	SF	NC	12	44%	5	0.006	0.001	20	$1.65	25%	738%	0%	29%	6.0	24.1	4.9	1.24
4016	Lighting	LED 5W Globe	No program	MH	MO	12	44%	5	0.006	0.001	20	$1.65	25%	738%	76%	81%	6.0	24.1	4.9	1.24
4017	Lighting	LED 5W Globe	No program	MH	MO	12	44%	5	0.006	0.001	20	$1.65	25%	738%	76%	81%	6.0	24.1	4.9	1.24
4018	Lighting	LED 5W Globe	No program	MH	NC	12	44%	5	0.006	0.001	20	$1.65	25%	738%	0%	29%	6.0	24.1	4.9	1.24
4019	Lighting	LED R30 Dimmable	No program	SF	MO	12	57%	7	0.008	0.002	20	$1.65	25%	284%	76%	81%	7.8	31.1	6.2	1.25
4020	Lighting	LED R30 Dimmable	No program	SF	MO	12	57%	7	0.008	0.002	20	$1.65	25%	284%	76%	81%	7.8	31.1	6.2	1.25
4021	Lighting	LED R30 Dimmable	No program	SF	NC	12	57%	7	0.008	0.002	20	$1.65	25%	284%	0%	29%	7.8	31.1	6.2	1.25
4022	Lighting	LED R30 Dimmable	No program	MH	MO	12	57%	7	0.008	0.002	20	$1.65	25%	284%	76%	81%	7.8	31.1	6.2	1.25
4023	Lighting	LED R30 Dimmable	No program	MH	MO	12	57%	7	0.008	0.002	20	$1.65	25%	284%	76%	81%	7.8	31.1	6.2	1.25
4024	Lighting	LED R30 Dimmable	No program	MH	NC	12	57%	7	0.008	0.002	20	$1.65	25%	284%	0%	29%	7.8	31.1	6.2	1.25
4025	Lighting	LED Nightlights	No program	SF	MO	26	85%	22	0.000	0.005	12	$3.35	25%	40%	76%	81%	5.9	23.6	6.9	0.86
4026	Lighting	LED Nightlights	No program	SF	MO	26	85%	22	0.000	0.005	12	$3.35	25%	40%	76%	81%	5.9	23.6	6.9	0.86
4027	Lighting	LED Nightlights	No program	SF	NC	26	85%	22	0.000	0.005	12	$3.35	25%	40%	0%	29%	5.9	23.6	6.9	0.86
4028	Lighting	LED Nightlights	No program	MH	MO	26	85%	22	0.000	0.005	12	$3.35	25%	40%	76%	81%	5.9	23.6	6.9	0.86

Residential Measure Summary:

Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
EKPC																				
4029	Lighting	LED Nightlights	No program	MH	MO	26	85%	22	0.000	0.005	12	$3.35	25%	40%	76%	81%	5.9	23.6	6.9	0.86
4030	Lighting	LED Nightlights	No program	MH	NC	26	85%	22	0.000	0.005	12	$3.35	25%	40%	0%	29%	5.9	23.6	6.9	0.86
4031	Lighting	Exterior LED Lamp	No program	SF	MO	60	57%	35	0.000	0.006	4	$1.65	25%	289%	76%	81%	6.3	25.4	8.5	0.75
4032	Lighting	Exterior LED Lamp	No program	SF	MO	60	57%	35	0.000	0.006	4	$1.65	25%	289%	76%	81%	6.3	25.4	8.5	0.75
4033	Lighting	Exterior LED Lamp	No program	SF	NC	60	57%	35	0.000	0.006	4	$1.65	25%	289%	0%	29%	6.3	25.4	8.5	0.75
4034	Lighting	Exterior LED Lamp	No program	MH	MO	60	57%	35	0.000	0.006	4	$1.65	25%	289%	76%	81%	6.3	25.4	8.5	0.75
4035	Lighting	Exterior LED Lamp	No program	MH	MO	60	57%	35	0.000	0.006	4	$1.65	25%	289%	76%	81%	6.3	25.4	8.5	0.75
4036	Lighting	Exterior LED Lamp	No program	MH	NC	60	57%	35	0.000	0.006	4	$1.65	25%	289%	0%	29%	6.3	25.4	8.5	0.75
4037	Lighting	Linear LED	No program	SF	MO	41	45%	18	0.002	0.004	10	$9.98	25%	509%	76%	81%	1.5	5.8	1.8	0.79
4038	Lighting	Linear LED	No program	SF	MO	41	45%	18	0.002	0.004	10	$9.98	25%	509%	76%	81%	1.5	5.8	1.8	0.79
4039	Lighting	Linear LED	No program	SF	NC	41	45%	18	0.002	0.004	10	$9.98	25%	509%	0%	29%	1.5	5.8	1.8	0.79
4040	Lighting	Linear LED	No program	MH	MO	41	45%	18	0.002	0.004	10	$9.98	25%	509%	76%	81%	1.5	5.8	1.8	0.79
4041	Lighting	Linear LED	No program	MH	MO	41	45%	18	0.002	0.004	10	$9.98	25%	509%	76%	81%	1.5	5.8	1.8	0.79
4042	Lighting	Linear LED	No program	MH	NC	41	45%	18	0.002	0.004	10	$9.98	25%	509%	0%	29%	1.5	5.8	1.8	0.79
4043	Lighting	LED Fixture	No program	SF	MO	87	75%	65	0.009	0.016	20	$26.00	25%	3003%	76%	81%	3.4	13.4	3.9	0.86
4044	Lighting	LED Fixture	No program	SF	MO	87	75%	65	0.009	0.016	20	$26.00	25%	3003%	76%	81%	3.4	13.4	3.9	0.86
4045	Lighting	LED Fixture	No program	SF	NC	87	75%	65	0.009	0.016	20	$26.00	25%	3003%	0%	29%	3.4	13.4	3.9	0.86
4046	Lighting	LED Fixture	No program	MH	MO	87	75%	65	0.009	0.016	20	$26.00	25%	3003%	76%	81%	3.4	13.4	3.9	0.86
4047	Lighting	LED Fixture	No program	MH	MO	87	75%	65	0.009	0.016	20	$26.00	25%	3003%	76%	81%	3.4	13.4	3.9	0.86
4048	Lighting	LED Fixture	No program	MH	NC	87	75%	65	0.009	0.016	20	$26.00	25%	3003%	0%	29%	3.4	13.4	3.9	0.86
4049	Lighting	Occupancy Sensor	No program	SF	Retrofit	302	30%	89	0.008	0.022	10	$30.00	25%	100%	42%	54%	2.4	9.6	2.9	0.84
4050	Lighting	Occupancy Sensor	No program	SF	Retrofit	302	30%	89	0.008	0.022	10	$30.00	25%	100%	42%	54%	2.4	9.6	2.9	0.84
4051	Lighting	Occupancy Sensor	No program	SF	NC	302	30%	89	0.008	0.022	10	$30.00	25%	100%	0%	29%	2.4	9.6	2.9	0.84
4052	Lighting	Occupancy Sensor	No program	MH	Retrofit	302	30%	89	0.008	0.022	10	$30.00	25%	100%	42%	54%	2.4	9.6	2.9	0.84
4053	Lighting	Occupancy Sensor	No program	MH	Retrofit	302	30%	89	0.008	0.022	10	$30.00	25%	100%	42%	54%	2.4	9.6	2.9	0.84
4054	Lighting	Occupancy Sensor	No program	MH	NC	302	30%	89	0.008	0.022	10	$30.00	25%	100%	0%	29%	2.4	9.6	2.9	0.84
4055	Lighting	Exterior Lighting Controls	No program	SF	Retrofit	108	80%	86	0.000	0.015	10	$3.00	25%	41%	42%	54%	19.1	76.6	25.4	0.75
4056	Lighting	Exterior Lighting Controls	No program	SF	Retrofit	108	80%	86	0.000	0.015	10	$3.00	25%	41%	42%	54%	19.1	76.6	25.4	0.75
4057	Lighting	Exterior Lighting Controls	No program	SF	NC	108	80%	86	0.000	0.015	10	$3.00	25%	41%	0%	29%	19.1	76.6	25.4	0.75
4058	Lighting	Exterior Lighting Controls	No program	MH	Retrofit	108	80%	86	0.000	0.015	10	$3.00	25%	41%	42%	54%	19.1	76.6	25.4	0.75
4059	Lighting	Exterior Lighting Controls	No program	MH	Retrofit	108	80%	86	0.000	0.015	10	$3.00	25%	41%	42%	54%	19.1	76.6	25.4	0.75
4060	Lighting	Exterior Lighting Controls	No program	MH	NC	108	80%	86	0.000	0.015	10	$3.00	25%	41%	0%	29%	19.1	76.6	25.4	0.75
5001	Pool/Pump	Heat Pump Pool Heater	No program	SF	MO	14,585	71%	10,418	0.000	1.520	15	$1,916.00	25%	3%	2%	29%	4.8	19.1	6.8	0.70
5002	Pool/Pump	Heat Pump Pool Heater	No program	SF	MO	14,585	71%	10,418	0.000	1.520	15	$1,916.00	25%	3%	2%	29%	4.8	19.1	6.8	0.70
5003	Pool/Pump	Heat Pump Pool Heater	No program	SF	NC	14,585	71%	10,418	0.000	1.520	15	$1,916.00	25%	3%	0%	29%	4.8	19.1	6.8	0.70
5004	Pool/Pump	Heat Pump Pool Heater	No program	MH	MO	14,585	71%	10,418	0.000	1.520	15	$1,916.00	25%	3%	2%	29%	4.8	19.1	6.8	0.70
5005	Pool/Pump	Heat Pump Pool Heater	No program	MH	MO	14,585	71%	10,418	0.000	1.520	15	$1,916.00	25%	3%	2%	29%	4.8	19.1	6.8	0.70
5006	Pool/Pump	Heat Pump Pool Heater	No program	MH	NC	14,585	71%	10,418	0.000	1.520	15	$1,916.00	25%	3%	0%	29%	4.8	19.1	6.8	0.70
5007	Pool/Pump	Variable Speed Pool Pump	No program	SF	MO	1,167	26%	308	0.215	0.042	7	$314.00	25%	10%	36%	49%	0.6	2.3	0.9	0.66
5008	Pool/Pump	Variable Speed Pool Pump	No program	SF	MO	1,167	26%	308	0.215	0.042	7	$314.00	25%	10%	36%	49%	0.6	2.3	0.9	0.66
5009	Pool/Pump	Variable Speed Pool Pump	No program	SF	NC	1,167	26%	308	0.215	0.042	7	$314.00	25%	10%	0%	29%	0.6	2.3	0.9	0.66
5010	Pool/Pump	Variable Speed Pool Pump	No program	MH	MO	1,167	26%	308	0.215	0.042	7	$314.00	25%	10%	36%	49%	0.6	2.3	0.9	0.66
5011	Pool/Pump	Variable Speed Pool Pump	No program	MH	MO	1,167	26%	308	0.215	0.042	7	$314.00	25%	10%	36%	49%	0.6	2.3	0.9	0.66
5012	Pool/Pump	Variable Speed Pool Pump	No program	MH	NC	1,167	26%	308	0.215	0.042	7	$314.00	25%	10%	0%	29%	0.6	2.3	0.9	0.66
5013	Pool/Pump	Well Pump	No program	SF	MO	411	33%	136	0.015	0.023	20	$110.00	25%	4%	36%	49%	1.4	5.7	2.1	0.69
5014	Pool/Pump	Well Pump	No program	SF	MO	411	33%	136	0.015	0.023	20	$110.00	25%	4%	36%	49%	1.4	5.7	2.1	0.69
5015	Pool/Pump	Well Pump	No program	SF	NC	411	33%	136	0.015	0.023	20	$110.00	25%	4%	0%	29%	1.4	5.7	2.1	0.69
5016	Pool/Pump	Well Pump	No program	MH	MO	411	33%	136	0.015	0.023	20	$110.00	25%	4%	36%	49%	1.4	5.7	2.1	0.69
5017	Pool/Pump	Well Pump	No program	MH	MO	411	33%	136	0.015	0.023	20	$110.00	25%	4%	36%	49%	1.4	5.7	2.1	0.69
5018	Pool/Pump	Well Pump	No program	MH	NC	411	33%	136	0.015	0.000	20	$110.00	25%	4%	0%	29%	0.9	3.8	2.1	0.46
6001	New Construction	New Construction - 15% more efficient (w/AC only)	Residential Home New Construction	SF	NC	12,068	15%	1,810	0.367	0.072	20	$990.00	76%	16%	0%	47%	2.0	2.3	4.2	0.50
6002	New Construction	New Construction - 15% more efficient (w/Elec. HP)	Residential Home New Construction	SF	NC	14,766	15%	2,215	0.321	0.659	20	$761.00	99%	62%	0%	72%	4.3	4.4	5.3	0.82

Residential Measure Summary:

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Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
6003	New Construction	New Construction - 30% more efficient (w/AC only)	Residential Home New Construction	SF	NC	12,068	30%	3,620	0.733	0.144	20	$1,980.00	38%	16%	0%	28%	2.0	4.5	3.8	0.56
6004	New Construction	New Construction - 30% more efficient (w/Elec. HP)	Residential Home New Construction	SF	NC	14,766	30%	4,430	0.643	1.318	20	$1,522.00	49%	62%	0%	35%	4.3	8.8	4.8	0.91
6005	New Construction	New Construction - 15% more efficient (w/AC only)	Residential New Manufactured Housing	MH	NC	9,871	15%	1,481	0.331	0.062	20	$990.00	76%	16%	0%	47%	1.7	1.9	3.7	0.48
6006	New Construction	New Construction - 15% more efficient (w/Elec. HP)	Residential New Manufactured Housing	MH	NC	12,747	15%	1,912	0.307	0.601	20	$761.00	99%	62%	0%	72%	3.8	3.9	4.7	0.82
6007	New Construction	New Construction - 30% more efficient (w/AC only)	Residential New Manufactured Housing	MH	NC	9,871	30%	2,961	0.663	0.124	20	$1,980.00	38%	16%	0%	28%	1.7	3.7	3.3	0.55
6008	New Construction	New Construction - 30% more efficient (w/Elec. HP)	Residential New Manufactured Housing	MH	NC	12,747	30%	3,824	0.614	1.202	20	$1,522.00	49%	62%	0%	35%	3.8	7.8	4.2	0.92
7001	Plug Load	Smart Power Strips - Tier 1	No program	SF	Retrofit	466	12%	57	0.006	0.006	7	$10.00	25%	100%	30%	44%	2.5	10.1	3.9	0.65
7002	Plug Load	Smart Power Strips - Tier 1	No program	SF	Retrofit	466	12%	57	0.006	0.006	7	$10.00	25%	100%	30%	44%	2.5	10.1	3.9	0.65
7003	Plug Load	Smart Power Strips - Tier 1	No program	SF	NC	466	12%	57	0.006	0.006	7	$10.00	25%	100%	0%	29%	2.5	10.1	3.9	0.65
7004	Plug Load	Smart Power Strips - Tier 1	No program	MH	Retrofit	466	12%	57	0.006	0.006	7	$10.00	25%	100%	30%	44%	2.5	10.1	3.9	0.65
7005	Plug Load	Smart Power Strips - Tier 1	No program	MH	Retrofit	466	12%	57	0.006	0.006	7	$10.00	25%	100%	30%	44%	2.5	10.1	3.9	0.65
7006	Plug Load	Smart Power Strips - Tier 1	No program	MH	NC	466	12%	57	0.006	0.006	7	$10.00	25%	100%	0%	29%	2.5	10.1	3.9	0.65
7007	Plug Load	Smart Power Strips - Tier 2	No program	SF	Retrofit	466	29%	136	0.015	0.015	7	$20.00	25%	100%	30%	44%	3.0	12.2	4.7	0.65
7008	Plug Load	Smart Power Strips - Tier 2	No program	SF	Retrofit	466	29%	136	0.015	0.015	7	$20.00	25%	100%	30%	44%	3.0	12.2	4.7	0.65
7009	Plug Load	Smart Power Strips - Tier 2	No program	SF	NC	466	29%	136	0.015	0.015	7	$20.00	25%	100%	0%	29%	3.0	12.2	4.7	0.65
7010	Plug Load	Smart Power Strips - Tier 2	No program	MH	Retrofit	466	29%	136	0.015	0.015	7	$20.00	25%	100%	30%	44%	3.0	12.2	4.7	0.65
7011	Plug Load	Smart Power Strips - Tier 2	No program	MH	Retrofit	466	29%	136	0.015	0.015	7	$20.00	25%	100%	30%	44%	3.0	12.2	4.7	0.65
7012	Plug Load	Smart Power Strips - Tier 2	No program	MH	NC	466	29%	136	0.015	0.015	7	$20.00	25%	100%	0%	29%	3.0	12.2	4.7	0.65
7013	Plug Load	ENERGY STAR TV	No program	SF	Retrofit	457	20%	91	0.011	0.013	5	$60.00	25%	200%	59%	67%	0.6	2.2	1.0	0.56
7014	Plug Load	ENERGY STAR TV	No program	SF	Retrofit	457	20%	91	0.011	0.013	5	$60.00	25%	200%	59%	67%	0.6	2.2	1.0	0.56
7015	Plug Load	ENERGY STAR TV	No program	SF	NC	457	20%	91	0.011	0.013	5	$60.00	25%	200%	0%	29%	0.6	2.2	1.0	0.56
7016	Plug Load	ENERGY STAR TV	No program	MH	Retrofit	457	20%	91	0.011	0.013	5	$60.00	25%	200%	59%	67%	0.6	2.2	1.0	0.56
7017	Plug Load	ENERGY STAR TV	No program	MH	Retrofit	457	20%	91	0.011	0.013	5	$60.00	25%	200%	59%	67%	0.6	2.2	1.0	0.56
7018	Plug Load	ENERGY STAR TV	No program	MH	NC	457	20%	91	0.011	0.013	5	$60.00	25%	200%	0%	29%	0.6	2.2	1.0	0.56
8001	Shell	Duct Sealing - Inadequate Sealing - Heat pump	Button Up (HVAC Duct Seal)	SF	Retrofit	5,074	14%	729	0.243	0.131	20	$738.01	100%	40%	76%	81%	1.5	1.3	2.7	0.52
8002	Shell	Duct Sealing - Inadequate Sealing - Heat pump	CARES Efficiency	SF	Retrofit	5,074	14%	729	0.243	0.131	20	$738.01	100%	40%	76%	81%	1.6	1.3	2.7	0.52
8003	Shell	Duct Sealing - Inadequate Sealing - Heat pump	Button Up (HVAC Duct Seal)	MH	Retrofit	4,228	17%	729	0.243	0.131	20	$491.40	100%	40%	76%	81%	1.4	1.3	2.6	0.52
8004	Shell	Duct Sealing - Inadequate Sealing - Heat pump	CARES Efficiency	MH	Retrofit	4,228	17%	729	0.243	0.131	20	$491.40	100%	40%	76%	81%	2.2	1.9	3.5	0.60
8005	Shell	Duct Sealing - Inadequate Sealing - Electric furnace	Button Up (HVAC Duct Seal)	SF	Retrofit	10,839	10%	1,130	0.243	0.203	20	$738.01	100%	22%	76%	81%	2.1	1.8	3.5	0.58
8006	Shell	Duct Sealing - Inadequate Sealing - Electric furnace	CARES Efficiency	SF	Retrofit	10,839	10%	1,130	0.243	0.203	20	$738.01	100%	22%	76%	81%	2.2	1.9	3.5	0.58
8007	Shell	Duct Sealing - Inadequate Sealing - Electric furnace	Button Up (HVAC Duct Seal)	MH	Retrofit	9,032	13%	1,130	0.243	0.203	20	$491.40	100%	22%	76%	81%	2.0	1.8	3.4	0.58
8008	Shell	Duct Sealing - Inadequate Sealing - Electric furnace	CARES Efficiency	MH	Retrofit	9,032	13%	1,130	0.243	0.203	20	$491.40	100%	22%	76%	81%	3.1	2.8	4.7	0.65
8009	Shell	Duct Sealing - Inadequate Sealing - Gas Heating	Button Up (HVAC Duct Seal)	SF	Retrofit	2,095	9%	186	0.243	0.002	20	$738.01	100%	16%	76%	81%	1.1	0.3	2.8	0.26
8010	Shell	Duct Sealing - Inadequate Sealing - Gas Heating	CARES Efficiency	SF	Retrofit	2,095	9%	186	0.243	0.002	20	$738.01	100%	16%	76%	81%	1.1	0.4	2.8	0.26
8011	Shell	Duct Sealing - Inadequate Sealing - Gas Heating	Button Up (HVAC Duct Seal)	MH	Retrofit	1,874	10%	186	0.243	0.002	20	$491.40	100%	16%	76%	81%	1.0	0.3	2.8	0.26
8012	Shell	Duct Sealing - Inadequate Sealing - Gas Heating	CARES Efficiency	MH	Retrofit	1,874	10%	186	0.243	0.002	20	$491.40	100%	16%	76%	81%	1.6	0.5	3.8	0.34
8013	Shell	Wall Insulation - Heat pump	Button Up (Building Shell Measures)	SF	Retrofit	5,074	25%	1,257	0.123	0.226	30	$1,574.30	48%	40%	80%	84%	1.5	2.5	2.3	0.60
8014	Shell	Wall Insulation - Heat pump	CARES Efficiency	SF	Retrofit	5,074	25%	1,257	0.123	0.226	30	$1,574.30	100%	40%	80%	84%	1.5	1.2	2.8	0.47
8015	Shell	Wall Insulation - Heat pump	Button Up (Building Shell Measures)	MH	Retrofit	4,228	16%	687	0.067	0.123	30	$861.25	87%	40%	80%	84%	1.5	1.3	2.7	0.50

Residential Measure Summary:

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Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
8016	Shell	Wall Insulation - Heat pump	CARES Efficiency	MH	Retrofit	4,228	16%	687	0.067	0.123	30	$861.25	100%	40%	80%	84%	1.5	1.2	2.8	0.47
8017	Shell	Wall Insulation - Electric furnace	Button Up (Building Shell Measures)	SF	Retrofit	10,839	18%	1,989	0.123	0.357	30	$1,574.30	48%	22%	80%	84%	2.1	3.8	3.1	0.64
8018	Shell	Wall Insulation - Electric furnace	CARES Efficiency	SF	Retrofit	10,839	18%	1,989	0.123	0.357	30	$1,574.30	100%	22%	80%	84%	2.1	1.8	3.7	0.54
8019	Shell	Wall Insulation - Electric furnace	Button Up (Building Shell Measures)	MH	Retrofit	9,032	12%	1,088	0.067	0.195	30	$861.25	87%	22%	80%	84%	2.1	2.1	3.5	0.56
8020	Shell	Wall Insulation - Electric furnace	CARES Efficiency	MH	Retrofit	9,032	12%	1,088	0.067	0.195	30	$861.25	100%	22%	80%	84%	2.1	1.8	3.7	0.54
8021	Shell	Wall Insulation - Gas Heating	Button Up (Building Shell Measures)	SF	Retrofit	2,095	17%	348	0.123	0.004	30	$1,574.30	48%	16%	80%	84%	1.1	0.6	2.5	0.30
8022	Shell	Wall Insulation - Gas Heating	CARES Efficiency	SF	Retrofit	2,095	17%	348	0.123	0.004	30	$1,574.30	100%	16%	80%	84%	1.1	0.3	3.0	0.19
8023	Shell	Wall Insulation - Gas Heating	Button Up (Building Shell Measures)	MH	Retrofit	1,874	12%	228	0.067	0.002	30	$861.25	87%	16%	80%	84%	1.3	0.3	3.4	0.22
8024	Shell	Wall Insulation - Gas Heating	CARES Efficiency	MH	Retrofit	1,874	12%	228	0.067	0.002	30	$861.25	100%	16%	80%	84%	1.3	0.3	3.6	0.20
8025	Shell	Air Sealing Inadequate Sealing - Heat pump	Button Up (Building Shell Measures)	SF	MO	5,074	19%	987	0.429	0.177	20	$1,479.71	51%	40%	76%	81%	1.2	1.8	1.8	0.60
8026	Shell	Air Sealing Inadequate Sealing - Heat pump	CARES Efficiency	SF	MO	5,074	19%	987	0.429	0.177	20	$1,479.71	100%	40%	76%	81%	1.2	0.9	2.3	0.45
8027	Shell	Air Sealing Inadequate Sealing - Heat pump	Button Up (Building Shell Measures)	MH	MO	4,228	23%	987	0.429	0.177	20	$986.23	76%	40%	76%	81%	1.6	1.8	2.5	0.60
8028	Shell	Air Sealing Inadequate Sealing - Heat pump	CARES Efficiency	MH	MO	4,228	23%	987	0.429	0.177	20	$986.23	100%	40%	76%	81%	1.6	1.3	2.8	0.54
8029	Shell	Air Sealing Inadequate Sealing - Electric furnace	Button Up (Building Shell Measures)	SF	MO	10,839	14%	1,473	0.429	0.265	20	$1,479.71	51%	22%	76%	81%	1.6	2.5	2.3	0.64
8030	Shell	Air Sealing Inadequate Sealing - Electric furnace	CARES Efficiency	SF	MO	10,839	14%	1,473	0.429	0.265	20	$1,479.71	100%	22%	76%	81%	1.6	1.3	2.8	0.51
8031	Shell	Air Sealing Inadequate Sealing - Electric furnace	Button Up (Building Shell Measures)	MH	MO	9,032	16%	1,473	0.429	0.265	20	$986.23	76%	22%	76%	81%	2.2	2.5	3.2	0.64
8032	Shell	Air Sealing Inadequate Sealing - Electric furnace	CARES Efficiency	MH	MO	9,032	16%	1,473	0.429	0.265	20	$986.23	100%	22%	76%	81%	2.2	1.9	3.5	0.59
8033	Shell	Air Sealing - Inadequate Sealing - Gas Heating	Button Up (Building Shell Measures)	SF	MO	2,095	19%	401	0.429	0.004	20	$1,479.71	51%	16%	76%	81%	1.1	0.7	2.4	0.38
8034	Shell	Air Sealing - Inadequate Sealing - Gas Heating	CARES Efficiency	SF	MO	2,095	19%	401	0.429	0.004	20	$1,479.71	100%	16%	76%	81%	1.1	0.3	2.9	0.25
8035	Shell	Air Sealing - Inadequate Sealing - Gas Heating	Button Up (Building Shell Measures)	MH	MO	1,874	21%	401	0.429	0.004	20	$986.23	76%	16%	76%	81%	1.6	0.7	3.7	0.38
8036	Shell	Air Sealing - Inadequate Sealing - Gas Heating	CARES Efficiency	MH	MO	1,874	21%	401	0.429	0.004	20	$986.23	100%	16%	76%	81%	1.6	0.5	4.0	0.33
8037	Shell	Attic Insulation - Inadequate Insulation - Heat pump	Button Up (Building Shell Measures)	SF	Retrofit	5,074	10%	486	0.117	0.087	30	$1,270.50	59%	40%	80%	84%	0.9	1.0	1.6	0.46
8038	Shell	Attic Insulation - Inadequate Insulation - Heat pump	CARES Efficiency	SF	Retrofit	5,074	10%	486	0.117	0.087	30	$1,270.50	100%	40%	80%	84%	0.9	0.6	2.0	0.35
8039	Shell	Attic Insulation - Inadequate Insulation - Electric furnace	Button Up (Building Shell Measures)	SF	Retrofit	10,839	7%	770	0.117	0.138	30	$1,270.50	59%	22%	80%	84%	1.2	1.6	2.0	0.53
8040	Shell	Attic Insulation - Inadequate Insulation - Electric furnace	CARES Efficiency	SF	Retrofit	10,839	7%	770	0.117	0.138	30	$1,270.50	100%	22%	80%	84%	1.2	0.9	2.4	0.43
8041	Shell	Attic Insulation - Inadequate Insulation - Gas Heating	Button Up (Building Shell Measures)	SF	Retrofit	2,095	15%	313	0.117	0.003	30	$1,270.50	59%	16%	80%	84%	1.2	0.5	2.8	0.28
8042	Shell	Attic Insulation - Inadequate Insulation - Gas Heating	CARES Efficiency	SF	Retrofit	2,095	15%	313	0.117	0.003	30	$1,270.50	100%	16%	80%	84%	1.2	0.3	3.2	0.20
8043	Shell	Radiant Barrier - Heat pump	No program	SF	Retrofit	5,074	11%	554	0.000	0.000	25	$496.65	25%	40%	75%	80%	0.9	3.6	2.1	0.43
8044	Shell	Radiant Barrier - Heat pump	No program	SF	Retrofit	5,074	11%	554	0.000	0.000	25	$496.65	25%	40%	75%	80%	0.9	3.6	2.1	0.43
8045	Shell	Radiant Barrier - Electric furnace	No program	SF	Retrofit	10,839	5%	554	0.000	0.000	25	$496.65	25%	22%	75%	80%	0.9	3.6	2.1	0.43
8046	Shell	Radiant Barrier - Electric furnace	No program	SF	Retrofit	10,839	5%	554	0.000	0.000	25	$496.65	25%	22%	75%	80%	0.9	3.6	2.1	0.43
8047	Shell	Radiant Barrier - Gas furnace	No program	SF	Retrofit	2,095	26%	554	0.000	0.000	25	$496.65	25%	16%	75%	80%	0.9	3.5	2.1	0.42
8048	Shell	Radiant Barrier - Gas furnace	No program	SF	Retrofit	2,095	26%	554	0.000	0.000	25	$496.65	25%	16%	75%	80%	0.9	3.5	2.1	0.42
8049	Shell	Cool Roof - Heat pump	No program	SF	Retrofit	2,095	1%	28	0.005	0.005	20	$508.73	25%	40%	75%	80%	0.1	0.3	0.3	0.20
8050	Shell	Cool Roof - Heat pump	No program	SF	Retrofit	2,095	1%	28	0.005	0.005	20	$508.73	25%	40%	75%	80%	0.1	0.3	0.3	0.20
8051	Shell	Cool Roof - Electric furnace	No program	SF	Retrofit	2,095	1%	28	0.005	0.005	20	$508.73	25%	22%	75%	80%	0.1	0.3	0.3	0.20
8052	Shell	Cool Roof - Electric furnace	No program	SF	Retrofit	2,095	1%	28	0.005	0.005	20	$508.73	25%	22%	75%	80%	0.1	0.3	0.3	0.20
8053	Shell	Cool Roof - Gas furnace	No program	SF	Retrofit	2,095	1%	28	0.013	0.000	20	$508.73	25%	16%	75%	80%	0.1	0.2	0.6	0.16
8054	Shell	Cool Roof - Gas furnace	No program	SF	Retrofit	2,095	1%	28	0.013	0.000	20	$508.73	25%	16%	75%	80%	0.1	0.2	0.6	0.16
8055	Shell	ENERGY STAR Windows - Heat pump	No program	SF	Retrofit	5,074	40%	2,052	0.370	0.369	20	$2,986.40	25%	40%	70%	76%	1.0	3.3	1.5	0.66
8056	Shell	ENERGY STAR Windows - Heat pump	No program	SF	Retrofit	5,074	40%	2,052	0.370	0.369	20	$2,986.40	25%	40%	70%	76%	1.0	3.3	1.5	0.66
8057	Shell	ENERGY STAR Windows - Heat pump	No program	MH	Retrofit	4,228	32%	1,370	0.247	0.246	20	$1,893.55	25%	40%	70%	76%	1.2	3.5	1.6	0.67
8058	Shell	ENERGY STAR Windows - Heat pump	No program	MH	Retrofit	4,228	32%	1,370	0.247	0.246	20	$1,893.55	25%	40%	70%	76%	1.2	3.5	1.6	0.67

Residential Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
8059	Shell	ENERGY STAR Windows - Electric furnace	No program	SF	Retrofit	10,839	47%	5,125	0.923	0.921	20	$2,986.40	25%	22%	70%	76%	2.3	8.3	3.0	0.75
8060	Shell	ENERGY STAR Windows - Electric furnace	No program	SF	Retrofit	10,839	47%	5,125	0.923	0.921	20	$2,986.40	25%	22%	70%	76%	2.3	8.3	3.0	0.75
8061	Shell	ENERGY STAR Windows - Electric furnace	No program	MH	Retrofit	9,032	38%	3,423	0.616	0.615	20	$1,893.55	25%	22%	70%	76%	2.5	8.7	3.2	0.75
8062	Shell	ENERGY STAR Windows - Electric furnace	No program	MH	Retrofit	9,032	38%	3,423	0.616	0.615	20	$1,893.55	25%	22%	70%	76%	2.5	8.7	3.2	0.75
8063	Shell	ENERGY STAR Windows - Gas Heating	No program	SF	Retrofit	2,095	15%	322	0.149	0.003	20	$2,986.40	25%	16%	70%	76%	0.5	0.4	1.1	0.25
8064	Shell	ENERGY STAR Windows - Gas Heating	No program	SF	Retrofit	2,095	15%	322	0.149	0.003	20	$2,986.40	25%	16%	70%	76%	0.5	0.4	1.1	0.25
8065	Shell	ENERGY STAR Windows - Gas Heating	No program	MH	Retrofit	1,874	13%	244	0.113	0.003	20	$1,893.55	25%	16%	70%	76%	0.7	0.5	1.4	0.28
8066	Shell	ENERGY STAR Windows - Gas Heating	No program	MH	Retrofit	1,874	13%	244	0.113	0.003	20	$1,893.55	25%	16%	70%	76%	0.7	0.5	1.4	0.28
8067	Shell	Basement Sidewall Insulation - Heat pump	Button Up (Building Shell Measures)	SF	Retrofit	5,074	17%	882	0.159	0.158	30	$5,171.40	15%	40%	80%	84%	0.5	1.8	0.7	0.56
8068	Shell	Basement Sidewall Insulation - Heat pump	CARES Efficiency	SF	Retrofit	5,074	17%	882	0.159	0.158	30	$5,171.40	100%	40%	80%	84%	0.5	0.3	1.6	0.20
8069	Shell	Basement Sidewall Insulation - Electric furnace	Button Up (Building Shell Measures)	SF	Retrofit	10,839	14%	1,535	0.276	0.276	30	$5,171.40	15%	22%	80%	84%	0.7	3.1	0.9	0.65
8070	Shell	Basement Sidewall Insulation - Electric furnace	CARES Efficiency	SF	Retrofit	10,839	14%	1,535	0.276	0.276	30	$5,171.40	100%	22%	80%	84%	0.7	0.5	1.8	0.29
8071	Shell	Basement Sidewall Insulation - Gas Heating	Button Up (Building Shell Measures)	SF	Retrofit	2,095	3%	70	0.027	0.003	30	$5,171.40	15%	16%	80%	84%	0.3	0.1	0.5	0.11
8072	Shell	Basement Sidewall Insulation - Gas Heating	CARES Efficiency	SF	Retrofit	2,095	3%	70	0.027	0.003	30	$5,171.40	100%	16%	80%	84%	0.3	0.0	1.3	0.02
8073	Shell	Floor Insulation Above Crawlspace - Heat pump	Button Up (Building Shell Measures)	SF	Retrofit	5,074	22%	1,091	0.197	0.196	30	$981.75	76%	40%	80%	84%	2.0	2.2	3.1	0.60
8074	Shell	Floor Insulation Above Crawlspace - Heat pump	CARES Efficiency	SF	Retrofit	5,074	22%	1,091	0.197	0.196	30	$981.75	100%	40%	80%	84%	2.0	1.7	3.4	0.55
8075	Shell	Floor Insulation Above Crawlspace - Heat pump	Button Up (Building Shell Measures)	MH	Retrofit	4,228	26%	1,091	0.197	0.196	30	$981.75	76%	40%	80%	84%	2.0	2.2	3.1	0.60
8076	Shell	Floor Insulation Above Crawlspace - Heat pump	CARES Efficiency	MH	Retrofit	4,228	26%	1,091	0.197	0.196	30	$981.75	100%	40%	80%	84%	2.0	1.7	3.4	0.55
8077	Shell	Floor Insulation Above Crawlspace - Electric furnace	Button Up (Building Shell Measures)	SF	Retrofit	10,839	17%	1,792	0.323	0.322	30	$981.75	76%	22%	80%	84%	3.1	3.7	4.5	0.67
8078	Shell	Floor Insulation Above Crawlspace - Electric furnace	CARES Efficiency	SF	Retrofit	10,839	17%	1,792	0.323	0.322	30	$981.75	100%	22%	80%	84%	3.1	2.8	4.7	0.64
8079	Shell	Floor Insulation Above Crawlspace - Electric furnace	Button Up (Building Shell Measures)	MH	Retrofit	9,032	20%	1,792	0.323	0.322	30	$981.75	76%	22%	80%	84%	3.1	3.7	4.5	0.67
8080	Shell	Floor Insulation Above Crawlspace - Electric furnace	CARES Efficiency	MH	Retrofit	9,032	20%	1,792	0.323	0.322	30	$981.75	100%	22%	80%	84%	3.1	2.8	4.7	0.64
8081	Shell	Floor Insulation Above Crawlspace - Gas Heating	Button Up (Building Shell Measures)	SF	Retrofit	2,095	10%	206	0.095	0.002	30	$981.75	76%	16%	80%	84%	1.1	0.4	2.7	0.23
8082	Shell	Floor Insulation Above Crawlspace - Gas Heating	CARES Efficiency	SF	Retrofit	2,095	10%	206	0.095	0.002	30	$981.75	100%	16%	80%	84%	1.1	0.3	2.9	0.19
8083	Shell	Floor Insulation Above Crawlspace - Gas Heating	Button Up (Building Shell Measures)	MH	Retrofit	1,874	11%	206	0.095	0.002	30	$981.75	76%	16%	80%	84%	1.1	0.4	2.9	0.23
8084	Shell	Floor Insulation Above Crawlspace - Gas Heating	CARES Efficiency	MH	Retrofit	1,874	11%	206	0.095	0.002	30	$981.75	100%	16%	80%	84%	1.1	0.3	3.1	0.19
8085	Shell	ENERGY STAR Door - Heat pump	No program	SF	Retrofit	5,074	5%	276	0.050	0.049	20	$1,275.00	25%	40%	75%	80%	0.3	1.0	0.6	0.46
8086	Shell	ENERGY STAR Door - Heat pump	No program	SF	Retrofit	5,074	5%	276	0.050	0.049	20	$1,275.00	25%	40%	75%	80%	0.3	1.0	0.6	0.46
8087	Shell	ENERGY STAR Door - Heat pump	No program	MH	Retrofit	4,228	7%	276	0.050	0.049	20	$1,275.00	25%	40%	75%	80%	0.3	1.0	0.6	0.46
8088	Shell	ENERGY STAR Door - Heat pump	No program	MH	Retrofit	4,228	7%	276	0.050	0.049	20	$1,275.00	25%	40%	75%	80%	0.3	1.0	0.6	0.46
8089	Shell	ENERGY STAR Door - Electric furnace	No program	SF	Retrofit	10,839	2%	196	0.035	0.035	20	$1,275.00	25%	22%	75%	80%	0.2	0.7	0.5	0.39
8090	Shell	ENERGY STAR Door - Electric furnace	No program	SF	Retrofit	10,839	2%	196	0.035	0.035	20	$1,275.00	25%	22%	75%	80%	0.2	0.7	0.5	0.39
8091	Shell	ENERGY STAR Door - Electric furnace	No program	MH	Retrofit	9,032	2%	196	0.035	0.035	20	$1,275.00	25%	22%	75%	80%	0.2	0.7	0.5	0.39
8092	Shell	ENERGY STAR Door - Electric furnace	No program	MH	Retrofit	9,032	2%	196	0.035	0.035	20	$1,275.00	25%	22%	75%	80%	0.2	0.7	0.5	0.39
8093	Shell	ENERGY STAR Door - Gas Heating	No program	SF	Retrofit	2,095	1%	20	0.009	0.000	20	$1,275.00	25%	16%	75%	80%	0.0	0.1	0.3	0.06
8094	Shell	ENERGY STAR Door - Gas Heating	No program	SF	Retrofit	2,095	1%	20	0.009	0.000	20	$1,275.00	25%	16%	75%	80%	0.0	0.1	0.3	0.06
8095	Shell	ENERGY STAR Door - Gas Heating	No program	MH	Retrofit	1,874	1%	20	0.009	0.000	20	$1,275.00	25%	16%	75%	80%	0.0	0.1	0.4	0.06
8096	Shell	ENERGY STAR Door - Gas Heating	No program	MH	Retrofit	1,874	1%	20	0.009	0.000	20	$1,275.00	25%	16%	75%	80%	0.0	0.1	0.4	0.06
9001	Water Heating	Pipe Wrap	No program	SF	Retrofit	3,242	8%	247	0.010	0.010	15	$18.00	25%	85%	75%	80%	9.3	37.1	16.7	0.56
9002	Water Heating	Pipe Wrap	No program	SF	Retrofit	3,242	8%	247	0.010	0.010	15	$18.00	25%	85%	75%	80%	9.3	37.1	16.7	0.56
9003	Water Heating	Pipe Wrap	No program	SF	NC	3,242	8%	247	0.010	0.010	15	$18.00	25%	85%	0%	24%	9.3	37.1	16.7	0.56
9004	Water Heating	Pipe Wrap	No program	MH	Retrofit	3,242	8%	247	0.010	0.010	15	$18.00	25%	85%	75%	80%	9.3	37.1	16.7	0.56
9005	Water Heating	Pipe Wrap	No program	MH	Retrofit	3,242	8%	247	0.010	0.010	15	$18.00	25%	85%	75%	80%	9.3	37.1	16.7	0.56
9006	Water Heating	Pipe Wrap	No program	MH	NC	3,242	8%	247	0.010	0.010	15	$18.00	25%	85%	0%	24%	9.3	37.1	16.7	0.56
9007	Water Heating	Bathroom Aerator 1.0 gpm	No program	SF	Retrofit	3,242	1%	35	0.048	0.007	10	$3.00	25%	212%	49%	59%	25.3	49.5	28.8	1.19
9008	Water Heating	Bathroom Aerator 1.0 gpm	No program	SF	Retrofit	3,242	1%	35	0.048	0.007	10	$3.00	25%	212%	49%	59%	25.3	49.5	28.8	1.19

Residential Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
9009	Water Heating	Bathroom Aerator 1.0 gpm	No program	SF	NC	3,242	1%	35	0.048	0.007	10	$3.00	25%	212%	0%	24%	25.3	49.5	28.8	1.19
9010	Water Heating	Bathroom Aerator 1.0 gpm	No program	MH	Retrofit	3,242	1%	35	0.048	0.007	10	$3.00	25%	170%	49%	59%	25.3	49.5	28.8	1.19
9011	Water Heating	Bathroom Aerator 1.0 gpm	No program	MH	Retrofit	3,242	1%	35	0.048	0.007	10	$3.00	25%	170%	49%	59%	25.3	49.5	28.8	1.19
9012	Water Heating	Bathroom Aerator 1.0 gpm	No program	MH	NC	3,242	1%	35	0.048	0.007	10	$3.00	25%	170%	0%	24%	25.3	49.5	28.8	1.19
9013	Water Heating	Kitchen Flip Aerator 1.5 gpm	No program	SF	Retrofit	3,242	8%	269	0.053	0.053	10	$3.00	25%	85%	49%	59%	132.6	272.1	171.2	0.86
9014	Water Heating	Kitchen Flip Aerator 1.5 gpm	No program	SF	Retrofit	3,242	8%	269	0.053	0.053	10	$3.00	25%	85%	49%	59%	132.6	272.1	171.2	0.86
9015	Water Heating	Kitchen Flip Aerator 1.5 gpm	No program	SF	NC	3,242	8%	269	0.053	0.053	10	$3.00	25%	85%	0%	24%	132.6	272.1	171.2	0.86
9016	Water Heating	Kitchen Flip Aerator 1.5 gpm	No program	MH	Retrofit	3,242	8%	269	0.053	0.053	10	$3.00	25%	85%	49%	59%	132.6	272.1	171.2	0.86
9017	Water Heating	Kitchen Flip Aerator 1.5 gpm	No program	MH	Retrofit	3,242	8%	269	0.053	0.053	10	$3.00	25%	85%	49%	59%	132.6	272.1	171.2	0.86
9018	Water Heating	Kitchen Flip Aerator 1.5 gpm	No program	MH	NC	3,242	8%	269	0.053	0.053	10	$3.00	25%	85%	0%	24%	132.6	272.1	171.2	0.86
9019	Water Heating	Low Flow Showerhead 1.5 gpm	No program	SF	Retrofit	3,242	7%	217	0.022	0.022	10	$7.00	25%	170%	61%	69%	42.2	73.9	61.4	0.68
9020	Water Heating	Low Flow Showerhead 1.5 gpm	No program	SF	Retrofit	3,242	7%	217	0.022	0.022	10	$7.00	25%	170%	61%	69%	42.2	73.9	61.4	0.68
9021	Water Heating	Low Flow Showerhead 1.5 gpm	No program	SF	NC	3,242	7%	217	0.022	0.022	10	$7.00	25%	170%	0%	24%	42.2	73.9	61.4	0.68
9022	Water Heating	Low Flow Showerhead 1.5 gpm	No program	MH	Retrofit	3,242	7%	217	0.022	0.022	10	$7.00	25%	170%	61%	69%	42.2	73.9	61.4	0.68
9023	Water Heating	Low Flow Showerhead 1.5 gpm	No program	MH	Retrofit	3,242	7%	217	0.022	0.022	10	$7.00	25%	170%	61%	69%	42.2	73.9	61.4	0.68
9024	Water Heating	Low Flow Showerhead 1.5 gpm	No program	MH	NC	3,242	7%	217	0.022	0.022	10	$7.00	25%	170%	0%	24%	42.2	73.9	61.4	0.68
9025	Water Heating	Thermostatic Restrictor Shower Valve	No program	SF	Retrofit	3,242	2%	77	0.005	0.005	10	$30.00	25%	170%	10%	28%	3.4	5.5	5.4	0.56
9026	Water Heating	Thermostatic Restrictor Shower Valve	No program	SF	Retrofit	3,242	2%	77	0.005	0.005	10	$30.00	25%	170%	10%	28%	3.4	5.5	5.4	0.56
9027	Water Heating	Thermostatic Restrictor Shower Valve	No program	SF	NC	3,242	2%	77	0.005	0.005	10	$30.00	25%	170%	0%	24%	3.4	5.5	5.4	0.56
9028	Water Heating	Thermostatic Restrictor Shower Valve	No program	MH	Retrofit	3,242	2%	77	0.005	0.005	10	$30.00	25%	170%	10%	28%	3.4	5.5	5.4	0.56
9029	Water Heating	Thermostatic Restrictor Shower Valve	No program	MH	Retrofit	3,242	2%	77	0.005	0.005	10	$30.00	25%	170%	10%	28%	3.4	5.5	5.4	0.56
9030	Water Heating	Thermostatic Restrictor Shower Valve	No program	MH	NC	3,242	2%	77	0.005	0.005	10	$30.00	25%	170%	0%	24%	3.4	5.5	5.4	0.56
9031	Water Heating	Heat Pump Water Heater (UEF 2.0)-electric resistance heat	Heat Pump Water Heater	SF	MO	2,942	61%	1,783	0.084	0.620	15	$1,030.00	25%	14%	19%	35%	2.8	8.8	2.9	0.94
9032	Water Heating	Heat Pump Water Heater (UEF 2.0)-electric resistance heat	Heat Pump Water Heater	SF	MO	2,942	61%	1,783	0.084	0.620	15	$1,030.00	25%	14%	19%	35%	2.8	8.8	2.9	0.94
9033	Water Heating	Heat Pump Water Heater (UEF 2.0)-electric resistance heat	Heat Pump Water Heater	SF	NC	2,942	61%	1,783	0.084	0.620	15	$1,030.00	25%	14%	0%	24%	2.8	8.8	2.9	0.94
9034	Water Heating	Heat Pump Water Heater (UEF 2.0)-electric resistance heat	Heat Pump Water Heater	MH	MO	2,942	56%	1,635	0.077	0.568	15	$1,030.00	25%	14%	19%	35%	2.6	8.0	2.8	0.93
9035	Water Heating	Heat Pump Water Heater (UEF 2.0)-electric resistance heat	Heat Pump Water Heater	MH	MO	3,242	50%	1,635	0.077	0.568	15	$1,030.00	25%	14%	19%	35%	2.6	8.0	2.8	0.93
9036	Water Heating	Heat Pump Water Heater (UEF 2.0)-electric resistance heat	Heat Pump Water Heater	MH	NC	3,242	50%	1,635	0.077	0.568	15	$1,030.00	25%	14%	0%	24%	2.6	8.0	2.8	0.93
9037	Water Heating	Heat Pump Water Heater (UEF 2.0)-heat pump heat	Heat Pump Water Heater	SF	MO	2,660	67%	1,791	0.085	0.622	15	$1,030.00	25%	38%	19%	35%	2.8	8.8	2.9	0.94
9038	Water Heating	Heat Pump Water Heater (UEF 2.0)-heat pump heat	Heat Pump Water Heater	SF	MO	2,660	67%	1,791	0.085	0.622	15	$1,030.00	25%	38%	19%	35%	2.8	8.8	2.9	0.94
9039	Water Heating	Heat Pump Water Heater (UEF 2.0)-heat pump heat	Heat Pump Water Heater	SF	NC	2,660	67%	1,791	0.085	0.622	15	$1,030.00	25%	38%	0%	24%	2.8	8.8	2.9	0.94
9040	Water Heating	Heat Pump Water Heater (UEF 2.0)-heat pump heat	Heat Pump Water Heater	MH	MO	3,242	51%	1,642	0.078	0.571	15	$1,030.00	25%	38%	19%	35%	2.6	8.1	2.8	0.94
9041	Water Heating	Heat Pump Water Heater (UEF 2.0)-heat pump heat	Heat Pump Water Heater	MH	MO	3,242	51%	1,642	0.078	0.571	15	$1,030.00	25%	38%	19%	35%	2.6	8.1	2.8	0.94
9042	Water Heating	Heat Pump Water Heater (UEF 2.0)-heat pump heat	Heat Pump Water Heater	MH	NC	3,242	51%	1,642	0.078	0.571	15	$1,030.00	25%	38%	0%	24%	2.6	8.1	2.8	0.94
9043	Water Heating	Heat Pump Water Heater (UEF 2.0)-gas heat	Heat Pump Water Heater	SF	MO	2,660	68%	1,800	0.085	0.625	15	$1,030.00	25%	14%	19%	35%	4.1	8.9	6.5	0.94
9044	Water Heating	Heat Pump Water Heater (UEF 2.0)-gas heat	Heat Pump Water Heater	SF	MO	2,660	68%	1,800	0.085	0.625	15	$1,030.00	25%	14%	19%	35%	4.1	8.9	6.5	0.94
9045	Water Heating	Heat Pump Water Heater (UEF 2.0)-gas heat	Heat Pump Water Heater	SF	NC	2,660	68%	1,800	0.085	0.625	15	$1,030.00	25%	14%	0%	24%	4.1	8.9	6.5	0.94
9046	Water Heating	Heat Pump Water Heater (UEF 2.0)-gas heat	Heat Pump Water Heater	MH	MO	3,242	51%	1,650	0.078	0.573	15	$1,030.00	25%	14%	19%	35%	3.4	8.1	5.0	0.94
9047	Water Heating	Heat Pump Water Heater (UEF 2.0)-gas heat	Heat Pump Water Heater	MH	MO	3,242	51%	1,650	0.078	0.573	15	$1,030.00	25%	14%	19%	35%	3.4	8.1	5.0	0.94
9048	Water Heating	Heat Pump Water Heater (UEF 2.0)-gas heat	Heat Pump Water Heater	MH	MO	3,242	51%	1,650	0.078	0.573	15	$1,030.00	25%	14%	19%	35%	3.4	8.1	5.0	0.94
9049	Water Heating	Heat Pump Water Heater (UEF 2.6)-electric resistance heat	Heat Pump Water Heater	SF	MO	2,660	80%	2,120	0.100	0.737	15	$1,199.00	25%	14%	19%	35%	2.8	9.0	2.9	0.95

Residential Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Home Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
9050	Water Heating	Heat Pump Water Heater (UEF 2.6)-electric resistance heat	Heat Pump Water Heater	SF	MO	2,660	80%	2,120	0.100	0.737	15	$1,199.00	25%	14%	19%	35%	2.8	9.0	2.9	0.95
9051	Water Heating	Heat Pump Water Heater (UEF 2.6)-electric resistance heat	Heat Pump Water Heater	SF	NC	2,660	80%	2,120	0.100	0.737	15	$1,199.00	25%	14%	0%	24%	2.8	9.0	2.9	0.95
9052	Water Heating	Heat Pump Water Heater (UEF 2.6)-electric resistance heat	Heat Pump Water Heater	MH	MO	3,242	60%	1,944	0.092	0.675	15	$1,199.00	25%	14%	19%	35%	2.6	8.2	2.8	0.94
9053	Water Heating	Heat Pump Water Heater (UEF 2.6)-electric resistance heat	Heat Pump Water Heater	MH	MO	3,242	60%	1,944	0.092	0.675	15	$1,199.00	25%	14%	19%	35%	2.6	8.2	2.8	0.94
9054	Water Heating	Heat Pump Water Heater (UEF 2.6)-electric resistance heat	Heat Pump Water Heater	MH	NC	3,242	60%	1,944	0.092	0.675	15	$1,199.00	25%	14%	0%	24%	2.6	8.2	2.8	0.94
9055	Water Heating	Heat Pump Water Heater (UEF 2.6)-heat pump heat	Heat Pump Water Heater	SF	MO	2,660	80%	2,129	0.101	0.740	15	$1,199.00	25%	38%	19%	35%	2.8	9.0	2.9	0.95
9056	Water Heating	Heat Pump Water Heater (UEF 2.6)-heat pump heat	Heat Pump Water Heater	SF	MO	2,660	80%	2,129	0.101	0.740	15	$1,199.00	25%	38%	19%	35%	2.8	9.0	2.9	0.95
9057	Water Heating	Heat Pump Water Heater (UEF 2.6)-heat pump heat	Heat Pump Water Heater	SF	NC	2,660	80%	2,129	0.101	0.740	15	$1,199.00	25%	38%	0%	24%	2.8	9.0	2.9	0.95
9058	Water Heating	Heat Pump Water Heater (UEF 2.6)-heat pump heat	Heat Pump Water Heater	MH	MO	3,242	60%	1,952	0.092	0.678	15	$1,199.00	25%	38%	19%	35%	2.6	8.3	2.8	0.94
9059	Water Heating	Heat Pump Water Heater (UEF 2.6)-heat pump heat	Heat Pump Water Heater	MH	MO	3,242	60%	1,952	0.092	0.678	15	$1,199.00	25%	38%	19%	35%	2.6	8.3	2.8	0.94
9060	Water Heating	Heat Pump Water Heater (UEF 2.6)-heat pump heat	Heat Pump Water Heater	MH	NC	3,242	60%	1,952	0.092	0.678	15	$1,199.00	25%	38%	0%	24%	2.6	8.3	2.8	0.94
9061	Water Heating	Heat Pump Water Heater (UEF 2.6)-gas heat	Heat Pump Water Heater	SF	MO	2,660	80%	2,140	0.101	0.744	15	$1,199.00	25%	14%	19%	35%	4.2	9.0	6.6	0.95
9062	Water Heating	Heat Pump Water Heater (UEF 2.6)-gas heat	Heat Pump Water Heater	SF	MO	2,660	80%	2,140	0.101	0.744	15	$1,199.00	25%	14%	19%	35%	4.2	9.0	6.6	0.95
9063	Water Heating	Heat Pump Water Heater (UEF 2.6)-gas heat	Heat Pump Water Heater	SF	NC	2,660	80%	2,140	0.101	0.744	15	$1,199.00	25%	14%	0%	24%	4.2	9.0	6.6	0.95
9064	Water Heating	Heat Pump Water Heater (UEF 2.6)-gas heat	Heat Pump Water Heater	MH	MO	3,242	61%	1,963	0.093	0.682	15	$1,199.00	25%	14%	19%	35%	3.5	8.3	5.0	0.94
9065	Water Heating	Heat Pump Water Heater (UEF 2.6)-gas heat	Heat Pump Water Heater	MH	MO	3,242	61%	1,963	0.093	0.682	15	$1,199.00	25%	14%	19%	35%	3.5	8.3	5.0	0.94
9066	Water Heating	Heat Pump Water Heater (UEF 2.6)-gas heat	Heat Pump Water Heater	MH	MO	3,242	61%	1,963	0.093	0.682	15	$1,199.00	25%	14%	19%	35%	3.5	8.3	5.0	0.94
9067	Water Heating	Water Heater Wrap	No program	SF	Retrofit	3,242	8%	246	0.028	0.333	5	$64.47	25%	85%	12%	30%	5.2	21.0	2.1	2.51
9068	Water Heating	Water Heater Wrap	No program	SF	Retrofit	3,242	8%	246	0.028	0.333	5	$64.47	25%	85%	12%	30%	5.2	21.0	2.1	2.51
9069	Water Heating	Water Heater Wrap	No program	SF	NC	3,242	8%	246	0.028	0.333	5	$64.47	25%	85%	0%	24%	5.2	21.0	2.1	2.51
9070	Water Heating	Water Heater Wrap	No program	MH	Retrofit	3,242	8%	246	0.028	0.333	5	$64.47	25%	85%	12%	30%	5.2	21.0	2.1	2.51
9071	Water Heating	Water Heater Wrap	No program	MH	Retrofit	3,242	8%	246	0.028	0.333	5	$64.47	25%	85%	12%	30%	5.2	21.0	2.1	2.51
9072	Water Heating	Water Heater Wrap	No program	MH	NC	3,242	8%	246	0.028	0.333	5	$64.47	25%	85%	0%	24%	5.2	21.0	2.1	2.51
9073	Water Heating	Drain water Heat Recovery	No program	SF	Retrofit	3,242	19%	601	0.006	0.006	30	$744.00	25%	85%	10%	28%	0.8	3.1	1.8	0.44
9074	Water Heating	Drain water Heat Recovery	No program	SF	Retrofit	3,242	19%	601	0.006	0.006	30	$744.00	25%	85%	10%	28%	0.8	3.1	1.8	0.44
9075	Water Heating	Drain water Heat Recovery	No program	SF	NC	3,242	19%	601	0.006	0.006	30	$744.00	25%	85%	0%	24%	0.8	3.1	1.8	0.44
9076	Water Heating	Drain water Heat Recovery	No program	MH	Retrofit	3,242	19%	601	0.006	0.006	30	$744.00	25%	85%	10%	28%	0.8	3.1	1.8	0.44
9077	Water Heating	Drain water Heat Recovery	No program	MH	Retrofit	3,242	19%	601	0.006	0.006	30	$744.00	25%	85%	10%	28%	0.8	3.1	1.8	0.44
9078	Water Heating	Drain water Heat Recovery	No program	MH	NC	3,242	19%	601	0.006	0.006	30	$744.00	25%	85%	0%	24%	0.8	3.1	1.8	0.44
9079	Water Heating	Shower Timer	No program	SF	Retrofit	3,242	3%	81	0.038	0.064	2	$25.99	25%	170%	1%	24%	1.9	5.1	1.8	1.43
9080	Water Heating	Shower Timer	No program	SF	Retrofit	3,242	3%	81	0.038	0.064	2	$25.99	25%	170%	1%	24%	1.9	5.1	1.8	1.43
9081	Water Heating	Shower Timer	No program	SF	NC	3,242	3%	81	0.038	0.064	2	$25.99	25%	170%	0%	24%	1.9	5.1	1.8	1.43
9082	Water Heating	Shower Timer	No program	MH	Retrofit	3,242	3%	81	0.038	0.057	2	$25.99	25%	170%	1%	24%	1.8	4.7	1.8	1.32
9083	Water Heating	Shower Timer	No program	MH	Retrofit	3,242	3%	81	0.038	0.057	2	$25.99	25%	170%	1%	24%	1.8	4.7	1.8	1.32
9084	Water Heating	Shower Timer	No program	MH	NC	3,242	3%	81	0.038	0.057	2	$25.99	25%	170%	0%	24%	1.8	4.7	1.8	1.32

APPENDIX B: COMMERCIAL AND INDUSTRIAL MEASURE DETAIL

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
1	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Assembly	MO	19496	39%	7532	1.841	0.802	12	$2,270.00	50%	17%	53%	51%	2.7	5.4	4.0	0.68
2	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Assembly	MO	10864	19%	2064	0.505	0.220	12	$960.00	50%	17%	53%	47%	1.7	3.5	2.8	0.63
3	Cooking	Commercial Electric Griddle	Biz - Custom	Assembly	MO	17056	15%	2596	0.634	0.277	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
4	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Assembly	MO	16915	80%	13507	3.301	1.439	12	$2,757.00	50%	6%	45%	53%	4.0	8.0	5.6	0.71
5	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Assembly	MO	35655	44%	15766	3.853	1.679	16	$466.50	50%	26%	61%	57%	34.3	68.7	44.9	0.77
6	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Assembly	MO	38282	16%	6279	1.535	0.669	15	$1,550.00	50%	26%	61%	52%	3.9	7.8	5.6	0.70
7	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Assembly	MO	18955	17%	3274	0.800	0.349	12	$1,500.00	50%	27%	24%	47%	1.8	3.5	2.8	0.64
8	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Assembly	MO	1478	37%	545	0.133	0.058	12	$1,000.00	50%	3%	16%	32%	0.4	0.9	1.1	0.41
9	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Assembly	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.7	5.5	4.4	0.62
10	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Assembly	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.6	3.2	2.8	0.58
11	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Assembly	MO	23742	21%	4935	0.611	0.589	13	$3,367.84	50%	100%	20%	48%	1.1	2.3	2.1	0.54
12	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Assembly	RETRO	476154	0%	1970	0.244	0.235	10	$244.00	50%	100%	5%	63%	5.1	10.3	7.8	0.66
13	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Assembly	MO	1130	50%	565	0.070	0.067	15	$57.00	50%	5%	20%	63%	8.7	17.3	12.9	0.67
14	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Assembly	MO	757	14%	107	0.051	0.001	15	$153.28	50%	23%	5%	32%	0.6	1.3	1.4	0.46
15	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Assembly	MO	757	19%	143	0.069	0.001	15	$214.59	50%	23%	5%	31%	0.6	1.2	1.3	0.45
16	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Assembly	MO	757	30%	231	0.111	0.002	15	$398.52	50%	23%	5%	28%	0.5	1.1	1.2	0.43
17	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Assembly	MO	850	9%	77	0.037	0.001	15	$71.00	50%	23%	5%	41%	1.0	2.0	1.9	0.53
18	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Assembly	MO	850	13%	113	0.055	0.001	15	$109.23	50%	23%	5%	39%	0.9	1.9	1.8	0.52
19	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Assembly	MO	850	24%	200	0.096	0.002	15	$218.46	50%	23%	5%	37%	0.8	1.7	1.6	0.51
20	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Assembly	RETRO	921	7%	65	0.031	0.001	3	$11.42	50%	46%	50%	46%	1.2	2.4	2.3	0.53
21	Cooling	Air Side Economizer	Biz - Custom	Assembly	RETRO	757	20%	151	0.073	0.001	10	$126.67	50%	46%	25%	32%	0.8	1.5	1.6	0.49
22	Cooling	HVAC Occupancy Controls	Biz - Custom	Assembly	RETRO	799	20%	160	0.077	0.002	15	$197.50	50%	46%	20%	26%	1.2	1.5	2.5	0.49
23	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Assembly	MO	790	13%	99	0.048	0.001	15	$115.00	50%	23%	5%	36%	0.8	1.6	1.6	0.50
24	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Assembly	MO	790	22%	175	0.085	0.002	15	$514.00	50%	23%	5%	21%	0.3	0.6	0.9	0.33
25	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Assembly	MO	790	33%	263	0.127	0.003	15	$630.50	50%	23%	5%	23%	0.4	0.8	1.0	0.37
26	Cooling	Smart Thermostat	Biz - Prescriptive	Assembly	RETRO	4532	14%	642	0.309	0.006	11	$175.00	50%	23%	20%	58%	4.2	5.1	7.5	0.63
27	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Assembly	MO	1019	15%	148	0.071	0.001	8	$84.00	50%	0%	20%	38%	0.9	1.9	1.8	0.51
28	Cooling	Air Cooled Chiller	Biz - Prescriptive	Assembly	MO	807	9%	73	0.035	0.001	23	$126.00	50%	28%	5%	28%	0.7	1.5	1.5	0.50
29	Cooling	Water Cooled Chiller	Biz - Prescriptive	Assembly	MO	405	23%	92	0.044	0.001	23	$61.00	50%	3%	5%	48%	1.9	3.8	3.0	0.63
30	Cooling	Window Film	Biz - Custom	Assembly	RETRO	6364	4%	280	0.135	0.003	10	$153.81	50%	100%	25%	39%	0.6	2.3	-0.2	0.55
31	Cooling	Triple Pane Windows	Biz - Custom	Assembly	MO	6364	6%	382	0.184	0.004	25	$700.00	50%	100%	2%	20%	0.7	1.5	1.5	0.50
32	Cooling	Energy Recovery Ventilator	Biz - Custom	Assembly	RETRO	850	0%	0	0.000	0.000	15	$1,500.00		100%	2%	50%	0.0	0.0	0.0	0.00
33	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Assembly	MO	2492	7%	173	0.028	0.038	15	$135.00	50%	23%	15%	45%	1.4	2.8	2.1	0.68
34	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Assembly	MO	2492	13%	333	0.054	0.074	15	$445.76	50%	23%	15%	33%	0.8	1.7	1.4	0.58
35	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Assembly	MO	2492	19%	468	0.076	0.103	15	$520.06	50%	23%	15%	36%	1.0	2.0	1.6	0.61
36	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Assembly	MO	2732	6%	166	0.027	0.037	15	$100.00	50%	16%	15%	50%	1.8	3.7	2.6	0.72
37	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Assembly	MO	2732	11%	308	0.050	0.068	15	$171.08	50%	16%	15%	51%	2.0	4.0	2.8	0.73
38	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Assembly	MO	2827	6%	183	0.030	0.040	15	$100.00	50%	15%	15%	51%	2.0	4.1	2.8	0.73
39	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Assembly	MO	2827	12%	334	0.054	0.074	15	$158.10	50%	15%	15%	53%	2.3	4.7	3.1	0.75
40	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Assembly	MO	2951	6%	187	0.030	0.041	15	$100.00	50%	15%	15%	52%	2.1	4.1	2.8	0.73
41	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Assembly	MO	2951	12%	362	0.059	0.080	15	$201.80	50%	15%	15%	51%	2.0	4.0	2.7	0.73
42	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Assembly	MO	2829	44%	1240	0.201	0.274	25	$4,361.00	50%	4%	15%	18%	0.4	0.9	1.0	0.44
43	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Assembly	MO	2829	47%	1333	0.216	0.295	25	$4,361.00	50%	4%	15%	19%	0.5	0.9	1.0	0.45
44	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Assembly	MO	1625	17%	271	0.044	0.060	15	$84.00	50%	0%	15%	43%	3.6	7.2	4.5	0.79
45	Hot Water	Heat Pump Water Heater	Biz - Custom	Assembly	MO	10591	73%	7766	1.053	1.212	15	$1,797.00	50%	100%	0%	41%	4.2	8.4	5.9	0.71
46	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Assembly	RETRO	395	32%	128	0.017	0.020	10	$8.00	50%	20%	85%	45%	11.4	22.7	15.0	0.76
47	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Assembly	RETRO	18059	54%	9789	1.327	1.528	5	$54.00	50%	20%	85%	46%	71.1	142.2	91.2	0.78
48	Hot Water	Ozone Commercial Laundry	Biz - Custom	Assembly	RETRO	2984	25%	746	0.101	0.116	10	$20,309.70	50%	0%	20%	15%	1.1	0.1	2.9	0.05
49	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Assembly	RETRO	996	76%	755	0.000	0.087	10	$97.00	22%	13%	70%	64%	4.3	19.1	7.3	0.59
50	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Assembly	RETRO	1744	71%	1239	0.000	0.143	10	$123.81	29%	13%	70%	67%	5.5	19.1	9.4	0.59
51	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Assembly	RETRO	2490	67%	1659	0.000	0.192	10	$134.35	36%	13%	70%	68%	6.8	19.1	11.6	0.59
52	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Assembly	RETRO	3984	65%	2570	0.000	0.297	10	$196.16	38%	13%	70%	69%	7.2	19.1	12.3	0.59
53	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Assembly	RETRO	9467	70%	6666	0.000	0.770	10	$319.31	60%	13%	70%	71%	11.5	19.1	19.6	0.59
54	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Assembly	RETRO	489	76%	370	0.000	0.043	10	$97.00	11%	7%	70%	56%	2.1	19.1	3.6	0.59
55	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Assembly	RETRO	856	71%	608	0.000	0.070	10	$123.81	14%	7%	70%	60%	2.7	19.1	4.6	0.59

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
56	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Assembly	RETRO	1222	67%	814	0.000	0.094	10	$134.35	18%	7%	70%	62%	3.3	19.1	5.7	0.59
57	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Assembly	RETRO	1956	65%	1262	0.000	0.146	10	$196.16	19%	7%	70%	63%	3.6	19.1	6.0	0.59
58	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Assembly	RETRO	4647	70%	3272	0.000	0.378	10	$319.31	30%	7%	70%	67%	5.7	19.1	9.6	0.59
59	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Assembly	RETRO	126	74%	93	0.012	0.012	15	$59.00	5%	19%	60%	40%	1.3	27.7	2.3	0.71
60	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Assembly	RETRO	91	51%	47	0.006	0.006	10	$15.00	10%	46%	40%	53%	1.8	20.2	3.8	0.70
61	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Assembly	RETRO	94	34%	32	0.004	0.004	15	$22.00	5%	46%	40%	38%	1.2	27.7	2.1	0.71
62	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Assembly	RETRO	184	51%	95	0.012	0.012	15	$61.00	5%	46%	40%	40%	1.3	27.7	2.3	0.71
63	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Assembly	RETRO	273	54%	148	0.019	0.019	15	$76.00	6%	46%	40%	44%	1.5	27.7	3.1	0.71
64	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Assembly	RETRO	364	54%	198	0.025	0.026	15	$104.00	6%	46%	40%	44%	1.5	27.7	3.0	0.71
65	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Assembly	RETRO	184	50%	92	0.012	0.012	15	$46.67	7%	46%	40%	45%	1.6	27.7	3.2	0.71
66	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Assembly	RETRO	485	53%	258	0.033	0.034	15	$152.00	6%	46%	40%	42%	1.4	27.7	2.5	0.71
67	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Assembly	RETRO	508	67%	340	0.043	0.045	15	$42.88	26%	5%	40%	65%	4.6	27.7	-54.6	0.71
68	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Assembly	RETRO	950	57%	542	0.069	0.071	15	$48.07	37%	6%	40%	68%	5.6	27.7	-19.4	0.71
69	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Assembly	RETRO	3815	72%	2758	0.352	0.362	15	$187.94	48%	17%	40%	70%	6.5	27.7	-14.4	0.71
70	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Assembly	RETRO	81	100%	81	0.010	0.011	11	$18.50	14%	46%	0%	59%	2.5	21.8	7.7	0.71
71	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Assembly	RETRO	422	30%	126	0.016	0.017	15	$65.40	6%	90%	15%	44%	1.8	27.7	2.5	0.71
72	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Assembly	RETRO	540	28%	151	0.019	0.020	15	$57.50	9%	90%	15%	50%	2.4	27.7	3.4	0.71
73	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Assembly	RETRO	241	38%	92	0.012	0.012	15	$75.00	4%	90%	15%	34%	1.1	27.7	1.6	0.71
74	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Assembly	RETRO	241	61%	147	0.019	0.019	15	$56.00	9%	90%	15%	50%	2.4	27.7	3.4	0.71
75	Lighting_Int	Networked Lighting Control	Biz - Custom	Assembly	RETRO	2	35%	1	0.000	0.000	15	$0.41	6%	90%	15%	31%	1.5	27.7	2.2	0.71
76	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Assembly	RETRO	66	71%	47	0.006	0.006	5	$32.50	5%	1%	85%	38%	0.5	11.1	0.8	0.69
77	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Assembly	RETRO	385	61%	237	0.029	0.028	5	$233.00	50%	0%	31%	44%	0.4	0.7	1.0	0.35
78	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Assembly	MO	0	0%	0	0.000	0.000	20	$1.73		32%	24%	54%	0.0	0.0	0.0	0.00
79	Misc	High Efficiency Hand Dryers	Biz - Custom	Assembly	MO	2093	83%	1737	0.215	0.207	10	$483.00	50%	1%	50%	46%	2.3	4.6	3.8	0.61
80	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Assembly	RETRO	3125	4%	114	0.014	0.014	15	$59.00	50%	1%	73%	41%	1.7	3.4	2.9	0.58
81	Misc	Miscellaneous Custom	Biz - Custom	Assembly	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	67%	10%	44%	1.6	3.2	2.8	0.57
82	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Assembly	MO	1503	28%	417	0.000	0.095	15	$198.32	50%	100%	25%	53%	2.1	4.2	3.1	0.68
83	Motors	Power Drive Systems	Biz - Custom	Assembly	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	7.7	15.5	10.1	0.76
84	Motors	Switch Reluctance Motors	Biz - Custom	Assembly	MO	33406	31%	10222	0.000	2.326	15	$527.50	50%	100%	1%	49%	19.5	39.0	24.7	0.79
85	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Assembly	MO	418	26%	110	0.014	0.013	6	$0.00		17%	95%	54%	#DIV/0!	0.0	0.0	0.00
86	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Assembly	RETRO	188	58%	109	0.013	0.013	7	$10.00	50%	17%	20%	52%	5.1	10.3	7.8	0.66
87	Plug_Office	Smart Socket	Biz - Custom	Assembly	RETRO	80	61%	48	0.006	0.006	7	$9.00	50%	17%	20%	49%	2.5	5.1	4.1	0.62
88	Plug_Office	Energy Star Server	Biz - Custom	Assembly	MO	2167	30%	650	0.080	0.078	9	$300.95	50%	20%	25%	42%	1.3	2.5	2.3	0.55
89	Plug_Office	Server Virtualization	Biz - Custom	Assembly	RETRO	2167	14%	301	0.037	0.036	9	$26.97	50%	20%	25%	52%	6.5	13.1	9.8	0.67
90	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Assembly	RETRO	86783	18%	15778	1.953	1.882	15	$480.00	50%	20%	25%	53%	28.7	57.4	41.6	0.69
91	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Assembly	RETRO	764	47%	358	0.044	0.043	15	$82.00	50%	20%	25%	48%	3.8	7.6	6.0	0.64
92	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Assembly	MO	8940	25%	2265	0.280	0.270	20	$750.00	50%	20%	25%	45%	3.2	6.5	5.1	0.63
93	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Assembly	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	20%	25%	48%	2.8	5.6	4.5	0.62
94	Refrigeration	Strip Curtains	Biz - Prescriptive	Assembly	RETRO	0	0%	0	0.000	0.000	4	$10.22		3%	26%	58%	0.0	0.0	0.0	0.00
95	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Assembly	RETRO	1228	25%	307	0.043	0.034	15	$431.00	50%	2%	25%	27%	0.6	1.2	1.4	0.44
96	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Assembly	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	3%	80%	53%	4.5	9.0	7.0	0.64
97	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Assembly	RETRO	1298	23%	293	0.041	0.032	13	$161.75	50%	2%	25%	45%	1.4	2.8	2.5	0.56
98	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Assembly	RETRO	3158	48%	1500	0.212	0.164	15	$1,170.00	50%	3%	25%	42%	1.1	2.2	2.1	0.53
99	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Assembly	RETRO	579	42%	240	0.034	0.026	10	$79.50	50%	21%	25%	50%	1.9	3.8	3.2	0.59
100	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Assembly	RETRO	1259893	0%	2399	0.338	0.262	8	$502.00	50%	15%	27%	53%	2.5	5.0	4.1	0.61
101	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Assembly	RETRO	45880	10%	4588	0.647	0.501	10	$311.54	50%	15%	27%	42%	9.3	18.6	13.9	0.67
102	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Assembly	RETRO	1558	50%	779	0.110	0.085	15	$390.00	50%	6%	25%	46%	1.7	3.5	3.0	0.58
103	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Assembly	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	3%	80%	53%	4.5	9.0	7.0	0.64
104	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Assembly	RETRO	2091	24%	505	0.071	0.055	10	$96.00	50%	3%	2%	40%	3.3	6.6	5.3	0.63
105	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Assembly	RETRO	1511	9%	136	0.019	0.015	5	$42.00	50%	20%	55%	51%	1.1	2.2	2.1	0.53
106	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Assembly	RETRO	2016	33%	655	0.092	0.072	10	$79.50	50%	7%	25%	55%	5.2	10.4	8.0	0.65
107	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Assembly	RETRO	1259893	1%	6949	0.980	0.759	8	$502.00	50%	7%	27%	56%	7.2	14.5	11.0	0.66
108	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Assembly	RETRO	2349	9%	211	0.030	0.023	5	$42.00	50%	7%	55%	53%	1.7	3.5	3.0	0.58
109	Refrigeration	Refrigeration - Custom	Biz - Custom	Assembly	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.1	2.8	0.57

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
110	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Assembly	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.1	2.8	0.57
111	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Assembly	MO	1278	12%	153	0.022	0.017	14	$500.00	50%	2%	31%	18%	0.3	0.5	0.9	0.29
112	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Assembly	RETRO	1663	23%	390	0.055	0.043	5	$245.00	50%	2%	31%	44%	0.6	1.1	1.3	0.43
113	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Assembly	MO	5551	8%	440	0.062	0.048	9	$222.00	50%	4%	44%	46%	1.1	2.3	2.2	0.53
114	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Assembly	MO	115	74%	84	0.012	0.009	9	$11.00	50%	12%	35%	55%	4.4	8.9	6.9	0.64
115	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Assembly	RETRO	7655	59%	4516	0.784	0.695	15	$2,250.00	50%	40%	33%	53%	2.0	4.0	3.0	0.66
116	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Assembly	RETRO	17237	3%	534	0.080	0.071	15	$381.00	50%	40%	10%	35%	1.3	2.6	2.3	0.58
117	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Assembly	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	100%	20%	41%	2.3	4.6	3.6	0.63
118	WholeBldg_HVAC	GREM Controls	Biz - Custom	Assembly	RETRO	0	0%	0	0.000	0.000	15	$0.00	0%	0%	20%	50%	#DIV/0!	0.0	0.0	0.00
119	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Assembly	RETRO	1920	20%	384	0.062	0.049	10	$235.60	50%	100%	10%	37%	2.3	2.2	4.5	0.55
120	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Assembly	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.17
121	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Assembly	RETRO	0	0%	0	0.000	0.000	10	$341.21		42%	33%	50%	0.0	0.0	0.0	0.00
122	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Assembly	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	7.7	15.3	10.9	0.70
123	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Assembly	RETRO	222	2%	4	0.001	0.001	10	$8.00	50%	100%	25%	20%	0.4	0.7	1.0	0.37
124	WholeBldg	WholeBlg - Com RET	Biz - Custom	Assembly	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.3	4.6	3.6	0.63
125	WholeBldg	Strategic Energy Management	Biz - RCx	Assembly	RETRO	0	0%	0	0.000	0.000	5	$0.27		100%	0%	73%	0.5	0.0	0.0	0.00
126	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Assembly	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.3	2.6	2.2	0.57
127	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Assembly	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.3	4.6	3.6	0.63
128	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Education	MO	19496	39%	7532	0.081	0.289	12	$2,270.00	50%	17%	53%	51%	2.0	4.1	4.0	0.51
129	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Education	MO	10864	19%	2064	0.022	0.079	12	$960.00	50%	17%	53%	47%	1.3	2.6	2.8	0.48
130	Cooking	Commercial Electric Griddle	Biz - Custom	Education	MO	17056	15%	2596	0.028	0.100	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
131	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Education	MO	16915	80%	13507	0.145	0.518	12	$2,757.00	50%	6%	45%	53%	3.0	6.0	5.6	0.53
132	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Education	MO	35655	44%	15766	0.169	0.604	16	$466.50	50%	26%	61%	57%	25.9	51.7	44.9	0.58
133	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Education	MO	38282	16%	6279	0.067	0.241	15	$1,550.00	50%	26%	61%	52%	3.0	5.9	5.6	0.53
134	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Education	MO	18955	17%	3274	0.035	0.125	12	$1,500.00	50%	27%	24%	47%	1.3	2.7	2.8	0.48
135	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Education	MO	1478	37%	545	0.006	0.021	12	$1,000.00	50%	3%	16%	32%	0.3	0.7	1.1	0.31
136	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Education	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.6	5.3	4.4	0.60
137	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Education	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.5	3.1	2.8	0.55
138	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Education	MO	23742	21%	4935	0.468	0.554	13	$3,367.84	50%	100%	20%	48%	1.1	2.2	2.1	0.52
139	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Education	RETRO	476154	0%	1970	0.187	0.221	10	$244.00	50%	100%	5%	63%	5.0	9.9	7.8	0.63
140	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Education	MO	1130	50%	565	0.054	0.063	15	$57.00	50%	5%	20%	63%	8.3	16.7	12.9	0.65
141	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Education	MO	546	14%	77	0.041	0.000	15	$153.28	50%	28%	5%	25%	0.5	0.9	1.1	0.41
142	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Education	MO	546	19%	103	0.054	0.001	15	$214.59	50%	28%	5%	24%	0.4	0.9	1.1	0.40
143	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Education	MO	546	30%	167	0.088	0.001	15	$398.52	50%	28%	5%	23%	0.4	0.8	1.0	0.38
144	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Education	MO	614	9%	56	0.029	0.000	15	$71.00	50%	28%	5%	34%	0.7	1.5	1.5	0.49
145	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Education	MO	614	13%	82	0.043	0.001	15	$109.23	50%	28%	5%	33%	0.7	1.4	1.4	0.48
146	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Education	MO	614	24%	144	0.076	0.001	15	$218.46	50%	28%	5%	31%	0.6	1.2	1.3	0.46
147	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Education	RETRO	665	7%	47	0.025	0.000	3	$11.42	50%	55%	50%	44%	0.9	1.7	1.8	0.49
148	Cooling	Air Side Economizer	Biz - Custom	Education	RETRO	546	20%	109	0.058	0.001	10	$126.67	50%	55%	25%	27%	0.6	1.1	1.3	0.44
149	Cooling	HVAC Occupancy Controls	Biz - Custom	Education	RETRO	577	20%	115	0.061	0.001	15	$197.50	50%	55%	20%	21%	0.9	1.1	1.9	0.44
150	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Education	MO	570	13%	71	0.038	0.000	15	$115.00	50%	0%	5%	30%	0.6	1.1	1.3	0.45
151	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Education	MO	570	22%	127	0.067	0.001	15	$514.00	50%	0%	5%	16%	0.2	0.5	0.8	0.28
152	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Education	MO	570	33%	190	0.100	0.001	15	$630.50	50%	0%	5%	19%	0.3	0.6	0.9	0.32
153	Cooling	Smart Thermostat	Biz - Prescriptive	Education	RETRO	3270	14%	463	0.244	0.003	11	$175.00	50%	0%	20%	56%	3.0	3.8	5.5	0.61
154	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Education	MO	735	15%	107	0.057	0.001	8	$84.00	50%	0%	20%	33%	0.7	1.4	1.5	0.47
155	Cooling	Air Cooled Chiller	Biz - Prescriptive	Education	MO	582	9%	52	0.028	0.000	23	$126.00	50%	41%	5%	23%	0.5	1.1	1.2	0.45
156	Cooling	Water Cooled Chiller	Biz - Prescriptive	Education	MO	292	23%	66	0.035	0.000	23	$61.00	50%	5%	5%	41%	1.4	2.8	2.3	0.60
157	Cooling	Window Film	Biz - Custom	Education	RETRO	6364	4%	280	0.148	0.002	10	$153.81	50%	100%	25%	39%	0.6	2.4	-0.2	0.56
158	Cooling	Triple Pane Windows	Biz - Custom	Education	MO	6364	6%	382	0.202	0.002	25	$700.00	50%	100%	2%	20%	0.8	1.5	1.5	0.51
159	Cooling	Energy Recovery Ventilator	Biz - Custom	Education	RETRO	614	0%	0	0.000	0.000	15	$1,500.00		100%	2%	50%	0.0	0.0	0.0	0.00
160	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Education	MO	1755	7%	123	0.022	0.031	15	$135.00	50%	0%	15%	36%	1.1	2.2	1.6	0.66
161	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Education	MO	1755	13%	237	0.042	0.060	15	$445.76	50%	0%	15%	26%	0.6	1.3	1.2	0.54
162	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Education	MO	1755	19%	332	0.059	0.084	15	$520.06	50%	0%	15%	30%	0.8	1.5	1.3	0.58
163	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Education	MO	1922	6%	117	0.021	0.030	15	$100.00	50%	23%	15%	42%	1.4	2.8	2.0	0.71

C&I Measure Summary:

EKPC																					
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
164	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Education	MO	1922	11%	217	0.039	0.055	15	$171.08	50%	23%	15%	44%	1.5	3.0	2.1	0.72
165	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Education	MO	1989	6%	129	0.023	0.033	15	$100.00	50%	22%	15%	45%	1.5	3.1	2.1	0.72
166	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Education	MO	1989	12%	235	0.042	0.060	15	$158.10	50%	22%	15%	48%	1.8	3.5	2.4	0.75
167	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Education	MO	2077	6%	132	0.024	0.033	15	$100.00	50%	22%	15%	45%	1.6	3.1	2.1	0.73
168	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Education	MO	2077	12%	255	0.046	0.065	15	$201.80	50%	22%	15%	44%	1.5	3.0	2.1	0.72
169	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Education	MO	1990	44%	867	0.155	0.220	25	$4,361.00	50%	5%	15%	16%	0.3	0.7	0.9	0.38
170	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Education	MO	1990	47%	933	0.167	0.237	25	$4,361.00	50%	5%	15%	16%	0.4	0.7	0.9	0.40
171	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Education	MO	3982	17%	664	0.119	0.169	15	$84.00	50%	0%	15%	47%	9.4	18.7	10.4	0.90
172	Hot Water	Heat Pump Water Heater	Biz - Custom	Education	MO	17641	73%	12936	1.328	2.056	15	$1,797.00	50%	100%	13%	43%	6.9	13.7	9.5	0.72
173	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Education	RETRO	474	32%	153	0.016	0.024	10	$8.00	50%	20%	85%	45%	13.4	26.7	17.9	0.75
174	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Education	RETRO	18059	54%	9789	1.005	1.556	5	$54.00	50%	20%	85%	46%	69.8	139.7	91.2	0.77
175	Hot Water	Ozone Commercial Laundry	Biz - Custom	Education	MO	2984	25%	746	0.077	0.119	10	$20,309.70	50%	0%	20%	15%	1.1	0.1	2.9	0.05
176	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Education	RETRO	996	76%	755	0.000	0.087	10	$97.00	22%	13%	70%	64%	4.3	19.2	7.3	0.59
177	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Education	RETRO	1744	71%	1239	0.000	0.142	10	$123.81	29%	13%	70%	67%	5.5	19.2	9.4	0.59
178	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Education	RETRO	2490	67%	1659	0.000	0.191	10	$134.35	35%	13%	70%	68%	6.8	19.2	11.6	0.59
179	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Education	RETRO	3984	65%	2570	0.000	0.295	10	$196.16	38%	13%	70%	69%	7.2	19.2	12.3	0.59
180	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Education	RETRO	9467	70%	6666	0.000	0.766	10	$319.31	60%	13%	70%	71%	11.5	19.2	19.6	0.59
181	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Education	RETRO	489	76%	370	0.000	0.043	10	$97.00	11%	7%	70%	56%	2.1	19.2	3.6	0.59
182	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Education	RETRO	856	71%	608	0.000	0.070	10	$123.81	14%	7%	70%	60%	2.7	19.2	4.6	0.59
183	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Education	RETRO	1222	67%	814	0.000	0.094	10	$134.35	17%	7%	70%	62%	3.3	19.2	5.7	0.59
184	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Education	RETRO	1956	65%	1262	0.000	0.145	10	$196.16	18%	7%	70%	63%	3.5	19.2	6.0	0.59
185	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Education	RETRO	4647	70%	3272	0.000	0.376	10	$319.31	29%	7%	70%	67%	5.7	19.2	9.6	0.59
186	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Education	RETRO	127	74%	94	0.009	0.011	15	$59.00	5%	11%	60%	40%	1.3	28.2	2.1	0.67
187	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Education	RETRO	92	51%	47	0.004	0.006	10	$15.00	10%	69%	40%	53%	1.9	20.6	3.2	0.67
188	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Education	RETRO	95	34%	32	0.003	0.004	15	$22.00	4%	69%	40%	39%	1.2	28.2	1.9	0.67
189	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Education	RETRO	186	51%	96	0.009	0.012	15	$61.00	5%	69%	40%	40%	1.3	28.2	2.1	0.67
190	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Education	RETRO	275	54%	149	0.014	0.018	15	$76.00	6%	69%	40%	44%	1.6	28.2	2.7	0.67
191	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Education	RETRO	367	54%	199	0.019	0.024	15	$104.00	6%	69%	40%	44%	1.6	28.2	2.6	0.67
192	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Education	RETRO	185	50%	93	0.009	0.011	15	$46.67	6%	69%	40%	45%	1.6	28.2	2.7	0.67
193	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Education	RETRO	489	53%	260	0.025	0.032	15	$152.00	5%	69%	40%	42%	1.4	28.2	2.3	0.67
194	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Education	RETRO	512	67%	343	0.033	0.042	15	$42.88	24%	8%	50%	65%	5.8	28.2	15.4	0.67
195	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Education	RETRO	958	57%	546	0.052	0.067	15	$48.07	35%	6%	40%	68%	7.8	28.2	28.8	0.67
196	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Education	RETRO	3847	72%	2781	0.264	0.339	15	$187.94	45%	2%	50%	70%	9.6	28.2	54.9	0.67
197	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Education	RETRO	82	100%	82	0.008	0.010	11	$18.50	13%	69%	0%	59%	2.8	22.2	5.1	0.67
198	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Education	RETRO	425	30%	128	0.012	0.016	15	$65.40	6%	90%	15%	44%	1.7	28.2	2.5	0.67
199	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Education	RETRO	544	28%	152	0.014	0.019	15	$57.50	8%	90%	15%	50%	2.3	28.2	3.4	0.67
200	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Education	RETRO	243	38%	92	0.009	0.011	15	$75.00	4%	90%	15%	34%	1.1	28.2	1.6	0.67
201	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Education	RETRO	243	61%	148	0.014	0.018	15	$56.00	8%	90%	15%	50%	2.3	28.2	3.4	0.67
202	Lighting_Int	Networked Lighting Control	Biz - Custom	Education	RETRO	2	35%	1	0.000	0.000	15	$0.41	5%	90%	15%	31%	1.5	28.2	2.2	0.67
203	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Education	RETRO	66	71%	47	0.004	0.006	5	$32.50	4%	1%	85%	38%	0.5	11.4	0.8	0.65
204	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Education	RETRO	385	61%	237	0.022	0.027	5	$233.00	50%	0%	31%	44%	0.3	0.7	1.0	0.34
205	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Education	MO	5	50%	3	0.000	0.000	20	$1.73	50%	45%	24%	38%	1.6	3.2	2.9	0.55
206	Misc	High Efficiency Hand Dryers	Biz - Custom	Education	MO	2093	83%	1737	0.165	0.195	10	$483.00	50%	1%	50%	46%	2.2	4.4	3.8	0.59
207	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Education	RETRO	3125	4%	114	0.011	0.013	15	$59.00	50%	1%	73%	41%	1.6	3.3	2.9	0.56
208	Misc	Miscellaneous Custom	Biz - Custom	Education	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	53%	10%	44%	1.5	3.1	2.8	0.55
209	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Education	MO	2296	28%	637	0.077	0.113	15	$198.32	50%	100%	25%	58%	3.2	6.4	4.5	0.71
210	Motors	Power Drive Systems	Biz - Custom	Education	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	7.6	15.3	10.1	0.76
211	Motors	Switch Reluctance Motors	Biz - Custom	Education	MO	33406	31%	10222	1.234	1.806	15	$527.50	50%	100%	1%	49%	19.3	38.5	24.7	0.78
212	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Education	MO	418	26%	110	0.010	0.012	6	$0.00		7%	95%	54%	#DIV/0!	0.0	0.0	0.00
213	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Education	RETRO	188	58%	109	0.010	0.012	7	$10.00	50%	25%	20%	52%	4.9	9.9	7.8	0.63
214	Plug_Office	Smart Socket	Biz - Custom	Education	RETRO	80	61%	48	0.005	0.005	7	$9.00	50%	25%	20%	49%	2.5	4.9	4.1	0.60
215	Plug_Office	Energy Star Server	Biz - Custom	Education	MO	2167	30%	650	0.062	0.073	9	$300.95	50%	29%	25%	42%	1.2	2.4	2.3	0.53
216	Plug_Office	Server Virtualization	Biz - Custom	Education	RETRO	2167	14%	301	0.029	0.034	9	$26.97	50%	29%	25%	52%	6.3	12.6	9.8	0.64
217	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Education	RETRO	86783	18%	15778	1.495	1.772	15	$480.00	50%	29%	25%	53%	27.6	55.3	41.6	0.66

C&I Measure Summary:

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
EKPC																				
218	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Education	RETRO	764	47%	358	0.034	0.040	15	$82.00	50%	29%	25%	48%	3.7	7.3	6.0	0.62
219	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Education	MO	8940	25%	2265	0.215	0.254	20	$750.00	50%	29%	25%	45%	3.1	6.2	5.1	0.60
220	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Education	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	29%	25%	48%	2.7	5.4	4.5	0.60
221	Refrigeration	Strip Curtains	Biz - Prescriptive	Education	RETRO	0	0%	0	0.000	0.000	4	$10.22		8%	26%	58%	0.0	0.0	0.0	0.00
222	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Education	RETRO	1228	25%	307	0.044	0.034	15	$431.00	50%	5%	25%	27%	0.6	1.2	1.4	0.44
223	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Education	RETRO	2884	55%	1586	0.226	0.175	15	$305.00	50%	2%	80%	53%	4.5	9.0	7.0	0.64
224	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Education	RETRO	1298	23%	293	0.042	0.032	13	$161.75	50%	5%	25%	45%	1.4	2.8	2.5	0.56
225	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Education	RETRO	3158	48%	1500	0.213	0.165	15	$1,170.00	50%	6%	25%	42%	1.1	2.2	2.1	0.53
226	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Education	RETRO	579	42%	240	0.034	0.026	10	$79.50	50%	16%	25%	50%	1.9	3.8	3.2	0.59
227	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Education	RETRO	1259893	0%	2399	0.341	0.264	8	$502.00	50%	11%	58%	53%	2.5	5.0	4.1	0.61
228	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Education	RETRO	45880	10%	4588	0.652	0.505	10	$311.54	50%	11%	58%	42%	9.3	18.6	13.9	0.67
229	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Education	RETRO	1558	50%	779	0.111	0.086	15	$390.00	50%	5%	25%	46%	1.7	3.5	3.0	0.58
230	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Education	RETRO	2884	55%	1586	0.226	0.175	15	$305.00	50%	2%	80%	53%	4.5	9.0	7.0	0.64
231	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Education	RETRO	2091	24%	505	0.072	0.056	10	$96.00	50%	2%	2%	40%	3.3	6.6	5.3	0.63
232	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Education	RETRO	1511	9%	136	0.019	0.015	5	$42.00	50%	15%	55%	51%	1.1	2.2	2.1	0.53
233	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Education	RETRO	2016	33%	655	0.093	0.072	10	$79.50	50%	5%	25%	55%	5.2	10.4	8.0	0.65
234	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Education	RETRO	1259893	1%	6949	0.988	0.765	8	$502.00	50%	5%	58%	56%	7.3	14.5	11.0	0.66
235	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Education	RETRO	2349	9%	211	0.030	0.023	5	$42.00	50%	5%	55%	53%	1.7	3.5	3.0	0.58
236	Refrigeration	Refrigeration - Custom	Biz - Custom	Education	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.2	2.8	0.57
237	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Education	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.2	2.8	0.57
238	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Education	MO	1278	12%	153	0.022	0.017	14	$500.00	50%	3%	31%	18%	0.3	0.5	0.9	0.29
239	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Education	RETRO	1663	23%	390	0.055	0.043	5	$245.00	50%	3%	31%	44%	0.6	1.1	1.3	0.43
240	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Education	MO	5551	8%	440	0.063	0.048	9	$222.00	50%	3%	44%	46%	1.1	2.3	2.2	0.53
241	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Education	MO	115	74%	84	0.012	0.009	9	$11.00	50%	9%	35%	55%	4.5	8.9	6.9	0.64
242	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Education	RETRO	7655	59%	4516	0.816	0.737	15	$2,250.00	50%	40%	50%	53%	2.0	4.0	3.0	0.67
243	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Education	RETRO	17237	3%	534	0.083	0.075	15	$381.00	50%	40%	10%	35%	1.3	2.7	2.3	0.59
244	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Education	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	100%	20%	41%	2.4	4.8	3.6	0.67
245	WholeBldg_HVAC	GREM Controls	Biz - Custom	Education	RETRO	0	0%	0	0.000	0.000	15	$0.00	0%	0%	20%	50%	#DIV/0!	0.0	0.0	0.00
246	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Education	RETRO	1920	20%	384	0.066	0.057	10	$235.60	50%	100%	10%	37%	2.3	2.3	4.5	0.58
247	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Education	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.18
248	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Education	RETRO	684	61%	415	0.071	0.062	10	$341.21	50%	55%	50%	33%	1.6	1.7	3.1	0.54
249	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Education	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	8.1	16.1	10.9	0.74
250	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Education	RETRO	222	2%	4	0.001	0.001	10	$8.00	50%	100%	25%	20%	0.4	0.8	1.0	0.39
251	WholeBldg	WholeBlg - Com RET	Biz - Custom	Education	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.4	4.8	3.6	0.67
252	WholeBldg	Strategic Energy Management	Biz - RCx	Education	RETRO	33	3%	1	0.000	0.000	5	$0.27	50%	100%	0%	62%	1.4	2.9	2.4	0.61
253	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Education	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.3	2.7	2.2	0.60
254	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Education	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.4	4.8	3.6	0.67
255	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Food Sales	MO	19496	39%	7532	1.530	0.951	12	$2,270.00	50%	17%	53%	51%	2.7	5.3	4.0	0.67
256	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Food Sales	MO	10864	19%	2064	0.419	0.261	12	$960.00	50%	17%	53%	47%	1.7	3.4	2.8	0.62
257	Cooking	Commercial Electric Griddle	Biz - Custom	Food Sales	MO	17056	15%	2596	0.527	0.328	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
258	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Food Sales	MO	16915	80%	13507	2.743	1.705	12	$2,757.00	50%	6%	45%	53%	3.9	7.8	5.6	0.69
259	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Food Sales	MO	35655	44%	15766	3.202	1.990	16	$466.50	50%	26%	61%	57%	33.7	67.4	44.9	0.75
260	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Food Sales	MO	38282	16%	6279	1.275	0.793	15	$1,550.00	50%	26%	61%	52%	3.9	7.7	5.6	0.69
261	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Food Sales	MO	18955	17%	3274	0.665	0.413	12	$1,500.00	50%	27%	24%	47%	1.7	3.5	2.8	0.63
262	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Food Sales	MO	1478	37%	545	0.111	0.069	12	$1,000.00	50%	3%	16%	32%	0.4	0.9	1.1	0.41
263	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Food Sales	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.8	5.5	4.4	0.63
264	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Food Sales	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.6	3.2	2.8	0.58
265	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Food Sales	MO	23742	21%	4935	0.762	0.566	13	$3,367.84	50%	100%	20%	48%	1.2	2.3	2.1	0.54
266	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Food Sales	RETRO	476154	0%	1970	0.304	0.226	10	$244.00	50%	100%	5%	63%	5.2	10.4	7.8	0.67
267	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Food Sales	MO	1130	50%	565	0.087	0.065	15	$57.00	50%	5%	20%	63%	8.8	17.6	12.9	0.68
268	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Food Sales	MO	930	14%	131	0.086	0.000	15	$153.28	50%	20%	5%	36%	0.9	1.7	1.6	0.55
269	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Food Sales	MO	930	19%	176	0.115	0.000	15	$214.59	50%	20%	5%	35%	0.8	1.7	1.5	0.55
270	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Food Sales	MO	930	30%	283	0.186	0.000	15	$398.52	50%	20%	5%	32%	0.7	1.4	1.4	0.52
271	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Food Sales	MO	1045	9%	95	0.062	0.000	15	$71.00	50%	20%	5%	46%	1.4	2.7	2.2	0.62

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
272	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Food Sales	MO	1045	13%	139	0.091	0.000	15	$109.23	50%	20%	5%	45%	1.3	2.6	2.1	0.62
273	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Food Sales	MO	1045	24%	246	0.161	0.000	15	$218.46	50%	20%	5%	41%	1.1	2.3	1.9	0.60
274	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Food Sales	RETRO	1132	7%	79	0.052	0.000	3	$11.42	50%	41%	50%	47%	1.6	3.2	2.7	0.60
275	Cooling	Air Side Economizer	Biz - Custom	Food Sales	RETRO	930	20%	186	0.122	0.000	10	$126.67	50%	41%	25%	36%	1.1	2.1	1.8	0.57
276	Cooling	HVAC Occupancy Controls	Biz - Custom	Food Sales	RETRO	982	20%	196	0.129	0.000	15	$197.50	50%	41%	20%	28%	1.4	2.0	2.6	0.58
277	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Food Sales	MO	970	13%	121	0.080	0.000	15	$115.00	50%	18%	5%	40%	1.1	2.1	1.8	0.59
278	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Food Sales	MO	970	22%	216	0.141	0.000	15	$514.00	50%	18%	5%	23%	0.4	0.9	1.0	0.42
279	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Food Sales	MO	970	33%	323	0.212	0.000	15	$630.50	50%	18%	5%	25%	0.5	1.0	1.1	0.46
280	Cooling	Smart Thermostat	Biz - Prescriptive	Food Sales	RETRO	5568	14%	788	0.517	0.000	11	$175.00	50%	18%	20%	60%	4.9	7.0	7.8	0.71
281	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Food Sales	MO	1252	15%	182	0.120	0.000	8	$84.00	50%	41%	20%	40%	1.3	2.5	2.1	0.60
282	Cooling	Air Cooled Chiller	Biz - Prescriptive	Food Sales	MO	991	9%	89	0.059	0.000	23	$126.00	50%	0%	5%	32%	1.0	2.0	1.7	0.60
283	Cooling	Water Cooled Chiller	Biz - Prescriptive	Food Sales	MO	498	23%	113	0.074	0.000	23	$61.00	50%	0%	5%	52%	2.6	5.3	3.6	0.73
284	Cooling	Window Film	Biz - Custom	Food Sales	RETRO	6364	4%	280	0.184	0.000	10	$153.81	50%	100%	25%	39%	0.7	2.6	-0.2	0.61
285	Cooling	Triple Pane Windows	Biz - Custom	Food Sales	MO	6364	6%	382	0.250	0.000	25	$700.00	50%	100%	2%	20%	0.8	1.6	1.5	0.56
286	Cooling	Energy Recovery Ventilator	Biz - Custom	Food Sales	RETRO	1045	0%	0	0.000	0.000	15	$1,500.00		100%	2%	50%	0.0	0.0	0.0	0.00
287	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Food Sales	MO	2390	8%	183	0.040	0.049	15	$135.00	50%	23%	15%	46%	1.7	3.4	2.2	0.77
288	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Food Sales	MO	2390	15%	347	0.076	0.092	15	$445.76	50%	23%	15%	34%	1.0	1.9	1.5	0.66
289	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Food Sales	MO	2390	21%	494	0.108	0.131	15	$520.06	50%	23%	15%	37%	1.2	2.4	1.7	0.70
290	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Food Sales	MO	2593	6%	161	0.035	0.043	15	$100.00	50%	17%	15%	50%	2.0	4.0	2.5	0.80
291	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Food Sales	MO	2593	12%	298	0.065	0.079	15	$171.08	50%	17%	15%	51%	2.2	4.3	2.7	0.81
292	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Food Sales	MO	2686	7%	180	0.039	0.048	15	$100.00	50%	17%	15%	51%	2.2	4.5	2.7	0.81
293	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Food Sales	MO	2686	12%	325	0.071	0.086	15	$158.10	50%	17%	15%	53%	2.6	5.1	3.1	0.83
294	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Food Sales	MO	2816	7%	187	0.041	0.050	15	$100.00	50%	17%	15%	52%	2.3	4.7	2.8	0.82
295	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Food Sales	MO	2816	13%	355	0.078	0.094	15	$201.80	50%	17%	15%	51%	2.2	4.4	2.7	0.81
296	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Food Sales	MO	2688	41%	1096	0.239	0.290	25	$4,361.00	50%	0%	15%	16%	0.4	0.9	0.9	0.46
297	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Food Sales	MO	2688	44%	1189	0.260	0.315	25	$4,361.00	50%	0%	15%	18%	0.5	0.9	1.0	0.48
298	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Food Sales	MO	5100	17%	850	0.186	0.225	15	$84.00	50%	10%	15%	48%	12.6	25.2	13.2	0.96
299	Hot Water	Heat Pump Water Heater	Biz - Custom	Food Sales	MO	16398	73%	12025	1.618	1.813	15	$1,797.00	50%	100%	0%	43%	6.4	12.7	8.9	0.72
300	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Food Sales	RETRO	288	32%	93	0.013	0.014	10	$8.00	50%	20%	85%	44%	8.1	16.2	11.1	0.73
301	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Food Sales	RETRO	18059	54%	9789	1.317	1.476	5	$54.00	50%	20%	85%	46%	69.4	138.9	91.2	0.76
302	Hot Water	Ozone Commercial Laundry	Biz - Custom	Food Sales	MO	2984	25%	746	0.100	0.112	10	$20,309.70	50%	0%	20%	15%	1.1	0.1	2.9	0.05
303	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Food Sales	RETRO	996	76%	755	0.000	0.096	10	$97.00	25%	13%	70%	65%	4.5	18.3	7.3	0.62
304	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Food Sales	RETRO	1744	71%	1239	0.000	0.157	10	$123.81	32%	13%	70%	67%	5.8	18.3	9.4	0.62
305	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Food Sales	RETRO	2490	67%	1659	0.000	0.210	10	$134.35	39%	13%	70%	68%	7.2	18.3	11.6	0.62
306	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Food Sales	RETRO	3984	65%	2570	0.000	0.325	10	$196.16	41%	13%	70%	69%	7.6	18.3	12.3	0.62
307	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Food Sales	RETRO	9467	70%	6666	0.000	0.844	10	$319.31	66%	13%	70%	71%	12.1	18.3	19.6	0.62
308	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Food Sales	RETRO	489	76%	370	0.000	0.047	10	$97.00	12%	7%	70%	57%	2.2	18.3	3.6	0.62
309	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Food Sales	RETRO	856	71%	608	0.000	0.077	10	$123.81	16%	7%	70%	60%	2.8	18.3	4.6	0.62
310	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Food Sales	RETRO	1222	67%	814	0.000	0.103	10	$134.35	19%	7%	70%	62%	3.5	18.3	5.7	0.62
311	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Food Sales	RETRO	1956	65%	1262	0.000	0.160	10	$196.16	20%	7%	70%	63%	3.7	18.3	6.0	0.62
312	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Food Sales	RETRO	4647	70%	3272	0.000	0.414	10	$319.31	32%	7%	70%	67%	5.9	18.3	9.6	0.62
313	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Food Sales	RETRO	220	74%	162	0.020	0.019	12	$59.00	8%	8%	60%	51%	1.8	24.9	3.4	0.68
314	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Food Sales	RETRO	159	51%	82	0.010	0.010	12	$15.00	16%	53%	40%	61%	3.0	21.5	6.8	0.68
315	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Food Sales	RETRO	164	34%	56	0.007	0.007	12	$22.00	7%	53%	40%	50%	1.7	24.9	3.1	0.68
316	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Food Sales	RETRO	321	51%	165	0.020	0.019	12	$61.00	8%	53%	40%	51%	1.8	24.9	3.3	0.68
317	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Food Sales	RETRO	475	54%	257	0.031	0.030	12	$76.00	10%	53%	40%	55%	2.2	24.9	4.4	0.68
318	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Food Sales	RETRO	634	54%	344	0.042	0.040	12	$104.00	10%	53%	40%	54%	2.2	24.9	4.3	0.68
319	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Food Sales	RETRO	320	50%	161	0.020	0.019	12	$46.67	10%	53%	40%	55%	2.3	24.9	4.5	0.68
320	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Food Sales	RETRO	844	53%	449	0.054	0.053	12	$152.00	9%	53%	40%	52%	2.0	24.9	3.7	0.68
321	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Food Sales	RETRO	883	67%	592	0.072	0.070	12	$42.88	41%	6%	50%	69%	7.0	24.9	131.4	0.68
322	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Food Sales	RETRO	1654	57%	943	0.114	0.111	12	$48.07	58%	23%	40%	71%	8.8	24.9	-73.5	0.68
323	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Food Sales	RETRO	6639	72%	4801	0.582	0.566	12	$187.94	75%	9%	50%	72%	10.3	24.9	-39.6	0.68
324	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Food Sales	RETRO	141	100%	141	0.017	0.017	11	$18.50	22%	53%	0%	64%	4.3	23.2	13.3	0.68
325	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Food Sales	RETRO	734	30%	220	0.027	0.026	15	$65.40	10%	90%	15%	54%	2.9	29.5	4.3	0.68

C&I Measure Summary:

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
EKPC																				
326	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Food Sales	RETRO	940	28%	263	0.032	0.031	15	$57.50	13%	90%	15%	59%	4.0	29.5	5.9	0.68
327	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Food Sales	RETRO	419	38%	159	0.019	0.019	15	$75.00	6%	90%	15%	46%	1.8	29.5	2.7	0.68
328	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Food Sales	RETRO	419	61%	256	0.031	0.030	15	$56.00	13%	90%	15%	59%	4.0	29.5	5.8	0.68
329	Lighting_Int	Networked Lighting Control	Biz - Custom	Food Sales	RETRO	3	35%	1	0.000	0.000	15	$0.71	5%	90%	15%	31%	1.5	29.5	2.2	0.68
330	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Food Sales	RETRO	63	71%	45	0.005	0.005	5	$32.50	4%	1%	85%	37%	0.5	11.8	0.7	0.66
331	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Food Sales	RETRO	385	61%	237	0.048	0.030	5	$233.00	50%	0%	31%	44%	0.4	0.8	1.0	0.38
332	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Food Sales	MO	5	50%	3	0.001	0.000	20	$1.73	50%	18%	24%	38%	1.8	3.6	2.9	0.63
333	Misc	High Efficiency Hand Dryers	Biz - Custom	Food Sales	MO	3819	83%	3170	0.644	0.400	10	$483.00	50%	1%	50%	50%	4.5	9.1	6.5	0.70
334	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Food Sales	RETRO	3125	4%	114	0.023	0.014	15	$59.00	50%	0%	73%	41%	1.8	3.7	2.9	0.63
335	Misc	Miscellaneous Custom	Biz - Custom	Food Sales	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	81%	10%	44%	1.7	3.5	2.8	0.62
336	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Food Sales	MO	3823	28%	1060	0.133	0.109	15	$198.32	50%	100%	25%	61%	4.6	9.1	7.2	0.64
337	Motors	Power Drive Systems	Biz - Custom	Food Sales	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	6.6	13.1	10.1	0.65
338	Motors	Switch Reluctance Motors	Biz - Custom	Food Sales	MO	37735	31%	11547	1.446	1.190	15	$527.50	50%	100%	1%	49%	18.7	37.4	27.9	0.67
339	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Food Sales	MO	418	26%	110	0.022	0.014	6	$0.00		26%	95%	54%	#DIV/0!	0.0	0.0	0.00
340	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Food Sales	RETRO	188	58%	109	0.022	0.014	7	$10.00	50%	10%	20%	52%	5.6	11.1	7.8	0.71
341	Plug_Office	Smart Socket	Biz - Custom	Food Sales	RETRO	80	61%	48	0.010	0.006	7	$9.00	50%	10%	20%	49%	2.8	5.5	4.1	0.67
342	Plug_Office	Energy Star Server	Biz - Custom	Food Sales	MO	2167	30%	650	0.132	0.082	9	$300.95	50%	12%	25%	42%	1.4	2.7	2.3	0.60
343	Plug_Office	Server Virtualization	Biz - Custom	Food Sales	RETRO	2167	14%	301	0.061	0.038	9	$26.97	50%	12%	25%	52%	7.1	14.2	9.8	0.72
344	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Food Sales	RETRO	86783	18%	15778	3.205	1.992	15	$480.00	50%	12%	25%	53%	31.3	62.5	41.6	0.75
345	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Food Sales	RETRO	764	47%	358	0.073	0.045	15	$82.00	50%	12%	25%	48%	4.2	8.3	6.0	0.70
346	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Food Sales	MO	8940	25%	2265	0.460	0.286	20	$750.00	50%	12%	25%	45%	3.5	7.1	5.1	0.69
347	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Food Sales	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	12%	25%	48%	3.0	6.1	4.5	0.68
348	Refrigeration	Strip Curtains	Biz - Prescriptive	Food Sales	RETRO	412	50%	206	0.025	0.024	4	$10.22	50%	16%	26%	57%	5.7	11.5	8.7	0.66
349	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Food Sales	RETRO	1228	25%	307	0.037	0.036	15	$431.00	50%	11%	25%	27%	0.6	1.2	1.4	0.45
350	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Food Sales	RETRO	2884	55%	1586	0.193	0.187	15	$305.00	50%	1%	80%	53%	4.5	9.0	7.0	0.65
351	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Food Sales	RETRO	1298	23%	293	0.036	0.035	13	$161.75	50%	10%	25%	45%	1.4	2.8	2.5	0.56
352	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Food Sales	RETRO	3158	48%	1500	0.182	0.177	15	$1,170.00	50%	14%	25%	42%	1.1	2.2	2.1	0.53
353	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Food Sales	RETRO	579	42%	240	0.029	0.028	10	$79.50	50%	8%	25%	50%	1.9	3.8	3.2	0.59
354	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Food Sales	RETRO	1259893	0%	2399	0.292	0.283	8	$502.00	50%	6%	32%	53%	2.5	5.0	4.1	0.61
355	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Food Sales	RETRO	45880	10%	4588	0.558	0.542	10	$311.54	50%	6%	32%	42%	9.3	18.7	13.9	0.67
356	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Food Sales	RETRO	1558	50%	779	0.095	0.092	15	$390.00	50%	2%	25%	46%	1.7	3.5	3.0	0.58
357	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Food Sales	RETRO	2884	55%	1586	0.193	0.187	15	$305.00	50%	1%	80%	53%	4.5	9.0	7.0	0.65
358	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Food Sales	RETRO	2091	24%	505	0.061	0.060	10	$96.00	50%	1%	2%	40%	3.3	6.7	5.3	0.63
359	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Food Sales	RETRO	1511	9%	136	0.017	0.016	5	$42.00	50%	8%	55%	51%	1.1	2.3	2.1	0.53
360	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Food Sales	RETRO	2016	33%	655	0.080	0.077	10	$79.50	50%	3%	25%	55%	5.2	10.5	8.0	0.65
361	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Food Sales	RETRO	1259893	1%	6949	0.845	0.821	8	$502.00	50%	3%	32%	56%	7.3	14.6	11.0	0.67
362	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Food Sales	RETRO	2349	9%	211	0.026	0.025	5	$42.00	50%	3%	55%	53%	1.8	3.5	3.0	0.58
363	Refrigeration	Refrigeration - Custom	Biz - Custom	Food Sales	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.2	2.8	0.57
364	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Food Sales	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.2	2.8	0.57
365	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Food Sales	MO	1278	12%	153	0.019	0.018	14	$500.00	50%	0%	31%	18%	0.3	0.5	0.9	0.29
366	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Food Sales	RETRO	1663	23%	390	0.047	0.046	5	$245.00	50%	0%	31%	44%	0.6	1.1	1.3	0.43
367	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Food Sales	MO	5551	8%	440	0.054	0.052	9	$222.00	50%	0%	44%	46%	1.2	2.3	2.2	0.54
368	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Food Sales	MO	115	74%	84	0.010	0.010	9	$11.00	50%	5%	35%	55%	4.5	8.9	6.9	0.65
369	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Food Sales	RETRO	16266	59%	9596	1.619	1.567	15	$2,250.00	50%	30%	33%	59%	4.3	8.6	5.8	0.74
370	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Food Sales	RETRO	19471	3%	604	0.088	0.085	15	$381.00	50%	30%	10%	37%	1.5	3.0	2.5	0.61
371	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Food Sales	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	100%	20%	41%	2.2	4.4	3.6	0.61
372	WholeBldg_HVAC	GREM Controls	Biz - Custom	Food Sales	RETRO	0	0%	0	0.000	0.000	15	$0.00	0%	0%	20%	50%	#DIV/0!	0.0	0.0	0.00
373	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Food Sales	RETRO	0	0%	0	0.000	0.000	10	$235.60		100%	10%	50%	0.0	0.0	0.0	0.00
374	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Food Sales	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.17
375	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Food Sales	RETRO	1108	44%	491	0.076	0.056	10	$341.21	50%	38%	33%	35%	1.7	1.9	3.4	0.51
376	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Food Sales	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	7.4	14.8	10.9	0.68
377	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Food Sales	RETRO	222	2%	4	0.001	0.001	10	$8.00	50%	100%	25%	20%	0.4	0.7	1.0	0.36
378	WholeBldg	WholeBlg - Com RET	Biz - Custom	Food Sales	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.2	4.4	3.6	0.61
379	WholeBldg	Strategic Energy Management	Biz - RCx	Food Sales	RETRO	0	0%	0	0.000	0.000	5	$0.27		100%	0%	73%	0.5	0.0	0.0	0.00

C&I Measure Summary:

EKPC																						
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test		
380	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Food Sales	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.2	2.5	2.2	0.55		
381	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Food Sales	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.2	4.4	3.6	0.61		
382	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Food Service	MO	19496	39%	7532	1.072	1.236	12	$2,270.00	50%	17%	53%	51%	2.8	5.5	4.0	0.69		
383	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Food Service	MO	10864	19%	2064	0.294	0.339	12	$960.00	50%	17%	53%	47%	1.8	3.6	2.8	0.65		
384	Cooking	Commercial Electric Griddle	Biz - Custom	Food Service	MO	17056	15%	2596	0.369	0.426	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00		
385	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Food Service	MO	16915	80%	13507	1.922	2.217	12	$2,757.00	50%	6%	45%	53%	4.1	8.2	5.6	0.72		
386	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Food Service	MO	35655	44%	15766	2.244	2.587	16	$466.50	50%	26%	61%	57%	35.0	70.0	44.9	0.78		
387	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Food Service	MO	38282	16%	6279	0.894	1.030	15	$1,550.00	50%	26%	61%	52%	4.0	8.0	5.6	0.72		
388	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Food Service	MO	18955	17%	3274	0.466	0.537	12	$1,500.00	50%	27%	24%	47%	1.8	3.6	2.8	0.65		
389	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Food Service	MO	1478	37%	545	0.078	0.089	12	$1,000.00	50%	3%	16%	32%	0.5	0.9	1.1	0.42		
390	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Food Service	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.7	5.3	4.4	0.61		
391	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Food Service	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.6	3.1	2.8	0.56		
392	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Food Service	MO	23742	21%	4935	0.641	0.546	13	$3,367.84	50%	100%	20%	48%	1.1	2.2	2.1	0.52		
393	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Food Service	RETRO	476154	0%	1970	0.256	0.218	10	$244.00	50%	100%	5%	63%	5.0	10.0	7.8	0.64		
394	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Food Service	MO	1130	50%	565	0.073	0.062	15	$57.00	50%	5%	20%	63%	8.5	16.9	12.9	0.66		
395	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Food Service	MO	1029	14%	145	0.074	0.001	15	$153.28	50%	22%	5%	37%	0.9	1.8	1.7	0.52		
396	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Food Service	MO	1029	19%	194	0.099	0.002	15	$214.59	50%	22%	5%	36%	0.8	1.7	1.6	0.51		
397	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Food Service	MO	1029	30%	314	0.159	0.003	15	$398.52	50%	22%	5%	34%	0.7	1.5	1.5	0.49		
398	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Food Service	MO	1155	9%	105	0.053	0.001	15	$71.00	50%	22%	5%	48%	1.4	2.7	2.3	0.58		
399	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Food Service	MO	1155	13%	154	0.078	0.001	15	$109.23	50%	22%	5%	47%	1.3	2.6	2.3	0.58		
400	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Food Service	MO	1155	24%	272	0.138	0.002	15	$218.46	50%	22%	5%	44%	1.2	2.3	2.1	0.56		
401	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Food Service	RETRO	1252	7%	88	0.045	0.001	3	$11.42	50%	44%	50%	47%	1.6	3.3	2.9	0.57		
402	Cooling	Air Side Economizer	Biz - Custom	Food Service	RETRO	1029	20%	206	0.105	0.002	10	$126.67	50%	44%	25%	37%	1.1	2.1	2.0	0.54		
403	Cooling	HVAC Occupancy Controls	Biz - Custom	Food Service	RETRO	1086	20%	217	0.110	0.002	15	$197.50	50%	44%	20%	31%	1.4	2.0	2.6	0.54		
404	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Food Service	MO	1073	13%	134	0.068	0.001	15	$115.00	50%	19%	5%	42%	1.1	2.2	2.0	0.55		
405	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Food Service	MO	1073	22%	238	0.121	0.002	15	$514.00	50%	19%	5%	24%	0.4	0.9	1.1	0.40		
406	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Food Service	MO	1073	33%	358	0.182	0.003	15	$630.50	50%	19%	5%	28%	0.5	1.1	1.2	0.43		
407	Cooling	Smart Thermostat	Biz - Prescriptive	Food Service	RETRO	6158	14%	872	0.444	0.007	11	$175.00	50%	19%	20%	60%	4.7	7.1	7.9	0.66		
408	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Food Service	MO	1384	15%	202	0.103	0.002	8	$84.00	50%	38%	20%	41%	1.3	2.6	2.3	0.56		
409	Cooling	Air Cooled Chiller	Biz - Prescriptive	Food Service	MO	1096	9%	99	0.050	0.001	23	$126.00	50%	0%	5%	34%	1.0	2.0	1.8	0.56		
410	Cooling	Water Cooled Chiller	Biz - Prescriptive	Food Service	MO	551	23%	125	0.064	0.001	23	$61.00	50%	0%	5%	53%	2.6	5.3	4.0	0.67		
411	Cooling	Window Film	Biz - Custom	Food Service	RETRO	6364	4%	280	0.142	0.002	10	$153.81	50%	100%	25%	39%	0.6	2.4	-0.2	0.56		
412	Cooling	Triple Pane Windows	Biz - Custom	Food Service	MO	6364	6%	382	0.194	0.003	25	$700.00	50%	100%	2%	20%	0.7	1.5	1.5	0.51		
413	Cooling	Energy Recovery Ventilator	Biz - Custom	Food Service	RETRO	1155	0%	0	0.000	0.000	15	$1,500.00		100%	2%	50%	0.0	0.0	0.0	0.00		
414	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Food Service	MO	2301	8%	187	0.032	0.038	15	$135.00	50%	23%	15%	47%	1.5	3.0	2.2	0.67		
415	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Food Service	MO	2301	15%	352	0.060	0.071	15	$445.76	50%	23%	15%	34%	0.9	1.7	1.5	0.57		
416	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Food Service	MO	2301	22%	505	0.086	0.101	15	$520.06	50%	23%	15%	37%	1.0	2.1	1.7	0.61		
417	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Food Service	MO	2477	6%	157	0.027	0.031	15	$100.00	50%	18%	15%	49%	1.7	3.4	2.5	0.69		
418	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Food Service	MO	2477	12%	289	0.049	0.058	15	$171.08	50%	18%	15%	50%	1.8	3.6	2.6	0.70		
419	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Food Service	MO	2568	7%	176	0.030	0.035	15	$100.00	50%	17%	15%	51%	1.9	3.8	2.7	0.70		
420	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Food Service	MO	2568	12%	316	0.054	0.063	15	$158.10	50%	17%	15%	53%	2.2	4.3	3.0	0.72		
421	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Food Service	MO	2701	7%	185	0.032	0.037	15	$100.00	50%	17%	15%	52%	2.0	4.0	2.8	0.71		
422	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Food Service	MO	2701	13%	348	0.059	0.070	15	$201.80	50%	17%	15%	51%	1.9	3.7	2.7	0.70		
423	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Food Service	MO	2570	39%	994	0.169	0.199	25	$4,361.00	50%	3%	15%	16%	0.3	0.7	0.9	0.38		
424	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Food Service	MO	2570	42%	1086	0.185	0.217	25	$4,361.00	50%	3%	15%	16%	0.4	0.8	0.9	0.40		
425	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Food Service	MO	4675	17%	779	0.133	0.156	15	$84.00	50%	0%	15%	47%	10.0	20.0	12.1	0.83		
426	Hot Water	Heat Pump Water Heater	Biz - Custom	Food Service	MO	19318	73%	14166	2.391	2.221	15	$1,797.00	50%	46%	18%	43%	7.8	15.5	10.4	0.75		
427	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Food Service	RETRO	1001	32%	324	0.055	0.051	10	$8.00	50%	9%	85%	46%	29.1	58.2	37.3	0.78		
428	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Food Service	RETRO	18059	54%	9789	1.652	1.535	5	$54.00	50%	9%	85%	46%	71.7	143.5	91.2	0.79		
429	Hot Water	Ozone Commercial Laundry	Biz - Custom	Food Service	MO	2984	25%	746	0.126	0.117	10	$20,309.70	50%	54%	20%	15%	1.1	0.1	2.9	0.05		
430	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Food Service	RETRO	996	76%	755	0.000	0.087	10	$97.00	23%	13%	70%	64%	4.3	19.1	7.3	0.59		
431	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Food Service	RETRO	1744	71%	1239	0.000	0.143	10	$123.81	29%	13%	70%	67%	5.5	19.1	9.4	0.59		
432	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Food Service	RETRO	2490	67%	1659	0.000	0.192	10	$134.35	36%	13%	70%	68%	6.8	19.1	11.6	0.59		
433	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Food Service	RETRO	3984	65%	2570	0.000	0.297	10	$196.16	38%	13%	70%	69%	7.2	19.1	12.3	0.59		

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
434	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Food Service	RETRO	9467	70%	6666	0.000	0.771	10	$319.31	60%	13%	70%	71%	11.5	19.1	19.6	0.59
435	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Food Service	RETRO	489	76%	370	0.000	0.043	10	$97.00	11%	7%	70%	56%	2.1	19.1	3.6	0.59
436	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Food Service	RETRO	856	71%	608	0.000	0.070	10	$123.81	14%	7%	70%	60%	2.7	19.1	4.6	0.59
437	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Food Service	RETRO	1222	67%	814	0.000	0.094	10	$134.35	18%	7%	70%	62%	3.4	19.1	5.7	0.59
438	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Food Service	RETRO	1956	65%	1262	0.000	0.146	10	$196.16	19%	7%	70%	63%	3.6	19.1	6.0	0.59
439	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Food Service	RETRO	4647	70%	3272	0.000	0.379	10	$319.31	30%	7%	70%	67%	5.7	19.1	9.6	0.59
440	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Food Service	RETRO	230	74%	170	0.026	0.022	12	$59.00	10%	5%	60%	52%	2.1	23.8	3.5	0.73
441	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Food Service	RETRO	166	51%	85	0.013	0.011	10	$15.00	19%	64%	40%	62%	3.4	20.6	7.0	0.72
442	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Food Service	RETRO	172	34%	58	0.009	0.008	12	$22.00	9%	64%	40%	50%	1.9	23.8	3.2	0.73
443	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Food Service	RETRO	336	51%	173	0.026	0.023	12	$61.00	9%	64%	40%	52%	2.1	23.8	3.5	0.73
444	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Food Service	RETRO	498	54%	269	0.041	0.036	12	$76.00	12%	64%	40%	56%	2.5	23.8	4.5	0.73
445	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Food Service	RETRO	664	54%	360	0.055	0.048	12	$104.00	11%	64%	40%	55%	2.5	23.8	4.4	0.73
446	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Food Service	RETRO	335	50%	169	0.026	0.022	12	$46.67	12%	64%	40%	56%	2.6	23.8	4.7	0.73
447	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Food Service	RETRO	884	53%	470	0.071	0.062	12	$152.00	10%	64%	40%	53%	2.2	23.8	3.8	0.73
448	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Food Service	RETRO	926	67%	620	0.094	0.082	12	$42.88	48%	7%	50%	70%	8.1	23.8	82.1	0.73
449	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Food Service	RETRO	1734	57%	988	0.150	0.131	12	$48.07	68%	3%	40%	71%	10.3	23.8	-127.9	0.73
450	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Food Service	RETRO	6958	72%	5031	0.765	0.665	12	$187.94	88%	1%	50%	72%	12.0	23.8	-53.1	0.73
451	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Food Service	RETRO	148	100%	148	0.022	0.020	11	$18.50	26%	64%	0%	65%	4.9	22.3	13.2	0.73
452	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Food Service	RETRO	769	30%	231	0.035	0.030	15	$65.40	12%	90%	15%	55%	3.3	28.3	4.5	0.73
453	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Food Service	RETRO	985	28%	276	0.042	0.036	15	$57.50	16%	90%	15%	60%	4.5	28.3	6.2	0.73
454	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Food Service	RETRO	439	38%	167	0.025	0.022	15	$75.00	7%	90%	15%	47%	2.1	28.3	2.9	0.73
455	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Food Service	RETRO	439	61%	268	0.041	0.035	15	$56.00	16%	90%	15%	60%	4.5	28.3	6.1	0.73
456	Lighting_Int	Networked Lighting Control	Biz - Custom	Food Service	RETRO	4	35%	1	0.000	0.000	15	$0.74	6%	90%	15%	31%	1.6	28.3	2.2	0.73
457	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Food Service	RETRO	65	71%	46	0.007	0.006	5	$32.50	5%	1%	85%	38%	0.5	11.3	0.8	0.70
458	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Food Service	RETRO	385	61%	237	0.031	0.026	5	$233.00	50%	0%	31%	44%	0.3	0.7	1.0	0.34
459	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Food Service	MO	2	50%	1	0.000	0.000	20	$1.73	50%	20%	24%	27%	0.7	1.5	1.6	0.46
460	Misc	High Efficiency Hand Dryers	Biz - Custom	Food Service	MO	1909	83%	1585	0.206	0.175	10	$483.00	50%	1%	50%	46%	2.0	4.1	3.5	0.59
461	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Food Service	RETRO	3125	4%	114	0.015	0.013	15	$59.00	50%	0%	73%	41%	1.7	3.3	2.9	0.57
462	Misc	Miscellaneous Custom	Biz - Custom	Food Service	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	79%	10%	44%	1.6	3.1	2.8	0.56
463	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Food Service	MO	1611	28%	447	0.057	0.049	15	$198.32	50%	100%	25%	54%	2.0	3.9	3.3	0.59
464	Motors	Power Drive Systems	Biz - Custom	Food Service	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	6.7	13.4	10.1	0.66
465	Motors	Switch Reluctance Motors	Biz - Custom	Food Service	MO	33406	31%	10222	1.296	1.131	15	$527.50	50%	100%	1%	49%	16.9	33.8	24.7	0.68
466	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Food Service	MO	418	26%	110	0.014	0.012	6	$0.00		21%	95%	54%	#DIV/0!	0.0	0.0	0.00
467	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Food Service	RETRO	188	58%	109	0.014	0.012	7	$10.00	50%	14%	20%	52%	5.0	10.0	7.8	0.64
468	Plug_Office	Smart Socket	Biz - Custom	Food Service	RETRO	80	61%	48	0.006	0.005	7	$9.00	50%	14%	20%	49%	2.5	5.0	4.1	0.60
469	Plug_Office	Energy Star Server	Biz - Custom	Food Service	MO	2167	30%	650	0.084	0.072	9	$300.95	50%	16%	25%	42%	1.2	2.5	2.3	0.54
470	Plug_Office	Server Virtualization	Biz - Custom	Food Service	RETRO	2167	14%	301	0.039	0.033	9	$26.97	50%	16%	25%	52%	6.4	12.7	9.8	0.65
471	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Food Service	RETRO	86783	18%	15778	2.048	1.745	15	$480.00	50%	16%	25%	53%	28.0	56.1	41.6	0.67
472	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Food Service	RETRO	764	47%	358	0.046	0.040	15	$82.00	50%	16%	25%	48%	3.7	7.4	6.0	0.62
473	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Food Service	MO	8940	25%	2265	0.294	0.250	20	$750.00	50%	16%	25%	45%	3.2	6.3	5.1	0.61
474	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Food Service	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	16%	25%	48%	2.7	5.5	4.5	0.61
475	Refrigeration	Strip Curtains	Biz - Prescriptive	Food Service	RETRO	88	50%	44	0.006	0.005	4	$10.22	50%	7%	26%	52%	1.2	2.4	2.3	0.54
476	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Food Service	RETRO	1228	25%	307	0.044	0.033	15	$431.00	50%	5%	25%	27%	0.6	1.2	1.4	0.44
477	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Food Service	RETRO	2884	55%	1586	0.226	0.171	15	$305.00	50%	2%	80%	53%	4.5	9.0	7.0	0.64
478	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Food Service	RETRO	1298	23%	293	0.042	0.032	13	$161.75	50%	5%	25%	45%	1.4	2.8	2.5	0.55
479	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Food Service	RETRO	3158	48%	1500	0.214	0.162	15	$1,170.00	50%	6%	25%	42%	1.1	2.2	2.1	0.53
480	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Food Service	RETRO	579	42%	240	0.034	0.026	10	$79.50	50%	16%	25%	50%	1.9	3.8	3.2	0.58
481	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Food Service	RETRO	1259893	0%	2399	0.342	0.258	8	$502.00	50%	12%	54%	53%	2.5	5.0	4.1	0.61
482	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Food Service	RETRO	45880	10%	4588	0.655	0.494	10	$311.54	50%	12%	54%	42%	9.3	18.5	13.9	0.67
483	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Food Service	RETRO	1558	50%	779	0.111	0.084	15	$390.00	50%	5%	25%	46%	1.7	3.4	3.0	0.57
484	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Food Service	RETRO	2884	55%	1586	0.226	0.171	15	$305.00	50%	2%	80%	53%	4.5	9.0	7.0	0.64
485	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Food Service	RETRO	2091	24%	505	0.072	0.054	10	$96.00	50%	2%	2%	40%	3.3	6.6	5.3	0.63
486	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Food Service	RETRO	1511	9%	136	0.019	0.015	5	$42.00	50%	16%	55%	51%	1.1	2.2	2.1	0.53
487	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Food Service	RETRO	2016	33%	655	0.094	0.071	10	$79.50	50%	5%	25%	55%	5.2	10.4	8.0	0.65

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
488	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Food Service	RETRO	1259893	1%	6949	0.992	0.748	8	$502.00	50%	5%	54%	56%	7.2	14.5	11.0	0.66
489	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Food Service	RETRO	2349	9%	211	0.030	0.023	5	$42.00	50%	5%	55%	53%	1.7	3.5	3.0	0.58
490	Refrigeration	Refrigeration - Custom	Biz - Custom	Food Service	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.1	2.8	0.57
491	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Food Service	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.1	2.8	0.57
492	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Food Service	MO	1278	12%	153	0.022	0.017	14	$500.00	50%	0%	31%	18%	0.3	0.5	0.9	0.29
493	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Food Service	RETRO	1663	23%	390	0.056	0.042	5	$245.00	50%	0%	31%	44%	0.5	1.1	1.3	0.42
494	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Food Service	MO	5551	8%	440	0.063	0.047	9	$222.00	50%	4%	44%	46%	1.1	2.3	2.2	0.53
495	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Food Service	MO	115	74%	84	0.012	0.009	9	$11.00	50%	10%	35%	55%	4.4	8.9	6.9	0.64
496	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Food Service	RETRO	13903	59%	8202	1.432	1.257	15	$2,250.00	50%	26%	30%	58%	3.6	7.2	5.1	0.71
497	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Food Service	RETRO	17237	3%	534	0.081	0.071	15	$381.00	50%	26%	10%	35%	1.3	2.6	2.3	0.58
498	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Food Service	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	100%	20%	41%	2.3	4.7	3.6	0.64
499	WholeBldg_HVAC	GREM Controls	Biz - Custom	Food Service	RETRO	0	0%	0	0.000	0.000	15	$0.00	0%	0%	20%	50%	#DIV/0!	0.0	0.0	0.00
500	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Food Service	RETRO	2550	20%	510	0.087	0.066	10	$235.60	50%	100%	10%	40%	3.0	2.9	5.6	0.60
501	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Food Service	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.17
502	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Food Service	RETRO	1237	47%	580	0.099	0.075	10	$341.21	50%	42%	30%	38%	1.4	2.3	2.5	0.56
503	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Food Service	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	7.8	15.5	10.9	0.71
504	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Food Service	RETRO	222	2%	4	0.001	0.001	10	$8.00	50%	100%	25%	20%	0.4	0.8	1.0	0.38
505	WholeBldg	WholeBlg - Com RET	Biz - Custom	Food Service	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.3	4.7	3.6	0.64
506	WholeBldg	Strategic Energy Management	Biz - RCx	Food Service	RETRO	0	0%	0	0.000	0.000	5	$0.27		100%	0%	73%	0.5	0.0	0.0	0.00
507	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Food Service	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.3	2.6	2.2	0.58
508	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Food Service	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.3	4.7	3.6	0.64
509	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Health	MO	19496	39%	7532	2.273	0.760	12	$2,270.00	50%	17%	53%	51%	2.7	5.4	4.0	0.67
510	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Health	MO	10864	19%	2064	0.623	0.208	12	$960.00	50%	17%	53%	47%	1.7	3.5	2.8	0.63
511	Cooking	Commercial Electric Griddle	Biz - Custom	Health	MO	17056	15%	2596	0.783	0.262	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
512	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Health	MO	16915	80%	13507	4.076	1.362	12	$2,757.00	50%	6%	45%	53%	4.0	7.9	5.6	0.70
513	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Health	MO	35655	44%	15766	4.758	1.590	16	$466.50	50%	26%	61%	57%	34.2	68.4	44.9	0.76
514	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Health	MO	38282	16%	6279	1.895	0.633	15	$1,550.00	50%	26%	61%	52%	3.9	7.8	5.6	0.70
515	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Health	MO	18955	17%	3274	0.988	0.330	12	$1,500.00	50%	27%	24%	47%	1.8	3.5	2.8	0.63
516	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Health	MO	1478	37%	545	0.165	0.055	12	$1,000.00	50%	3%	16%	32%	0.4	0.9	1.1	0.41
517	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Health	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.7	5.4	4.4	0.61
518	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Health	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.6	3.1	2.8	0.56
519	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Health	MO	23742	21%	4935	0.616	0.536	13	$3,367.84	50%	100%	20%	48%	1.1	2.3	2.1	0.53
520	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Health	RETRO	476154	0%	1970	0.246	0.214	10	$244.00	50%	100%	5%	63%	5.1	10.1	7.8	0.65
521	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Health	MO	1130	50%	565	0.071	0.061	15	$57.00	50%	5%	20%	63%	8.5	17.0	12.9	0.66
522	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Health	MO	1216	14%	172	0.048	0.006	15	$153.28	50%	29%	5%	41%	0.9	1.8	1.9	0.48
523	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Health	MO	1216	19%	230	0.064	0.008	15	$214.59	50%	29%	5%	40%	0.9	1.7	1.8	0.47
524	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Health	MO	1216	30%	371	0.103	0.013	15	$398.52	50%	29%	5%	37%	0.7	1.5	1.7	0.45
525	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Health	MO	1366	9%	124	0.035	0.004	15	$71.00	50%	29%	5%	51%	1.4	2.8	2.7	0.52
526	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Health	MO	1366	13%	182	0.051	0.006	15	$109.23	50%	29%	5%	50%	1.3	2.7	2.6	0.52
527	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Health	MO	1366	24%	321	0.090	0.011	15	$218.46	50%	29%	5%	48%	1.2	2.4	2.3	0.51
528	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Health	RETRO	1480	7%	104	0.029	0.004	3	$11.42	50%	59%	50%	47%	1.8	3.5	3.3	0.53
529	Cooling	Air Side Economizer	Biz - Custom	Health	RETRO	1216	20%	243	0.068	0.008	10	$126.67	50%	59%	25%	39%	1.1	2.2	2.2	0.50
530	Cooling	HVAC Occupancy Controls	Biz - Custom	Health	RETRO	1284	20%	257	0.072	0.009	15	$197.50	50%	59%	20%	34%	1.5	2.1	3.0	0.49
531	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Health	MO	1268	13%	159	0.044	0.005	15	$115.00	50%	0%	5%	46%	1.1	2.2	2.2	0.50
532	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Health	MO	1268	22%	282	0.079	0.010	15	$514.00	50%	0%	5%	27%	0.4	0.9	1.2	0.37
533	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Health	MO	1268	33%	423	0.118	0.014	15	$630.50	50%	0%	5%	31%	0.5	1.1	1.3	0.40
534	Cooling	Smart Thermostat	Biz - Prescriptive	Health	RETRO	7280	14%	1031	0.287	0.035	11	$175.00	50%	0%	20%	61%	5.1	7.4	9.3	0.59
535	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Health	MO	1637	15%	238	0.066	0.008	8	$84.00	50%	0%	20%	42%	1.4	2.7	2.6	0.51
536	Cooling	Air Cooled Chiller	Biz - Prescriptive	Health	MO	1296	9%	117	0.033	0.004	23	$126.00	50%	37%	5%	37%	1.0	2.1	2.1	0.50
537	Cooling	Water Cooled Chiller	Biz - Prescriptive	Health	MO	651	23%	148	0.041	0.005	23	$61.00	50%	4%	5%	55%	2.7	5.4	4.6	0.59
538	Cooling	Window Film	Biz - Custom	Health	RETRO	6364	4%	280	0.078	0.009	10	$153.81	50%	100%	25%	39%	0.5	2.1	-0.2	0.49
539	Cooling	Triple Pane Windows	Biz - Custom	Health	MO	6364	6%	382	0.106	0.013	25	$700.00	50%	100%	2%	20%	0.6	1.3	1.5	0.44
540	Cooling	Energy Recovery Ventilator	Biz - Custom	Health	RETRO	1366	33%	446	0.124	0.015	15	$1,500.00	50%	100%	2%	14%	0.2	0.5	0.9	0.28
541	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Health	MO	2780	8%	224	0.021	0.052	15	$135.00	50%	0%	15%	50%	1.8	3.6	2.6	0.70
542	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Health	MO	2780	15%	422	0.039	0.099	15	$445.76	50%	0%	15%	37%	1.0	2.0	1.7	0.61

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
543	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Health	MO	2780	22%	604	0.056	0.141	15	$520.06	50%	0%	15%	42%	1.3	2.5	2.0	0.64
544	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Health	MO	2998	6%	189	0.018	0.044	15	$100.00	50%	17%	15%	52%	2.0	4.1	2.9	0.71
545	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Health	MO	2998	12%	349	0.032	0.082	15	$171.08	50%	17%	15%	53%	2.2	4.4	3.0	0.72
546	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Health	MO	3107	7%	212	0.020	0.050	15	$100.00	50%	17%	15%	53%	2.3	4.6	3.1	0.73
547	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Health	MO	3107	12%	381	0.035	0.089	15	$158.10	50%	17%	15%	55%	2.6	5.2	3.5	0.74
548	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Health	MO	3266	7%	223	0.021	0.052	15	$100.00	50%	17%	15%	54%	2.4	4.8	3.3	0.73
549	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Health	MO	3266	13%	419	0.039	0.098	15	$201.80	50%	17%	15%	53%	2.2	4.5	3.1	0.72
550	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Health	MO	3109	39%	1213	0.113	0.284	25	$4,361.00	50%	0%	15%	18%	0.4	0.8	1.0	0.42
551	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Health	MO	3109	43%	1325	0.123	0.310	25	$4,361.00	50%	0%	15%	19%	0.5	0.9	1.0	0.44
552	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Health	MO	5698	17%	950	0.088	0.222	15	$84.00	50%	0%	15%	48%	12.2	24.4	14.6	0.83
553	Hot Water	Heat Pump Water Heater	Biz - Custom	Health	MO	24473	73%	17947	1.817	2.087	15	$1,797.00	50%	71%	17%	44%	8.5	17.0	13.0	0.66
554	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Health	RETRO	1297	34%	447	0.045	0.052	10	$14.27	50%	14%	85%	46%	19.5	39.0	29.0	0.67
555	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Health	RETRO	18059	54%	9789	0.991	1.138	5	$54.00	50%	14%	85%	46%	62.2	124.4	91.2	0.68
556	Hot Water	Ozone Commercial Laundry	Biz - Custom	Health	MO	2984	25%	746	0.076	0.087	10	$20,309.70	50%	29%	20%	15%	1.1	0.0	2.9	0.04
557	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Health	RETRO	996	76%	755	0.000	0.087	10	$97.00	22%	13%	70%	64%	4.3	19.2	7.3	0.59
558	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Health	RETRO	1744	71%	1239	0.000	0.142	10	$123.81	29%	13%	70%	67%	5.5	19.2	9.4	0.59
559	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Health	RETRO	2490	67%	1659	0.000	0.191	10	$134.35	35%	13%	70%	68%	6.8	19.2	11.6	0.59
560	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Health	RETRO	3984	65%	2570	0.000	0.295	10	$196.16	38%	13%	70%	69%	7.2	19.2	12.3	0.59
561	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Health	RETRO	9467	70%	6666	0.000	0.766	10	$319.31	60%	13%	70%	71%	11.5	19.2	19.6	0.59
562	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Health	RETRO	489	76%	370	0.000	0.043	10	$97.00	11%	7%	70%	56%	2.1	19.2	3.6	0.59
563	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Health	RETRO	856	71%	608	0.000	0.070	10	$123.81	14%	7%	70%	60%	2.7	19.2	4.6	0.59
564	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Health	RETRO	1222	67%	814	0.000	0.094	10	$134.35	17%	7%	70%	62%	3.3	19.2	5.7	0.59
565	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Health	RETRO	1956	65%	1262	0.000	0.145	10	$196.16	18%	7%	70%	63%	3.5	19.2	6.0	0.59
566	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Health	RETRO	4647	70%	3272	0.000	0.376	10	$319.31	29%	7%	70%	67%	5.6	19.2	9.6	0.59
567	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Health	RETRO	251	74%	185	0.024	0.018	12	$59.00	8%	16%	60%	53%	2.0	29.4	3.9	0.66
568	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Health	RETRO	181	51%	93	0.012	0.009	10	$15.00	15%	43%	40%	62%	3.3	25.5	7.9	0.65
569	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Health	RETRO	187	34%	64	0.008	0.006	12	$22.00	7%	43%	40%	51%	1.9	29.4	3.5	0.66
570	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Health	RETRO	366	51%	188	0.024	0.018	12	$61.00	7%	43%	40%	53%	2.0	29.4	3.8	0.66
571	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Health	RETRO	543	54%	294	0.037	0.028	12	$76.00	9%	43%	40%	56%	2.5	29.4	5.0	0.66
572	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Health	RETRO	724	54%	393	0.050	0.038	12	$104.00	9%	43%	40%	56%	2.4	29.4	4.9	0.66
573	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Health	RETRO	365	50%	184	0.023	0.018	12	$46.67	9%	43%	40%	57%	2.5	29.4	5.2	0.66
574	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Health	RETRO	964	53%	513	0.065	0.049	12	$152.00	8%	43%	40%	54%	2.2	29.4	4.2	0.66
575	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Health	RETRO	1009	67%	676	0.086	0.065	12	$42.88	38%	5%	50%	69%	7.7	29.4	175.5	0.66
576	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Health	RETRO	1890	57%	1077	0.137	0.103	12	$48.07	54%	7%	40%	71%	9.7	29.4	-77.9	0.66
577	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Health	RETRO	7584	72%	5484	0.698	0.526	12	$187.94	70%	1%	50%	72%	11.2	29.4	-43.4	0.66
578	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Health	RETRO	161	100%	161	0.021	0.015	11	$18.50	21%	43%	0%	65%	4.7	27.5	15.5	0.66
579	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Health	RETRO	838	30%	251	0.032	0.024	15	$65.40	9%	90%	15%	56%	3.2	35.0	4.9	0.66
580	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Health	RETRO	1073	28%	301	0.038	0.029	15	$57.50	13%	90%	15%	60%	4.4	35.0	6.7	0.66
581	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Health	RETRO	479	38%	182	0.023	0.017	15	$75.00	6%	90%	15%	48%	2.0	35.0	3.1	0.66
582	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Health	RETRO	479	61%	292	0.037	0.028	15	$56.00	13%	90%	15%	60%	4.4	35.0	6.6	0.66
583	Lighting_Int	Networked Lighting Control	Biz - Custom	Health	RETRO	4	35%	1	0.000	0.000	15	$0.81	4%	90%	15%	31%	1.4	35.0	2.2	0.66
584	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Health	RETRO	69	71%	49	0.006	0.005	5	$32.50	4%	1%	85%	39%	0.5	14.0	0.8	0.64
585	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Health	RETRO	385	61%	237	0.030	0.026	5	$233.00	50%	1%	31%	44%	0.4	0.7	1.0	0.35
586	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Health	MO	5	50%	3	0.000	0.000	20	$1.73	50%	32%	24%	38%	1.6	3.2	2.9	0.57
587	Misc	High Efficiency Hand Dryers	Biz - Custom	Health	MO	1909	83%	1585	0.198	0.172	10	$483.00	50%	1%	50%	46%	2.1	4.1	3.5	0.59
588	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Health	RETRO	3125	4%	114	0.014	0.012	15	$59.00	50%	1%	73%	41%	1.7	3.3	2.9	0.57
589	Misc	Miscellaneous Custom	Biz - Custom	Health	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	66%	10%	44%	1.6	3.1	2.8	0.57
590	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Health	MO	4349	28%	1206	0.170	0.122	15	$198.32	50%	100%	25%	61%	5.1	10.3	8.1	0.63
591	Motors	Power Drive Systems	Biz - Custom	Health	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	6.5	13.0	10.1	0.64
592	Motors	Switch Reluctance Motors	Biz - Custom	Health	MO	33406	31%	10222	1.439	1.033	15	$527.50	50%	100%	1%	49%	16.4	32.8	24.7	0.66
593	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Health	MO	418	26%	110	0.014	0.012	6	$0.00		13%	95%	54%	#DIV/0!	0.0	0.0	0.00
594	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Health	RETRO	188	58%	109	0.014	0.012	7	$10.00	50%	20%	20%	52%	5.0	10.1	7.8	0.65
595	Plug_Office	Smart Socket	Biz - Custom	Health	RETRO	80	61%	48	0.006	0.005	7	$9.00	50%	20%	20%	49%	2.5	5.0	4.1	0.61

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
596	Plug_Office	Energy Star Server	Biz - Custom	Health	MO	2167	30%	650	0.081	0.071	9	$300.95	50%	23%	25%	42%	1.2	2.5	2.3	0.54
597	Plug_Office	Server Virtualization	Biz - Custom	Health	RETRO	2167	14%	301	0.038	0.033	9	$26.97	50%	23%	25%	52%	6.4	12.8	9.8	0.65
598	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Health	RETRO	86783	18%	15778	1.971	1.714	15	$480.00	50%	23%	25%	53%	28.3	56.5	41.6	0.68
599	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Health	RETRO	764	47%	358	0.045	0.039	15	$82.00	50%	23%	25%	48%	3.8	7.5	6.0	0.63
600	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Health	MO	8940	25%	2265	0.283	0.246	20	$750.00	50%	23%	25%	45%	3.2	6.4	5.1	0.62
601	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Health	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	23%	25%	48%	2.8	5.5	4.5	0.61
602	Refrigeration	Strip Curtains	Biz - Prescriptive	Health	RETRO	0	0%	0	0.000	0.000	4	$10.22		6%	26%	58%	0.0	0.0	0.0	0.00
603	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Health	RETRO	1228	25%	307	0.048	0.035	15	$431.00	50%	4%	25%	27%	0.6	1.3	1.4	0.46
604	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Health	RETRO	2884	55%	1586	0.248	0.181	15	$305.00	50%	2%	80%	53%	4.6	9.2	7.0	0.66
605	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Health	RETRO	1298	23%	293	0.046	0.034	13	$161.75	50%	4%	25%	45%	1.4	2.9	2.5	0.57
606	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Health	RETRO	3158	48%	1500	0.234	0.172	15	$1,170.00	50%	5%	25%	42%	1.1	2.3	2.1	0.54
607	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Health	RETRO	579	42%	240	0.037	0.027	10	$79.50	50%	17%	25%	50%	2.0	3.9	3.2	0.60
608	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Health	RETRO	1259893	0%	2399	0.374	0.274	8	$502.00	50%	12%	27%	53%	2.6	5.1	4.1	0.63
609	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Health	RETRO	45880	10%	4588	0.716	0.525	10	$311.54	50%	12%	27%	42%	9.5	19.1	13.9	0.69
610	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Health	RETRO	1558	50%	779	0.122	0.089	15	$390.00	50%	5%	25%	46%	1.8	3.6	3.0	0.59
611	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Health	RETRO	2884	55%	1586	0.248	0.181	15	$305.00	50%	2%	80%	53%	4.6	9.2	7.0	0.66
612	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Health	RETRO	2091	24%	505	0.079	0.058	10	$96.00	50%	2%	2%	40%	3.4	6.8	5.3	0.65
613	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Health	RETRO	1511	9%	136	0.021	0.016	5	$42.00	50%	16%	55%	51%	1.2	2.3	2.1	0.54
614	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Health	RETRO	2016	33%	655	0.102	0.075	10	$79.50	50%	6%	25%	55%	5.3	10.7	8.0	0.67
615	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Health	RETRO	1259893	1%	6949	1.085	0.795	8	$502.00	50%	6%	27%	56%	7.5	14.9	11.0	0.68
616	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Health	RETRO	2349	9%	211	0.033	0.024	5	$42.00	50%	5%	55%	53%	1.8	3.6	3.0	0.59
617	Refrigeration	Refrigeration - Custom	Biz - Custom	Health	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.2	2.8	0.58
618	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Health	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.2	2.8	0.58
619	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Health	MO	1278	12%	153	0.024	0.018	14	$500.00	50%	3%	31%	18%	0.3	0.5	0.9	0.30
620	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Health	RETRO	1663	23%	390	0.061	0.045	5	$245.00	50%	3%	31%	44%	0.6	1.1	1.3	0.44
621	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Health	MO	5551	8%	440	0.069	0.050	9	$222.00	50%	5%	44%	46%	1.2	2.4	2.2	0.55
622	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Health	MO	115	74%	84	0.013	0.010	9	$11.00	50%	10%	35%	55%	4.6	9.1	6.9	0.66
623	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Health	RETRO	11036	59%	6510	0.967	0.871	15	$2,250.00	50%	22%	64%	57%	2.7	5.3	4.1	0.65
624	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Health	RETRO	17237	3%	534	0.069	0.062	15	$381.00	50%	22%	10%	35%	1.2	2.4	2.3	0.54
625	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Health	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	100%	20%	41%	2.1	4.3	3.6	0.59
626	WholeBldg_HVAC	GREM Controls	Biz - Custom	Health	RETRO	0	0%	0	0.000	0.000	15	$0.00	0%	0%	20%	50%	#DIV/0!	0.0	0.0	0.00
627	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Health	RETRO	305	20%	61	0.009	0.006	10	$235.60	50%	100%	10%	13%	0.8	0.3	2.1	0.22
628	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Health	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.16
629	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Health	RETRO	0	0%	0	0.000	0.000	10	$341.21		57%	64%	50%	0.0	0.0	0.0	0.00
630	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Health	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	7.1	14.3	10.9	0.65
631	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Health	RETRO	222	2%	4	0.001	0.000	10	$8.00	50%	100%	25%	20%	0.3	0.7	1.0	0.34
632	WholeBldg	WholeBlg - Com RET	Biz - Custom	Health	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.1	4.3	3.6	0.59
633	WholeBldg	Strategic Energy Management	Biz - RCx	Health	RETRO	33	3%	1	0.000	0.000	5	$0.27	50%	100%	0%	62%	1.3	2.5	2.4	0.54
634	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Health	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.2	2.4	2.2	0.53
635	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Health	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.1	4.3	3.6	0.59
636	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Lodging	MO	19496	39%	7532	2.382	0.739	12	$2,270.00	50%	17%	53%	51%	2.7	5.4	4.0	0.67
637	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Lodging	MO	10864	19%	2064	0.653	0.203	12	$960.00	50%	17%	53%	47%	1.7	3.5	2.8	0.63
638	Cooking	Commercial Electric Griddle	Biz - Custom	Lodging	MO	17056	15%	2596	0.821	0.255	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
639	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Lodging	MO	16915	80%	13507	4.272	1.325	12	$2,757.00	50%	6%	45%	53%	4.0	7.9	5.6	0.70
640	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Lodging	MO	35655	44%	15766	4.987	1.547	16	$466.50	50%	26%	61%	57%	34.3	68.7	44.9	0.77
641	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Lodging	MO	38282	16%	6279	1.986	0.616	15	$1,550.00	50%	26%	61%	52%	3.9	7.8	5.6	0.70
642	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Lodging	MO	18955	17%	3274	1.036	0.321	12	$1,500.00	50%	27%	24%	47%	1.8	3.5	2.8	0.63
643	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Lodging	MO	1478	37%	545	0.172	0.054	12	$1,000.00	50%	3%	16%	32%	0.4	0.9	1.1	0.41
644	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Lodging	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.9	5.8	4.4	0.66
645	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Lodging	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.7	3.4	2.8	0.61
646	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Lodging	MO	23742	21%	4935	0.612	0.683	13	$3,367.84	50%	100%	20%	48%	1.2	2.4	2.1	0.56
647	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Lodging	RETRO	476154	0%	1970	0.244	0.273	10	$244.00	50%	100%	5%	63%	5.4	10.8	7.8	0.69
648	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Lodging	MO	1130	50%	565	0.070	0.078	15	$57.00	50%	5%	20%	63%	9.1	18.2	12.9	0.71
649	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Lodging	MO	1174	14%	166	0.053	0.003	15	$153.28	50%	16%	5%	40%	0.9	1.8	1.9	0.48

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
650	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Lodging	MO	1174	19%	222	0.072	0.005	15	$214.59	50%	16%	5%	39%	0.8	1.7	1.8	0.47
651	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Lodging	MO	1174	30%	358	0.115	0.007	15	$398.52	50%	16%	5%	36%	0.7	1.5	1.6	0.45
652	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Lodging	MO	1319	9%	120	0.039	0.002	15	$71.00	50%	16%	5%	50%	1.4	2.8	2.6	0.53
653	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Lodging	MO	1319	13%	176	0.057	0.004	15	$109.23	50%	16%	5%	50%	1.3	2.6	2.5	0.52
654	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Lodging	MO	1319	24%	310	0.100	0.006	15	$218.46	50%	16%	5%	47%	1.2	2.3	2.3	0.51
655	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Lodging	RETRO	1429	7%	100	0.032	0.002	3	$11.42	50%	32%	50%	47%	1.7	3.4	3.2	0.52
656	Cooling	Air Side Economizer	Biz - Custom	Lodging	RETRO	1174	20%	235	0.076	0.005	10	$126.67	50%	32%	25%	39%	1.1	2.2	2.2	0.50
657	Cooling	HVAC Occupancy Controls	Biz - Custom	Lodging	RETRO	1239	20%	248	0.080	0.005	15	$197.50	50%	32%	20%	33%	1.4	2.0	3.0	0.50
658	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Lodging	MO	1225	13%	153	0.049	0.003	15	$115.00	50%	0%	5%	46%	1.1	2.2	2.2	0.50
659	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Lodging	MO	1225	22%	272	0.088	0.006	15	$514.00	50%	0%	5%	26%	0.4	0.9	1.2	0.37
660	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Lodging	MO	1225	33%	408	0.132	0.008	15	$630.50	50%	0%	5%	31%	0.5	1.1	1.3	0.40
661	Cooling	Smart Thermostat	Biz - Prescriptive	Lodging	RETRO	7028	14%	995	0.321	0.021	11	$175.00	50%	0%	20%	61%	5.1	7.2	9.2	0.59
662	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Lodging	MO	1580	15%	230	0.074	0.005	8	$84.00	50%	15%	20%	42%	1.3	2.6	2.6	0.51
663	Cooling	Air Cooled Chiller	Biz - Prescriptive	Lodging	MO	1251	9%	113	0.036	0.002	23	$126.00	50%	43%	5%	36%	1.0	2.0	2.0	0.50
664	Cooling	Water Cooled Chiller	Biz - Prescriptive	Lodging	MO	629	23%	143	0.046	0.003	23	$61.00	50%	5%	5%	55%	2.6	5.3	4.4	0.59
665	Cooling	Window Film	Biz - Custom	Lodging	RETRO	6364	4%	280	0.090	0.006	10	$153.81	50%	100%	25%	39%	0.6	2.1	-0.2	0.49
666	Cooling	Triple Pane Windows	Biz - Custom	Lodging	MO	6364	6%	382	0.123	0.008	25	$700.00	50%	100%	2%	20%	0.7	1.3	1.5	0.44
667	Cooling	Energy Recovery Ventilator	Biz - Custom	Lodging	RETRO	1319	0%	0	0.000	0.000	15	$1,500.00		100%	2%	50%	0.0	0.0	0.0	0.00
668	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Lodging	MO	2753	8%	220	0.024	0.045	15	$135.00	50%	0%	15%	50%	1.7	3.4	2.5	0.67
669	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Lodging	MO	2753	15%	414	0.046	0.085	15	$445.76	50%	0%	15%	37%	1.0	1.9	1.7	0.58
670	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Lodging	MO	2753	21%	592	0.065	0.121	15	$520.06	50%	0%	15%	42%	1.2	2.4	1.9	0.61
671	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Lodging	MO	2972	6%	187	0.021	0.038	15	$100.00	50%	9%	15%	52%	1.9	3.9	2.8	0.68
672	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Lodging	MO	2972	12%	345	0.038	0.070	15	$171.08	50%	9%	15%	53%	2.1	4.2	3.0	0.69
673	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Lodging	MO	3081	7%	209	0.023	0.043	15	$100.00	50%	8%	15%	53%	2.2	4.3	3.1	0.70
674	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Lodging	MO	3081	12%	377	0.042	0.077	15	$158.10	50%	8%	15%	55%	2.5	4.9	3.5	0.71
675	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Lodging	MO	3237	7%	220	0.024	0.045	15	$100.00	50%	8%	15%	54%	2.3	4.6	3.2	0.70
676	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Lodging	MO	3237	13%	414	0.046	0.085	15	$201.80	50%	8%	15%	53%	2.1	4.3	3.1	0.69
677	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Lodging	MO	3083	39%	1215	0.134	0.248	25	$4,361.00	50%	7%	15%	18%	0.4	0.8	1.0	0.41
678	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Lodging	MO	3083	43%	1325	0.146	0.271	25	$4,361.00	50%	7%	15%	19%	0.4	0.9	1.0	0.42
679	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Lodging	MO	5695	17%	949	0.105	0.194	15	$84.00	50%	15%	15%	48%	11.7	23.5	14.6	0.80
680	Hot Water	Heat Pump Water Heater	Biz - Custom	Lodging	MO	22206	73%	16284	1.679	2.591	15	$1,797.00	50%	52%	13%	44%	8.6	17.2	11.8	0.73
681	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Lodging	RETRO	123	32%	40	0.004	0.006	10	$8.00	50%	10%	85%	41%	3.5	6.9	5.0	0.69
682	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Lodging	RETRO	18059	54%	9789	1.009	1.558	5	$54.00	50%	10%	85%	46%	69.8	139.7	91.2	0.77
683	Hot Water	Ozone Commercial Laundry	Biz - Custom	Lodging	MO	2984	25%	746	0.077	0.119	10	$20,309.70	50%	48%	20%	15%	1.1	0.1	2.9	0.05
684	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Lodging	RETRO	996	76%	755	0.000	0.087	10	$97.00	22%	13%	70%	64%	4.3	19.1	7.3	0.59
685	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Lodging	RETRO	1744	71%	1239	0.000	0.143	10	$123.81	29%	13%	70%	67%	5.5	19.1	9.4	0.59
686	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Lodging	RETRO	2490	67%	1659	0.000	0.192	10	$134.35	36%	13%	70%	68%	6.8	19.1	11.6	0.59
687	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Lodging	RETRO	3984	65%	2570	0.000	0.297	10	$196.16	38%	13%	70%	69%	7.2	19.1	12.3	0.59
688	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Lodging	RETRO	9467	70%	6666	0.000	0.770	10	$319.31	60%	13%	70%	71%	11.5	19.1	19.6	0.59
689	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Lodging	RETRO	489	76%	370	0.000	0.043	10	$97.00	11%	7%	70%	56%	2.1	19.1	3.6	0.59
690	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Lodging	RETRO	856	71%	608	0.000	0.070	10	$123.81	14%	7%	70%	60%	2.7	19.1	4.6	0.59
691	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Lodging	RETRO	1222	67%	814	0.000	0.094	10	$134.35	17%	7%	70%	62%	3.3	19.1	5.7	0.59
692	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Lodging	RETRO	1956	65%	1262	0.000	0.146	10	$196.16	19%	7%	70%	63%	3.6	19.1	6.0	0.59
693	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Lodging	RETRO	4647	70%	3272	0.000	0.378	10	$319.31	30%	7%	70%	67%	5.7	19.1	9.6	0.59
694	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Lodging	RETRO	178	74%	131	0.013	0.017	15	$59.00	7%	15%	60%	47%	1.7	27.4	3.7	0.68
695	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Lodging	RETRO	128	51%	66	0.006	0.008	10	$15.00	14%	44%	40%	59%	2.3	20.1	6.5	0.68
696	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Lodging	RETRO	133	34%	45	0.004	0.006	15	$22.00	6%	44%	40%	45%	1.6	27.4	3.3	0.68
697	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Lodging	RETRO	260	51%	133	0.013	0.017	15	$61.00	7%	44%	40%	47%	1.7	27.4	3.6	0.68
698	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Lodging	RETRO	385	54%	208	0.020	0.026	15	$76.00	9%	44%	40%	51%	2.0	27.4	5.0	0.68
699	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Lodging	RETRO	513	54%	278	0.027	0.035	15	$104.00	8%	44%	40%	51%	2.0	27.4	4.9	0.68
700	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Lodging	RETRO	259	50%	130	0.013	0.017	15	$46.67	9%	44%	40%	51%	2.0	27.4	5.2	0.68
701	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Lodging	RETRO	683	53%	363	0.035	0.046	15	$152.00	8%	44%	40%	49%	1.8	27.4	4.1	0.68
702	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Lodging	RETRO	715	67%	479	0.046	0.061	15	$42.88	35%	5%	50%	68%	5.5	27.4	-22.6	0.68
703	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Lodging	RETRO	1339	57%	764	0.074	0.097	15	$48.07	50%	0%	40%	70%	6.6	27.4	-14.8	0.68

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
704	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Lodging	RETRO	5375	72%	3886	0.377	0.493	15	$187.94	66%	1%	50%	71%	7.4	27.4	-12.4	0.68
705	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Lodging	RETRO	114	100%	114	0.011	0.014	11	$18.50	20%	44%	0%	63%	3.2	21.6	16.4	0.68
706	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Lodging	RETRO	594	30%	178	0.017	0.023	15	$65.40	9%	90%	15%	51%	2.4	27.4	3.5	0.68
707	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Lodging	RETRO	761	28%	213	0.021	0.027	15	$57.50	12%	90%	15%	56%	3.2	27.4	4.8	0.68
708	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Lodging	RETRO	339	38%	129	0.013	0.016	15	$75.00	5%	90%	15%	42%	1.5	27.4	2.2	0.68
709	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Lodging	RETRO	339	61%	207	0.020	0.026	15	$56.00	12%	90%	15%	56%	3.2	27.4	4.7	0.68
710	Lighting_Int	Networked Lighting Control	Biz - Custom	Lodging	RETRO	3	35%	1	0.000	0.000	15	$0.57	5%	90%	15%	31%	1.5	27.4	2.2	0.68
711	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Lodging	RETRO	66	71%	47	0.005	0.006	5	$32.50	5%	1%	85%	38%	0.5	11.1	0.7	0.66
712	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Lodging	RETRO	385	61%	237	0.029	0.033	5	$233.00	50%	0%	31%	44%	0.4	0.8	1.0	0.37
713	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Lodging	MO	5	50%	3	0.000	0.000	20	$1.73	50%	27%	24%	38%	1.7	3.4	2.9	0.60
714	Misc	High Efficiency Hand Dryers	Biz - Custom	Lodging	MO	262	83%	217	0.027	0.030	10	$483.00	50%	1%	50%	19%	0.3	0.6	0.9	0.33
715	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Lodging	RETRO	3125	4%	114	0.014	0.016	15	$59.00	50%	0%	73%	41%	1.8	3.6	2.9	0.61
716	Misc	Miscellaneous Custom	Biz - Custom	Lodging	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	72%	10%	44%	1.7	3.4	2.8	0.60
717	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Lodging	MO	3628	28%	1006	0.129	0.132	15	$198.32	50%	100%	25%	60%	4.6	9.1	6.8	0.67
718	Motors	Power Drive Systems	Biz - Custom	Lodging	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	6.9	13.8	10.1	0.68
719	Motors	Switch Reluctance Motors	Biz - Custom	Lodging	MO	56602	31%	17320	2.215	2.279	15	$527.50	50%	100%	1%	49%	29.5	59.0	41.6	0.71
720	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Lodging	MO	418	26%	110	0.014	0.015	6	$0.00		29%	95%	54%	#DIV/0!	0.0	0.0	0.00
721	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Lodging	RETRO	188	58%	109	0.013	0.015	7	$10.00	50%	8%	20%	52%	5.4	10.8	7.8	0.69
722	Plug_Office	Smart Socket	Biz - Custom	Lodging	RETRO	80	61%	48	0.006	0.007	7	$9.00	50%	8%	20%	49%	2.7	5.3	4.1	0.65
723	Plug_Office	Energy Star Server	Biz - Custom	Lodging	MO	2167	30%	650	0.081	0.090	9	$300.95	50%	9%	25%	42%	1.3	2.7	2.3	0.58
724	Plug_Office	Server Virtualization	Biz - Custom	Lodging	RETRO	2167	14%	301	0.037	0.042	9	$26.97	50%	9%	25%	52%	6.9	13.7	9.8	0.70
725	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Lodging	RETRO	86783	18%	15778	1.956	2.185	15	$480.00	50%	9%	25%	53%	30.1	60.3	41.6	0.72
726	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Lodging	RETRO	764	47%	358	0.044	0.050	15	$82.00	50%	9%	25%	48%	4.0	8.0	6.0	0.67
727	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Lodging	MO	8940	25%	2265	0.281	0.314	20	$750.00	50%	9%	25%	45%	3.4	6.8	5.1	0.66
728	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Lodging	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	9%	25%	48%	3.0	5.9	4.5	0.66
729	Refrigeration	Strip Curtains	Biz - Prescriptive	Lodging	RETRO	0	0%	0	0.000	0.000	4	$10.22		7%	26%	58%	0.0	0.0	0.0	0.00
730	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Lodging	RETRO	1228	25%	307	0.042	0.034	15	$431.00	50%	5%	25%	27%	0.6	1.2	1.4	0.44
731	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Lodging	RETRO	2884	55%	1586	0.219	0.174	15	$305.00	50%	2%	80%	53%	4.5	9.0	7.0	0.64
732	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Lodging	RETRO	1298	23%	293	0.040	0.032	13	$161.75	50%	4%	25%	45%	1.4	2.8	2.5	0.56
733	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Lodging	RETRO	3158	48%	1500	0.207	0.165	15	$1,170.00	50%	6%	25%	42%	1.1	2.2	2.1	0.53
734	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Lodging	RETRO	579	42%	240	0.033	0.026	10	$79.50	50%	16%	25%	50%	1.9	3.8	3.2	0.59
735	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Lodging	RETRO	1259893	0%	2399	0.331	0.264	8	$502.00	50%	12%	27%	53%	2.5	5.0	4.1	0.61
736	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Lodging	RETRO	45880	10%	4588	0.634	0.504	10	$311.54	50%	12%	27%	42%	9.3	18.5	13.9	0.67
737	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Lodging	RETRO	1558	50%	779	0.108	0.086	15	$390.00	50%	5%	25%	46%	1.7	3.5	3.0	0.58
738	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Lodging	RETRO	2884	55%	1586	0.219	0.174	15	$305.00	50%	2%	80%	53%	4.5	9.0	7.0	0.64
739	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Lodging	RETRO	2091	24%	505	0.070	0.055	10	$96.00	50%	2%	2%	40%	3.3	6.6	5.3	0.63
740	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Lodging	RETRO	1511	9%	136	0.019	0.015	5	$42.00	50%	15%	55%	51%	1.1	2.2	2.1	0.53
741	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Lodging	RETRO	2016	33%	655	0.091	0.072	10	$79.50	50%	5%	25%	55%	5.2	10.4	8.0	0.65
742	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Lodging	RETRO	1259893	1%	6949	0.960	0.764	8	$502.00	50%	5%	27%	56%	7.2	14.5	11.0	0.66
743	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Lodging	RETRO	2349	9%	211	0.029	0.023	5	$42.00	50%	5%	55%	53%	1.7	3.5	3.0	0.58
744	Refrigeration	Refrigeration - Custom	Biz - Custom	Lodging	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.1	2.8	0.57
745	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Lodging	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.1	2.8	0.57
746	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Lodging	MO	1278	12%	153	0.021	0.017	14	$500.00	50%	5%	31%	18%	0.3	0.5	0.9	0.29
747	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Lodging	RETRO	1663	23%	390	0.054	0.043	5	$245.00	50%	5%	31%	44%	0.6	1.1	1.3	0.42
748	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Lodging	MO	5551	8%	440	0.061	0.048	9	$222.00	50%	5%	44%	46%	1.1	2.3	2.2	0.53
749	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Lodging	MO	115	74%	84	0.012	0.009	9	$11.00	50%	9%	35%	55%	4.4	8.9	6.9	0.64
750	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Lodging	RETRO	10560	59%	6229	0.862	0.947	15	$2,250.00	50%	35%	46%	56%	2.6	5.3	4.0	0.66
751	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Lodging	RETRO	29207	3%	905	0.108	0.119	15	$381.00	50%	35%	10%	41%	2.1	4.3	3.5	0.61
752	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Lodging	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	15%	20%	41%	2.2	4.5	3.6	0.62
753	WholeBldg_HVAC	GREM Controls	Biz - Custom	Lodging	RETRO	4853	19%	936	0.139	0.113	15	$260.00	50%	85%	20%	44%	3.2	6.5	5.0	0.65
754	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Lodging	RETRO	2045	20%	409	0.061	0.050	10	$235.60	50%	100%	10%	38%	1.4	2.3	2.7	0.55
755	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Lodging	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.17
756	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Lodging	RETRO	0	0%	0	0.000	0.000	10	$341.21		27%	46%	50%	0.0	0.0	0.0	0.00
757	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Lodging	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	7.5	15.0	10.9	0.69

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
758	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Lodging	RETRO	222	2%	4	0.001	0.001	10	$8.00	50%	100%	25%	20%	0.4	0.7	1.0	0.36
759	WholeBldg	WholeBlg - Com RET	Biz - Custom	Lodging	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.2	4.5	3.6	0.62
760	WholeBldg	Strategic Energy Management	Biz - RCx	Lodging	RETRO	0	0%	0	0.000	0.000	5	$0.27		100%	0%	73%	0.5	0.0	0.0	0.00
761	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Lodging	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.2	2.5	2.2	0.56
762	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Lodging	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.2	4.5	3.6	0.62
763	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Retail	MO	19496	39%	7532	1.841	0.802	12	$2,270.00	50%	17%	53%	51%	2.7	5.4	4.0	0.68
764	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Retail	MO	10864	19%	2064	0.505	0.220	12	$960.00	50%	17%	53%	47%	1.8	3.5	2.8	0.64
765	Cooking	Commercial Electric Griddle	Biz - Custom	Retail	MO	17056	15%	2596	0.634	0.277	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
766	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Retail	MO	16915	80%	13507	3.301	1.439	12	$2,757.00	50%	6%	45%	53%	4.0	8.0	5.6	0.71
767	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Retail	MO	35655	44%	15766	3.853	1.679	16	$466.50	50%	26%	61%	57%	34.6	69.2	44.9	0.77
768	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Retail	MO	38282	16%	6279	1.535	0.669	15	$1,550.00	50%	26%	61%	52%	3.9	7.9	5.6	0.71
769	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Retail	MO	18955	17%	3274	0.800	0.349	12	$1,500.00	50%	27%	24%	47%	1.8	3.6	2.8	0.64
770	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Retail	MO	1478	37%	545	0.133	0.058	12	$1,000.00	50%	3%	16%	32%	0.4	0.9	1.1	0.42
771	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Retail	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.7	5.4	4.4	0.61
772	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Retail	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.6	3.1	2.8	0.56
773	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Retail	MO	23742	21%	4935	0.530	0.568	13	$3,367.84	50%	100%	20%	48%	1.1	2.3	2.1	0.53
774	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Retail	RETRO	476154	0%	1970	0.212	0.227	10	$244.00	50%	100%	5%	63%	5.0	10.1	7.8	0.64
775	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Retail	MO	1130	50%	565	0.061	0.065	15	$57.00	50%	5%	20%	63%	8.5	17.0	12.9	0.66
776	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Retail	MO	626	14%	88	0.036	0.001	15	$153.28	50%	18%	5%	28%	0.5	1.0	1.2	0.41
777	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Retail	MO	626	19%	118	0.048	0.002	15	$214.59	50%	18%	5%	27%	0.5	1.0	1.2	0.41
778	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Retail	MO	626	30%	191	0.078	0.003	15	$398.52	50%	18%	5%	24%	0.4	0.8	1.1	0.38
779	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Retail	MO	703	9%	64	0.026	0.001	15	$71.00	50%	18%	5%	36%	0.8	1.6	1.6	0.49
780	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Retail	MO	703	13%	94	0.038	0.001	15	$109.23	50%	18%	5%	36%	0.8	1.5	1.6	0.48
781	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Retail	MO	703	24%	166	0.067	0.003	15	$218.46	50%	18%	5%	34%	0.7	1.3	1.4	0.46
782	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Retail	RETRO	762	7%	53	0.022	0.001	3	$11.42	50%	36%	50%	45%	1.0	1.9	2.0	0.49
783	Cooling	Air Side Economizer	Biz - Custom	Retail	RETRO	626	20%	125	0.051	0.002	10	$126.67	50%	36%	25%	28%	0.6	1.2	1.4	0.44
784	Cooling	HVAC Occupancy Controls	Biz - Custom	Retail	RETRO	661	20%	132	0.054	0.002	15	$197.50	50%	36%	20%	23%	0.9	1.2	2.1	0.44
785	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Retail	MO	653	13%	82	0.033	0.001	15	$115.00	50%	18%	5%	32%	0.6	1.2	1.4	0.45
786	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Retail	MO	653	22%	145	0.059	0.002	15	$514.00	50%	18%	5%	18%	0.2	0.5	0.9	0.29
787	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Retail	MO	653	33%	218	0.089	0.003	15	$630.50	50%	18%	5%	21%	0.3	0.6	0.9	0.32
788	Cooling	Smart Thermostat	Biz - Prescriptive	Retail	RETRO	3749	14%	531	0.216	0.008	11	$175.00	50%	18%	20%	57%	3.2	4.1	6.0	0.59
789	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Retail	MO	843	15%	123	0.050	0.002	8	$84.00	50%	18%	20%	36%	0.8	1.5	1.6	0.47
790	Cooling	Air Cooled Chiller	Biz - Prescriptive	Retail	MO	667	9%	60	0.024	0.001	23	$126.00	50%	25%	5%	24%	0.6	1.2	1.3	0.44
791	Cooling	Water Cooled Chiller	Biz - Prescriptive	Retail	MO	335	23%	76	0.031	0.001	23	$61.00	50%	3%	5%	44%	1.5	3.0	2.6	0.58
792	Cooling	Window Film	Biz - Custom	Retail	RETRO	6364	4%	280	0.114	0.004	10	$153.81	50%	100%	25%	39%	0.6	2.3	-0.2	0.53
793	Cooling	Triple Pane Windows	Biz - Custom	Retail	MO	6364	6%	382	0.155	0.006	25	$700.00	50%	100%	2%	20%	0.7	1.4	1.5	0.48
794	Cooling	Energy Recovery Ventilator	Biz - Custom	Retail	RETRO	703	5%	35	0.014	0.001	15	$1,500.00	50%	100%	2%	12%	0.0	0.0	0.5	0.04
795	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Retail	MO	1896	7%	136	0.018	0.030	15	$135.00	50%	22%	15%	38%	1.1	2.2	1.8	0.63
796	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Retail	MO	1896	14%	260	0.035	0.058	15	$445.76	50%	22%	15%	28%	0.6	1.3	1.2	0.52
797	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Retail	MO	1896	19%	367	0.050	0.082	15	$520.06	50%	22%	15%	32%	0.8	1.6	1.4	0.56
798	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Retail	MO	2071	6%	127	0.017	0.028	15	$100.00	50%	15%	15%	44%	1.4	2.8	2.1	0.67
799	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Retail	MO	2071	11%	235	0.032	0.053	15	$171.08	50%	15%	15%	46%	1.5	3.0	2.2	0.68
800	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Retail	MO	2144	7%	140	0.019	0.031	15	$100.00	50%	15%	15%	47%	1.5	3.1	2.3	0.68
801	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Retail	MO	2144	12%	255	0.035	0.057	15	$158.10	50%	15%	15%	50%	1.8	3.5	2.5	0.70
802	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Retail	MO	2241	6%	144	0.020	0.032	15	$100.00	50%	15%	15%	47%	1.6	3.2	2.3	0.69
803	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Retail	MO	2241	12%	277	0.038	0.062	15	$201.80	50%	15%	15%	46%	1.5	3.0	2.2	0.68
804	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Retail	MO	2145	43%	920	0.125	0.205	25	$4,361.00	50%	5%	15%	16%	0.3	0.6	0.9	0.37
805	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Retail	MO	2145	46%	992	0.135	0.222	25	$4,361.00	50%	5%	15%	16%	0.3	0.7	0.9	0.39
806	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Retail	MO	4239	17%	706	0.096	0.158	15	$84.00	50%	10%	15%	47%	9.2	18.5	11.0	0.84
807	Hot Water	Heat Pump Water Heater	Biz - Custom	Retail	MO	16398	73%	12025	1.572	1.561	15	$1,797.00	50%	100%	9%	43%	6.2	12.4	8.9	0.70
808	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Retail	RETRO	288	32%	93	0.012	0.012	10	$8.00	50%	20%	85%	44%	7.8	15.7	11.1	0.71
809	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Retail	RETRO	18059	54%	9789	1.280	1.270	5	$54.00	50%	20%	85%	46%	67.2	134.4	91.2	0.74
810	Hot Water	Ozone Commercial Laundry	Biz - Custom	Retail	MO	2984	25%	746	0.098	0.097	10	$20,309.70	50%	0%	20%	15%	1.1	0.0	2.9	0.05
811	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Retail	RETRO	996	76%	755	0.000	0.088	10	$97.00	23%	13%	70%	64%	4.3	19.1	7.3	0.59

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
812	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Retail	RETRO	1744	71%	1239	0.000	0.144	10	$123.81	29%	13%	70%	67%	5.5	19.1	9.4	0.59
813	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Retail	RETRO	2490	67%	1659	0.000	0.192	10	$134.35	36%	13%	70%	68%	6.8	19.1	11.6	0.59
814	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Retail	RETRO	3984	65%	2570	0.000	0.298	10	$196.16	38%	13%	70%	69%	7.3	19.1	12.3	0.59
815	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Retail	RETRO	9467	70%	6666	0.000	0.773	10	$319.31	61%	13%	70%	71%	11.6	19.1	19.6	0.59
816	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Retail	RETRO	489	76%	370	0.000	0.043	10	$97.00	11%	7%	70%	56%	2.1	19.1	3.6	0.59
817	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Retail	RETRO	856	71%	608	0.000	0.070	10	$123.81	14%	7%	70%	60%	2.7	19.1	4.6	0.59
818	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Retail	RETRO	1222	67%	814	0.000	0.094	10	$134.35	18%	7%	70%	62%	3.4	19.1	5.7	0.59
819	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Retail	RETRO	1956	65%	1262	0.000	0.146	10	$196.16	19%	7%	70%	63%	3.6	19.1	6.0	0.59
820	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Retail	RETRO	4647	70%	3272	0.000	0.379	10	$319.31	30%	7%	70%	67%	5.7	19.1	9.6	0.59
821	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Retail	RETRO	171	74%	126	0.013	0.013	15	$59.00	6%	4%	60%	46%	1.6	32.5	3.4	0.67
822	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Retail	RETRO	123	51%	63	0.007	0.007	10	$15.00	11%	63%	40%	58%	2.2	23.7	5.7	0.67
823	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Retail	RETRO	127	34%	43	0.004	0.005	15	$22.00	5%	63%	40%	44%	1.5	32.5	3.0	0.67
824	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Retail	RETRO	249	51%	128	0.013	0.013	15	$61.00	6%	63%	40%	46%	1.6	32.5	3.3	0.67
825	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Retail	RETRO	370	54%	200	0.021	0.021	15	$76.00	7%	63%	40%	50%	1.9	32.5	4.5	0.67
826	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Retail	RETRO	493	54%	267	0.028	0.028	15	$104.00	7%	63%	40%	50%	1.9	32.5	4.4	0.67
827	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Retail	RETRO	249	50%	125	0.013	0.013	15	$46.67	7%	63%	40%	50%	2.0	32.5	4.7	0.67
828	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Retail	RETRO	656	53%	349	0.036	0.037	15	$152.00	6%	63%	40%	48%	1.7	32.5	3.7	0.67
829	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Retail	RETRO	687	67%	460	0.048	0.048	15	$42.88	28%	7%	50%	67%	5.4	32.5	-32.4	0.67
830	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Retail	RETRO	1286	57%	733	0.076	0.077	15	$48.07	40%	14%	40%	69%	6.6	32.5	-18.2	0.67
831	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Retail	RETRO	5163	72%	3733	0.387	0.393	15	$187.94	52%	8%	50%	71%	7.5	32.5	-14.6	0.67
832	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Retail	RETRO	110	100%	110	0.011	0.012	11	$18.50	16%	63%	0%	62%	3.1	25.6	12.9	0.67
833	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Retail	RETRO	571	30%	171	0.018	0.018	15	$65.40	7%	90%	15%	50%	2.2	32.5	3.3	0.67
834	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Retail	RETRO	731	28%	205	0.021	0.022	15	$57.50	9%	90%	15%	55%	3.0	32.5	4.5	0.67
835	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Retail	RETRO	326	38%	124	0.013	0.013	15	$75.00	4%	90%	15%	41%	1.4	32.5	2.1	0.67
836	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Retail	RETRO	326	61%	199	0.021	0.021	15	$56.00	9%	90%	15%	55%	3.0	32.5	4.5	0.67
837	Lighting_Int	Networked Lighting Control	Biz - Custom	Retail	RETRO	3	35%	1	0.000	0.000	15	$0.55	4%	90%	15%	31%	1.4	32.5	2.2	0.67
838	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Retail	RETRO	66	71%	47	0.005	0.005	5	$32.50	4%	1%	85%	38%	0.5	13.0	0.7	0.65
839	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Retail	RETRO	385	61%	237	0.025	0.027	5	$233.00	50%	1%	31%	44%	0.4	0.7	1.0	0.35
840	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Retail	MO	0	0%	0	0.000	0.000	20	$1.73		31%	24%	54%	0.0	0.0	0.0	0.00
841	Misc	High Efficiency Hand Dryers	Biz - Custom	Retail	MO	1909	83%	1585	0.170	0.182	10	$483.00	50%	1%	50%	46%	2.1	4.1	3.5	0.59
842	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Retail	RETRO	3125	4%	114	0.012	0.013	15	$59.00	50%	1%	73%	41%	1.7	3.3	2.9	0.57
843	Misc	Miscellaneous Custom	Biz - Custom	Retail	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	67%	10%	44%	1.6	3.1	2.8	0.56
844	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Retail	MO	1675	28%	465	0.069	0.071	15	$198.32	50%	100%	25%	55%	2.3	4.5	3.4	0.66
845	Motors	Power Drive Systems	Biz - Custom	Retail	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	7.4	14.8	10.1	0.73
846	Motors	Switch Reluctance Motors	Biz - Custom	Retail	MO	28430	31%	8700	1.300	1.335	15	$527.50	50%	100%	1%	48%	15.9	31.7	21.1	0.75
847	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Retail	MO	418	26%	110	0.012	0.013	6	$0.00		12%	95%	54%	#DIV/0!	0.0	0.0	0.00
848	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Retail	RETRO	188	58%	109	0.012	0.012	7	$10.00	50%	21%	20%	52%	5.0	10.1	7.8	0.65
849	Plug_Office	Smart Socket	Biz - Custom	Retail	RETRO	80	61%	48	0.005	0.006	7	$9.00	50%	21%	20%	49%	2.5	5.0	4.1	0.61
850	Plug_Office	Energy Star Server	Biz - Custom	Retail	MO	2167	30%	650	0.070	0.075	9	$300.95	50%	24%	25%	42%	1.2	2.5	2.3	0.54
851	Plug_Office	Server Virtualization	Biz - Custom	Retail	RETRO	2167	14%	301	0.032	0.035	9	$26.97	50%	24%	25%	52%	6.4	12.8	9.8	0.65
852	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Retail	RETRO	86783	18%	15778	1.696	1.816	15	$480.00	50%	24%	25%	53%	28.2	56.3	41.6	0.68
853	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Retail	RETRO	764	47%	358	0.038	0.041	15	$82.00	50%	24%	25%	48%	3.7	7.5	6.0	0.63
854	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Retail	MO	8940	25%	2265	0.243	0.261	20	$750.00	50%	24%	25%	45%	3.2	6.3	5.1	0.62
855	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Retail	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	24%	25%	48%	2.8	5.5	4.5	0.61
856	Refrigeration	Strip Curtains	Biz - Prescriptive	Retail	RETRO	0	0%	0	0.000	0.000	4	$10.22		5%	26%	58%	0.0	0.0	0.0	0.00
857	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Retail	RETRO	1228	25%	307	0.043	0.034	15	$431.00	50%	3%	25%	27%	0.6	1.2	1.4	0.44
858	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Retail	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	3%	80%	53%	4.5	9.0	7.0	0.64
859	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Retail	RETRO	1298	23%	293	0.041	0.032	13	$161.75	50%	3%	25%	45%	1.4	2.8	2.5	0.56
860	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Retail	RETRO	3158	48%	1500	0.212	0.164	15	$1,170.00	50%	4%	25%	42%	1.1	2.2	2.1	0.53
861	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Retail	RETRO	579	42%	240	0.034	0.026	10	$79.50	50%	19%	25%	50%	1.9	3.8	3.2	0.59
862	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Retail	RETRO	1259893	0%	2399	0.338	0.262	8	$502.00	50%	14%	27%	53%	2.5	5.0	4.1	0.61
863	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Retail	RETRO	45880	10%	4588	0.647	0.501	10	$311.54	50%	14%	27%	42%	9.3	18.5	13.9	0.67
864	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Retail	RETRO	1558	50%	779	0.110	0.085	15	$390.00	50%	5%	25%	46%	1.7	3.5	3.0	0.58
865	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Retail	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	3%	80%	53%	4.5	9.0	7.0	0.64

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
866	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Retail	RETRO	2091	24%	505	0.071	0.055	10	$96.00	50%	3%	2%	40%	3.3	6.6	5.3	0.63
867	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Retail	RETRO	1511	9%	136	0.019	0.015	5	$42.00	50%	18%	55%	51%	1.1	2.2	2.1	0.53
868	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Retail	RETRO	2016	33%	655	0.092	0.072	10	$79.50	50%	6%	25%	55%	5.2	10.4	8.0	0.65
869	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Retail	RETRO	1259893	1%	6949	0.980	0.759	8	$502.00	50%	6%	27%	56%	7.2	14.5	11.0	0.66
870	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Retail	RETRO	2349	9%	211	0.030	0.023	5	$42.00	50%	6%	55%	53%	1.7	3.5	3.0	0.58
871	Refrigeration	Refrigeration - Custom	Biz - Custom	Retail	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.1	2.8	0.57
872	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Retail	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.1	2.8	0.57
873	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Retail	MO	1278	12%	153	0.022	0.017	14	$500.00	50%	3%	31%	18%	0.3	0.5	0.9	0.29
874	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Retail	RETRO	1663	23%	390	0.055	0.043	5	$245.00	50%	3%	31%	44%	0.6	1.1	1.3	0.43
875	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Retail	MO	5551	8%	440	0.062	0.048	9	$222.00	50%	2%	44%	46%	1.1	2.3	2.2	0.53
876	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Retail	MO	115	74%	84	0.012	0.009	9	$11.00	50%	11%	35%	55%	4.4	8.9	6.9	0.64
877	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Retail	RETRO	13400	59%	7905	1.235	1.072	15	$2,250.00	50%	15%	30%	58%	3.3	6.6	4.9	0.68
878	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Retail	RETRO	14670	3%	455	0.061	0.053	15	$381.00	50%	15%	10%	32%	1.1	2.1	2.0	0.54
879	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Retail	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	100%	20%	41%	2.2	4.4	3.6	0.61
880	WholeBldg_HVAC	GREM Controls	Biz - Custom	Retail	RETRO	0	0%	0	0.000	0.000	15	$0.00	0%	0%	20%	50%	#DIV/0!	0.0	0.0	0.00
881	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Retail	RETRO	1663	20%	333	0.051	0.036	10	$235.60	50%	100%	10%	35%	1.3	1.8	2.7	0.51
882	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Retail	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.17
883	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Retail	RETRO	776	91%	705	0.108	0.077	10	$341.21	50%	33%	30%	40%	1.5	2.7	2.7	0.56
884	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Retail	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	7.4	14.8	10.9	0.68
885	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Retail	RETRO	222	2%	4	0.001	0.000	10	$8.00	50%	100%	25%	20%	0.4	0.7	1.0	0.36
886	WholeBldg	WholeBlg - Com RET	Biz - Custom	Retail	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.2	4.4	3.6	0.61
887	WholeBldg	Strategic Energy Management	Biz - RCx	Retail	RETRO	0	0%	0	0.000	0.000	5	$0.27		100%	0%	73%	0.5	0.0	0.0	0.00
888	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Retail	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.2	2.5	2.2	0.55
889	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Retail	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.2	4.4	3.6	0.61
890	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Office	MO	19496	39%	7532	3.829	0.945	12	$2,270.00	50%	17%	53%	51%	3.3	6.5	4.0	0.82
891	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Office	MO	10864	19%	2064	1.049	0.259	12	$960.00	50%	17%	53%	47%	2.1	4.2	2.8	0.77
892	Cooking	Commercial Electric Griddle	Biz - Custom	Office	MO	17056	15%	2596	1.320	0.326	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
893	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Office	MO	16915	80%	13507	6.866	1.695	12	$2,757.00	50%	6%	45%	53%	4.8	9.7	5.6	0.86
894	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Office	MO	35655	44%	15766	8.014	1.978	16	$466.50	50%	26%	61%	57%	41.9	83.9	44.9	0.94
895	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Office	MO	38282	16%	6279	3.192	0.788	15	$1,550.00	50%	26%	61%	52%	4.8	9.6	5.6	0.86
896	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Office	MO	18955	17%	3274	1.664	0.411	12	$1,500.00	50%	27%	24%	47%	2.2	4.3	2.8	0.77
897	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Office	MO	1478	37%	545	0.277	0.068	12	$1,000.00	50%	3%	16%	32%	0.5	1.1	1.1	0.50
898	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Office	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.7	5.5	4.4	0.62
899	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Office	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.6	3.2	2.8	0.58
900	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Office	MO	23742	21%	4935	0.723	0.572	13	$3,367.84	50%	100%	20%	48%	1.2	2.3	2.1	0.54
901	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Office	RETRO	476154	0%	1970	0.289	0.228	10	$244.00	50%	100%	5%	63%	5.2	10.4	7.8	0.66
902	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Office	MO	1130	50%	565	0.083	0.065	15	$57.00	50%	5%	20%	63%	8.7	17.4	12.9	0.68
903	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Office	MO	1885	14%	266	0.151	0.001	15	$153.28	50%	28%	5%	51%	1.6	3.3	2.7	0.61
904	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Office	MO	1885	19%	356	0.202	0.001	15	$214.59	50%	28%	5%	50%	1.6	3.1	2.6	0.61
905	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Office	MO	1885	30%	575	0.326	0.002	15	$398.52	50%	28%	5%	47%	1.4	2.7	2.3	0.59
906	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Office	MO	2118	9%	193	0.109	0.001	15	$71.00	50%	28%	5%	56%	2.6	5.1	3.9	0.66
907	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Office	MO	2118	13%	282	0.160	0.001	15	$109.23	50%	28%	5%	56%	2.4	4.9	3.7	0.65
908	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Office	MO	2118	24%	498	0.283	0.002	15	$218.46	50%	28%	5%	54%	2.2	4.3	3.4	0.64
909	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Office	RETRO	2294	7%	161	0.091	0.001	3	$11.42	50%	57%	50%	48%	3.0	6.1	4.9	0.62
910	Cooling	Air Side Economizer	Biz - Custom	Office	RETRO	1885	20%	377	0.214	0.002	10	$126.67	50%	57%	25%	43%	2.0	4.0	3.2	0.62
911	Cooling	HVAC Occupancy Controls	Biz - Custom	Office	RETRO	1990	20%	398	0.226	0.002	15	$197.50	50%	57%	20%	40%	2.6	3.8	4.5	0.63
912	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Office	MO	1966	13%	246	0.140	0.001	15	$115.00	50%	5%	5%	54%	2.0	4.0	3.2	0.64
913	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Office	MO	1966	22%	437	0.248	0.002	15	$514.00	50%	5%	5%	35%	0.8	1.6	1.6	0.51
914	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Office	MO	1966	33%	655	0.372	0.003	15	$630.50	50%	5%	5%	39%	1.0	2.0	1.8	0.55
915	Cooling	Smart Thermostat	Biz - Prescriptive	Office	RETRO	11285	14%	1598	0.907	0.007	11	$175.00	50%	5%	20%	63%	9.0	13.3	14.4	0.70
916	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Office	MO	2537	15%	370	0.210	0.002	8	$84.00	50%	8%	20%	45%	2.4	4.8	3.8	0.63
917	Cooling	Air Cooled Chiller	Biz - Prescriptive	Office	MO	2009	9%	181	0.103	0.001	23	$126.00	50%	27%	5%	47%	1.9	3.8	2.9	0.65
918	Cooling	Water Cooled Chiller	Biz - Prescriptive	Office	MO	1009	23%	229	0.130	0.001	23	$61.00	50%	3%	5%	59%	5.0	10.0	6.8	0.73
919	Cooling	Window Film	Biz - Custom	Office	RETRO	6364	4%	280	0.159	0.001	10	$153.81	50%	100%	25%	39%	0.6	2.4	-0.2	0.56
920	Cooling	Triple Pane Windows	Biz - Custom	Office	MO	6364	6%	382	0.217	0.002	25	$700.00	50%	100%	2%	20%	0.8	1.5	1.5	0.52

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
921	Cooling	Energy Recovery Ventilator	Biz - Custom	Office	RETRO	2118	15%	327	0.186	0.001	15	$1,500.00	50%	100%	2%	12%	0.2	0.4	0.8	0.27
922	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Office	MO	4429	8%	353	0.067	0.080	15	$135.00	50%	4%	15%	56%	3.0	5.9	3.8	0.79
923	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Office	MO	4429	15%	665	0.126	0.150	15	$445.76	50%	4%	15%	48%	1.7	3.4	2.4	0.72
924	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Office	MO	4429	21%	951	0.180	0.215	15	$520.06	50%	4%	15%	51%	2.1	4.1	2.8	0.74
925	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Office	MO	4782	6%	301	0.057	0.068	15	$100.00	50%	18%	15%	57%	3.4	6.8	4.3	0.80
926	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Office	MO	4782	12%	555	0.105	0.125	15	$171.08	50%	18%	15%	58%	3.7	7.4	4.6	0.81
927	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Office	MO	4956	7%	336	0.064	0.076	15	$100.00	50%	18%	15%	58%	3.8	7.6	4.7	0.81
928	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Office	MO	4956	12%	606	0.115	0.137	15	$158.10	50%	18%	15%	59%	4.3	8.7	5.3	0.82
929	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Office	MO	5207	7%	353	0.067	0.080	15	$100.00	50%	18%	15%	58%	4.0	8.0	4.9	0.81
930	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Office	MO	5207	13%	665	0.126	0.150	15	$201.80	50%	18%	15%	58%	3.7	7.5	4.6	0.81
931	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Office	MO	4959	39%	1956	0.370	0.442	25	$4,361.00	50%	2%	15%	23%	0.7	1.4	1.3	0.55
932	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Office	MO	4959	43%	2133	0.404	0.482	25	$4,361.00	50%	2%	15%	24%	0.8	1.6	1.4	0.57
933	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Office	MO	9167	17%	1528	0.289	0.345	15	$84.00	50%	10%	15%	49%	20.6	41.2	23.2	0.89
934	Hot Water	Heat Pump Water Heater	Biz - Custom	Office	MO	15870	73%	11638	1.950	1.738	15	$1,797.00	50%	100%	13%	43%	6.3	12.6	8.6	0.73
935	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Office	RETRO	428	32%	139	0.023	0.021	10	$8.00	50%	20%	85%	45%	12.2	24.5	16.2	0.75
936	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Office	RETRO	18059	54%	9789	1.640	1.462	5	$54.00	50%	20%	85%	46%	70.6	141.1	91.2	0.77
937	Hot Water	Ozone Commercial Laundry	Biz - Custom	Office	MO	2984	25%	746	0.125	0.111	10	$20,309.70	50%	0%	20%	15%	1.1	0.1	2.9	0.05
938	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Office	RETRO	996	76%	755	0.000	0.088	10	$97.00	23%	13%	70%	64%	4.3	19.1	7.3	0.59
939	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Office	RETRO	1744	71%	1239	0.000	0.144	10	$123.81	29%	13%	70%	67%	5.5	19.1	9.4	0.59
940	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Office	RETRO	2490	67%	1659	0.000	0.193	10	$134.35	36%	13%	70%	68%	6.8	19.1	11.6	0.59
941	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Office	RETRO	3984	65%	2570	0.000	0.299	10	$196.16	38%	13%	70%	69%	7.3	19.1	12.3	0.59
942	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Office	RETRO	9467	70%	6666	0.000	0.775	10	$319.31	61%	13%	70%	71%	11.6	19.1	19.6	0.59
943	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Office	RETRO	489	76%	370	0.000	0.043	10	$97.00	11%	7%	70%	56%	2.1	19.1	3.6	0.59
944	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Office	RETRO	856	71%	608	0.000	0.071	10	$123.81	14%	7%	70%	60%	2.7	19.1	4.6	0.59
945	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Office	RETRO	1222	67%	814	0.000	0.095	10	$134.35	18%	7%	70%	62%	3.4	19.1	5.7	0.59
946	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Office	RETRO	1956	65%	1262	0.000	0.147	10	$196.16	19%	7%	70%	63%	3.6	19.1	6.0	0.59
947	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Office	RETRO	4647	70%	3272	0.000	0.380	10	$319.31	30%	7%	70%	67%	5.7	19.1	9.6	0.59
948	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Office	RETRO	126	74%	93	0.015	0.013	15	$59.00	6%	4%	60%	40%	1.4	26.3	2.2	0.74
949	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Office	RETRO	91	51%	47	0.008	0.007	10	$15.00	11%	55%	40%	53%	1.9	19.2	3.6	0.73
950	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Office	RETRO	94	34%	32	0.005	0.005	15	$22.00	5%	55%	40%	38%	1.3	26.3	2.0	0.74
951	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Office	RETRO	183	51%	94	0.016	0.014	15	$61.00	6%	55%	40%	40%	1.4	26.3	2.2	0.74
952	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Office	RETRO	272	54%	147	0.024	0.021	15	$76.00	7%	55%	40%	44%	1.7	26.3	2.9	0.74
953	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Office	RETRO	362	54%	197	0.033	0.028	15	$104.00	7%	55%	40%	44%	1.6	26.3	2.8	0.74
954	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Office	RETRO	183	50%	92	0.015	0.013	15	$46.67	7%	55%	40%	45%	1.7	26.3	3.0	0.74
955	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Office	RETRO	482	53%	256	0.043	0.037	15	$152.00	6%	55%	40%	42%	1.5	26.3	2.4	0.74
956	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Office	RETRO	505	67%	338	0.056	0.049	15	$42.88	29%	6%	50%	65%	5.2	26.3	94.9	0.74
957	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Office	RETRO	946	57%	539	0.090	0.078	15	$48.07	41%	19%	40%	68%	6.5	26.3	-46.1	0.74
958	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Office	RETRO	3795	72%	2744	0.457	0.396	15	$187.94	53%	11%	50%	70%	7.6	26.3	-25.4	0.74
959	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Office	RETRO	81	100%	81	0.013	0.012	11	$18.50	16%	55%	0%	59%	2.7	20.7	6.5	0.74
960	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Office	RETRO	419	30%	126	0.021	0.018	15	$65.40	7%	90%	15%	44%	1.8	26.3	2.5	0.74
961	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Office	RETRO	537	28%	150	0.025	0.022	15	$57.50	9%	90%	15%	50%	2.5	26.3	3.4	0.74
962	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Office	RETRO	240	38%	91	0.015	0.013	15	$75.00	4%	90%	15%	34%	1.2	26.3	1.6	0.74
963	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Office	RETRO	240	61%	146	0.024	0.021	15	$56.00	9%	90%	15%	50%	2.5	26.3	3.4	0.74
964	Lighting_Int	Networked Lighting Control	Biz - Custom	Office	RETRO	2	35%	1	0.000	0.000	15	$0.41	6%	90%	15%	31%	1.6	26.3	2.2	0.74
965	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Office	RETRO	67	71%	48	0.008	0.007	5	$32.50	5%	1%	85%	39%	0.5	10.6	0.8	0.71
966	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Office	RETRO	385	61%	237	0.035	0.027	5	$233.00	50%	0%	31%	44%	0.4	0.7	1.0	0.36
967	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Office	MO	0	0%	0	0.000	0.000	20	$1.73		0%	24%	54%	0.0	0.0	0.0	0.00
968	Misc	High Efficiency Hand Dryers	Biz - Custom	Office	MO	262	83%	217	0.032	0.025	10	$483.00	50%	1%	50%	19%	0.3	0.6	0.9	0.32
969	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Office	RETRO	3125	4%	114	0.017	0.013	15	$59.00	50%	4%	73%	41%	1.7	3.4	2.9	0.58
970	Misc	Miscellaneous Custom	Biz - Custom	Office	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	95%	10%	44%	1.6	3.2	2.8	0.58
971	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Office	MO	3090	28%	857	0.124	0.106	15	$198.32	50%	100%	25%	60%	3.9	7.7	5.9	0.65
972	Motors	Power Drive Systems	Biz - Custom	Office	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	6.9	13.7	10.1	0.68
973	Motors	Switch Reluctance Motors	Biz - Custom	Office	MO	17620	31%	5392	0.783	0.667	15	$527.50	50%	100%	1%	48%	9.1	18.3	13.3	0.69

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
974	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Office	MO	418	26%	110	0.016	0.013	6	$0.00		9%	95%	54%	#DIV/0!	0.0	0.0	0.00
975	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Office	RETRO	188	58%	109	0.016	0.013	7	$10.00	50%	23%	20%	52%	5.2	10.3	7.8	0.66
976	Plug_Office	Smart Socket	Biz - Custom	Office	RETRO	80	61%	48	0.007	0.006	7	$9.00	50%	23%	20%	49%	2.6	5.1	4.1	0.62
977	Plug_Office	Energy Star Server	Biz - Custom	Office	MO	2167	30%	650	0.095	0.075	9	$300.95	50%	27%	25%	42%	1.3	2.5	2.3	0.55
978	Plug_Office	Server Virtualization	Biz - Custom	Office	RETRO	2167	14%	301	0.044	0.035	9	$26.97	50%	27%	25%	52%	6.6	13.1	9.8	0.67
979	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Office	RETRO	86783	18%	15778	2.311	1.828	15	$480.00	50%	27%	25%	53%	28.9	57.9	41.6	0.70
980	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Office	RETRO	764	47%	358	0.052	0.041	15	$82.00	50%	27%	25%	48%	3.8	7.7	6.0	0.64
981	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Office	MO	8940	25%	2265	0.332	0.262	20	$750.00	50%	27%	25%	45%	3.3	6.5	5.1	0.63
982	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Office	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	27%	25%	48%	2.8	5.7	4.5	0.63
983	Refrigeration	Strip Curtains	Biz - Prescriptive	Office	RETRO	0	0%	0	0.000	0.000	4	$10.22		4%	26%	58%	0.0	0.0	0.0	0.00
984	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Office	RETRO	1228	25%	307	0.043	0.034	15	$431.00	50%	2%	25%	27%	0.6	1.2	1.4	0.44
985	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Office	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	3%	80%	53%	4.5	9.0	7.0	0.64
986	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Office	RETRO	1298	23%	293	0.041	0.032	13	$161.75	50%	2%	25%	45%	1.4	2.8	2.5	0.56
987	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Office	RETRO	3158	48%	1500	0.212	0.164	15	$1,170.00	50%	3%	25%	42%	1.1	2.2	2.1	0.53
988	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Office	RETRO	579	42%	240	0.034	0.026	10	$79.50	50%	19%	25%	50%	1.9	3.8	3.2	0.59
989	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Office	RETRO	1259893	0%	2399	0.338	0.262	8	$502.00	50%	14%	27%	53%	2.5	5.0	4.1	0.61
990	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Office	RETRO	45880	10%	4588	0.647	0.501	10	$311.54	50%	14%	27%	42%	9.3	18.5	13.9	0.67
991	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Office	RETRO	1558	50%	779	0.110	0.085	15	$390.00	50%	5%	25%	46%	1.7	3.5	3.0	0.58
992	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Office	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	3%	80%	53%	4.5	9.0	7.0	0.64
993	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Office	RETRO	2091	24%	505	0.071	0.055	10	$96.00	50%	3%	2%	40%	3.3	6.6	5.3	0.63
994	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Office	RETRO	1511	9%	136	0.019	0.015	5	$42.00	50%	18%	55%	51%	1.1	2.2	2.1	0.53
995	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Office	RETRO	2016	33%	655	0.092	0.072	10	$79.50	50%	6%	25%	55%	5.2	10.4	8.0	0.65
996	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Office	RETRO	1259893	1%	6949	0.980	0.759	8	$502.00	50%	6%	27%	56%	7.2	14.5	11.0	0.66
997	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Office	RETRO	2349	9%	211	0.030	0.023	5	$42.00	50%	6%	55%	53%	1.7	3.5	3.0	0.58
998	Refrigeration	Refrigeration - Custom	Biz - Custom	Office	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.1	2.8	0.57
999	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Office	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.1	2.8	0.57
1000	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Office	MO	1278	12%	153	0.022	0.017	14	$500.00	50%	6%	31%	18%	0.3	0.5	0.9	0.29
1001	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Office	RETRO	1663	23%	390	0.055	0.043	5	$245.00	50%	6%	31%	44%	0.6	1.1	1.3	0.43
1002	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Office	MO	5551	8%	440	0.062	0.048	9	$222.00	50%	6%	44%	46%	1.1	2.3	2.2	0.53
1003	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Office	MO	115	74%	84	0.012	0.009	9	$11.00	50%	11%	35%	55%	4.4	8.9	6.9	0.64
1004	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Office	RETRO	6786	59%	4003	0.802	0.591	15	$2,250.00	50%	32%	69%	51%	1.7	3.5	2.7	0.64
1005	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Office	RETRO	9092	3%	282	0.049	0.036	15	$381.00	50%	32%	10%	25%	0.7	1.4	1.4	0.48
1006	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Office	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	100%	20%	41%	2.4	4.7	3.6	0.65
1007	WholeBldg_HVAC	GREM Controls	Biz - Custom	Office	RETRO	0	0%	0	0.000	0.000	15	$0.00	0%	0%	20%	50%	#DIV/0!	0.0	0.0	0.00
1008	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Office	RETRO	1313	20%	263	0.053	0.034	10	$235.60	50%	100%	10%	31%	1.0	1.5	2.1	0.50
1009	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Office	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.18
1010	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Office	RETRO	2169	50%	1076	0.216	0.139	10	$341.21	50%	55%	69%	43%	2.3	4.3	3.6	0.64
1011	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Office	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	7.8	15.7	10.9	0.72
1012	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Office	RETRO	222	2%	4	0.001	0.001	10	$8.00	50%	100%	25%	20%	0.4	0.8	1.0	0.38
1013	WholeBldg	WholeBlg - Com RET	Biz - Custom	Office	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.4	4.7	3.6	0.65
1014	WholeBldg	Strategic Energy Management	Biz - RCx	Office	RETRO	33	3%	1	0.000	0.000	5	$0.27	50%	100%	0%	62%	1.4	2.8	2.4	0.59
1015	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Office	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.3	2.6	2.2	0.59
1016	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Office	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.4	4.7	3.6	0.65
1017	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Warehouse	MO	19496	39%	7532	1.841	0.802	12	$2,270.00	50%	17%	53%	51%	2.7	5.4	4.0	0.68
1018	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Warehouse	MO	10864	19%	2064	0.505	0.220	12	$960.00	50%	17%	53%	47%	1.7	3.5	2.8	0.63
1019	Cooking	Commercial Electric Griddle	Biz - Custom	Warehouse	MO	17056	15%	2596	0.634	0.277	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
1020	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Warehouse	MO	16915	80%	13507	3.301	1.439	12	$2,757.00	50%	6%	45%	53%	4.0	8.0	5.6	0.71
1021	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Warehouse	MO	35655	44%	15766	3.853	1.679	16	$466.50	50%	26%	61%	57%	34.3	68.7	44.9	0.77
1022	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Warehouse	MO	38282	16%	6279	1.535	0.669	15	$1,550.00	50%	26%	61%	52%	3.9	7.8	5.6	0.70
1023	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Warehouse	MO	18955	17%	3274	0.800	0.349	12	$1,500.00	50%	27%	24%	47%	1.8	3.5	2.8	0.64
1024	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Warehouse	MO	1478	37%	545	0.133	0.058	12	$1,000.00	50%	3%	16%	32%	0.4	0.9	1.1	0.41
1025	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Warehouse	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.7	5.4	4.4	0.61
1026	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Warehouse	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.6	3.1	2.8	0.57
1027	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Warehouse	MO	23742	21%	4935	0.667	0.537	13	$3,367.84	50%	100%	20%	48%	1.1	2.3	2.1	0.53

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
1028	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Warehouse	RETRO	476154	0%	1970	0.266	0.214	10	$244.00	50%	100%	5%	63%	5.1	10.2	7.8	0.65
1029	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Warehouse	MO	1130	50%	565	0.076	0.061	15	$57.00	50%	5%	20%	63%	8.6	17.1	12.9	0.66
1030	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Warehouse	MO	293	14%	41	0.027	0.000	15	$153.28	50%	29%	5%	18%	0.3	0.5	0.8	0.32
1031	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Warehouse	MO	293	19%	55	0.036	0.000	15	$214.59	50%	29%	5%	17%	0.3	0.5	0.8	0.31
1032	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Warehouse	MO	293	30%	89	0.058	0.000	15	$398.52	50%	29%	5%	16%	0.2	0.4	0.8	0.29
1033	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Warehouse	MO	329	9%	30	0.020	0.000	15	$71.00	50%	29%	5%	23%	0.4	0.8	1.0	0.41
1034	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Warehouse	MO	329	13%	44	0.029	0.000	15	$109.23	50%	29%	5%	22%	0.4	0.8	1.0	0.40
1035	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Warehouse	MO	329	24%	78	0.050	0.000	15	$218.46	50%	29%	5%	21%	0.4	0.7	0.9	0.38
1036	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Warehouse	RETRO	357	7%	25	0.016	0.000	3	$11.42	50%	57%	50%	40%	0.5	1.0	1.2	0.42
1037	Cooling	Air Side Economizer	Biz - Custom	Warehouse	RETRO	293	20%	59	0.038	0.000	10	$126.67	50%	57%	25%	18%	0.3	0.7	0.9	0.36
1038	Cooling	HVAC Occupancy Controls	Biz - Custom	Warehouse	RETRO	310	20%	62	0.040	0.000	15	$197.50	50%	57%	20%	15%	0.6	0.6	1.6	0.35
1039	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Warehouse	MO	306	13%	38	0.025	0.000	15	$115.00	50%	43%	5%	20%	0.3	0.7	0.9	0.36
1040	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Warehouse	MO	306	22%	68	0.044	0.000	15	$514.00	50%	43%	5%	16%	0.1	0.3	0.7	0.20
1041	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Warehouse	MO	306	33%	102	0.066	0.000	15	$630.50	50%	43%	5%	16%	0.2	0.3	0.7	0.23
1042	Cooling	Smart Thermostat	Biz - Prescriptive	Warehouse	RETRO	1756	14%	249	0.162	0.000	11	$175.00	50%	43%	20%	47%	2.3	2.2	4.4	0.58
1043	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Warehouse	MO	395	15%	58	0.037	0.000	8	$84.00	50%	0%	20%	24%	0.4	0.8	1.0	0.39
1044	Cooling	Air Cooled Chiller	Biz - Prescriptive	Warehouse	MO	313	9%	28	0.018	0.000	23	$126.00	50%	0%	5%	16%	0.3	0.6	0.9	0.36
1045	Cooling	Water Cooled Chiller	Biz - Prescriptive	Warehouse	MO	157	23%	36	0.023	0.000	23	$61.00	50%	0%	5%	29%	0.8	1.6	1.5	0.55
1046	Cooling	Window Film	Biz - Custom	Warehouse	RETRO	6364	4%	280	0.182	0.000	10	$153.81	50%	100%	25%	39%	0.7	2.6	-0.2	0.60
1047	Cooling	Triple Pane Windows	Biz - Custom	Warehouse	MO	6364	6%	382	0.249	0.000	25	$700.00	50%	100%	2%	20%	0.8	1.6	1.5	0.56
1048	Cooling	Energy Recovery Ventilator	Biz - Custom	Warehouse	RETRO	329	0%	0	0.000	0.000	15	$1,500.00		100%	2%	50%	0.0	0.0	0.0	0.00
1049	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Warehouse	MO	1535	6%	92	0.020	0.020	15	$135.00	50%	14%	15%	32%	0.8	1.6	1.3	0.58
1050	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Warehouse	MO	1535	12%	182	0.039	0.041	15	$445.76	50%	14%	15%	23%	0.5	0.9	1.0	0.46
1051	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Warehouse	MO	1535	16%	249	0.054	0.056	15	$520.06	50%	14%	15%	24%	0.5	1.1	1.1	0.50
1052	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Warehouse	MO	1706	6%	100	0.022	0.022	15	$100.00	50%	6%	15%	38%	1.1	2.3	1.8	0.65
1053	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Warehouse	MO	1706	11%	188	0.041	0.042	15	$171.08	50%	6%	15%	41%	1.3	2.5	1.9	0.67
1054	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Warehouse	MO	1762	6%	109	0.024	0.024	15	$100.00	50%	6%	15%	41%	1.2	2.5	1.9	0.67
1055	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Warehouse	MO	1762	11%	201	0.044	0.045	15	$158.10	50%	6%	15%	45%	1.5	2.9	2.1	0.70
1056	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Warehouse	MO	1830	6%	108	0.023	0.024	15	$100.00	50%	6%	15%	40%	1.2	2.5	1.8	0.67
1057	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Warehouse	MO	1830	12%	215	0.047	0.048	15	$201.80	50%	6%	15%	40%	1.2	2.4	1.8	0.67
1058	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Warehouse	MO	1764	48%	842	0.183	0.188	25	$4,361.00	50%	0%	15%	16%	0.3	0.6	0.8	0.37
1059	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Warehouse	MO	1764	51%	897	0.195	0.200	25	$4,361.00	50%	0%	15%	16%	0.3	0.7	0.9	0.38
1060	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Warehouse	MO	3805	17%	634	0.138	0.142	15	$84.00	50%	0%	15%	47%	8.6	17.3	9.9	0.87
1061	Hot Water	Heat Pump Water Heater	Biz - Custom	Warehouse	MO	10591	73%	7766	1.045	1.171	15	$1,797.00	50%	100%	0%	41%	4.1	8.2	5.9	0.70
1062	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Warehouse	RETRO	197	32%	64	0.009	0.010	10	$8.00	50%	20%	85%	43%	5.5	11.1	7.8	0.71
1063	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Warehouse	RETRO	18059	54%	9789	1.317	1.476	5	$54.00	50%	20%	85%	46%	69.4	138.9	91.2	0.76
1064	Hot Water	Ozone Commercial Laundry	Biz - Custom	Warehouse	MO	2984	25%	746	0.100	0.112	10	$20,309.70	50%	0%	20%	15%	1.1	0.1	2.9	0.05
1065	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Warehouse	RETRO	996	76%	755	0.000	0.089	10	$97.00	23%	13%	70%	64%	4.3	18.9	7.3	0.59
1066	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Warehouse	RETRO	1744	71%	1239	0.000	0.146	10	$123.81	29%	13%	70%	67%	5.6	18.9	9.4	0.59
1067	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Warehouse	RETRO	2490	67%	1659	0.000	0.196	10	$134.35	36%	13%	70%	68%	6.9	18.9	11.6	0.59
1068	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Warehouse	RETRO	3984	65%	2570	0.000	0.303	10	$196.16	39%	13%	70%	69%	7.3	18.9	12.3	0.59
1069	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Warehouse	RETRO	9467	70%	6666	0.000	0.786	10	$319.31	62%	13%	70%	71%	11.6	18.9	19.6	0.59
1070	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Warehouse	RETRO	489	76%	370	0.000	0.044	10	$97.00	11%	7%	70%	57%	2.1	18.9	3.6	0.59
1071	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Warehouse	RETRO	856	71%	608	0.000	0.072	10	$123.81	14%	7%	70%	60%	2.7	18.9	4.6	0.59
1072	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Warehouse	RETRO	1222	67%	814	0.000	0.096	10	$134.35	18%	7%	70%	62%	3.4	18.9	5.7	0.59
1073	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Warehouse	RETRO	1956	65%	1262	0.000	0.149	10	$196.16	19%	7%	70%	63%	3.6	18.9	6.0	0.59
1074	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Warehouse	RETRO	4647	70%	3272	0.000	0.386	10	$319.31	30%	7%	70%	67%	5.7	18.9	9.6	0.59
1075	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Warehouse	RETRO	122	74%	90	0.013	0.010	15	$59.00	4%	2%	60%	39%	1.2	31.9	2.2	0.68
1076	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Warehouse	RETRO	88	51%	45	0.006	0.005	10	$15.00	8%	37%	40%	52%	1.7	23.3	3.5	0.68
1077	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Warehouse	RETRO	91	34%	31	0.004	0.003	15	$22.00	4%	37%	40%	38%	1.1	31.9	2.0	0.68
1078	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Warehouse	RETRO	179	51%	92	0.013	0.010	15	$61.00	4%	37%	40%	39%	1.2	31.9	2.1	0.68
1079	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Warehouse	RETRO	265	54%	143	0.020	0.016	15	$76.00	5%	37%	40%	43%	1.5	31.9	2.8	0.68
1080	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Warehouse	RETRO	353	54%	191	0.027	0.021	15	$104.00	5%	37%	40%	43%	1.4	31.9	2.8	0.68
1081	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Warehouse	RETRO	178	50%	90	0.013	0.010	15	$46.67	5%	37%	40%	44%	1.5	31.9	2.9	0.68

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
1082	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Warehouse	RETRO	470	53%	250	0.036	0.027	15	$152.00	4%	37%	40%	41%	1.3	31.9	2.4	0.68
1083	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Warehouse	RETRO	492	67%	330	0.047	0.036	15	$42.88	21%	4%	50%	64%	4.5	31.9	1241.7	0.68
1084	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Warehouse	RETRO	921	57%	525	0.075	0.057	15	$48.07	30%	38%	40%	67%	5.6	31.9	-30.3	0.68
1085	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Warehouse	RETRO	3698	72%	2674	0.382	0.292	15	$187.94	39%	19%	50%	69%	6.5	31.9	-19.4	0.68
1086	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Warehouse	RETRO	79	100%	79	0.011	0.009	11	$18.50	12%	37%	0%	58%	2.4	25.1	6.6	0.68
1087	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Warehouse	RETRO	409	30%	123	0.017	0.013	15	$65.40	5%	90%	15%	43%	1.6	31.9	2.4	0.68
1088	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Warehouse	RETRO	523	28%	147	0.021	0.016	15	$57.50	7%	90%	15%	50%	2.2	31.9	3.3	0.68
1089	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Warehouse	RETRO	233	38%	89	0.013	0.010	15	$75.00	3%	90%	15%	33%	1.0	31.9	1.5	0.68
1090	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Warehouse	RETRO	233	61%	142	0.020	0.016	15	$56.00	7%	90%	15%	49%	2.2	31.9	3.2	0.68
1091	Lighting_Int	Networked Lighting Control	Biz - Custom	Warehouse	RETRO	2	35%	1	0.000	0.000	15	$0.39	5%	90%	15%	31%	1.5	31.9	2.2	0.68
1092	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Warehouse	RETRO	61	71%	44	0.006	0.005	5	$32.50	4%	1%	85%	36%	0.5	12.8	0.7	0.66
1093	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Warehouse	RETRO	385	61%	237	0.032	0.026	5	$233.00	50%	1%	31%	44%	0.4	0.7	1.0	0.35
1094	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Warehouse	MO	0	0%	0	0.000	0.000	20	$1.73		0%	24%	54%	0.0	0.0	0.0	0.00
1095	Misc	High Efficiency Hand Dryers	Biz - Custom	Warehouse	MO	262	83%	217	0.029	0.024	10	$483.00	50%	1%	50%	19%	0.3	0.6	0.9	0.31
1096	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Warehouse	RETRO	3125	4%	114	0.015	0.012	15	$59.00	50%	2%	73%	41%	1.7	3.4	2.9	0.57
1097	Misc	Miscellaneous Custom	Biz - Custom	Warehouse	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	97%	10%	44%	1.6	3.1	2.8	0.57
1098	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Warehouse	MO	538	28%	149	0.022	0.019	15	$198.32	50%	100%	25%	33%	0.7	1.4	1.4	0.48
1099	Motors	Power Drive Systems	Biz - Custom	Warehouse	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	7.0	14.1	10.1	0.70
1100	Motors	Switch Reluctance Motors	Biz - Custom	Warehouse	MO	40630	31%	12433	1.820	1.609	15	$527.50	50%	100%	1%	49%	21.6	43.1	30.0	0.72
1101	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Warehouse	MO	418	26%	110	0.015	0.012	6	$0.00		8%	95%	54%	#DIV/0!	0.0	0.0	0.00
1102	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Warehouse	RETRO	188	58%	109	0.015	0.012	7	$10.00	50%	24%	20%	52%	5.1	10.1	7.8	0.65
1103	Plug_Office	Smart Socket	Biz - Custom	Warehouse	RETRO	80	61%	48	0.007	0.005	7	$9.00	50%	24%	20%	49%	2.5	5.0	4.1	0.61
1104	Plug_Office	Energy Star Server	Biz - Custom	Warehouse	MO	2167	30%	650	0.088	0.071	9	$300.95	50%	28%	25%	42%	1.2	2.5	2.3	0.54
1105	Plug_Office	Server Virtualization	Biz - Custom	Warehouse	RETRO	2167	14%	301	0.041	0.033	9	$26.97	50%	28%	25%	52%	6.4	12.9	9.8	0.66
1106	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Warehouse	RETRO	86783	18%	15778	2.131	1.717	15	$480.00	50%	28%	25%	53%	28.4	56.8	41.6	0.68
1107	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Warehouse	RETRO	764	47%	358	0.048	0.039	15	$82.00	50%	28%	25%	48%	3.8	7.5	6.0	0.63
1108	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Warehouse	MO	8940	25%	2265	0.306	0.246	20	$750.00	50%	28%	25%	45%	3.2	6.4	5.1	0.62
1109	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Warehouse	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	28%	25%	48%	2.8	5.5	4.5	0.62
1110	Refrigeration	Strip Curtains	Biz - Prescriptive	Warehouse	RETRO	207	50%	103	0.015	0.011	4	$10.22	50%	8%	26%	56%	2.9	5.7	4.6	0.62
1111	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Warehouse	RETRO	1228	25%	307	0.043	0.034	15	$431.00	50%	5%	25%	27%	0.6	1.2	1.4	0.44
1112	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Warehouse	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	2%	80%	53%	4.5	9.0	7.0	0.64
1113	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Warehouse	RETRO	1298	23%	293	0.041	0.032	13	$161.75	50%	5%	25%	45%	1.4	2.8	2.5	0.56
1114	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Warehouse	RETRO	3158	48%	1500	0.212	0.164	15	$1,170.00	50%	7%	25%	42%	1.1	2.2	2.1	0.53
1115	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Warehouse	RETRO	579	42%	240	0.034	0.026	10	$79.50	50%	13%	25%	50%	1.9	3.8	3.2	0.59
1116	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Warehouse	RETRO	1259893	0%	2399	0.338	0.262	8	$502.00	50%	10%	27%	53%	2.5	5.0	4.1	0.61
1117	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Warehouse	RETRO	45880	10%	4588	0.647	0.501	10	$311.54	50%	10%	27%	42%	9.3	18.5	13.9	0.67
1118	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Warehouse	RETRO	1558	50%	779	0.110	0.085	15	$390.00	50%	4%	25%	46%	1.7	3.5	3.0	0.58
1119	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Warehouse	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	2%	80%	53%	4.5	9.0	7.0	0.64
1120	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Warehouse	RETRO	2091	24%	505	0.071	0.055	10	$96.00	50%	2%	2%	40%	3.3	6.6	5.3	0.63
1121	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Warehouse	RETRO	1511	9%	136	0.019	0.015	5	$42.00	50%	12%	55%	51%	1.1	2.2	2.1	0.53
1122	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Warehouse	RETRO	2016	33%	655	0.092	0.072	10	$79.50	50%	4%	25%	55%	5.2	10.4	8.0	0.65
1123	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Warehouse	RETRO	1259893	1%	6949	0.980	0.759	8	$502.00	50%	4%	27%	56%	7.2	14.5	11.0	0.66
1124	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Warehouse	RETRO	2349	9%	211	0.030	0.023	5	$42.00	50%	4%	55%	53%	1.7	3.5	3.0	0.58
1125	Refrigeration	Refrigeration - Custom	Biz - Custom	Warehouse	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.1	2.8	0.57
1126	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Warehouse	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.1	2.8	0.57
1127	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Warehouse	MO	1278	12%	153	0.022	0.017	14	$500.00	50%	16%	31%	18%	0.3	0.5	0.9	0.29
1128	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Warehouse	RETRO	1663	23%	390	0.055	0.043	5	$245.00	50%	16%	31%	44%	0.6	1.1	1.3	0.43
1129	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Warehouse	MO	5551	8%	440	0.062	0.048	9	$222.00	50%	0%	44%	46%	1.1	2.3	2.2	0.53
1130	Refrigeration	LED Refrigerated Display Case Lighting Average 6W/LF	Biz - Prescriptive	Warehouse	MO	115	74%	84	0.012	0.009	9	$11.00	50%	7%	35%	55%	4.4	8.9	6.9	0.64
1131	Ventilation	Pump and Fan Variable Frequency Drive Controls (Fans)	Biz - Prescriptive	Warehouse	RETRO	13008	59%	7674	0.998	1.275	15	$2,250.00	50%	40%	31%	58%	3.3	6.6	4.8	0.69
1132	Ventilation	Cogged V-Belt (Synchronous)	Biz - Custom	Warehouse	RETRO	20965	3%	650	0.073	0.093	15	$381.00	50%	40%	10%	38%	1.6	3.1	2.6	0.59
1133	WholeBldg_HVAC	HVAC - Energy Management System	Biz - Custom	Warehouse	RETRO	13	8%	1	0.000	0.000	15	$0.40	50%	100%	20%	41%	2.2	4.3	3.6	0.60
1134	WholeBldg_HVAC	GREM Controls	Biz - Custom	Warehouse	RETRO	0	0%	0	0.000	0.000	15	$0.00	0%	0%	20%	50%	#DIV/0!	0.0	0.0	0.00
1135	WholeBldg_HVAC	Demand Control Ventilation	Biz - Custom	Warehouse	RETRO	0	0%	0	0.000	0.000	10	$235.60		100%	10%	50%	0.0	0.0	0.0	0.00

C&I Measure Summary:

EKPC																				
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
1136	WholeBldg_HVAC	High Efficiency DOAS	Biz - Custom	Warehouse	RETRO	5	36%	2	0.000	0.000	15	$15.22	50%	100%	1%	12%	0.1	0.2	0.7	0.16
1137	WholeBldg_HVAC	Advanced Rooftop Controls	Biz - Custom	Warehouse	RETRO	0	0%	0	0.000	0.000	10	$341.21		62%	31%	50%	0.0	0.0	0.0	0.00
1138	WholeBldg_HVAC	Retro-commissioning_Bld Optimization	Biz - RCx	Warehouse	RETRO	13	8%	1	0.000	0.000	15	$0.12	50%	100%	0%	63%	7.2	14.4	10.9	0.66
1139	WholeBldg_HVAC	Commercial Weatherstripping	Biz - Custom	Warehouse	RETRO	222	2%	4	0.001	0.001	10	$8.00	50%	100%	25%	20%	0.4	0.7	1.0	0.35
1140	WholeBldg	WholeBlg - Com RET	Biz - Custom	Warehouse	RETRO	7	15%	1	0.000	0.000	15	$0.40	50%	80%	0%	44%	2.2	4.3	3.6	0.60
1141	WholeBldg	Strategic Energy Management	Biz - RCx	Warehouse	RETRO	0	0%	0	0.000	0.000	5	$0.27		100%	0%	73%	0.5	0.0	0.0	0.00
1142	WholeBldg	Power Distribution Equipment Upgrades (Transformers)	Biz - Custom	Warehouse	RETRO	990	1%	6	0.001	0.001	30	$6.27	50%	100%	20%	31%	1.2	2.4	2.2	0.53
1143	WholeBldg_NC	WholeBlg - Com NC	Biz - Custom	Warehouse	NC	4	25%	1	0.000	0.000	15	$0.40	50%	100%	60%	44%	2.2	4.3	3.6	0.60
1144	Cooking	Commercial Combination Oven (Electric)	Biz - Prescriptive	Other	MO	19496	39%	7532	1.272	0.961	12	$2,270.00	50%	17%	53%	51%	2.6	5.2	4.0	0.65
1145	Cooking	Commercial Electric Convection Oven	Biz - Prescriptive	Other	MO	10864	19%	2064	0.349	0.263	12	$960.00	50%	17%	53%	47%	1.7	3.4	2.8	0.61
1146	Cooking	Commercial Electric Griddle	Biz - Custom	Other	MO	17056	15%	2596	0.439	0.331	12	$0.00		14%	20%	44%	#DIV/0!	0.0	0.0	0.00
1147	Cooking	Commercial Electric Steam Cooker	Biz - Prescriptive	Other	MO	16915	80%	13507	2.282	1.722	12	$2,757.00	50%	6%	45%	53%	3.8	7.6	5.6	0.68
1148	Cooking	Dishwasher Low Temp Door (Energy Star)	Biz - Prescriptive	Other	MO	35655	44%	15766	2.663	2.010	16	$466.50	50%	26%	61%	57%	32.8	65.6	44.9	0.73
1149	Cooking	Dishwasher High Temp Door (Energy Star)	Biz - Prescriptive	Other	MO	38282	16%	6279	1.061	0.801	15	$1,550.00	50%	26%	61%	52%	3.7	7.5	5.6	0.67
1150	Cooking	Energy efficient electric fryer	Biz - Prescriptive	Other	MO	18955	17%	3274	0.553	0.418	12	$1,500.00	50%	27%	24%	47%	1.7	3.4	2.8	0.61
1151	Cooking	Insulated Holding Cabinets	Biz - Prescriptive	Other	MO	1478	37%	545	0.092	0.070	12	$1,000.00	50%	3%	16%	32%	0.4	0.9	1.1	0.40
1152	Compressed Air	Compressed Air Leak Repair	Biz - Prescriptive	Other	RETRO	6	17%	1	0.000	0.000	3	$0.08	50%	100%	39%	64%	2.7	5.4	4.4	0.62
1153	Compressed Air	Retro-commissioning_Compressed Air Optimization	Biz - RCx	Other	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	100%	20%	60%	1.6	3.2	2.8	0.57
1154	Compressed Air	Efficient Air Compressors (VSD)	Biz - Prescriptive	Other	MO	23742	21%	4935	0.595	0.585	13	$3,367.84	50%	100%	20%	48%	1.1	2.3	2.1	0.53
1155	Compressed Air	No Loss Condensate Drain	Biz - Prescriptive	Other	RETRO	476154	0%	1970	0.237	0.233	10	$244.00	50%	100%	5%	63%	5.1	10.2	7.8	0.65
1156	Compressed Air	Efficient Air Nozzles	Biz - Prescriptive	Other	MO	1130	50%	565	0.068	0.067	15	$57.00	50%	5%	20%	63%	8.6	17.2	12.9	0.67
1157	Cooling	Air Conditioner - 17 IEER (5-20 Tons)	Biz - Prescriptive	Other	MO	994	14%	140	0.065	0.002	15	$153.28	50%	31%	5%	37%	0.8	1.6	1.6	0.50
1158	Cooling	Air Conditioner - 18 IEER (5-20 Tons)	Biz - Prescriptive	Other	MO	994	19%	188	0.088	0.002	15	$214.59	50%	31%	5%	36%	0.8	1.6	1.6	0.49
1159	Cooling	Air Conditioner - 21 IEER (5-20 Tons)	Biz - Prescriptive	Other	MO	994	30%	303	0.141	0.003	15	$398.52	50%	31%	5%	34%	0.7	1.4	1.5	0.47
1160	Cooling	Air Conditioner - 14.3 IEER (20+ Tons)	Biz - Prescriptive	Other	MO	1116	9%	101	0.047	0.001	15	$71.00	50%	31%	5%	47%	1.3	2.6	2.3	0.56
1161	Cooling	Air Conditioner - 15 IEER (20+ Tons)	Biz - Prescriptive	Other	MO	1116	13%	149	0.069	0.002	15	$109.23	50%	31%	5%	46%	1.2	2.4	2.2	0.56
1162	Cooling	Air Conditioner - 17 IEER (20+ Tons)	Biz - Prescriptive	Other	MO	1116	24%	263	0.123	0.003	15	$218.46	50%	31%	5%	43%	1.1	2.2	2.0	0.54
1163	Cooling	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Biz - Custom	Other	RETRO	1209	7%	85	0.040	0.001	3	$11.42	50%	61%	50%	47%	1.5	3.1	2.8	0.55
1164	Cooling	Air Side Economizer	Biz - Custom	Other	RETRO	994	20%	199	0.093	0.002	10	$126.67	50%	61%	25%	37%	1.0	2.0	1.9	0.52
1165	Cooling	HVAC Occupancy Controls	Biz - Custom	Other	RETRO	1049	20%	210	0.098	0.002	15	$197.50	50%	61%	20%	30%	1.4	1.9	2.7	0.52
1166	Cooling	Air Conditioner - 16 SEER (<5 Tons)	Biz - Prescriptive	Other	MO	1037	13%	130	0.060	0.001	15	$115.00	50%	0%	5%	41%	1.0	2.0	1.9	0.53
1167	Cooling	Air Conditioner - 18 SEER(<5 Tons)	Biz - Prescriptive	Other	MO	1037	22%	230	0.108	0.003	15	$514.00	50%	0%	5%	23%	0.4	0.8	1.1	0.38
1168	Cooling	Air Conditioner - 21 SEER (<5 Tons)	Biz - Prescriptive	Other	MO	1037	33%	346	0.161	0.004	15	$630.50	50%	0%	5%	27%	0.5	1.0	1.2	0.42
1169	Cooling	Smart Thermostat	Biz - Prescriptive	Other	RETRO	5950	14%	842	0.393	0.009	11	$175.00	50%	0%	20%	60%	4.8	6.7	8.4	0.64
1170	Cooling	PTAC - 7,000 to 15,000 Btuh	Biz - Custom	Other	MO	1338	15%	195	0.091	0.002	8	$84.00	50%	0%	20%	41%	1.2	2.4	2.3	0.54
1171	Cooling	Air Cooled Chiller	Biz - Prescriptive	Other	MO	1059	9%	95	0.045	0.001	23	$126.00	50%	35%	5%	34%	0.9	1.9	1.8	0.53
1172	Cooling	Water Cooled Chiller	Biz - Prescriptive	Other	MO	532	23%	121	0.056	0.001	23	$61.00	50%	4%	5%	53%	2.5	5.0	3.8	0.65
1173	Cooling	Window Film	Biz - Custom	Other	RETRO	6364	4%	280	0.131	0.003	10	$153.81	50%	100%	25%	39%	0.6	2.3	-0.2	0.54
1174	Cooling	Triple Pane Windows	Biz - Custom	Other	MO	6364	6%	382	0.178	0.004	25	$700.00	50%	100%	2%	20%	0.7	1.4	1.5	0.49
1175	Cooling	Energy Recovery Ventilator	Biz - Custom	Other	RETRO	1116	0%	0	0.000	0.000	15	$1,500.00		100%	2%	50%	0.0	0.0	0.0	0.00
1176	Heating	Heat Pump - 16 SEER (<5 Tons)	Biz - Prescriptive	Other	MO	2607	8%	198	0.031	0.044	15	$135.00	50%	0%	15%	48%	1.6	3.2	2.3	0.70
1177	Heating	Heat Pump - 18 SEER(<5 Tons)	Biz - Prescriptive	Other	MO	2607	14%	376	0.059	0.083	15	$445.76	50%	0%	15%	35%	0.9	1.9	1.6	0.60
1178	Heating	Heat Pump - 21 SEER(<5 Tons)	Biz - Prescriptive	Other	MO	2607	20%	534	0.084	0.118	15	$520.06	50%	0%	15%	39%	1.1	2.3	1.8	0.64
1179	Heating	Heat Pump - 15.0 IEER COP 3.6 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Other	MO	2830	6%	176	0.028	0.039	15	$100.00	50%	17%	15%	51%	1.9	3.9	2.7	0.72
1180	Heating	Heat Pump - 16.0 IEER COP 3.8 (65,000-134,000 Btu/hr)	Biz - Prescriptive	Other	MO	2830	11%	325	0.051	0.072	15	$171.08	50%	17%	15%	52%	2.1	4.2	2.9	0.73
1181	Heating	Heat Pump - 14.5 IEER COP 3.5 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Other	MO	2932	7%	195	0.031	0.043	15	$100.00	50%	17%	15%	52%	2.2	4.3	2.9	0.73
1182	Heating	Heat Pump - 15.5 IEER COP 3.7 (135,000-239,000 Btu/hr)	Biz - Prescriptive	Other	MO	2932	12%	354	0.055	0.078	15	$158.10	50%	17%	15%	54%	2.5	5.0	3.3	0.75
1183	Heating	Heat Pump - 12 IEER 3.4 COP (>239,000 Btu/hr)	Biz - Prescriptive	Other	MO	3073	7%	203	0.032	0.045	15	$100.00	50%	17%	15%	53%	2.2	4.5	3.0	0.74
1184	Heating	Heat Pump - 13 IEER 3.6 COP (>239,000 Btu/hr)	Biz - Prescriptive	Other	MO	3073	13%	387	0.061	0.086	15	$201.80	50%	17%	15%	52%	2.1	4.2	2.9	0.73
1185	Heating	Geothermal HP - 17 EER < 135kbtu	Biz - Prescriptive	Other	MO	2934	41%	1204	0.189	0.267	25	$4,361.00	50%	0%	15%	18%	0.4	0.9	1.0	0.43
1186	Heating	Geothermal HP - 19 EER < 135kbtu	Biz - Prescriptive	Other	MO	2934	45%	1306	0.205	0.289	25	$4,361.00	50%	0%	15%	19%	0.5	0.9	1.0	0.45
1187	Heating	PTHP - 7,000 to 15,000 Btuh	Biz - Custom	Other	MO	5598	17%	933	0.146	0.207	15	$84.00	50%	0%	15%	48%	12.3	24.6	14.4	0.85
1188	Hot Water	Heat Pump Water Heater	Biz - Custom	Other	MO	17237	73%	12640	1.701	1.906	15	$1,797.00	50%	100%	0%	43%	6.7	13.4	9.3	0.72
1189	Hot Water	Low Flow Faucet Aerator	Biz - Custom	Other	RETRO	395	32%	128	0.017	0.019	10	$8.00	50%	20%	85%	45%	11.1	22.2	15.0	0.74

C&I Measure Summary:

EKPC

Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
1190	Hot Water	Pre-Rinse Spray Valves - DI	Biz - Custom	Other	RETRO	18059	54%	9789	1.317	1.476	5	$54.00	50%	20%	85%	46%	69.4	138.9	91.2	0.76
1191	Hot Water	Ozone Commercial Laundry	Biz - Custom	Other	MO	2984	25%	746	0.100	0.112	10	$20,309.70	50%	0%	20%	15%	1.1	0.1	2.9	0.05
1192	Lighting_Ext	Ext LED Replacing 100W MH (24/7)	Biz - Prescriptive	Other	RETRO	996	76%	755	0.000	0.087	10	$97.00	22%	13%	70%	64%	4.3	19.1	7.3	0.59
1193	Lighting_Ext	Ext LED Replacing 175W MH (24/7)	Biz - Prescriptive	Other	RETRO	1744	71%	1239	0.000	0.143	10	$123.81	29%	13%	70%	67%	5.5	19.1	9.4	0.59
1194	Lighting_Ext	Ext LED Replacing 250W MH (24/7)	Biz - Prescriptive	Other	RETRO	2490	67%	1659	0.000	0.192	10	$134.35	36%	13%	70%	68%	6.8	19.1	11.6	0.59
1195	Lighting_Ext	Ext LED Replacing 400W MH (24/7)	Biz - Prescriptive	Other	RETRO	3984	65%	2570	0.000	0.297	10	$196.16	38%	13%	70%	69%	7.2	19.1	12.3	0.59
1196	Lighting_Ext	Ext LED Replacing 1000W MH (24/7)	Biz - Prescriptive	Other	RETRO	9467	70%	6666	0.000	0.771	10	$319.31	60%	13%	70%	71%	11.5	19.1	19.6	0.59
1197	Lighting_Ext	Ext LED Replacing 100W MH (D2D)	Biz - Prescriptive	Other	RETRO	489	76%	370	0.000	0.043	10	$97.00	11%	7%	70%	56%	2.1	19.1	3.6	0.59
1198	Lighting_Ext	Ext LED Replacing 175W MH (D2D)	Biz - Prescriptive	Other	RETRO	856	71%	608	0.000	0.070	10	$123.81	14%	7%	70%	60%	2.7	19.1	4.6	0.59
1199	Lighting_Ext	Ext LED Replacing 250W MH (D2D)	Biz - Prescriptive	Other	RETRO	1222	67%	814	0.000	0.094	10	$134.35	18%	7%	70%	62%	3.4	19.1	5.7	0.59
1200	Lighting_Ext	Ext LED Replacing 400W MH (D2D)	Biz - Prescriptive	Other	RETRO	1956	65%	1262	0.000	0.146	10	$196.16	19%	7%	70%	63%	3.6	19.1	6.0	0.59
1201	Lighting_Ext	Ext LED Replacing 1000W MH (D2D)	Biz - Prescriptive	Other	RETRO	4647	70%	3272	0.000	0.378	10	$319.31	30%	7%	70%	67%	5.7	19.1	9.6	0.59
1202	Lighting_Int	LED Interior Direction (Track lighting / Wall-Wash Fixture)	Biz - Prescriptive	Other	RETRO	140	74%	103	0.013	0.013	15	$59.00	6%	7%	60%	42%	1.4	28.3	2.5	0.70
1203	Lighting_Int	LED Linear Replacement Lamps (Replacing T8)	Biz - Prescriptive	Other	RETRO	101	51%	52	0.006	0.007	10	$15.00	11%	62%	40%	55%	2.0	20.7	4.1	0.69
1204	Lighting_Int	LED Troffers (Replacing 1-Lamp T8)	Biz - Prescriptive	Other	RETRO	104	34%	35	0.004	0.004	15	$22.00	5%	62%	40%	40%	1.3	28.3	2.3	0.70
1205	Lighting_Int	LED Troffers (Replacing 2-Lamp T8)	Biz - Prescriptive	Other	RETRO	204	51%	105	0.013	0.013	15	$61.00	5%	62%	40%	42%	1.4	28.3	2.5	0.70
1206	Lighting_Int	LED Troffers (Replacing 3-Lamp T8)	Biz - Prescriptive	Other	RETRO	302	54%	163	0.020	0.021	15	$76.00	7%	62%	40%	46%	1.7	28.3	3.3	0.70
1207	Lighting_Int	LED Troffers (Replacing 4-Lamp T8)	Biz - Prescriptive	Other	RETRO	403	54%	219	0.027	0.028	15	$104.00	7%	62%	40%	46%	1.7	28.3	3.2	0.70
1208	Lighting_Int	LED Linear Ambient Fixture (<6000 lumens, replacing T8)	Biz - Prescriptive	Other	RETRO	203	50%	102	0.013	0.013	15	$46.67	7%	62%	40%	47%	1.7	28.3	3.4	0.70
1209	Lighting_Int	LED Linear Ambient Fixture (>6000 lumens, replacing T5HO)	Biz - Prescriptive	Other	RETRO	536	53%	285	0.035	0.036	15	$152.00	6%	62%	40%	43%	1.5	28.3	2.8	0.70
1210	Lighting_Int	LED Low-Bay Fixture	Biz - Prescriptive	Other	RETRO	561	67%	376	0.046	0.047	15	$42.88	28%	7%	50%	66%	5.2	28.3	-3066.8	0.70
1211	Lighting_Int	LED High-Bay Fixture (Replacing T8 High Bay)	Biz - Prescriptive	Other	RETRO	1051	57%	600	0.074	0.076	15	$48.07	39%	5%	40%	69%	6.5	28.3	-34.0	0.70
1212	Lighting_Int	LED High-Bay Fixture (Replacing Metal Halide)	Biz - Prescriptive	Other	RETRO	4220	72%	3051	0.375	0.385	15	$187.94	51%	4%	50%	70%	7.6	28.3	-22.0	0.70
1213	Lighting_Int	Fluorescent Delamping	Biz - Prescriptive	Other	RETRO	90	100%	90	0.011	0.011	11	$18.50	15%	62%	0%	60%	2.8	22.3	7.8	0.70
1214	Lighting_Int	Lighting Occupancy Sensor	Biz - Prescriptive	Other	RETRO	466	30%	140	0.017	0.018	15	$65.40	7%	90%	15%	46%	1.9	28.3	2.7	0.70
1215	Lighting_Int	Lighting Daylight Sensor	Biz - Prescriptive	Other	RETRO	597	28%	167	0.021	0.021	15	$57.50	9%	90%	15%	52%	2.6	28.3	3.7	0.70
1216	Lighting_Int	Dual Occupancy / Daylight Sensor	Biz - Prescriptive	Other	RETRO	266	38%	101	0.012	0.013	15	$75.00	4%	90%	15%	37%	1.2	28.3	1.7	0.70
1217	Lighting_Int	Luminaire-Level Lighting Controls	Biz - Prescriptive	Other	RETRO	266	61%	163	0.020	0.021	15	$56.00	9%	90%	15%	52%	2.6	28.3	3.7	0.70
1218	Lighting_Int	Networked Lighting Control	Biz - Custom	Other	RETRO	2	35%	1	0.000	0.000	15	$0.45	5%	90%	15%	31%	1.5	28.3	2.2	0.70
1219	Lighting_Int	LED Exit Sign	Biz - Prescriptive	Other	RETRO	65	71%	46	0.006	0.006	5	$32.50	5%	1%	85%	38%	0.5	11.4	0.7	0.68
1220	Misc	Non-Refrigerated Vending Machine Controls	Biz - Prescriptive	Other	RETRO	385	61%	237	0.029	0.028	5	$233.00	50%	0%	31%	44%	0.4	0.7	1.0	0.35
1221	Misc	Kitchen Exhaust Hood Demand Ventilation Control System	Biz - Custom	Other	MO	0	0%	0	0.000	0.000	20	$1.73		0%	24%	54%	0.0	0.0	0.0	0.00
1222	Misc	High Efficiency Hand Dryers	Biz - Custom	Other	MO	262	83%	217	0.026	0.026	10	$483.00	50%	1%	50%	19%	0.3	0.6	0.9	0.31
1223	Misc	ENERGY STAR Uninterrupted Power Supply	Biz - Custom	Other	RETRO	3125	4%	114	0.014	0.014	15	$59.00	50%	1%	73%	41%	1.7	3.4	2.9	0.58
1224	Misc	Miscellaneous Custom	Biz - Custom	Other	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	99%	10%	44%	1.6	3.2	2.8	0.57
1225	Motors	Pump and Fan Variable Frequency Drive Controls (Pumps)	Biz - Prescriptive	Other	MO	2088	28%	579	0.122	0.057	15	$198.32	50%	100%	25%	57%	2.6	5.2	4.2	0.63
1226	Motors	Power Drive Systems	Biz - Custom	Other	RETRO	4	23%	1	0.000	0.000	15	$0.13	50%	100%	25%	47%	6.9	13.8	10.1	0.68
1227	Motors	Switch Reluctance Motors	Biz - Custom	Other	MO	33406	31%	10222	2.148	1.008	15	$527.50	50%	100%	1%	49%	17.4	34.8	24.7	0.70
1228	Plug_Office	Energy Star Printer/Copier/Fax	Biz - Custom	Other	MO	418	26%	110	0.013	0.013	6	$0.00		23%	95%	54%	#DIV/0!	0.0	0.0	0.00
1229	Plug_Office	Advanced Power Strip – Teri 1 Commercial Use	Biz - Custom	Other	RETRO	188	58%	109	0.013	0.013	7	$10.00	50%	13%	20%	52%	5.1	10.2	7.8	0.65
1230	Plug_Office	Smart Socket	Biz - Custom	Other	RETRO	80	61%	48	0.006	0.006	7	$9.00	50%	13%	20%	49%	2.5	5.1	4.1	0.61
1231	Plug_Office	Energy Star Server	Biz - Custom	Other	MO	2167	30%	650	0.078	0.077	9	$300.95	50%	15%	25%	42%	1.3	2.5	2.3	0.55
1232	Plug_Office	Server Virtualization	Biz - Custom	Other	RETRO	2167	14%	301	0.036	0.036	9	$26.97	50%	15%	25%	52%	6.5	13.0	9.8	0.66
1233	Plug_Office	Electrically Commutated Plug Fans in data centers	Biz - Custom	Other	RETRO	86783	18%	15778	1.901	1.869	15	$480.00	50%	15%	25%	53%	28.6	57.2	41.6	0.69
1234	Plug_Office	Computer Room Air Conditioner Economizer	Biz - Custom	Other	RETRO	764	47%	358	0.043	0.042	15	$82.00	50%	15%	25%	48%	3.8	7.6	6.0	0.64
1235	Plug_Office	High Efficiency CRAC unit	Biz - Custom	Other	MO	8940	25%	2265	0.273	0.268	20	$750.00	50%	15%	25%	45%	3.2	6.4	5.1	0.63
1236	Plug_Office	Data Center Hot/Cold Aisle Configuration	Biz - Custom	Other	RETRO	13	8%	1	0.000	0.000	10	$0.23	50%	15%	25%	48%	2.8	5.6	4.5	0.62
1237	Refrigeration	Strip Curtains	Biz - Prescriptive	Other	RETRO	37	50%	18	0.003	0.002	4	$10.22	50%	4%	26%	45%	0.5	1.0	1.2	0.41
1238	Refrigeration	Floating Head Pressure Controls	Biz - Custom	Other	RETRO	1228	25%	307	0.043	0.034	15	$431.00	50%	3%	25%	27%	0.6	1.2	1.4	0.44
1239	Refrigeration	Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Biz - Prescriptive	Other	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	3%	80%	53%	4.5	9.0	7.0	0.64
1240	Refrigeration	Evaporator Fan Motor Controls	Biz - Prescriptive	Other	RETRO	1298	23%	293	0.041	0.032	13	$161.75	50%	2%	25%	45%	1.4	2.8	2.5	0.56
1241	Refrigeration	Variable Speed Condenser Fan	Biz - Prescriptive	Other	RETRO	3158	48%	1500	0.212	0.164	15	$1,170.00	50%	3%	25%	42%	1.1	2.2	2.1	0.53
1242	Refrigeration	Door Heater Controls for Cooler	Biz - Prescriptive	Other	RETRO	579	42%	240	0.034	0.026	10	$79.50	50%	19%	25%	50%	1.9	3.8	3.2	0.59
1243	Refrigeration	Automated Door Closer for Refrigerator	Biz - Prescriptive	Other	RETRO	1259893	0%	2399	0.338	0.262	8	$502.00	50%	14%	27%	53%	2.5	5.0	4.1	0.61
1244	Refrigeration	Aerofoils for Open Display Cases	Biz - Custom	Other	RETRO	45880	10%	4588	0.647	0.501	10	$311.54	50%	14%	27%	42%	9.3	18.5	13.9	0.67

C&I Measure Summary:

EKPC																					
Measure #	End-Use	Measure Name	Program	Building Type	Replacement Type	Base Annual Electric	% Electric Savings	Per Unit KWh Savings	Per Unit Summer kW	Per Unit Winter kW	Useful Life	Measure $	RAP Incentive (%)	Base Saturation	EE Saturation	RAP Adoption Rate	TRC Test	Utility Cost Test	Participant Test	RIM Test
1245	Refrigeration	Display Case Door Retrofit, Medium Temp	Biz - Prescriptive	Other	RETRO	1558	50%	779	0.110	0.085	15	$390.00	50%	5%	25%	46%	1.7	3.5	3.0	0.58
1246	Refrigeration	Electronically Commutated (EC) Reach-In Evaporator Fan Motor	Biz - Prescriptive	Other	RETRO	2884	55%	1586	0.224	0.173	15	$305.00	50%	3%	80%	53%	4.5	9.0	7.0	0.64
1247	Refrigeration	Q-Sync Motor for Walk-In and Reach-in Evaporator Fan Motor	Biz - Custom	Other	RETRO	2091	24%	505	0.071	0.055	10	$96.00	50%	3%	2%	40%	3.3	6.6	5.3	0.63
1248	Refrigeration	Night Covers for Coolers	Biz - Prescriptive	Other	RETRO	1511	9%	136	0.019	0.015	5	$42.00	50%	18%	55%	51%	1.1	2.2	2.1	0.53
1249	Refrigeration	Door Heater Controls for Freezer	Biz - Prescriptive	Other	RETRO	2016	33%	655	0.092	0.072	10	$79.50	50%	6%	25%	55%	5.2	10.4	8.0	0.65
1250	Refrigeration	Automated Door Closer for Freezer	Biz - Prescriptive	Other	RETRO	1259893	1%	6949	0.980	0.759	8	$502.00	50%	6%	27%	56%	7.2	14.5	11.0	0.66
1251	Refrigeration	Night Covers for Freezers	Biz - Prescriptive	Other	RETRO	2349	9%	211	0.030	0.023	5	$42.00	50%	6%	55%	53%	1.7	3.5	3.0	0.58
1252	Refrigeration	Refrigeration - Custom	Biz - Custom	Other	RETRO	7	15%	1	0.000	0.000	10	$0.40	50%	90%	25%	36%	1.6	3.1	2.8	0.57
1253	Refrigeration	Retro-commissioning_Refrigerator Optimization	Biz - RCx	Other	RETRO	5	21%	1	0.000	0.000	5	$0.22	50%	90%	25%	52%	1.6	3.1	2.8	0.57
1254	Refrigeration	ESTAR Refrigerated Vending Machine	Biz - Custom	Other	MO	1278	12%	153	0.022	0.017	14	$500.00	50%	5%	31%	18%	0.3	0.5	0.9	0.29
1255	Refrigeration	Refrigerated Vending Machine Controls	Biz - Prescriptive	Other	RETRO	1663	23%	390	0.055	0.043	5	$245.00	50%	5%	31%	44%	0.6	1.1	1.3	0.43
1256	Refrigeration	Commercial Ice Marker	Biz - Prescriptive	Other	MO	5551	8%	440	0.062	0.048	9	$222.00	50%	5%	44%	46%	1.1	2.3	2.2	0.53

APPENDIX C: ANNUAL ACHIEVABLE POTENTIAL

Residential - Incremental Annual MAP Savings - by End-Use (MWh)

EKPC	Year														
End Use	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Appliances	702	1,244	1,646	2,041	2,502	3,215	4,033	4,927	5,865	6,731	7,476	8,082	8,596	8,900	9,800
Behavioral	2,905	7,318	12,287	17,674	23,672	31,305	40,548	51,390	63,573	76,561	89,892	102,545	114,138	124,327	132,956
HVAC Equipment	15,912	17,903	19,374	20,674	22,042	23,881	25,654	27,519	29,546	31,108	32,260	34,846	36,002	36,430	36,532
Lighting	573	901	1,057	1,190	1,370	1,731	2,123	2,519	2,907	3,186	4,094	4,433	4,516	4,456	4,385
Pool/Pump	34	86	143	203	270	353	454	571	704	842	979	1,110	1,229	1,330	1,413
New Construction	6,304	6,561	6,660	6,555	6,541	6,460	6,337	6,339	6,773	6,801	6,735	6,843	6,973	7,056	7,067
Plug Load	1,016	1,534	1,719	1,856	2,056	2,586	3,138	4,842	5,817	6,279	6,479	6,526	6,702	6,783	8,245
Shell	7,261	11,013	12,419	13,488	14,983	18,642	22,466	26,066	28,957	30,695	31,019	29,947	27,782	24,973	21,965
Water Heating	18,200	21,078	23,050	24,458	26,057	28,660	31,101	33,001	34,852	35,767	39,891	41,065	41,118	40,412	39,838
Total	52,908	67,639	78,354	88,141	99,494	116,833	135,854	157,175	178,994	197,971	218,824	235,397	247,056	254,666	262,201

Residential - Cumulative Annual MAP Savings - by End-Use (MWh)

EKPC	Year														
End Use	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Appliances	702	1,947	3,593	5,633	8,134	11,348	15,377	19,787	24,874	30,737	37,277	44,314	51,572	58,815	66,522
Behavioral	2,905	7,495	12,903	19,024	26,068	34,914	45,609	58,151	72,349	87,710	103,648	119,295	133,974	147,195	158,685
HVAC Equipment	15,912	33,803	53,148	73,775	95,538	118,993	144,129	171,037	199,860	230,072	261,272	293,697	326,574	359,623	392,637
Lighting	573	1,474	2,532	3,722	5,082	6,788	8,869	11,330	14,153	17,229	20,638	24,066	27,412	30,569	33,494
Pool/Pump	34	120	263	466	736	1,089	1,542	2,103	2,782	3,582	4,500	5,530	6,654	7,848	9,091
New Construction	6,304	12,865	19,525	26,080	32,621	39,081	45,418	51,757	58,530	65,331	72,066	78,908	85,881	92,937	100,004
Plug Load	1,016	2,550	4,269	6,125	8,181	10,757	13,880	17,699	21,979	26,536	31,141	35,585	39,684	43,316	46,710
Shell	7,261	18,212	30,463	43,654	58,189	76,187	97,749	122,573	149,859	178,405	206,770	233,510	257,608	278,488	296,017
Water Heating	18,200	39,127	61,508	84,898	109,201	134,902	161,665	189,068	216,772	243,997	270,867	296,444	320,536	343,098	364,233
Total	52,908	117,592	188,203	263,377	343,750	434,058	534,239	643,504	761,157	883,598	1,008,178	1,131,348	1,249,894	1,361,890	1,467,394

Residential - Incremental Annual RAP Savings - by End-Use (MWh)

EKPC	Year														
End Use	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Appliances	373	700	973	1,249	1,565	2,022	2,555	3,149	3,783	4,396	4,955	5,438	5,869	6,169	6,658
Behavioral	2,905	7,318	12,287	17,674	23,672	31,305	40,548	51,390	63,573	76,561	89,892	102,545	114,138	124,327	132,956
HVAC Equipment	12,200	13,635	14,803	15,864	16,962	18,327	19,655	21,091	22,713	24,053	25,160	26,909	27,931	28,539	28,906
Lighting	272	437	527	607	709	900	1,111	1,329	1,547	1,718	2,189	2,387	2,462	2,468	2,463
Pool/Pump	18	45	75	107	142	186	239	300	370	443	515	584	646	699	743
New Construction	4,093	4,260	4,324	4,256	4,247	4,195	4,114	4,116	4,398	4,416	4,373	4,443	4,527	4,581	4,588
Plug Load	415	629	706	764	847	1,070	1,300	2,014	2,419	2,616	2,710	2,739	2,819	2,857	3,501
Shell	6,213	9,462	10,720	11,698	13,052	16,290	19,703	22,953	25,617	27,296	27,746	26,967	25,205	22,846	20,282
Water Heating	9,142	10,576	11,606	12,347	13,233	14,525	15,854	16,932	18,052	18,697	20,674	21,349	21,540	21,303	21,172
Total	35,631	47,063	56,021	64,567	74,430	88,820	105,078	123,275	142,472	160,195	178,213	193,362	205,137	213,789	221,269

Residential - Cumulative Annual RAP Savings - by End-Use (MWh)

EKPC	Year														
End Use	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Appliances	373	1,073	2,045	3,294	4,859	6,880	9,433	12,347	15,777	19,778	24,307	29,265	34,507	39,882	45,503
Behavioral	2,905	7,495	12,903	19,024	26,068	34,914	45,609	58,151	72,349	87,710	103,648	119,295	133,974	147,195	158,685
HVAC Equipment	12,200	25,831	40,625	56,472	73,252	91,304	110,636	131,362	153,654	177,182	201,715	227,368	253,705	280,519	307,633
Lighting	272	709	1,235	1,842	2,543	3,424	4,502	5,784	7,266	8,899	10,729	12,598	14,451	16,235	17,922
Pool/Pump	18	63	138	245	386	572	811	1,102	1,451	1,859	2,323	2,839	3,397	3,983	4,584
New Construction	4,093	8,353	12,678	16,934	21,181	25,375	29,490	33,605	38,003	42,419	46,792	51,234	55,762	60,343	64,931
Plug Load	415	1,044	1,750	2,514	3,361	4,423	5,710	7,303	9,091	10,999	12,931	14,804	16,539	18,087	19,567
Shell	6,213	15,634	26,245	37,748	50,503	66,368	85,473	107,602	132,106	157,960	183,905	208,678	231,327	251,293	268,405
Water Heating	9,142	19,680	31,001	42,903	55,377	68,750	82,929	97,734	113,031	128,427	143,916	158,988	173,463	187,228	200,275
Total	35,631	79,882	128,620	180,975	237,530	302,010	374,592	454,990	542,728	635,232	730,265	825,069	917,126	1,004,765	1,087,505

C&I - Incremental Annual MAP Savings - by End-Use (MWh)

EKPC	Year														
End Use	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Compressed Air	740	952	1,063	1,741	1,979	2,271	3,157	3,594	4,004	4,927	5,422	5,803	6,611	6,863	6,981
Cooking	317	337	354	367	378	386	390	393	395	397	398	398	398	398	398
Hot Water	71	91	109	125	138	191	212	235	260	284	366	394	416	425	437
HVAC	2,622	2,799	2,868	3,258	3,374	3,820	4,635	5,298	5,977	6,887	7,646	8,390	9,083	9,405	9,621
Ind. Process	735	1,256	1,608	2,373	2,990	3,733	4,994	6,111	7,206	8,676	9,818	10,961	12,236	12,956	13,423
Lighting	36,270	32,438	28,102	23,681	18,907	15,283	12,094	8,973	4,314	3,621	3,152	2,581	1,985	1,236	814
Misc	844	1,275	1,436	1,556	1,733	2,174	2,641	3,086	3,447	3,668	4,245	4,677	4,636	4,371	4,092
Motors	1,025	1,787	2,351	3,578	4,564	5,695	7,643	9,386	11,124	13,483	15,369	17,007	19,005	20,246	21,096
Plug_Office	688	1,041	1,169	1,265	1,405	1,763	2,141	2,868	3,346	3,666	3,797	3,771	3,733	3,635	3,890
Refrigeration	3,656	3,605	3,419	2,983	3,239	3,469	3,354	3,236	3,532	3,398	4,302	4,071	4,357	4,357	4,131
WholeBldg	5,770	8,347	9,531	12,798	16,066	18,467	23,869	28,117	32,976	36,690	40,712	43,252	47,284	46,102	46,941
Total	52,739	53,928	52,012	53,727	54,773	57,252	65,131	71,297	76,581	85,697	95,229	101,305	109,744	109,993	111,824

C&I - Cumulative Annual MAP Savings - by End-Use (MWh)

EKPC	Year														
End Use	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Compressed Air	740	1,692	2,755	3,919	5,203	6,732	8,550	10,667	13,064	15,666	18,457	21,378	24,361	27,200	29,893
Cooking	317	654	1,008	1,376	1,754	2,140	2,530	2,924	3,319	3,716	4,114	4,512	4,722	4,916	5,096
Hot Water	71	162	272	397	535	687	857	1,047	1,262	1,504	1,769	2,061	2,376	2,705	3,054
HVAC	2,622	5,421	8,290	11,242	14,172	17,484	21,249	25,480	30,200	35,336	40,746	46,362	52,093	57,807	63,459
Ind. Process	735	1,991	3,599	5,547	7,889	10,892	14,662	19,245	24,623	30,732	37,454	44,607	52,003	59,430	66,772
Lighting	36,270	68,709	96,811	120,367	139,140	154,287	166,232	175,077	179,291	182,842	185,677	188,008	189,755	190,803	191,522
Misc	844	2,119	3,555	5,111	6,844	9,018	11,659	14,745	18,192	21,860	25,565	29,154	32,465	35,391	37,904
Motors	1,025	2,811	5,162	8,076	11,627	16,180	21,911	28,910	37,179	46,656	57,198	68,644	80,788	93,339	106,114
Plug_Office	688	1,729	2,898	4,163	5,569	7,331	9,473	11,975	14,772	17,745	20,746	23,630	26,275	28,609	30,602
Refrigeration	3,656	7,261	10,680	13,658	16,469	19,156	21,705	24,183	26,592	28,306	29,724	30,853	31,842	32,676	33,363
WholeBldg	5,770	14,117	23,648	34,006	46,370	60,556	77,296	96,557	118,989	140,984	163,009	184,480	205,121	221,463	236,239
Total	52,739	106,667	158,679	207,862	255,572	304,463	356,124	410,810	467,482	525,347	584,460	643,689	701,800	754,337	804,018

C&I - Incremental Annual RAP Savings - by End-Use (MWh)

EKPC	Year														
End Use	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Compressed Air	602	748	815	1,359	1,513	1,710	2,401	2,694	2,966	3,669	4,009	4,262	4,884	5,044	5,108
Cooking	276	293	307	318	327	333	337	339	341	342	343	343	343	343	343
Hot Water	64	79	92	102	110	153	166	179	192	206	274	291	304	305	310
HVAC	1,971	2,045	2,061	2,322	2,340	2,616	3,173	3,619	4,084	4,740	5,253	5,817	6,358	6,622	6,803
Ind. Process	529	902	1,153	1,715	2,163	2,697	3,617	4,428	5,221	6,299	7,134	7,957	8,895	9,426	9,772
Lighting	24,017	21,638	18,900	16,084	12,872	10,479	8,380	6,413	3,201	2,667	2,279	1,868	1,418	857	545
Misc	498	751	845	914	1,016	1,274	1,547	1,807	2,016	2,142	2,461	2,723	2,702	2,543	2,374
Motors	757	1,318	1,735	2,649	3,380	4,216	5,662	6,954	8,244	10,001	11,408	12,632	14,133	15,068	15,712
Plug_Office	412	622	697	754	837	1,049	1,274	1,715	2,002	2,194	2,270	2,253	2,232	2,175	2,337
Refrigeration	2,941	2,901	2,757	2,388	2,658	2,866	2,778	2,684	2,977	2,867	3,611	3,411	3,692	3,660	3,462
WholeBldg	4,226	6,217	7,182	10,155	12,993	14,770	19,403	23,007	27,316	30,779	34,383	36,969	41,237	40,669	41,962
Total	36,292	37,514	36,544	38,760	40,210	42,165	48,739	53,838	58,559	65,906	73,425	78,526	86,197	86,710	88,727

C&I - Cumulative Annual RAP Savings - by End-Use (MWh)

EKPC	Year														
End Use	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Compressed Air	602	1,349	2,164	3,038	3,987	5,102	6,414	7,931	9,638	11,472	13,430	15,469	17,539	19,500	21,348
Cooking	276	569	876	1,195	1,522	1,855	2,192	2,531	2,872	3,214	3,556	3,899	4,082	4,252	4,412
Hot Water	64	143	235	337	447	564	690	826	976	1,141	1,321	1,516	1,726	1,942	2,172
HVAC	1,971	4,016	6,077	8,168	10,172	12,404	14,918	17,729	20,861	24,276	27,890	31,666	35,553	39,456	43,351
Ind. Process	529	1,431	2,584	3,978	5,652	7,798	10,493	13,768	17,609	21,972	26,769	31,875	37,158	42,463	47,707
Lighting	24,017	45,655	64,554	80,539	93,300	103,660	111,917	118,222	121,333	123,936	125,972	127,652	128,906	129,635	130,122
Misc	498	1,249	2,094	3,009	4,025	5,299	6,847	8,653	10,669	12,811	14,969	17,056	18,975	20,662	22,101
Motors	757	2,076	3,811	5,961	8,583	11,943	16,173	21,338	27,441	34,439	42,225	50,683	59,661	68,944	78,397
Plug_Office	412	1,033	1,731	2,485	3,322	4,371	5,645	7,134	8,797	10,563	12,345	14,054	15,619	16,995	18,168
Refrigeration	2,941	5,842	8,599	10,983	13,242	15,409	17,471	19,482	21,442	22,782	23,906	24,787	25,555	26,199	26,727
WholeBldg	4,226	10,442	17,624	25,470	34,957	45,678	58,330	72,941	90,249	107,061	124,038	140,807	157,243	170,149	182,085
Total	36,292	73,806	110,350	145,164	179,209	214,085	251,090	290,554	331,885	373,666	416,423	459,465	502,018	540,200	576,589

Demand Response - Summer MAP Savings - by Program (MW)

Sector	Program	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Residential	DLC Central AC Switch	12	10	8	5	3	1	0	0	0	0	0	0	0	0	0
	DLC Thermostat	9	19	29	39	50	61	72	83	94	105	117	129	140	152	165
	DLC Water Heaters	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0
	Critical Peak Pricing with Enabling Technology	0	73	149	196	210	212	211	209	206	204	201	199	196	194	191
	Critical Peak Pricing without Enabling Technology	0	31	48	50	50	50	50	50	50	51	51	51	51	52	52
	Generators	0	15	30	36	36	33	29	26	22	18	14	10	6	2	0
Non-Residential	DLC Thermostat	1	1	2	3	3	4	5	6	6	7	8	9	10	10	11
	DLC Water Heaters	0	0	1	1	1	1	1	2	2	2	2	3	3	3	3
	DLC Agricultural Irrigation	0	3	6	7	8	8	8	8	8	8	8	8	8	8	8
	Interruptible Rate	196	229	267	291	301	304	307	308	309	311	312	315	318	320	321
	CPP with Enabling Technology	0	22	45	58	63	64	65	65	65	65	66	66	66	66	66
	CPP without Enabling Technology	0	12	17	17	17	17	17	17	17	17	17	17	17	17	17
	Demand Buyback	0	1	1	2	2	2	2	2	2	2	2	2	2	2	2
	Golf Cart Charging Rate	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
	Capacity Bidding	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
	Generators	0	4	9	12	14	14	14	14	14	15	15	15	15	15	15
Total		221	424	615	723	760	773	783	791	799	808	816	826	836	844	855

Demand Response - Winter Annual MAP Savings - by Program (MW)

Sector	Program	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Residential	DLC Central AC Switch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DLC Thermostat	7	11	15	19	23	27	31	36	40	44	49	53	58	62	67
	DLC Water Heaters	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0
	Critical Peak Pricing with Enabling Technology	0	76	156	205	220	222	221	218	216	214	211	208	206	203	200
	Critical Peak Pricing without Enabling Technology	0	44	69	72	71	71	71	72	72	72	73	73	73	74	74
	Generators	0	15	30	36	36	33	29	26	22	18	14	10	6	2	0
Non-Residential	DLC Thermostat	1	1	2	2	3	4	4	5	5	6	7	7	8	9	9
	DLC Water Heaters	0	1	1	2	2	2	3	3	4	4	5	5	6	6	7
	DLC Agricultural Irrigation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Interruptible Rate	247	294	347	381	394	399	402	405	406	408	411	414	419	421	423
	CPP with Enabling Technology	0	29	59	76	82	84	85	85	85	86	86	86	86	87	87
	CPP without Enabling Technology	0	15	22	23	22	22	22	22	22	22	22	23	23	23	23
	Demand Buyback	0	1	2	3	3	3	3	3	3	3	3	3	3	3	3
	Golf Cart Charging Rate	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
	Capacity Bidding	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
	Generators	0	4	9	12	14	14	14	14	14	15	15	15	15	15	15
Total		260	498	716	835	873	884	888	891	893	895	897	901	905	907	911

Demand Response - Summer Annual RAP Savings - by Program (MW)

Sector	Program	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Residential	DLC Central AC Switch	12	10	8	5	3	1	0	0	0	0	0	0	0	0	0
	DLC Thermostat	9	12	15	18	21	24	27	30	33	36	40	43	47	50	53
	DLC Water Heaters	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0
	Critical Peak Pricing with Enabling Technology	0	18	37	50	54	55	56	56	56	56	56	56	56	57	57
	Critical Peak Pricing without Enabling Technology	0	8	15	20	21	21	22	22	22	22	22	22	22	22	22
	Generators	0	8	17	22	23	23	23	23	22	22	22	21	21	20	20
Non-Residential	DLC Thermostat	1	1	2	2	3	3	4	5	5	6	6	7	8	8	9
	DLC Water Heaters	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2
	Interruptible Rate	196	213	231	244	248	250	251	252	253	253	254	255	257	258	259
	CPP with Enabling Technology	0	7	14	19	20	21	21	21	21	21	21	21	22	22	22
	CPP without Enabling Technology	0	4	7	10	11	11	11	11	11	11	11	11	11	11	11
	Generators	0	2	5	6	7	7	7	7	7	7	7	7	7	8	8
Total		221	284	353	396	412	417	422	427	432	437	442	447	453	458	463

Demand Response - Winter Annual RAP Savings - by Program (MW)

Sector	Program	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Residential	DLC Central AC Switch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DLC Thermostat	7	8	9	10	11	12	13	15	16	17	18	19	20	21	22
	DLC Water Heaters	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0
	Critical Peak Pricing with Enabling Technology	0	19	39	52	57	58	58	58	59	59	59	59	59	59	59
	Critical Peak Pricing without Enabling Technology	0	11	22	28	30	31	31	31	31	31	32	32	32	32	32
	Generators	0	8	17	22	23	23	23	23	22	22	22	21	21	20	20
Non-Residential	DLC Thermostat	0	1	1	2	2	3	3	4	4	5	5	6	7	7	8
	DLC Water Heaters	0	1	1	1	1	2	2	2	3	3	3	4	4	5	5
	Interruptible Rate	247	270	297	314	321	323	325	326	327	328	329	331	333	334	335
	CPP with Enabling Technology	0	9	18	24	27	27	27	28	28	28	28	28	28	28	29
	CPP without Enabling Technology	0	5	10	13	14	14	14	14	14	15	15	15	15	15	15
	Generators	0	2	5	6	7	7	7	7	7	7	7	7	7	8	8
Total		260	338	421	474	494	501	505	508	511	514	517	521	526	529	532

APPENDIX D: PROGRAM SCENARIOS

Scenario 1

Incremental Annual Savings

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Energy Efficiency (MWh)	13,261	13,612	13,974	14,344	14,715	15,109	15,519	15,926	14,912	15,281	15,606	15,536	15,937	16,320	16,674
Demand Response - Summer (MW)	28.5	29.8	30.9	31.7	32.5	33.0	33.5	33.9	34.2	34.5	34.7	34.9	35.0	35.2	35.2
Demand Response - Winter (MW)	10.1	10.6	11.1	11.4	11.7	11.9	12.1	12.3	12.4	12.5	12.6	12.7	12.7	12.8	12.8

Annual Budget - by Program

Program	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Residential Weatherization	$1,522,950	$1,578,679	$1,636,708	$1,697,144	$1,760,099	$1,825,691	$1,894,043	$1,965,287	$2,039,559	$2,117,004	$2,197,772	$2,282,023	$2,369,926	$2,461,655	$2,557,398
CARES Efficiency Program	$444,000	$458,402	$473,314	$488,758	$504,754	$521,324	$538,492	$556,282	$574,720	$593,832	$613,645	$634,189	$655,494	$677,593	$700,518
Residential HVAC Equipment	$2,494,798	$2,597,822	$2,705,629	$2,818,464	$2,936,583	$3,060,257	$3,189,770	$3,325,423	$3,467,534	$3,616,436	$3,772,482	$3,936,043	$4,107,513	$4,287,303	$4,475,851
Residential Home New Construction	$716,300	$746,450	$778,023	$811,093	$845,736	$882,033	$920,071	$959,941	$1,001,737	$1,045,561	$1,091,519	$1,139,722	$1,190,289	$1,243,346	$1,299,022
Commercial & Industrial	$614,850	$632,681	$651,028	$669,908	$689,336	$709,326	$729,897	$751,064	$772,845	$795,257	$818,320	$842,051	$866,470	$891,598	$917,454
Residential Electric Vehicle Off-peak Charging Program	$22,115	$22,747	$23,398	$24,067	$24,756	$25,464	$26,192	$26,941	$27,711	$28,504	$29,319	$30,158	$31,020	$31,907	$32,820
Direct Load Control	$1,581,080	$1,597,699	$1,614,793	$1,632,376	$1,650,462	$1,669,065	$1,688,201	$1,707,883	$1,728,129	$1,748,953	$1,770,373	$1,792,406	$1,815,069	$1,838,380	$1,862,357
Residential DR Other	$12,500	$12,858	$13,225	$13,603	$13,993	$14,393	$14,804	$15,228	$15,663	$16,111	$16,572	$17,046	$17,533	$18,035	$18,551
Total	**$7,408,593**	**$7,647,337**	**$7,896,119**	**$8,155,413**	**$8,425,717**	**$8,707,552**	**$9,001,471**	**$9,308,050**	**$9,627,899**	**$9,961,658**	**$10,310,002**	**$10,673,638**	**$11,053,314**	**$11,449,817**	**$11,863,971**

Annual Budget - by Category

Category	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Incentives	$4,042,591	$4,159,838	$4,280,377	$4,404,120	$4,532,524	$4,662,733	$4,795,754	$4,933,803	$5,247,416	$5,400,266	$5,563,653	$5,780,080	$5,945,950	$6,120,111	$6,304,215
Admin	$1,594,142	$1,625,380	$1,658,361	$1,693,217	$1,729,823	$1,768,783	$1,810,062	$1,853,433	$1,870,621	$1,917,835	$1,966,693	$2,010,284	$2,066,055	$2,124,394	$2,185,227
Net Lost Revenues	$1,771,860	$1,862,120	$1,957,382	$2,058,076	$2,163,369	$2,276,037	$2,395,654	$2,520,813	$2,509,862	$2,643,555	$2,779,655	$2,883,274	$3,041,309	$3,205,313	$3,374,529
Total	**$7,408,593**	**$7,647,337**	**$7,896,120**	**$8,155,413**	**$8,425,716**	**$8,707,553**	**$9,001,470**	**$9,308,050**	**$9,627,899**	**$9,961,657**	**$10,310,002**	**$10,673,638**	**$11,053,314**	**$11,449,818**	**$11,863,971**

Scenario 2

Incremental Annual Savings

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Energy Efficiency (MWh)	9,668	9,925	10,188	10,459	10,729	11,016	11,315	11,612	10,884	11,154	11,391	11,344	11,637	11,917	12,176
Demand Response - Summer (MW)	8.0	8.4	8.7	8.9	9.1	9.3	9.4	9.6	9.6	9.7	9.8	9.8	9.9	9.9	9.9
Demand Response - Winter (MW)	3.0	3.0	3.1	3.2	3.3	3.4	3.4	3.5	3.5	3.5	3.5	3.6	3.6	3.6	3.6

Annual Budget - by Program

Program	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Residential Weatherization	$1,115,429	$1,156,245	$1,198,746	$1,243,010	$1,289,119	$1,337,160	$1,387,222	$1,439,402	$1,493,800	$1,550,521	$1,609,677	$1,671,384	$1,735,765	$1,802,948	$1,873,072
CARES Efficiency Program	$325,191	$335,739	$346,662	$357,973	$369,688	$381,825	$394,399	$407,429	$420,932	$434,930	$449,442	$464,488	$480,093	$496,278	$513,069
Residential HVAC Equipment	$1,827,223	$1,902,678	$1,981,638	$2,064,280	$2,150,792	$2,241,372	$2,336,229	$2,435,584	$2,539,667	$2,648,725	$2,763,015	$2,882,810	$3,008,396	$3,140,077	$3,278,172
Residential Home New Construction	$524,627	$546,710	$569,834	$594,055	$619,428	$646,013	$673,872	$703,073	$733,686	$765,783	$799,442	$834,747	$871,783	$910,643	$951,421
Commercial & Industrial	$450,324	$463,383	$476,822	$490,649	$504,878	$519,520	$534,586	$550,089	$566,041	$582,456	$599,348	$616,729	$634,614	$653,018	$671,955
Residential Electric Vehicle Off-peak Charging Program	$16,197	$16,661	$17,137	$17,627	$18,131	$18,650	$19,183	$19,732	$20,296	$20,877	$21,474	$22,088	$22,720	$23,369	$24,038
Direct Load Control	$1,163,680	$1,168,313	$1,173,137	$1,178,089	$1,183,182	$1,188,421	$1,193,810	$1,199,353	$1,205,054	$1,210,919	$1,216,951	$1,223,156	$1,229,538	$1,236,103	$1,242,856
Residential DR Other	$3,500	$3,600	$3,703	$3,809	$3,918	$4,030	$4,145	$4,264	$4,386	$4,511	$4,640	$4,773	$4,909	$5,050	$5,194
Total	**$5,426,171**	**$5,593,330**	**$5,767,680**	**$5,949,492**	**$6,139,137**	**$6,336,990**	**$6,543,447**	**$6,758,925**	**$6,983,863**	**$7,218,722**	**$7,463,989**	**$7,720,175**	**$7,987,818**	**$8,267,486**	**$8,559,775**

Annual Budget - by Category

Category	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Incentives	$2,691,855	$2,769,968	$2,850,330	$2,932,805	$3,018,448	$3,105,192	$3,193,761	$3,285,744	$3,504,105	$3,606,323	$3,715,910	$3,863,507	$3,974,407	$4,091,035	$4,214,579
Admin	$1,440,970	$1,464,021	$1,488,353	$1,514,063	$1,541,061	$1,569,787	$1,600,214	$1,632,182	$1,645,302	$1,680,110	$1,716,139	$1,748,409	$1,789,503	$1,832,491	$1,877,323
Net Lost Revenues	$1,293,347	$1,359,342	$1,428,996	$1,502,625	$1,579,628	$1,662,011	$1,749,472	$1,840,999	$1,834,455	$1,932,289	$2,031,940	$2,108,259	$2,223,909	$2,343,960	$2,467,874
Total	**$5,426,172**	**$5,593,331**	**$5,767,679**	**$5,949,493**	**$6,139,137**	**$6,336,990**	**$6,543,447**	**$6,758,924**	**$6,983,863**	**$7,218,722**	**$7,463,988**	**$7,720,175**	**$7,987,818**	**$8,267,486**	**$8,559,775**

Scenario 3

Incremental Annual Savings

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Energy Efficiency (MWh)	20,446	20,987	21,544	22,116	22,688	23,295	23,927	24,555	22,969	23,537	24,037	23,921	24,538	25,127	25,670
Demand Response - Summer (MW)	68.7	74.1	79.1	82.8	85.2	86.8	88.0	89.1	89.9	90.6	91.2	91.7	92.1	92.5	92.8
Demand Response - Winter (MW)	23.9	27.4	30.8	33.3	34.6	35.3	35.9	36.4	36.7	37.1	37.3	37.5	37.8	37.9	38.1

Annual Budget - by Program

Program	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Residential Weatherization	$2,337,993	$2,423,547	$2,512,631	$2,605,411	$2,702,058	$2,802,753	$2,907,686	$3,017,058	$3,131,078	$3,249,969	$3,373,962	$3,503,302	$3,638,248	$3,779,069	$3,926,050
CARES Efficiency Program	$681,617	$703,726	$726,620	$750,328	$774,885	$800,323	$826,679	$853,990	$882,295	$911,635	$942,052	$973,590	$1,006,298	$1,040,223	$1,075,417
Residential HVAC Equipment	$3,829,949	$3,988,108	$4,153,611	$4,326,832	$4,508,165	$4,698,026	$4,896,851	$5,105,103	$5,323,267	$5,551,858	$5,791,416	$6,042,511	$6,305,746	$6,581,755	$6,871,209
Residential Home New Construction	$1,099,645	$1,145,931	$1,194,401	$1,245,168	$1,298,351	$1,354,074	$1,412,470	$1,473,676	$1,537,841	$1,605,118	$1,675,671	$1,749,671	$1,827,301	$1,908,752	$1,994,225
Commercial & Industrial	$943,902	$971,275	$999,442	$1,028,426	$1,058,250	$1,088,940	$1,120,519	$1,153,014	$1,186,451	$1,220,858	$1,256,263	$1,292,695	$1,330,183	$1,368,758	$1,408,452
Residential Electric Vehicle Off-peak Charging Program	$33,950	$34,921	$35,920	$36,947	$38,004	$39,091	$40,209	$41,359	$42,542	$43,759	$45,010	$46,297	$47,621	$48,983	$50,384
Direct Load Control	$2,415,990	$2,447,941	$2,490,894	$2,535,382	$2,581,423	$2,629,065	$2,678,314	$2,729,254	$2,781,851	$2,836,195	$2,892,333	$2,950,262	$3,010,086	$3,071,859	$3,135,583
Residential DR Other	$30,500	$31,372	$32,270	$33,192	$34,142	$35,118	$36,123	$37,156	$38,218	$39,311	$40,436	$41,592	$42,782	$44,005	$45,264
Total	**$11,373,546**	**$11,746,821**	**$12,145,789**	**$12,561,688**	**$12,995,278**	**$13,447,390**	**$13,918,851**	**$14,410,609**	**$14,923,544**	**$15,458,702**	**$16,017,142**	**$16,599,922**	**$17,208,264**	**$17,843,404**	**$18,506,584**

Annual Budget - by Category

Category	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Incentives	$6,744,172	$6,931,047	$7,133,258	$7,341,182	$7,557,080	$7,776,526	$8,001,075	$8,234,232	$8,741,611	$8,999,327	$9,274,256	$9,632,584	$9,912,993	$10,207,185	$10,517,709
Admin	$1,900,487	$1,948,099	$1,998,380	$2,051,525	$2,107,346	$2,166,776	$2,229,758	$2,295,936	$2,321,257	$2,393,287	$2,467,802	$2,534,033	$2,619,160	$2,708,200	$2,801,035
Net Lost Revenues	$2,728,887	$2,867,675	$3,014,152	$3,168,980	$3,330,853	$3,504,087	$3,688,018	$3,880,442	$3,860,676	$4,066,089	$4,275,084	$4,433,305	$4,676,111	$4,928,019	$5,187,840
Total	**$11,373,546**	**$11,746,821**	**$12,145,790**	**$12,561,687**	**$12,995,278**	**$13,447,390**	**$13,918,851**	**$14,410,609**	**$14,923,544**	**$15,458,702**	**$16,017,143**	**$16,599,922**	**$17,208,264**	**$17,843,405**	**$18,506,584**

GDS Associates, Inc.
ENGINEERS & CONSULTANTS

EAST KENTUCKY
POWER COOPERATIVE
A Touchstone Energy® Cooperative

2024 POTENTIAL STUDY

FINAL REPORT

September
2024

prepared by
GDS ASSOCIATES INC

ATTACHMENT SD-8

2024 CPCN/Tariff filing

System year 1 is 2025

Backup Generator Control Program

The Backup Generator Control Program is designed to incentivize the use of end-use member-owned backup generators to support EKPC's demand response initiatives. The program helps EKPC optimize its system performance, particularly during high peak hours.

Assumption	***Source***
Load Impacts	
Generator annual load relief *416 kWh, 10 kW (coincident with winter system peak), 6 kW (summer)*	Based on GDS Tec Pot. Comports with typical diversified peak demands for residential.. kWh are calculated based on # of interruption hours in winter (32) and summer(16)
Lifetime of savings 10 Years.	Estimate . This means that a participant would remain in the program for 10 years.
Discount rate for TRC and RIM	**5** percent per EKPC financial data ; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.53 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. OATT. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 104 per year.. 2% esc.	participant has existing generator. Fuel costs.
Tax credit (benefit): $0	none for this program
Administrative Cost EK **$ 5,000** fixed first year , 2026 only; **$2,000 (**2026 value) fixed annual (2026-2038). 2% esc. Per device fee is **$24** annual (2026-2039) 2% esc	Fixed first year : set up, data protocol for communicating with generators Fixed annual is ongoing program mgt; Per device annual fee for 3rd party event data mgt
Co-op **$ 150** per participant per year, 2% esc.	end-use member service, testing, verification
Rate Schedule - Retail	
Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale	
East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2026-2039: 50 per year..** **0%** Free Riders	Budget estimate
Rebates	
Co-op to Participant **$ 450 per year,**, 2% esc	**proposed tariff**
EK to Co-op **$600 per year,** 2% esc	**proposed tariff**

2024 CPCN/Tariff filing
System year 1 is 2025

Case: Weatherization

Button-Up Weatherization

The Button-Up Weatherization Program offers Residential end-use members an incentive for reducing the heat loss of a home **using a variety of building shell measures, including insulation, air sealing, and ENERGY STAR windows.** Duct sealing is a separate case.

Assumption	***Source***
Load Impacts Before Participant *10,500 kWh, 8.12 kW (coinc. with winter system peak), 2.47 kW (summer)*	Mix of Furnace/Central AC and air source heat pump weighted according to saturation in existing single family homes. 70% heat pump, 30% furnace/CAC.
Savings: ***3,000*** *kWh* ***2.20*** *kW (winter),* ***0.95*** *kW (summer)*	GDS kWh savings for a package of measures, weighted by electric heat technology. kW impacts based on planning load profile.
After Participant *7,500 kWh, 5.92 kW (coinc. with winter system peak), 1.52 kW (summer)*	Before participant net of savings
Lifetime of savings	**20** Years
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 3,125.. 2% esc.	GDS costs for measure bundle
Tax credit (benefit): $400	30% of measure cost less labor costs and utility subsidy , subject to a limit of $1,200 per year
Administrative Cost EK **$5,756** (2025 value) fixed annual (2025-2039). 2% esc	Program admin - 2022 value of $5,300 adjusted to 2025..
Co-op **$360** per new participant	Based on new program design. Average of air sealing and non-air sealing cost
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 28. 2026-2039: 560 per year. 10%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant **$ 1,000**, 2% esc	**Based on new program design**
EK to Co-op **$1,480,** 2% esc	**Reimburse for rebate, 50% of admin costs, plus compensation for a share of net lost revenues.**

2024 CPCN

System year 1 is 2025

Direct Load Control of Residential Air Conditioners and Heat Pumps: Bring Your Own Thermostat

Case: Bring Your Own Thermostat ("BYOT")

Reduce peak demand and energy usage through smart thermostat control of residential air conditioners

Assumption	***Source***
Load Impacts Before Participant Air Conditioner savings *6.5 kWh, 0.00 kW (coincident with winter system peak), 1.05 kW (summer)*	Based on average of M&V reports for Hoosier Energy (2021) and CenterPoint (2023); kWh savings based on 15 4-hour events
Lifetime of savings 20 years.	Life of program. Program models all devices in the field. The participation represents the load that is avaiable to the program each year,.
Discount rate for TRC and RIM	5 percent per EKPC financial data ; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - $174.60 per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, $45.96 /MWh in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. $45.96 /MWh in 2025. DSMore **Scenario 9, 0.53 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 44.34 per kW-year in 2025	Point-to-point rate, 2023-24. OATT. 2.8 % escalation rate based on 10 yr PPI.. Applied to summer coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to summer coincident peak.
Participant Costs $ 110 per new participant ($110,000 in 2025). . 2% esc. **Tax credit (benefit): $0**	cost to install new smart thermostat. One time cost for new participants none for this program
Administrative Cost EK $25,000 (2025 value) fixed annual (2025-2044). 2% esc. . Per device fee of $24 annually 2% esc Co-op $0 per new participant	Fix admin cost for EK staff program admin (estimate) No administrative costs incurred by member cooperatives
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg $16.09, Energy Rate $.088229 **Rate Schedule - Wholesale** East Kentucky E-2 rate.	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC** Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation -2025: 8,000 (existing plus new). 2026-2039: 1,000 new per year.. 0% Free Riders	Budget estimate plus 2024 actual
Rebates Co-op to Participant **$ 110 one-time for new participants,; $20 per year for all participants**, 2% esc EK to Co-op **All rebate payments,** 2% esc	**Based on tariff. One time rebate is for installing the thermostat ($100) and enrolling in the DR program ($10). Annual credit is $20 per year..** **Based on tariff.**

2024 CPCN/Tariff filing

System year 1 is 2025

C&I Thermostat program

The Commercial & Industrial (C&I) Thermostat Program is an energy efficiency initiative designed to encourage non-residential end-use members to reduce energy usage by upgrading to self-learning thermostats. The C&I Thermostat Program offers an incentive for purchasing and installing a smart thermostat that controls the setback temperature settings for cooling.

Assumption	***Source***
Load Impacts Before Participant *5,950 kWh, 0.065 kW (coinc. with winter system peak), 2.777 kW (summer)*	GDS Baseline - Cooling for "Other" building type
Savings: ***842*** *kWh* ***0.000*** *kW (winter),* ***0.322*** *kW (summer)*	GDS kWh savings for smart thermostat , "Other" building type. kW impacts based on planning load profile
After Participant *5,108 kWh, 0.065 kW (coinc. with winter system peak), 2.455 kW (summer)*	Before participant net of savings
Lifetime of savings	11 Years
Discount rate for TRC and RIM	5 percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - $174.60 per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, $45.96 /MWh in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. $45.96 /MWh in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 44.34 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to summer coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to summer coincident peak.
Participant Costs $ 175.. 2% esc.	GDS costs for measure bundle
Tax credit (benefit): $0	no tax credit for this program
Administrative Cost EK $ 0 (2025). $ 900 fixed annual (2026-2039). 2% esc	Fixed admin - 2018 budget prorated, $688 times 1.20 ECI increase 2018 to 2023. escalated 2% a year to 2026 value
Co-op $20 per new participant, 2% esc	**Variable admin - rebate processing .**
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg $16.09, Energy Rate $.088229	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - 2025: 0. 2026-2039: 25 per year. 0% Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant $ 100, 2% esc	**Based on tariff**
EK to Co-op $194, 2% esc	**Based on tariff**

2024 CPCN/Tariff filing
System year 1 is 2025

Community Assistance Resources for Energy Savings (CARES)

The CARES program provides an incentive to enhance the weatherization and energy efficiency services provided to qualifying Residential end-use members by the Kentucky Community Action Agencies (""CAA") network and Affordable Housing Organizations ("AHOs"). EKPC and its owner members provide an incentive to the agency impementing the project, The incentive assists the CAA in weatherizing more homes and provide additional energy efficiency improvements in each home.

Assumption	Source
Load Impacts	
Before Participant *10,500 kWh, 8.12 kW (coinc. with winter system peak), 2.47 kW (summer). 750 therms*	Mix of Furnace/Central AC and air source heat pump weighted according to saturation in existing single family homes. 70% heat pump, 30% furnace/CAC.
Savings: 5,735 kWh 4.21 kW (winter), 1.81 kW (summer) 59 therms	GDS kWh savings for building shell,duct sealing, heat pump retrofit (eligible homes), and water heater wrap, weighted by heating type. kW impacts based on planning load profile
After Participant *4,765 kWh, 3.91 kW (coincident with winter system peak), 0.66 kW (summer), 691 therms*	Before participant net of savings
Lifetime of savings	17 Years
Discount rate for TRC and RIM	5 percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - $174.60 per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, $45.96 /MWh in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. $45.96 /MWh in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Avoided Gas Commodity Costs - **$3.94** per Mcf in 2025	DSMore scenario **1, 1.34 esc in 2025.** Based on Aces Henry Hub 1/11/2024 forecast .
Participant Costs $ 3,803	GDS costs for measure bundles
Tax credit (benefit): $0	Not applicable
Administrative Cost	
EK $5,756 (2025 value) fixed annual (2025-2039). 2% esc	Program admin - 2022 value of $5,300 adjusted to 2025..
Co-op $200 per new participant	Based on new program design
Rate Schedule - Retail	
Median Residential Rate for Co-ops Cust chrg $16.09, Energy Rate $.088229	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale	
East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Natural gas delivery rate is **$ 5.2528** per Mcf in 2018 (**$0.52528** per ccf for DSMore units)	Current rates as of November 2023. From Columbia Gas of KY GSR rate. Sum of base rate charge and gas cost demand. DSMore adds in the commodity portion using the market forecast.
Participation - **2025: 120. 2026-2039: 120 per year. 0%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates	
Co-op to Participant **$ 2,236**, 2% esc	**Based on proposed tariff. Weighted by heating type**
EK to Co-op **$2,710,** 2% esc	**Based on proposed tariff. Weighted by heating type**

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System year 1 is 2025

For analysis purposes, the unit of participation is 1 kW connected load savings. Rebates are per kW .

Commercial Advanced Lighting program

This program promotes energy efficiency by offering incentives to non-residential end-use members to install high-efficiency LED lighting in their facilities.

Assumption	***Source***
Load Impacts Before Participant *48,000 kWh, 5.1 kW (coincident with winter system peak), 9.6 kW (summer)*	Lighting load for typical 8,000 square foot commercial building. EUI of 6 kWh per square foot (sources: EPRI Market Profiles, Duke Power end use metering study).
Savings: ***4,250*** *kWh* ***0.45*** *kW (winter),* ***0.64*** *kW (summer)*	Savings in connected load of 1 kW : coincidence/diversity factor of 0.85 in Summer,. kWh savings based on DSManager factor for kWh savings per kW. kW impacts based on planning load profile
After Participant *43,750 kWh, 4.65 kW (coinc. with winter system peak), 8.96 kW (summer)*	Before participant net of savings
Lifetime of savings	**15** Years, based on GDS measures in 2024 potential study
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 44.34 per kW-year in 2025	Point-to-point rate (12 CP), 2023-24. OATT. 2.8 % escalation rate based on 10 yr PPI.. Applied to summer coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Based on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to summer coincident peak.
Participant Costs $ 2,210 per unit.. 2% esc.	Based on median measure cost per kWh in GDS 2024 potential study (office lighting)
Tax credit (benefit): $0	No tax credit available for this program
Administrative Cost EK **$0 (**2025**) ,$20,000** (2026), **$10,400** fixed annual (2027-2039). 2% esc	Note: no program in Year 1. Year 2 only: program setup, marketing, verification, , rebate processing, general admin, Years 3 forward: marketing, verification, rebate processing, general admin,
Co-op **$32** per new unit (1 kW), 2 % esc.	Site visit. Assumes typical savings per facility is 4 kW. Labor costs are $128. (2 hours). .
Rate Schedule - Retail South Kentucky **B** rate Cust chrg **$40.00**, Energy Rate **$.08742**	Current rates in effect as of January 2024..**plus Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **plus Environmental Surcharge and FAC**
Participation - **2025: 0. 2026-2039: 1,000 units per year. 10%** Free Riders	Per program design. Participation unit is 1 kW connected load reduction. Program starts 2026.
Rebates Co-op to Participant **$ 250 per unit**, 2%	**Per program design**
EK to Co-op **$ 610 per unit,** 2% esc	**Per program design**

2024 CPCN

System year 1 is 2025

Direct Load Control of Air Condiitioners using Switch technology

Reduce peak demand and energy usage through the installation of load control devices on air conditioners and heat pumps .

Assumption	*Source*
Load Impacts Before Participant Air Conditioner savings ***6*** *kWh,* ***0.00 kW*** ***(*** *coincident with winter system peak),* ***0.95*** *kW (summer)*	Based on M&V data for the program.Temperature of 98 degrees.
Lifetime of savings 1 year.	Life of program. Program models all devices in the field. The participation represents the load that is available to the program each year,. Switch counts decline in some years.
Discount rate for TRC and RIM	**5** percent per EKPC financial data ; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.53 esc in 2025**
Transmission Capacity Cost - OATT tariff **$ 44.34 per kW-year in 2025**	Point-to-point rate, 2023-24. OATT. 2.8 % escalation rate based on 10 yr PPI.. Applied to summer coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to summer coincident peak.
Participant Costs $ 0	all program costs are borne by EKPC
Tax credit (benefit): $0	none for this program
Administrative Cost EK **$560,000** (2025 value) fixed annual (**2025-2044**). 2% esc. .	Fix admin cost is AC switch share of UPA costs
Co-op **$0** per new participant	No administrative costs incurred by member cooperatives
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation -**2025-2033: 12,777 active devices). 2034-2039: 7,957 active switches.. 0%** Free Riders	Based on access by communicating technology
Rebates Co-op to Participant **$ 20 per year for each active switch;** 2% esc	**Based on tariff.**
EK to Co-op **All rebate payments,** 2% esc	**Based on tariff.**

2024 CPCN

System year 1 is 2025

Direct Load Control of Water Heaters using Switch technology

Reduce peak demand and energy usage through the installation of load control devices on electric water heaters .

Assumption	*Source*
Load Impacts Before Participant Water Heater control savings *18.5 kWh, 0.45 kW (coincident with winter system peak), 0.30 kW (summer)*	Based on M&V data for the program.
Lifetime of savings 1 year.	Life of program. Program models all devices in the field. The participation represents the load that is available to the program each year,. Switch counts decline in some years.
Discount rate for TRC and RIM	5 percent per EKPC financial data ; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - $174.60 per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, $45.96 /MWh in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. $45.96 /MWh in 2025. DSMore Scenario 9, 0.53 esc in 2025
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 0 **Tax credit (benefit): $0**	all program costs are borne by EKPC none for this program
Administrative Cost EK $440,000 (2025 value) fixed annual (2025-2044). 2% esc. . Co-op $0 per new participant	Fix admin cost is AC switch share of UPA costs No administrative costs incurred by member cooperatives
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg $16.09, Energy Rate $.088229	 Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	 Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation -2025-2033: 10,042 active devices). 2034-2039: 5,641 active switches.. 0% Free Riders	Based on access by communicating technology
Rebates Co-op to Participant **$ 10 per year for each active switch;** 2% esc EK to Co-op **All rebate payments,** 2% esc	 **Based on tariff.** **Based on tariff.**

2024 CPCN/Tariff filing

System year 1 is 2025

Case: Duct Sealing

Button-Up Duct sealing

Sealing ductwork. Duct Sealing Program ("Duct Seal") is designed to incentivize Residential end-use members to seal up the ducts that deliver heat or cooling from the heating or cooling equipment to individual rooms in the home. Reductions in duct losses are measured using a blower test.

Assumption	***Source***
Load Impacts Before Participant *10,500 kWh, 8.12 kW (coinc. with winter system peak), 2.47 kW (summer)*	Mix of Furnace/Central AC and air source heat pump weighted according to saturation in existing single family homes. 70% heat pump, 30% furnace/CAC.
*Savings: **880** kWh **0.78** kW (winter), **0.30** kW (summer)*	GDS kWh savings for duct sealing, weighted by electric heat technology. kW impacts based on planning load profile.
After Participant *9,620 kWh, 7.34 kW (coinc. with winter system peak), 2.23 kW (summer)*	Before participant net of savings
Lifetime of savings	**20** Years (Illinois 2023 TRM)
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 738.. 2% esc.	GDS costs for measure
Tax credit (benefit): $0	No tax credit available
Administrative Cost EK **$6,600** (2025 value) fixed annual (2025-2039). 2% esc	Program admin - 2022 value of $6,000 escalated to 2025.
Co-op **$200** per new participant	Based on new program design
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 0. 2026-2039: 37 per year. 10%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant **$ 500**, 2% esc	**Based on proposed tariff**
EK to Co-op **$750,** 2% esc	**Based on proposed tariff**

2024 CPCN

System year 1 is 2025

Electric Vehicle Off-Peak charging

Electric Vehicle ("EV") Off-Peak Charging Program is available to Residential end-use members in the service territories of EKPC owner-members and includes energy reporting from electric vehicles or compatible electric vehicle supply equipment. The program is designed to reduce growth in peak demand resulting from the adoption of EVs. EKPC provides a monthly incentive for registered EVs' charging energy (kWh) that occurs during the off-peak hours.

Assumption	***Source***
Load Impacts Before Participant *7,500 kWh, 1.83 kW (diversified, coincident with summer peak), 0.32 kW (winter).*	Typical electric vehicle charging profile, diversified. Level 2 charging, 7,500 kWh per year. Peaks are diversified, coincident with system peak.. PJM summer, EKPC (hour 18 summer, hour 8 winter). Based on Duke Energy metered profile. Savings: 1.65 kW coincident Summer peak; 0.29 kW coincident Winter peak
After Participant *7,500 kWh, 0.18 kW (diversified, coincident with summer peak), 0.03 kW (winter). 4,336 kWh shifted*	Same vehicle with 90% demand response. 90% of baseline on-peak EV kWh shifted to off-peak hours of 10 PM - 6 AM.
Lifetime of savings 10 Years.	Assumes that the vehicle participates for the program for 10 years
Discount rate for TRC and RIM	5 percent per EKPC financial data ; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - $174.60 per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, $45.96 /MWh in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. $45.96 /MWh in 2025. DSMore Scenario 9, 0.53 esc in 2025
Transmission Capacity Cost - OATT tariff $ 44.34 per kW-year in 2025	Point-to-point rate, 2023-24. OATT. 2.8 % escalation rate based on 10 yr PPI.. Applied to summer coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to summer coincident peak.
Participant Costs $ 0.. 2% esc. **Tax credit (benefit): $0**	EKPC pays all costs for this program none for this program
Administrative Cost EK **$ $108** per participant per year, 2% esc	Cost for API only. Based on 2022 quote
Co-op **$0**	EKPC pays all administrative costs for this program
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation -2025: 0 2026-2039: 500 per year.. 40% Free Riders	Based on 2024 budget projections. Free riders to account for the share of participants who would be charging off -peak anyway.
Rebates Co-op to Participant **$ $140 per year, for all cumulative participants**, 2% esc	**2 cents per kWh (all off-peak charging - assumed to be 7,000 kWh).**
EK to Co-op **$70 per year, all cumulative participants,** 2% esc	**EKPC pays 50% of the rebate to the end-use member.**

2024 CPCN/Tariff filing
System year 1 is 2025

High Efficiency Heat Pump Program: Cold Climate Heat Pump/Geothermal

Case:Cold Climate Heat Pump/Geothermal

The High Efficiency Heat Pump Program offers an incentive to Residential end-use members for purchasing an energy efficient heat pump rather than a standard efficiency heat pump. This program has two Tiers for Air Source Heat Pumps: ENERGY STAR® and cold-climate heat pump/geothermal, There is a separate incentive for purchasing a Heat Pump Water Heater rather than a standard electric water heater.

Assumption	***Source***
Load Impacts	
Before Participant	
6,865 kWh, 8.12 kW (coinc. with winter system peak), 1.84 kW (summer)	Federal Standard efficiency new heat pump: SEER 15, HSPF 8.8 (equivalent to 14.3 SEER2, 7.5 HSPF2)
Savings: ***1,583*** *kWh* ***2.381*** *kW (winter),* ***0.442*** *kW (summer)*	GDS kWh savings Cold Climate ASHP 18,1 SEER2, HP baseline. kW impacts based on planning load profile
After Participant	
5,282 kWh, 5.74 kW (coinc. with winter system peak), 1.40 kW (summer)	Before participant net of savings
Lifetime of savings	**16** Years
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 2,546.. 2% esc.	GDS costs for measure bundle
Tax credit (benefit): $2,000	30% of heat pump cost less utility subsidy , subject to a limit of $2,000 per year
Administrative Cost	
EK **$8,600** (2025 value) fixed annual (2025-2039). 2% esc	Program admin - 2018 value of $6,885 adjusted to 2025..
Co-op **$180** per new participant	Based on proposed tariff
Rate Schedule - Retail	
Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale	
East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 0. 2026-2039: 416 per year.** **0%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates	
Co-op to Participant **$ 1,000**, 2% esc	**Proposed for new program design.**
EK to Co-op **$1,248,** 2% esc	**Based on proposed tariff. Reimburse for rebate, 50% of admin costs, plus compensation for lost margins.**

2024 CPCN/Tariff filing

System year 1 is 2025

High Efficiency Heat Pump Program: ENERGY STAR®

Case: ENERGY STAR®

The High Efficiency Heat Pump Program offers an incentive to Residential end-use members for purchasing an energy efficient heat pump rather than a standard efficiency heat pump. This program has two Tiers for Air Source Heat Pumps: ENERGY STAR® and cold-climate heat pump/geothermal, There is a separate incentive for purchasing a Heat Pump Water Heater rather than a standard electric water heater.

Assumption	***Source***
Load Impacts	
Before Participant *6,865 kWh, 8.12 kW (coinc. with winter system peak), 1.84 kW (summer)*	Federal Standard efficiency new heat pump: SEER 15, HSPF 8.8 (equivalent to 14.3 SEER2, 7.5 HSPF2)
Savings: ***890*** *kWh* ***0.16*** *kW (winter),* ***0.203*** *kW (summer)*	GDS kWh savings Energy Star ASHP 16.2 SEER2, HP baseline. kW impacts based on planning load profile
After Participant *5,975 kWh, 7.96 kW (coinc. with winter system peak), 1.64 kW (summer)*	Before participant net of savings
Lifetime of savings	16 Years
Discount rate for TRC and RIM	5 percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - $174.60 per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, $45.96 /MWh in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. $45.96 /MWh in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 1,232.. 2% esc.	GDS costs for measure bundle
Tax credit (benefit): $2,000	30% of heat pump cost less utility subsidy , subject to a limit of $2,000 per year
Administrative Cost	
EK $8,600 (2025 value) fixed annual (2025-2039). 2% esc	Program admin - 2018 value of $6,885 adjusted to 2025..
Co-op $180 per new participant	Based on proposed tariff
Rate Schedule - Retail	
Median Residential Rate for Co-ops Cust chrg $16.09, Energy Rate $.088229	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale	
East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - 2025: 0. 2026-2039: 1,249 per year. 10% Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates	
Co-op to Participant $ 500, 2% esc	**Proposed for new program design.**
EK to Co-op $641, 2% esc	**Based on proposed tariff. Reimburse for rebate, 50% of admin costs, plus compensation for lost margins.**

2024 CPCN/Tariff filing

System year 1 is 2025

High Efficiency Heat Pump Program: Heat Pump Water Heater

Case:Heat Pump Water Heater

The High Efficiency Heat Pump Program offers an incentive to Residential end-use members for purchasing an energy efficient heat pump rather than a standard efficiency heat pump. This program has two Tiers for Air Source Heat Pumps: ENERGY STAR® and cold-climate heat pump/geothermal, There is a separate incentive for purchasing a Heat Pump Water Heater rather than a standard electric water heater.

Assumption	***Source***
Load Impacts Before Participant *3,600 kWh, 0.84 kW (coincident with winter peak), 0.32 kW (summer)*	Typical efficiency (EF=0.90) new electric hot water heater, 50 or more gallons
*Savings: **2,129** kWh **0.74** kW (winter), **0.136** kW (summer)*	GDS kWh, Heat Pump Water Heater (UEF 2.6) heat pump heat. kW impacts based on planning load profile.
After Participant *1,471 kWh, 0.10 kW (coinc. with winter system peak), 0.18 kW (summer)*	Before participant net of savings
Lifetime of savings	**15** Years
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 1,199.. 2% esc.	GDS costs for measure
Tax credit (benefit): $561	30% of HPWH cost less utility subsidy , subject to a limit of $2,000 per year
Administrative Cost EK **$8,600** (2025 value) fixed annual (2025-2039). 2% esc	Program admin - 2018 value of $6,885 adjusted to 2025..
Co-op **$180** per new participant	Based on proposed tariff
Rate Schedule - Retail	
Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 0. 2026-2039: 245 per year. 10%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant **$ 250**, 2% esc	**Proposed for new program design.**
EK to Co-op **$553,** 2% esc	**Based on proposed tariff. Reimburse for rebate, 50% of admin costs, plus compensation for lost margins.**

2024 CPCN/Tariff filing
System year 1 is 2025

Heat Pump Retrofit - ENERGY STAR®

Case: ENERGY STAR®

This program encourages Residential end-use members to convert their primary heat source from electric resistance heat to an efficient air source heat pump. This program has five heat pump cases: Federal Standard, ENERGY STAR®, and Mini-splits (1,2, 3 heads).

Assumption	***Source***
Load Impacts Before Participant *14,843 kWh, 8.12 kW (coinc. with winter system peak), 2.25 kW (summer)*	Electric Furnace and Central AC
*Savings: **6,724** kWh **1.208** kW (winter), **0.203** kW (summer)*	GDS kWh savings ASHP 16.2 SEER2, Elec Furnace Baseline. kW impacts based on planning load profile.
After Participant *8,119 kWh, 6.91 kW (coinc. with winter system peak), 2.05 kW (summer)*	Before participant net of savings
Lifetime of savings	16 Years
Discount rate for TRC and RIM	5 percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 1,273.. 2% esc.	GDS costs for measure
Tax credit (benefit): $1,882	30% of heat pump cost, less utility subsidy, subject to $2,000 cap
Administrative Cost EK **$6,175** (2025 value) fixed annual (2025-2039),	Fixed admin - 2021 value of $5300 escalated to 2025
Co-op **$180** per new participant	based on proposed tariff
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 92. 2026-2039: 131 per year. 0%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant **$ 1,000**, 2% esc	**Proposed for new program design.**
EK to Co-op **$ 2,241**, 2% esc	**Based on proposed tariff. Reimburse for rebate, 50% of admin costs, plus compensation for lost margins.**

2024 CPCN/Tariff filing

System year 1 is 2025

Case: Federal Standard

Heat Pump Retrofit - Federal Standard

This program encourages Residential end-use members to convert their primary heat source from electric resistance heat to an efficient air source heat pump. This program has five heat pump cases: Federal Standard, ENERGY STAR®, and Mini-splits (1,2, 3 heads).

Assumption	***Source***
Load Impacts Before Participant *14,843 kWh, 8.12 kW (coinc. with winter system peak), 2.25 kW (summer)*	Electric Furnace and Central AC
*Savings: **6,341** kWh **1.139** kW (winter), **0.081** kW (summer)*	GDS kWh savings ASHP 15.2 SEER2, Elec Furnace Baseline (GDS did not include a Federal Minimum measure). kW impacts based on plannng load profile.
After Participant *8,502 kWh, 6.98 kW (coinc. with winter system peak), 2.17 kW (summer)*	Before participant net of savings
Lifetime of savings	**16** Years
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 636.. 2% esc.	GDS costs for measure
Tax credit (benefit): $0	No tax credit in this case
Administrative Cost EK **$6,175** (2025 value) fixed annual (2025-2039),	Fixed admin - 2021 value of $5300 escalated to 2025
Co-op **$180** per new participant	based on proposed tariff
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 177. 2026-2039: 252 per year.** **0%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant **$ 750**, 2% esc	**Proposed for new program design.**
EK to Co-op **$ 1,945,** 2% esc	**Based on proposed tariff. Reimburse for rebate, 50% of admin costs, plus compensation for lost margins.**

2024 CPCN/Tariff filing

System year 1 is 2025

Heat Pump Retrofit - Mini-split (1 head)

Case: Mini-split, 1 head

This program encourages Residential end-use members to convert their primary heat source from electric resistance heat to an efficient air source heat pump. This program has five heat pump cases: Federal Standard, ENERGY STAR®, and Mini-splits (1,2, 3 heads).

Assumption	***Source***
Load Impacts Before Participant *14,843 kWh, 8.12 kW (coinc. with winter system peak), 2.25 kW (summer)*	Electric Furnace and Central AC
*Savings: **2,373** kWh, **0.43** kW (winter), **0.09** kW (summer)* After Participant *12,470 kWh, 7,69 kW (coinc. with winter system peak), 2.16 kW (summer)*	GDS kWh savings Ductless HP 9.4 HSPF2, Elec resistance Baseline, adjusted for **1** head instead of 3 heads. kW savings based on planning load profile. Before participant net of savings
Lifetime of savings	**16** Years
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 224.. 2% esc.	GDS costs for measure, adjusted for **1** head instead of 3 heads
Tax credit (benefit): $667	30% of heat pump cost (**1** head), less utility subsidy, subject to $2,000 cap
Administrative Cost EK **$6,175** (2025 value) fixed annual (2025-2039), Co-op **$180** per new participant	Fixed admin - 2021 value of $5300 escalated to 2025 based on proposed tariff
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 31. 2026-2039: 44 per year.** **0%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant **$ 500**, 2% esc EK to Co-op **$ 1,025**, 2% esc	**Proposed for new program design.** **Based on proposed tariff. Reimburse for rebate, 50% of admin costs, plus compensation for lost margins.**

2024 CPCN/Tariff filing

System year 1 is 2025

Case:Mini-split, 2 heads

Heat Pump Retrofit - Mini-split (2 heads)

This program encourages Residential end-use members to convert their primary heat source from electric resistance heat to an efficient air source heat pump. This program has five heat pump cases: Federal Standard, ENERGY STAR®, and Mini-splits (1,2, 3 heads).

Assumption	***Source***
Load Impacts Before Participant *14,843 kWh, 8.12 kW (coinc. with winter system peak), 2.25 kW (summer)*	Electric Furnace and Central AC
Savings: ***4,746*** *kWh* ***.0.85*** *kW (winter),* ***0.14*** *kW (summer)*	GDS kWh Ductless HP 9.4 HSPF2, Elec resistance Baseline, adjusted for **2** heads instead of 3 heads. kW impacts based on planning load profile
After Participant *10,097 kWh, 7,27 kW (coinc. with winter system peak), 2.08 kW (summer)*	Before participant net of savings
Lifetime of savings	**16** Years
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 448.. 2% esc.	GDS costs for measure, adjusted for **2** heads instead of 3 heads
Tax credit (benefit): $1,334	30% of heat pump cost (**2 head**), less utility subsidy, subject to $2,000 cap
Administrative Cost EK **$6,175** (2025 value) fixed annual (2025-2039),	Fixed admin - 2021 value of $5300 escalated to 2025
Co-op **$180** per new participant	based on proposed tariff
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 31. 2026-2039: 44 per year. 0%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant **$ 1,000**, 2% esc EK to Co-op **$ 1,960,** 2% esc	**Proposed for new program design.** **Based on proposed tariff. Reimburse for rebate, 50% of admin costs, plus compensation for lost margins.**

2024 CPCN/Tariff filing
System year 1 is 2025

Heat Pump Retrofit - Mini-split (3 heads)

Case: Mini-split, 3 heads

This program encourages Residential end-use members to convert their primary heat source from electric resistance heat to an efficient air source heat pump. This program has five heat pump cases: Federal Standard, ENERGY STAR®, and Mini-splits (1,2, 3 heads).

Assumption	***Source***
Load Impacts Before Participant *14,843 kWh, 8.12 kW (coinc. with winter system peak), 2.25 kW (summer)*	Electric Furnace and Central AC
*Savings: **7,119** kWh **1.28** kW (winter), **0.22** kW (summer)*	GDS kWh savings Ductless HP 9.4 HSPF2, Elec resistance Baseline. kW impacts based on planning load profile.
After Participant *7,724 kWh, 6.84 kW (coinc. with winter system peak), 2.03 kW (summer)*	Before participant net of savings
Lifetime of savings	16 Years
Discount rate for TRC and RIM	5 percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 672.. 2% esc.	GDS costs for measure
Tax credit (benefit): $1,552	30% of heat pump cost, less utility subsidy, subject to $2,000 cap
Administrative Cost EK **$6,175** (2025 value) fixed annual (2025-2039),	Fixed admin - 2021 value of $5300 escalated to 2025
Co-op **$180** per new participant	based on proposed tariff
Rate Schedule - Retail Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 30. 2026-2039: 43 per year.** **0%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget
Rebates Co-op to Participant **$ 1,500**, 2% esc	**Proposed for new program design.**
EK to Co-op **$ 2,895**, 2% esc	**Based on proposed tariff. Reimburse for rebate, 50% of admin costs, plus compensation for lost margins.**

2024 CPCN

System year 1 is 2025

Touchstone Energy Home

This program is designed to improve new residential home energy performance. This program provides guidance during the building process to guarantee a home that is 25%-30% more efficient than the Kentucky standard built home. The program encourages new homes to be built to higher standards for thermal integrity and equipment efficiency, as well as to choose a geothermal or air source heat pump rather than less efficient forms of heating and cooling.

Assumption	***Source***
Load Impacts	
Before Participant	
10,500 kWh, 8.12 kW (coinc. with winter system peak), 2.47 kW (summer)	Mix of Furnace/Central AC and air source heat pump weighted according to saturation in existing single family homes. 70% heat pump, 30% furnace/CAC.
*Savings: **3,263** kWh **2.49** kW (winter), **0.95** kW (summer)*	GDS kWh savings 15% savings from weatherization, plus more efficient heat pump (16.2 SEER2) . kW impacts based on planning load profile
After Participant	
7,237 kWh, 5.63 kW (coinc. with winter system peak), 1.52 kW (summer)	Before participant net of savings
Lifetime of savings	**20** Years
Discount rate for TRC and RIM	**5** percent per EKPC financial data; 3.5 % societal test from Mercatus Center report
Generation Capacity Cost - **$174.60** per kW-year (no escalation). 73% winter 27% summer.	**Avoided costs of a RICE unit. Updated escalators to match. Allocation is 73% winter 27% summer. Summer values based on PJM capacity performance market December 2023 with IHS Markit forecast, start year is 2024.**
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$45.96 /MWh** in 2025	based on December 26, 2023 ACES Forward prices for AEP_Dayton hub. **$45.96 /MWh** in 2025. DSMore **Scenario 9, 0.587 esc in 2025**
Transmission Capacity Cost - OATT tariff $ 35.76 per kW-year in 2025	Network rate, 2023-24. 2.8 % escalation rate based on 10 yr PPI.. Applied to winter coincident peak.
Distribution Capacity Cost - $ 4.93 per kW-year in 2025	Basd on marginal cost of distribution. 2.8 % escalation rate based on 10 yr PPI. . Applied to winter coincident peak.
Participant Costs $ 2,263.. 2% esc.	GDS costs for measure bundle
Tax credit (benefit): $0	Tax credit for new construction is given to the builder for Energy Star qualified homes
Administrative Cost	
EK **$5,756** (2025 value) fixed annual (2025-2039). 2% esc	Program admin - 2022 value of $5,300 adjusted to 2025..
Co-op **$400** per new participant	Based on new program design
Rate Schedule - Retail	
Median Residential Rate for Co-ops Cust chrg **$16.09**, Energy Rate **$.088229**	Current rates in effect as of January 2024.. **includes Environmental Surcharge and FAC**
Rate Schedule - Wholesale	
East Kentucky E-2 rate.	Current rates in effect as of January 2024. **includes Environmental Surcharge and FAC**
Participation - **2025: 494. 2026-2039: 494 per year. 5%** Free Riders	2025 - existing programs based on 2023 annual report. New programs - 0 (they begin in 2026).. 2026-2039 based on proposed new budget. Free riders based on Frontier Assoc study for LG&E/KU
Rebates	
Co-op to Participant **$ 750**, 2% esc	**Based on tariff**
EK to Co-op **$1,450,** 2% esc	**Based on tariff**

ATTACHMENT SD-9

Backup Generators, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 1,326,522	Revenue Declines	($141,939)
Rebates From EK	$2,186,111	Administrative Costs	($546,528)
		Rebates Paid To Consumers	($1,639,584)
Total Benefits	$3,512,633	Total Costs	($2,328,050)

Benefit / Cost Ratio: 1.51

Participant Benefits		Participant Costs	
Electric Bill Declines	$76,485	Up Front Investment	($202,506)
Rebates From Distribution System	$ 876,228		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$952,714	Total Costs	($202,506)

Benefit / Cost Ratio: 4.70

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$140,258	Up Front Customer Investment	($378,926)
Avoided Gen Capacity Costs	$5,048,291	Distribution System Admin. Costs	($546,528)
Avoided Transmission Expense	$1,011,843	EK Administrative Costs	($114,889)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$6,200,391	Total Costs	($1,040,343)

Benefit / Cost Ratio: 5.96

EK Benefits		EK Costs	
Avoided Energy Costs	$140,258	Decrease In Revenue	($1,326,522)
Avoided Gen Capacity Costs	$5,048,291	Rebates Paid	($2,186,111)
Avoided Transmission Expense	$1,011,843	Administrative Costs	($114,889)
Total Benefits	$6,200,391	Total Costs	($3,627,523)

Benefit / Cost Ratio: 1.71

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$140,258	Rebates Paid to Participants	($1,639,584)
Avoided Gen Capacity Costs	$5,048,291	Utility Admin Costs	($661,417)
Avoided Transmission Expense	$1,011,843		
Environmental Externalities	$0		
Total Benefits	$6,200,391	Total Costs	($2,301,001)

Benefit / Cost Ratio: 2.69

Combined RIM:

Total Benefits	$6,200,391	Total Costs	($2,442,940)

Benefit / Cost Ratio: 2.54

Button-Up Weatherization, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 22,197,416	Revenue Declines	($23,965,715)
Rebates From EK	$9,441,276	Administrative Costs	($2,296,527)
		Rebates Paid To Consumers	($6,379,241)
Total Benefits	$31,638,692	Total Costs	($32,641,482)

Benefit / Cost Ratio: 0.97

Participant Benefits		Participant Costs	
Electric Bill Declines	$9,935,398	Up Front Investment	($12,446,209)
Rebates From Distribution System	$ 3,982,787		
Reductions in O&M costs	$0		
Tax Credits	$1,593,115		
Total Benefits	$15,511,300	Total Costs	($12,446,209)

Benefit / Cost Ratio: 1.25

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$14,511,358	Up Front Customer Investment	($17,941,614)
Avoided Gen Capacity Costs	$22,618,807	Distribution System Admin. Costs	($2,296,527)
Avoided Transmission Expense	$9,454,052	EK Administrative Costs	($71,038)
Reduced Customer O&M costs	$0		
Tax Credits	$2,296,527		
Total Benefits	$48,880,742	Total Costs	($20,309,179)

Benefit / Cost Ratio: 2.41

EK Benefits		EK Costs	
Avoided Energy Costs	$14,511,358	Decrease In Revenue	($22,197,416)
Avoided Gen Capacity Costs	$22,618,807	Rebates Paid	($9,441,276)
Avoided Transmission Expense	$9,454,052	Administrative Costs	($71,038)
Total Benefits	$46,584,216	Total Costs	($31,709,729)

Benefit / Cost Ratio: 1.47

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$14,511,358	Rebates Paid to Participants	($6,379,241)
Avoided Gen Capacity Costs	$22,618,807	Utility Admin Costs	($2,367,564)
Avoided Transmission Expense	$9,454,052		
Environmental Externalities	$0		
Total Benefits	$46,584,216	Total Costs	($8,746,805)

Benefit / Cost Ratio: 5.33

Combined RIM:

Total Benefits	$46,584,216	Total Costs	($32,712,520)

Benefit / Cost Ratio: 1.42

DLC - BYOT, 2024 CPCN

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 9,870,517	Revenue Declines	($179,865)
Rebates From EK	$7,618,791	Administrative Costs	$0
		Rebates Paid To Consumers	($7,618,791)
Total Benefits	$17,489,308	Total Costs	($7,798,655)

Benefit / Cost Ratio: 2.24

Participant Benefits		Participant Costs	
Electric Bill Declines	$83,920	Up Front Investment	($806,212)
Rebates From Distribution System	$ 3,615,981		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$3,699,901	Total Costs	($806,212)

Benefit / Cost Ratio: 4.59

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$313,258	Up Front Customer Investment	($1,234,150)
Avoided Gen Capacity Costs	$12,262,158	Distribution System Admin. Costs	$0
Avoided Transmission Expense	$6,008,830	EK Administrative Costs	($6,981,630)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$18,584,246	Total Costs	($8,215,780)

Benefit / Cost Ratio: 2.26

EK Benefits		EK Costs	
Avoided Energy Costs	$313,258	Decrease In Revenue	($9,870,517)
Avoided Gen Capacity Costs	$12,262,158	Rebates Paid	($7,618,791)
Avoided Transmission Expense	$6,008,830	Administrative Costs	($6,981,630)
Total Benefits	$18,584,246	Total Costs	($24,470,938)

Benefit / Cost Ratio: 0.76

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$313,258	Rebates Paid to Participants	($7,618,791)
Avoided Gen Capacity Costs	$12,262,158	Utility Admin Costs	($6,981,630)
Avoided Transmission Expense	$6,008,830		
Environmental Externalities	$0		
Total Benefits	$18,584,246	Total Costs	($14,600,420)

Benefit / Cost Ratio: 1.27

Combined RIM:

Total Benefits	$18,584,246	Total Costs	($14,780,285)

Benefit / Cost Ratio: 1.26

C&I Thermostat program, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 155,919	Revenue Declines	($212,535)
Rebates From EK	$55,006	Administrative Costs	($5,671)
		Rebates Paid To Consumers	($28,354)
Total Benefits	$210,925	Total Costs	($246,560)

Benefit / Cost Ratio: 0.86

Participant Benefits		Participant Costs	
Electric Bill Declines	$97,657	Up Front Investment	($30,897)
Rebates From Distribution System	$ 17,655		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$115,312	Total Costs	($30,897)

Benefit / Cost Ratio: 3.73

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$68,138	Up Front Customer Investment	($49,619)
Avoided Gen Capacity Costs	$34,654	Distribution System Admin. Costs	($5,671)
Avoided Transmission Expense	$18,613	EK Administrative Costs	($10,007)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$121,405	Total Costs	($65,297)

Benefit / Cost Ratio: 1.86

EK Benefits		EK Costs	
Avoided Energy Costs	$68,138	Decrease In Revenue	($155,919)
Avoided Gen Capacity Costs	$34,654	Rebates Paid	($55,006)
Avoided Transmission Expense	$18,613	Administrative Costs	($10,007)
Total Benefits	$121,405	Total Costs	($220,932)

Benefit / Cost Ratio: 0.55

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$68,138	Rebates Paid to Participants	($28,354)
Avoided Gen Capacity Costs	$34,654	Utility Admin Costs	($15,678)
Avoided Transmission Expense	$18,613		
Environmental Externalities	$0		
Total Benefits	$121,405	Total Costs	($44,032)

Benefit / Cost Ratio: 2.76

Combined RIM:

Total Benefits	$121,405	Total Costs	($256,567)

Benefit / Cost Ratio: 0.47

CARES 2024 CPCN/Tariff filing. NOTE: Participant Test is not accurate. Participant investment included for TRC only

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 9,826,725	Revenue Declines	($10,606,510)
Rebates From EK	$4,013,456	Administrative Costs	($296,196)
		Rebates Paid To Consumers	($3,311,472)
Total Benefits	$13,840,181	Total Costs	($14,214,178)

Benefit / Cost Ratio: 0.97

Participant Benefits		N/A	Participant Costs	
Electric Bill Declines	$4,418,160		Up Front Investment	($3,679,229)
Rebates From Distribution System	$ 2,163,228			
Reductions in O&M costs	$0			
Tax Credits	$0			
Reductions in Gas bill	$449,333			
Total Benefits	$7,030,721		Total Costs	($3,679,229)

DO NOT USE — Benefit / Cost Ratio: 1.91 — DO NOT USE

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$6,388,093	Up Front Customer Investment	($5,632,167)
Avoided Gen Capacity Costs	$10,212,614	Distribution System Admin. Costs	($296,196)
Avoided Transmission Expense	$4,076,382	EK Administrative Costs	($71,038)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Reduced Nat Gas Costs	$91,184		
Total Benefits	$20,768,273	Total Costs	($5,999,401)

Benefit / Cost Ratio: 3.46

EK Benefits		EK Costs	
Avoided Energy Costs	$6,388,093	Decrease In Revenue	($9,826,725)
Avoided Gen Capacity Costs	$10,212,614	Rebates Paid	($4,013,456)
Avoided Transmission Expense	$4,076,382	Administrative Costs	($71,038)
Total Benefits	$20,677,089	Total Costs	($13,911,219)

Benefit / Cost Ratio: 1.49

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$6,388,093	Rebates Paid to Participants	($3,311,472)
Avoided Gen Capacity Costs	$10,212,614	Utility Admin Costs	($367,234)
Avoided Transmission Expense	$4,076,382		
Environmental Externalities	$0		
Total Benefits	$20,677,089	Total Costs	($3,678,705)

Benefit / Cost Ratio: 5.62

Combined RIM:

Total Benefits	$20,677,089	Total Costs	($14,285,215)

Benefit / Cost Ratio: 1.45

Commercial Advanced Lighting, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 35,146,486	Revenue Declines	($48,458,650)
Rebates From EK	$6,918,316	Administrative Costs	($362,928)
		Rebates Paid To Consumers	($2,835,375)
Total Benefits	$42,064,802	Total Costs	($51,656,953)

Benefit / Cost Ratio: 0.81

Participant Benefits		Participant Costs	
Electric Bill Declines	$22,349,029	Up Front Investment	($15,607,284)
Rebates From Distribution System	$ 1,765,530		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$24,114,559	Total Costs	($15,607,284)

Benefit / Cost Ratio: 1.55

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$16,026,306	Up Front Customer Investment	($22,558,246)
Avoided Gen Capacity Costs	$9,006,210	Distribution System Admin. Costs	($362,928)
Avoided Transmission Expense	$3,796,849	EK Administrative Costs	($122,748)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$28,829,365	Total Costs	($23,043,922)

Benefit / Cost Ratio: 1.25

EK Benefits		EK Costs	
Avoided Energy Costs	$16,026,306	Decrease In Revenue	($35,146,486)
Avoided Gen Capacity Costs	$9,006,210	Rebates Paid	($6,918,316)
Avoided Transmission Expense	$3,796,849	Administrative Costs	($122,748)
Total Benefits	$28,829,365	Total Costs	($42,187,550)

Benefit / Cost Ratio: 0.68

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$16,026,306	Rebates Paid to Participants	($2,835,375)
Avoided Gen Capacity Costs	$9,006,210	Utility Admin Costs	($485,676)
Avoided Transmission Expense	$3,796,849		
Environmental Externalities	$0		
Total Benefits	$28,829,365	Total Costs	($3,321,052)

Benefit / Cost Ratio: 8.68

Combined RIM:

Total Benefits	$28,829,365	Total Costs	($51,779,701)

Benefit / Cost Ratio: 0.56

DLC - AC Switches , 2024 CPCN

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 4,353,092	Revenue Declines	($79,324)
Rebates From EK	$2,738,807	Administrative Costs	($11)
		Rebates Paid To Consumers	($2,738,807)
Total Benefits	$7,091,899	Total Costs	($2,818,142)

Benefit / Cost Ratio: 2.52

Participant Benefits		Participant Costs	
Electric Bill Declines	$55,026	Up Front Investment	$0
Rebates From Distribution System	$ 1,879,331		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$1,934,356	Total Costs	$0

Benefit / Cost Ratio: #DIV/0!

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$133,932	Up Front Customer Investment	$0
Avoided Gen Capacity Costs	$5,811,887	Distribution System Admin. Costs	($11)
Avoided Transmission Expense	$2,369,673	EK Administrative Costs	($6,911,241)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$8,315,493	Total Costs	($6,911,251)

Benefit / Cost Ratio: 1.20

EK Benefits		EK Costs	
Avoided Energy Costs	$133,932	Decrease In Revenue	($4,353,092)
Avoided Gen Capacity Costs	$5,811,887	Rebates Paid	($2,738,807)
Avoided Transmission Expense	$2,369,673	Administrative Costs	($6,911,241)
Total Benefits	$8,315,493	Total Costs	($14,003,140)

Benefit / Cost Ratio: 0.59

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$133,932	Rebates Paid to Participants	($2,738,807)
Avoided Gen Capacity Costs	$5,811,887	Utility Admin Costs	($6,911,253)
Avoided Transmission Expense	$2,369,673		
Environmental Externalities	$0		
Total Benefits	$8,315,493	Total Costs	($9,650,060)

Benefit / Cost Ratio: 0.86

Combined RIM:

Total Benefits	$8,315,493	Total Costs	($9,729,382)

Benefit / Cost Ratio: 0.85

DLC - WH Switches, 2024 CPCN

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 4,063,297	Revenue Declines	($190,502)
Rebates From EK	$1,049,899	Administrative Costs	($10)
		Rebates Paid To Consumers	($1,049,899)
Total Benefits	$5,113,196	Total Costs	($1,240,411)

Benefit / Cost Ratio: 4.12

Participant Benefits		Participant Costs	
Electric Bill Declines	$133,314	Up Front Investment	$0
Rebates From Distribution System	$ 727,028		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$860,341	Total Costs	$0

Benefit / Cost Ratio: #DIV/0!

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$199,903	Up Front Customer Investment	$0
Avoided Gen Capacity Costs	$7,150,279	Distribution System Admin. Costs	($10)
Avoided Transmission Expense	$1,419,673	EK Administrative Costs	($5,430,260)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$8,769,855	Total Costs	($5,430,271)

Benefit / Cost Ratio: 1.61

EK Benefits		EK Costs	
Avoided Energy Costs	$199,903	Decrease In Revenue	($4,063,297)
Avoided Gen Capacity Costs	$7,150,279	Rebates Paid	($1,049,899)
Avoided Transmission Expense	$1,419,673	Administrative Costs	($5,430,260)
Total Benefits	$8,769,855	Total Costs	($10,543,456)

Benefit / Cost Ratio: 0.83

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$199,903	Rebates Paid to Participants	($1,049,899)
Avoided Gen Capacity Costs	$7,150,279	Utility Admin Costs	($5,430,273)
Avoided Transmission Expense	$1,419,673		
Environmental Externalities	$0		
Total Benefits	$8,769,855	Total Costs	($6,480,172)

Benefit / Cost Ratio: 1.35

Combined RIM:

Total Benefits	$8,769,855	Total Costs	($6,670,671)

Benefit / Cost Ratio: 1.31

Button-Up Duct Sealing. 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 452,825	Revenue Declines	($462,314)
Rebates From EK	$314,727	Administrative Costs	($83,927)
		Rebates Paid To Consumers	($209,818)
Total Benefits	$767,552	Total Costs	($756,059)

Benefit / Cost Ratio: 1.02

Participant Benefits		Participant Costs	
Electric Bill Declines	$191,132	Up Front Investment	($192,838)
Rebates From Distribution System	$ 130,649		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$321,781	Total Costs	($192,838)

Benefit / Cost Ratio: 1.67

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$279,964	Up Front Customer Investment	($278,722)
Avoided Gen Capacity Costs	$519,424	Distribution System Admin. Costs	($83,927)
Avoided Transmission Expense	$220,541	EK Administrative Costs	($74,854)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$1,019,929	Total Costs	($437,503)

Benefit / Cost Ratio: 2.33

EK Benefits		EK Costs	
Avoided Energy Costs	$279,964	Decrease In Revenue	($452,825)
Avoided Gen Capacity Costs	$519,424	Rebates Paid	($314,727)
Avoided Transmission Expense	$220,541	Administrative Costs	($74,854)
Total Benefits	$1,019,929	Total Costs	($842,405)

Benefit / Cost Ratio: 1.21

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$279,964	Rebates Paid to Participants	($209,818)
Avoided Gen Capacity Costs	$519,424	Utility Admin Costs	($158,781)
Avoided Transmission Expense	$220,541		
Environmental Externalities	$0		
Total Benefits	$1,019,929	Total Costs	($368,599)

Benefit / Cost Ratio: 2.77

Combined RIM:

Total Benefits	$1,019,929	Total Costs	($830,913)

Benefit / Cost Ratio: 1.23

Electric Vehicle Off-Peak Charging, 2024 CPCN

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 3,459,960	Revenue Declines	$5,785
Rebates From EK	$3,496,164	Administrative Costs	$0
		Rebates Paid To Consumers	($6,992,328)
Total Benefits	$6,956,124	Total Costs	($6,986,542)

Benefit / Cost Ratio: 1.00

Participant Benefits		Participant Costs	
Electric Bill Declines	($4,554)	Up Front Investment	$0
Rebates From Distribution System	$ 3,254,678		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$3,250,124	Total Costs	$0

Benefit / Cost Ratio: #DIV/0!

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$3,970,455	Up Front Customer Investment	$0
Avoided Gen Capacity Costs	$2,924,983	Distribution System Admin. Costs	$0
Avoided Transmission Expense	$1,465,734	EK Administrative Costs	($5,394,081)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$8,361,172	Total Costs	($5,394,081)

Benefit / Cost Ratio: 1.55

EK Benefits		EK Costs	
Avoided Energy Costs	$3,970,455	Decrease In Revenue	($3,459,960)
Avoided Gen Capacity Costs	$2,924,983	Rebates Paid	($3,496,164)
Avoided Transmission Expense	$1,465,734	Administrative Costs	($5,394,081)
Total Benefits	$8,361,172	Total Costs	($12,350,205)

Benefit / Cost Ratio: 0.68

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$3,970,455	Rebates Paid to Participants	($6,992,328)
Avoided Gen Capacity Costs	$2,924,983	Utility Admin Costs	($5,394,081)
Avoided Transmission Expense	$1,465,734		
Environmental Externalities	$0		
Total Benefits	$8,361,172	Total Costs	($12,386,409)

Benefit / Cost Ratio: 0.68

Combined RIM:

Total Benefits	$8,361,172	Total Costs	($12,380,624)

Benefit / Cost Ratio: 0.68

High Efficiency HP: Cold Climate Heat Pump/Geothermal, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 10,026,998	Revenue Declines	($8,882,012)
Rebates From EK	$5,888,144	Administrative Costs	($849,252)
		Rebates Paid To Consumers	($4,718,064)
Total Benefits	$15,915,142	Total Costs	($14,449,328)

Benefit / Cost Ratio: 1.10

Participant Benefits		Participant Costs	
Electric Bill Declines	$3,601,515	Up Front Investment	($7,479,745)
Rebates From Distribution System	$ 2,937,842		
Reductions in O&M costs	$0		
Tax Credits	$5,875,683		
Total Benefits	$12,415,040	Total Costs	($7,479,745)

Benefit / Cost Ratio: 1.66

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$5,354,387	Up Front Customer Investment	($12,012,192)
Avoided Gen Capacity Costs	$16,016,070	Distribution System Admin. Costs	($849,252)
Avoided Transmission Expense	$7,014,652	EK Administrative Costs	($97,537)
Reduced Customer O&M costs	$0		
Tax Credits	$9,436,129		
Total Benefits	$37,821,237	Total Costs	($12,958,981)

Benefit / Cost Ratio: 2.92

EK Benefits		EK Costs	
Avoided Energy Costs	$5,354,387	Decrease In Revenue	($10,026,998)
Avoided Gen Capacity Costs	$16,016,070	Rebates Paid	($5,888,144)
Avoided Transmission Expense	$7,014,652	Administrative Costs	($97,537)
Total Benefits	$28,385,108	Total Costs	($16,012,679)

Benefit / Cost Ratio: 1.77

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$5,354,387	Rebates Paid to Participants	($4,718,064)
Avoided Gen Capacity Costs	$16,016,070	Utility Admin Costs	($946,789)
Avoided Transmission Expense	$7,014,652		
Environmental Externalities	$0		
Total Benefits	$28,385,108	Total Costs	($5,664,853)

Benefit / Cost Ratio: 5.01

Combined RIM:

Total Benefits	$28,385,108	Total Costs	($14,546,865)

Benefit / Cost Ratio: 1.95

High Efficiency HP: ENERGY STAR® , 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 9,908,684	Revenue Declines	($13,493,731)
Rebates From EK	$9,080,108	Administrative Costs	($2,549,796)
		Rebates Paid To Consumers	($7,082,767)
Total Benefits	$18,988,792	Total Costs	($23,126,295)

Benefit / Cost Ratio: 0.82

Participant Benefits		Participant Costs	
Electric Bill Declines	$6,079,437	Up Front Investment	($10,866,964)
Rebates From Distribution System	$ 4,410,294		
Reductions in O&M costs	$0		
Tax Credits	$17,641,175		
Total Benefits	$28,130,905	Total Costs	($10,866,964)

Benefit / Cost Ratio: 2.59

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$8,134,492	Up Front Customer Investment	($15,706,745)
Avoided Gen Capacity Costs	$4,021,044	Distribution System Admin. Costs	($2,549,796)
Avoided Transmission Expense	$1,273,733	EK Administrative Costs	($97,537)
Reduced Customer O&M costs	$0		
Tax Credits	$25,497,963		
Total Benefits	$38,927,232	Total Costs	($18,354,078)

Benefit / Cost Ratio: 2.12

EK Benefits		EK Costs	
Avoided Energy Costs	$8,134,492	Decrease In Revenue	($9,908,684)
Avoided Gen Capacity Costs	$4,021,044	Rebates Paid	($9,080,108)
Avoided Transmission Expense	$1,273,733	Administrative Costs	($97,537)
Total Benefits	$13,429,269	Total Costs	($19,086,329)

Benefit / Cost Ratio: 0.70

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$8,134,492	Rebates Paid to Participants	($7,082,767)
Avoided Gen Capacity Costs	$4,021,044	Utility Admin Costs	($2,647,333)
Avoided Transmission Expense	$1,273,733		
Environmental Externalities	$0		
Total Benefits	$13,429,269	Total Costs	($9,730,101)

Benefit / Cost Ratio: 1.38

Combined RIM:

Total Benefits	$13,429,269	Total Costs	($23,223,831)

Benefit / Cost Ratio: 0.58

High Efficiency HP: Heat Pump Water Heater, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 4,748,678	Revenue Declines	($6,036,819)
Rebates From EK	$1,536,603	Administrative Costs	($500,160)
		Rebates Paid To Consumers	($694,667)
Total Benefits	$6,285,281	Total Costs	($7,231,646)

Benefit / Cost Ratio: 0.87

Participant Benefits		Participant Costs	
Electric Bill Declines	$2,784,169	Up Front Investment	($2,074,533)
Rebates From Distribution System	$ 432,555		
Reductions in O&M costs	$0		
Tax Credits	$970,653		
Total Benefits	$4,187,376	Total Costs	($2,074,533)

Benefit / Cost Ratio: 2.02

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$3,096,277	Up Front Customer Investment	($2,998,460)
Avoided Gen Capacity Costs	$2,541,486	Distribution System Admin. Costs	($500,160)
Avoided Transmission Expense	$1,094,692	EK Administrative Costs	($97,537)
Reduced Customer O&M costs	$0		
Tax Credits	$1,402,949		
Total Benefits	$8,135,405	Total Costs	($3,596,158)

Benefit / Cost Ratio: 2.26

EK Benefits		EK Costs	
Avoided Energy Costs	$3,096,277	Decrease In Revenue	($4,748,678)
Avoided Gen Capacity Costs	$2,541,486	Rebates Paid	($1,536,603)
Avoided Transmission Expense	$1,094,692	Administrative Costs	($97,537)
Total Benefits	$6,732,456	Total Costs	($6,382,818)

Benefit / Cost Ratio: 1.05

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$3,096,277	Rebates Paid to Participants	($694,667)
Avoided Gen Capacity Costs	$2,541,486	Utility Admin Costs	($597,697)
Avoided Transmission Expense	$1,094,692		
Environmental Externalities	$0		
Total Benefits	$6,732,456	Total Costs	($1,292,364)

Benefit / Cost Ratio: 5.21

Combined RIM:

Total Benefits	$6,732,456	Total Costs	($7,329,183)

Benefit / Cost Ratio: 0.92

Heat Pump Retrofit, ENERGY STAR®, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 8,917,338	Revenue Declines	($12,661,669)
Rebates From EK	$3,535,708	Administrative Costs	($283,993)
		Rebates Paid To Consumers	($1,577,737)
Total Benefits	$12,453,046	Total Costs	($14,523,399)

Benefit / Cost Ratio: 0.86

Participant Benefits		Participant Costs	
Electric Bill Declines	$5,322,036	Up Front Investment	($1,294,816)
Rebates From Distribution System	$ 1,017,138		
Reductions in O&M costs	$0		
Tax Credits	$1,914,253		
Total Benefits	$8,253,426	Total Costs	($1,294,816)

Benefit / Cost Ratio: 6.37

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$5,624,974	Up Front Customer Investment	($2,008,459)
Avoided Gen Capacity Costs	$2,741,221	Distribution System Admin. Costs	($283,993)
Avoided Transmission Expense	$1,186,455	EK Administrative Costs	($76,209)
Reduced Customer O&M costs	$0		
Tax Credits	$2,969,300		
Total Benefits	$12,521,951	Total Costs	($2,368,660)

Benefit / Cost Ratio: 5.29

EK Benefits		EK Costs	
Avoided Energy Costs	$5,624,974	Decrease In Revenue	($8,917,338)
Avoided Gen Capacity Costs	$2,741,221	Rebates Paid	($3,535,708)
Avoided Transmission Expense	$1,186,455	Administrative Costs	($76,209)
Total Benefits	$9,552,650	Total Costs	($12,529,255)

Benefit / Cost Ratio: 0.76

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$5,624,974	Rebates Paid to Participants	($1,577,737)
Avoided Gen Capacity Costs	$2,741,221	Utility Admin Costs	($360,201)
Avoided Transmission Expense	$1,186,455		
Environmental Externalities	$0		
Total Benefits	$9,552,650	Total Costs	($1,937,938)

Benefit / Cost Ratio: 4.93

Combined RIM:

Total Benefits	$9,552,650	Total Costs	($14,599,607)

Benefit / Cost Ratio: 0.65

Heat Pump Retrofit, Federal Standard, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 16,043,408	Revenue Declines	($22,969,616)
Rebates From EK	$5,903,188	Administrative Costs	($546,310)
		Rebates Paid To Consumers	($2,276,294)
Total Benefits	$21,946,597	Total Costs	($25,792,220)

Benefit / Cost Ratio: 0.85

Participant Benefits		Participant Costs	
Electric Bill Declines	$9,654,780	Up Front Investment	($1,244,432)
Rebates From Distribution System	$ 1,467,491		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$11,122,271	Total Costs	($1,244,432)

Benefit / Cost Ratio: 8.94

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$10,204,300	Up Front Customer Investment	($1,930,297)
Avoided Gen Capacity Costs	$4,804,676	Distribution System Admin. Costs	($546,310)
Avoided Transmission Expense	$2,151,990	EK Administrative Costs	($76,209)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$17,160,967	Total Costs	($2,552,816)

Benefit / Cost Ratio: 6.72

EK Benefits		EK Costs	
Avoided Energy Costs	$10,204,300	Decrease In Revenue	($16,043,408)
Avoided Gen Capacity Costs	$4,804,676	Rebates Paid	($5,903,188)
Avoided Transmission Expense	$2,151,990	Administrative Costs	($76,209)
Total Benefits	$17,160,967	Total Costs	($22,022,806)

Benefit / Cost Ratio: 0.78

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$10,204,300	Rebates Paid to Participants	($2,276,294)
Avoided Gen Capacity Costs	$4,804,676	Utility Admin Costs	($622,519)
Avoided Transmission Expense	$2,151,990		
Environmental Externalities	$0		
Total Benefits	$17,160,967	Total Costs	($2,898,813)

Benefit / Cost Ratio: 5.92

Combined RIM:

Total Benefits	$17,160,967	Total Costs	($25,868,429)

Benefit / Cost Ratio: 0.66

Heat Pump Retrofit, Mini-Split, 1 head, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 1,058,558	Revenue Declines	($1,501,165)
Rebates From EK	$543,277	Administrative Costs	($95,405)
		Rebates Paid To Consumers	($265,013)
Total Benefits	$1,601,835	Total Costs	($1,861,583)

Benefit / Cost Ratio: 0.86

Participant Benefits		Participant Costs	
Electric Bill Declines	$631,047	Up Front Investment	($76,548)
Rebates From Distribution System	$ 170,867		
Reductions in O&M costs	$0		
Tax Credits	$227,936		
Total Benefits	$1,029,849	Total Costs	($76,548)

Benefit / Cost Ratio: 13.45

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$666,893	Up Front Customer Investment	($118,726)
Avoided Gen Capacity Costs	$327,739	Distribution System Admin. Costs	($95,405)
Avoided Transmission Expense	$141,877	EK Administrative Costs	($76,209)
Reduced Customer O&M costs	$0		
Tax Credits	$353,527		
Total Benefits	$1,490,036	Total Costs	($290,339)

Benefit / Cost Ratio: 5.13

EK Benefits		EK Costs	
Avoided Energy Costs	$666,893	Decrease In Revenue	($1,058,558)
Avoided Gen Capacity Costs	$327,739	Rebates Paid	($543,277)
Avoided Transmission Expense	$141,877	Administrative Costs	($76,209)
Total Benefits	$1,136,508	Total Costs	($1,678,044)

Benefit / Cost Ratio: 0.68

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$666,893	Rebates Paid to Participants	($265,013)
Avoided Gen Capacity Costs	$327,739	Utility Admin Costs	($171,613)
Avoided Transmission Expense	$141,877		
Environmental Externalities	$0		
Total Benefits	$1,136,508	Total Costs	($436,626)

Benefit / Cost Ratio: 2.60

Combined RIM:

Total Benefits	$1,136,508	Total Costs	($1,937,791)

Benefit / Cost Ratio: 0.59

Heat Pump Retrofit, Mini-Split, 2 heads, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 2,112,890	Revenue Declines	($3,002,330)
Rebates From EK	$1,038,851	Administrative Costs	($95,405)
		Rebates Paid To Consumers	($530,026)
Total Benefits	$3,151,741	Total Costs	($3,627,761)

Benefit / Cost Ratio: 0.87

Participant Benefits		Participant Costs	
Electric Bill Declines	$1,262,093	Up Front Investment	($153,097)
Rebates From Distribution System	$ 341,733		
Reductions in O&M costs	$0		
Tax Credits	$455,872		
Total Benefits	$2,059,699	Total Costs	($153,097)

Benefit / Cost Ratio: 13.45

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$1,333,785	Up Front Customer Investment	($237,452)
Avoided Gen Capacity Costs	$647,241	Distribution System Admin. Costs	($95,405)
Avoided Transmission Expense	$280,454	EK Administrative Costs	($76,209)
Reduced Customer O&M costs	$0		
Tax Credits	$707,055		
Total Benefits	$2,968,535	Total Costs	($409,065)

Benefit / Cost Ratio: 7.26

EK Benefits		EK Costs	
Avoided Energy Costs	$1,333,785	Decrease In Revenue	($2,112,890)
Avoided Gen Capacity Costs	$647,241	Rebates Paid	($1,038,851)
Avoided Transmission Expense	$280,454	Administrative Costs	($76,209)
Total Benefits	$2,261,480	Total Costs	($3,227,949)

Benefit / Cost Ratio: 0.70

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$1,333,785	Rebates Paid to Participants	($530,026)
Avoided Gen Capacity Costs	$647,241	Utility Admin Costs	($171,613)
Avoided Transmission Expense	$280,454		
Environmental Externalities	$0		
Total Benefits	$2,261,480	Total Costs	($701,640)

Benefit / Cost Ratio: 3.22

Combined RIM:

Total Benefits	$2,261,480	Total Costs	($3,703,969)

Benefit / Cost Ratio: 0.61

Heat Pump Retrofit, Mini-Split, 3 heads, 2024 CPCN/Tariff filing

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 3,098,322	Revenue Declines	($4,398,487)
Rebates From EK	$1,498,697	Administrative Costs	($93,183)
		Rebates Paid To Consumers	($776,527)
Total Benefits	$4,597,019	Total Costs	($5,268,197)

Benefit / Cost Ratio: 0.87

Participant Benefits		Participant Costs	
Electric Bill Declines	$1,848,398	Up Front Investment	($224,227)
Rebates From Distribution System	$ 500,507		
Reductions in O&M costs	$0		
Tax Credits	$517,858		
Total Benefits	$2,866,762	Total Costs	($224,227)

Benefit / Cost Ratio: 12.79

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$1,954,056	Up Front Customer Investment	($347,884)
Avoided Gen Capacity Costs	$953,238	Distribution System Admin. Costs	($93,183)
Avoided Transmission Expense	$412,509	EK Administrative Costs	($76,209)
Reduced Customer O&M costs	$0		
Tax Credits	$803,446		
Total Benefits	$4,123,249	Total Costs	($517,276)

Benefit / Cost Ratio: 7.97

EK Benefits		EK Costs	
Avoided Energy Costs	$1,954,056	Decrease In Revenue	($3,098,322)
Avoided Gen Capacity Costs	$953,238	Rebates Paid	($1,498,697)
Avoided Transmission Expense	$412,509	Administrative Costs	($76,209)
Total Benefits	$3,319,803	Total Costs	($4,673,228)

Benefit / Cost Ratio: 0.71

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$1,954,056	Rebates Paid to Participants	($776,527)
Avoided Gen Capacity Costs	$953,238	Utility Admin Costs	($169,392)
Avoided Transmission Expense	$412,509		
Environmental Externalities	$0		
Total Benefits	$3,319,803	Total Costs	($945,919)

Benefit / Cost Ratio: 3.51

Combined RIM:

Total Benefits	$3,319,803	Total Costs	($5,344,406)

Benefit / Cost Ratio: 0.62

Touchstone Energy Home, 2024 CPCN

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 24,466,054	Revenue Declines	($26,420,875)
Rebates From EK	$8,840,217	Administrative Costs	($2,438,681)
		Rebates Paid To Consumers	($4,572,526)
Total Benefits	$33,306,272	Total Costs	($33,432,082)

Benefit / Cost Ratio: 1.00

Participant Benefits		Participant Costs	
Electric Bill Declines	$10,873,499	Up Front Investment	($9,012,821)
Rebates From Distribution System	$ 2,987,015		
Reductions in O&M costs	$0		
Tax Credits	$0		
Total Benefits	$13,860,514	Total Costs	($9,012,821)

Benefit / Cost Ratio: 1.54

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$15,967,780	Up Front Customer Investment	($13,106,994)
Avoided Gen Capacity Costs	$25,693,730	Distribution System Admin. Costs	($2,438,681)
Avoided Transmission Expense	$10,752,588	EK Administrative Costs	($71,038)
Reduced Customer O&M costs	$0		
Tax Credits	$0		
Total Benefits	$52,414,097	Total Costs	($15,616,712)

Benefit / Cost Ratio: 3.36

EK Benefits		EK Costs	
Avoided Energy Costs	$15,967,780	Decrease In Revenue	($24,466,054)
Avoided Gen Capacity Costs	$25,693,730	Rebates Paid	($8,840,217)
Avoided Transmission Expense	$10,752,588	Administrative Costs	($71,038)
Total Benefits	$52,414,097	Total Costs	($33,377,309)

Benefit / Cost Ratio: 1.57

Utility Test Benefits		Utility Test Costs	
Avoided Energy Costs	$15,967,780	Rebates Paid to Participants	($4,572,526)
Avoided Gen Capacity Costs	$25,693,730	Utility Admin Costs	($2,509,718)
Avoided Transmission Expense	$10,752,588		
Environmental Externalities	$0		
Total Benefits	$52,414,097	Total Costs	($7,082,244)

Benefit / Cost Ratio: 7.40

Combined RIM:

Total Benefits	$52,414,097	Total Costs	($33,503,119)

Benefit / Cost Ratio: 1.56

ATTACHMENT SD-10
PROPOSED TARIFFS

DSM
Button-Up Weatherization Program

Purpose

The Button-Up Weatherization Program offers an incentive for reducing the heat loss of a home. The residential end-use member may qualify for this incentive by making improvements such as increasing insulation, installing higher efficiency windows and doors, by reducing the air leakage of their home, or by sealing their HVAC duct system. T T

Availability

This program is available in all service territories of participating owner-members cooperatives (owner-members) of EKPC. T

Eligibility

This program is targeted at older single-family, multi-family or manufactured dwellings. Eligibility requirements are:

- Home must be 2-years old or older to qualify for the incentive.
  Primary source of heat must be electricity.
- Heat loss calculation of British thermal units per hour (Btuh) reduced will be made using the
- Manual J 8th Edition or through other methods approved by EKPC. Heat loss calculations in Btuh are based on the winter design temperature. T

N

The Button-Up program encourages homeowners to improve the thermal envelope of their home through improved insulation, upgraded windows/doors, and air-sealing, and EKPC approved contractor or owner-member representative must preform a "pre" and "post" blower door test to measure actual Btuh reduced. N

The following is a list of eligible Button-Up Program improvements:

- Insulating basement walls
- Insulating floor over unconditioned space
- Encapsulating a crawlspace
- Insulating rim or band board
  Retrofitting uninsulated exterior walls with insulation
  Insulating ceiling
  Converted to a conditioned attic
  Insulating attic accesses
  Upgrading windows and doors
  Air-sealing the home envelope
  Air-sealing ductwork.

DATE OF ISSUE: November 20, 2024

DATE EFFECTIVE: For services on or after January 1, 2025

ISSUED BY: Anthony S. Campbell

Anthony S. Campbell,
President and Chief Executive Officer

DSM
Button-Up Weatherization Program (continued)

The HVAC duct sealing portion of the Button up is a standalone measure that can be utilized to air seal HVAC duct systems located in un-heated spaces. Air sealing ducts with traditional mastic sealers is an effective way to lower energy costs.

- Limited to homes that have accessible centrally ducted heating systems in unconditioned areas.
- Initial duct leakage must be greater than 10cfm per 100ft2
- Contractor or owner-member representative are required to conduct a “pre” and “post” blower door test to verify leakage reductions. Contractors must be trained or pre-approved by EKPC or the Owner-Member.
- Duct leakage per system must be reduced to less than 8cfm per 100ft2 (Ex: Duct system serves 1200ft. 1200ft2/100ft^2 x8cfm = 12 x 8cfm= Duct Seal Target of 96cfm)
- All joints in the duct system must be properly sealed with duct mastic. Foil tape does not qualify as properly sealing the duct system.

For homes that have two or more separately ducted heat systems, each system will qualify independently for the incentive.

Payments

The Button-Up pays an incentive to the residential end-use member of $100 per one thousand British thermal unit per hour (Btuh) of heat loss reduced, up to $1,875. EKPC all also provided a transfer payment to the owner-member of $40 per thousand Btuh, up to $565 to cover lost margins. To assist with owner-member administrative cost, EKPC will provide a payment of $130. For enrollments that compete air sealing, the administrative payment will be $230. N

The HVAC duct sealing portion of the Button Up program will pay a $500 incentive to residential members (or their contractor) that meets the eligibility requirements for duct sealing listed above. EKPC will also pay the owner-member an administrative fee of $100 and lost margins of $150. EKPC will pay a total transfer payment of $750.

Term

The program is an ongoing program.

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ISSUED BY: Anthony S. Campbell

Anthony S. Campbell,
President and Chief Executive Officer

DSM

Heat Pump Retrofit Program

Purpose

The Heat Pump Retrofit Program provides incentives for residential end-use members to replace their existing resistance heat source with a heat pump.

Availability

This program is available in all participating owner-member cooperative (owner-member) service territories served by EKPC.

Eligibility

This program is targeted to end-use members who currently heat their home with a resistance heat source; this program is targeted to site-built homes, manufactured homes, and multi-family dwellings. Eligibility requirements are:

- Incentive only applies when homeowner 's primary source of heat is an electric resistance heat furnace, ceiling cable heat, baseboard heat or electric thermal storage.
- Existing heat source must be at least two (2)-years old.
- New manufactured homes are eligible for the incentive.
- Two (2) maximum incentive payments per location, per lifetime for centrally ducted systems. DOE Federal minimum standard heat pumps with be incentivized at a rate of $750.00 per unit, while ENERGY STAR® standard heat pumps will receive a $1000.00 incentive per unit.
- Ducted and Ductless mini-splits will be incentivized at a rate of $500 per indoor head unit up to a maximum of three head units per location, per lifetime.

Payments

Owner-member cooperatives having an end-use member who replaces their existing resistance heat source with a heat pump will qualify for the following incentive based on the equipment type.

Equipment Type

Ducted Systems:

Current Energy Conservation Standard established by the Federal Department of Energy "DOE".	$1855 + $90 Admin Fee
Current EPA ENERGY STAR® level equipment or greater.	$2151 + $90 Admin Fee

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President and Chief Executive Officer

DSM - Heat Pump Retrofit Program (continued)

Mini Split Systems:

Ducted or Ductless Mini-Splits	\$935 per indoor heat unit + \$90 Admin Fee

EKPC will provide the payments outlined above to the owner-member for administrative costs, lost margin, and the recommended incentive to the end-use member.

Term

The program is an ongoing program.

N

DSM
High-Efficiency Heat Pump Program

Purpose

The High-Efficiency Heat Pump (HEHP) Program offers two incentive levels to residential end-use members (end-use member) for choosing to install either an air source heat pump (ASHP) that meets or exceeds the current ENERGY STAR® Program requirements, product specification for heat pump equipment established by the Environmental Protection Agency (EPA), or by installing a heat pump that has received the EPA cold climate air source heat pump (ccASHP) designation. The HEHP Program also provides an incentive for end-use members to choose a high-efficiency heat pump water heater over the standard conventional tank or instantaneous water heater.

Availability

This program is available in all service territories of the participating owner-member cooperatives (owner-members) of EKPC.

Eligibility

This program is targeted to new single or multi-family homes, existing single or multi-family homes or manufactured homes. Eligibility requirements are detailed below and are available at each participating owner-member's office and on the owner-member's website.

- Product must be certified based on the guidelines set forth below by equipment type.
- Rebate application must be completed and original receipt or copy must be provided for verification.

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(Signature of Officer)

TITLE President and Chief Executive Officer

DSM – continued

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- Receipt must include the following information:
  - Retailer's Name
  - Itemized listing of product(s), including description(s), manufacturer(s), model number(s), serial number(s) or other identifying information. The receipt information must match the product information from the rebate application.
  - Purchase price and proof that full payment was made.
  - Purchase date and date of delivery or installment (if installed by a contractor).
  - For new and existing construction, an owner-member energy advisor or pre-approved EKPC or owner-member representative may enter the rebate application on behalf of the end-use member. For an application entered by the energy advisor, the application must be accompanied by a picture of the appliance model number(s) and serial number(s). Rebate applications for new construction, without a receipt, will only be accepted through an energy advisor.
  - Each rebate application must be accompanied by a copy of the matching Air Conditioning, Heating and Refrigeration Institute's (AHRI) certificate. AHRI certificates can be acquired from the installer of the equipment or from the online AHRI directory.
    - Heat Pump AHRI certificate must list model numbers for the outside unit and indoor unit.
    - Heat Pump Water Heater AHRI certificate must list model number for the water heater.
- Incentive cannot be combined with the Heat Pump Retrofit incentive.

Heat Pumps

ENERGY STAR® ASHP Level
- Must be ducted and the primary source of heat for the home.
- Must meet the SEER2 and HSPF2 specifications of the current EPA ENERGY STAR® Standard.
- End-use members may apply for up to two HEHP incentives per calendar year, per premise/location. A maximum of six (6) rebates lifetime within this appliance category will be allowed per premise/location.

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TITLE President and Chief Executive Officer

DSM – continued

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ENERGY STAR® certified ccASHP or Geothermal Heat Pump Level

- Must be ducted and the primary source of heat for the home.
- ccASHP must meet current EPA standard for ccASHP and be listed as ccASHP certified on EPA's ENERGY STAR® product finder website.
- Geothermal heat pumps must meet the EER and COP specifications of the current EPA ENERGY STAR® standard.
- End-use members may apply for up to two HEHP incentives per calendar year, per premise/location. A maximum of six rebates per lifetime within this appliance category will be allowed per premise/location.

ENERGY STAR® Heat Pump Water Heaters

- End-use members may apply for two ENERGY STAR® certified heat pump water heater rebates per calendar year, per premise/location. A maximum of four rebates within this appliance category (Heat Pump Water Heaters) will be allowed per premise/location.
- Heat pump water heaters in new manufactured housing are not eligible for the incentive.

Landlord/Tenant Relationships:

Notwithstanding the forgoing, a landlord who rents to a tenant who is an end-use member of an EKPC owner-member shall also be eligible to participate in the HEHP program regardless of whether said landlord is also an end-use member of an EKPC owner-member. A landlord may be eligible for the same number of incentives per calendar year as a metered tenant end-use member.

Payments

- Residential end-use members will receive an incentive from their owner-member for installing heat pump equipment based on the levels in the table below, while owner-members will receive a transfer payment from EKPC to cover the incentive to end-use member, administrative cost and lost margin as a result of implementing the program:

N

DSM – continued

Equipment	Rebate to End-Use Member	EKPC Admin Payment to Owner-Member	EKPC Lost Margin Payment to Owner-Member
ENERGY STAR® HP	$500	$90	$51
ccASHP or Geothermal	$1,000	$90	$158
Heat Pump Water Heater	$250	$90	$213

Term

The ducted heat pump portion of this program is ongoing.

The heat pump water heater portion of this program will end when the US Department of Energy updates the conservation standards for consumer electric water heaters to require heat pump water heaters as the new minimum standard.

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(Signature of Officer)

TITLE President and Chief Executive Officer

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DSM

Backup Generator Control Program

Purpose

The Backup Generator Control Program is designed to incentivize the use of end-use member-owned backup generators to support EKPC's demand response initiatives. This program helps EKPC optimize its system performance.

Availability

The Backup Generator Control Program is available to residential end-use members within the service territories of participating EKPC owner-member cooperatives (owner-member). Participation in the program requires that the generator meets specific size and operational criteria as outlined in this tariff.

Eligibility

To qualify for this program:

- The generator must have a minimum capacity of 14 kW.
- The generator must have sufficient fuel reserves to operate continuously for at least 30 hours at any given time.
- The generator must be capable of being controlled remotely through EKPC's demand response systems for testing, performance verification, and event dispatch.
- The generator must be sized and permanently installed to supply and transfer the energy for the entire load of the residence at any time during the year.

Payments

Participating end-use members in the Backup Generator Control Program will receive the following incentives:

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DSM

Backup Generator Control Program - continued

- **Annual Availability Incentive**: $350 per year, provided the generator is available and meets all program eligibility requirements listed above.
- **Performance Incentive**: An additional $100 in any year in which the generator is dispatched for at least 25 hours

In total, the owner-member cooperative will receive an annual transfer payment of $500 from EKPC, where a $350 incentive is allocated to the end-use member and $150 is retained by the cooperative for administrative cost. If the generator is dispatched for 25 hours or more in a year, the total transfer payment will be $600, where $450 allocated to the end-use member and $150 retained by the owner-member cooperative for administrative cost.

Terms and Conditions

1. **Control and Testing**: Generators enrolled in the program will be subject to annual control events for testing and performance verification. Participants must ensure that the generator is fully operational and accessible for these events.
2. **Installation and Maintenance**: The end-use member is responsible for the proper installation, maintenance, and operation of the generator to meet the program's requirements. The cooperative reserves the right to inspect the generator installation to ensure compliance with the program criteria.
3. **Participation Agreement**: Participants must agree to terms and conditions outlining the program terms, including the conditions under which the generator may be controlled by EKPC. Participation in the program is voluntary, but withdrawal from the program requires a 30-day notice.
4. **Program Duration and Withdrawal**: Participants may enroll in the program at any time. Withdrawal from the program is permitted, but end-use members who withdraw must wait six (6) months before reapplying. Rejoining end-use members will initially be placed on the standard incentive schedule.

DSM

Backup Generator Control Program - continued

N

5. **Generator Dispatch**: EKPC will dispatch participating generators during peak demand periods or other times as needed. Participants will be notified in advance whenever possible, and dispatch events will be limited to ensure the reliability and longevity of the generators. At EKPC's discretion, generators may participate in available PJM markets and may be subject to PJM control events.
6. **Liability**: EKPC and the cooperative will not be liable for any damage to the generator or the end-use member's property resulting from participation in this program. The end-use member assumes all risks associated with the operation and use of the generator.
7. **Maximum Dispatch**: Generators will not be dispatched more than 50 hours in a calendar year.
8. **Program Termination:** EKPC reserves the right to terminate participation in the program if the end-use member is found to be non-compliant during demand response events or testing. Termination may occur if the generator fails to operate as required or does not meet the program criteria.
9. **Term**: This is an ongoing program.

Time Periods for Generator Dispatch

Generators may be dispatched during EKPC's peak demand periods, with specific timing and frequency determined by system needs and communicated to end-use members at least 30 minutes in advance.

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Anthony Campbell
President and Chief Executive Officer

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DSM

Commercial Advanced Lighting Program

Purpose

The Commercial Advanced Lighting Program aims to promote energy efficiency by encouraging non-residential end-use members to install high-efficiency LED lighting in their facilities.

Availability

This program is available to non-residential end-use members within EKPC's service territory in which the owner-member cooperative (owner-member) has a conforming tariff, provided the facility's energy usage in the prior calendar year did not exceed 3,000,000 kWh.

Eligibility

To qualify for the Commercial Advanced Lighting Program the end-use member must be on a non-residential rate. The business must have been in operations for at least two years and be current on its power bill payment to the owner-member. No empty buildings, inactive warehouses, or inactive storage areas shall qualify. The business must be open or have its normal lighting load on for at least 50 hours per week.

Incentive

There will be four (4) prescriptive measures end-use members can utilize for incentives. Each incentive measure is described below along with the incentive amount, administrative fee, and lost margin payment to the cooperative.

Measure 1: For indoor ceilings greater than 15 feet, typically, that utilize multi-lamp non-LED fixtures such as T5,T8, T12 or metal-halide single lamp fixtures that convert to an LED, fixture the cooperative will receive a total transfer payment of $85 per fixture; where a $35 incentive is provided to the end-use member and $50 is retained by the owner-member cooperative for lost margins and administrative costs.

Measure 2: For indoor ceilings equal to or less than 15 feet, typically, that utilize multi-lamp non-LED fixtures such as T5, T8, or T12 that convert to an LED fixture, the cooperative will receive a total transfer payment of $44 per fixture; where an $18 incentive is provided to the end-use member and where $26 is retained by the owner-member cooperative for lost margins and administrative costs.

DSM

Commercial Advanced Lighting Program - continued

Measure 3: For any outdoor non-LED high-pressure sodium or metal halide fixture that is converted to LED, this includes wall packs, flag lights, parking lot lights, canopy lights, and directional lights, the cooperative will receive a total transfer payment of $90 per fixture; where a $37 incentive is provided to the end-use member and $53 is retained by the owner-member cooperative for lost margins and administrative costs.

Measure 4: For any indoor non-LED screw-in type bulb or single-light fixture replaced with an LED, the cooperative will receive a total transfer payment of $26 per fixture, where a $10 incentive is provided to the end-use member and $16 is retained by the owner-member cooperative for lost margins and administrative costs.

All of these incentive amounts are summarized in the following table:

	End-Use Member	Coop Lost Margin	Admin Cost	Total Transfer Payment
Measure 1	$35	$49	$1	$85
Measure 2	$18	$25	$1	$44
Measure 3	$37	$52	$1	$90
Measure 4	$10	$15	$1	$26

Total end-use member incentives are limited to $5,000/year/facility.

Term

The Commercial Advanced Lighting Program is an ongoing program.

Verification Procedure

To qualify for the above-mentioned incentives, owner-member cooperative or EKPC personnel must verify that non-LED fixtures are currently installed and in use at the facility. Participants must submit receipts for the purchase of LED fixtures to the owner-member cooperative and the purchase date must be after the initial visit by owner-member cooperative or EKPC personnel.

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Anthony Campbell
President and Chief Executive Officer

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Section DSM

Commercial & Industrial Thermostat Program

Purpose
The Commercial & Industrial Thermostat Program is an energy efficiency initiative designed to encourage commercial and industrial end-use members to reduce energy usage by upgrading to self-learning thermostats.

Availability
This program is available to non-residential end-use members within the service territories of participating EKPC owner-member cooperatives (owner-members).

Eligibility
End-use members are eligible for this program if they have a ducted air-source air conditioner or heat pump with a capacity of 2 tons or greater, controlled by a single thermostat that is non-self-learning. An incentive is available for each single-zone system where a self-learning thermostat is installed. Zoned systems are not eligible for this incentive.

Notwithstanding the forgoing, a landlord who rents to a tenant who is an end-use member of an EKPC owner-member shall also be eligible to participate in the Commercial & Industrial Thermostat Program regardless of whether said landlord is also an end-use member of an EKPC owner-member. A landlord may be eligible for the same number of incentives per calendar year as a metered tenant end-use member.

Verification Procedure
To qualify for the incentive, existing non-self-learning thermostats must be identified or documented by EKPC or owner-member cooperative staff before the retrofit. After the end-use member completes the retrofit, EKPC or owner-member cooperative staff must verify the installation of thermostat.

N

Payment
For each qualifying thermostat that is replaced with a self-learning thermostat, the owner-member cooperative will receive a total transfer payment of $194, distributed as follows:

- $100 for the participant's incentive
- $94 retained by the owner-member cooperative for their lost margin and administrative cost

Term
The Commercial & Industrial Thermostat Program is an ongoing program.

DSM - 10 T

Community Assistance Resources for Energy Savings Program

Purpose

The Community Assistance Resources for Energy Savings (CARES) program provides an incentive to enhance the weatherization and energy efficiency services provided to the residential end-use members (end-use member) of the owner-member cooperatives (owner-member) of EKPC by the Kentucky Community Action Agency (CAA) network of not-for-profit community action agencies or by Kentucky's non-profit affordable housing organizations (AHO). EKPC will provide an incentive through the owner-member to the CAA or AHO on behalf of the end-use member. EKPC's program has two primary objectives. First, EKPC's incentive will enable the CAA or AHO to accomplish additional energy efficiency improvements in each home. Second, the additional incentive from EKPC will assist the CAA or AHO in weatherizing more homes. T T T T

Availability

This U.S. Department of Energy's Weatherization Assistance Program is available to end-use members who qualify for weatherization and energy-efficiency services through their local CAA in all service territories of the participating owner-members of EKPC. T

Weatherization and energy efficiency services provided by Kentucky's AHO's are also available to end-use member in all service territories of the participating owner-member of EKPC. T

Eligibility

AGENCY QUALIFICATIONS

- CAA's and AHO's must be registered with the IRS as 501(c)(3) non-profit organizations and work to improve housing affordability for low to moderate income Kentuckians.

HOMEOWNER QUALIFICATIONS

- A participant must be an end-use member of one of EKPC's owner-members. T
- A participant must qualify for weatherization and energy efficiency services according to the guidelines of the Federal Weatherization Assistance Program as administered by the local CAA or the AHO. Household income cannot exceed the designated poverty guidelines administered by the CAA or AHO.
- A participant must dwell in either a Heat Pump-Eligible Home or a Heat Pump-Ineligible Home. For purposes of this tariff:

  A Heat Pump-Eligible Home is a single-family or multi-family individually metered residential dwelling that utilizes electricity as the primary source of heat or that switches from wood as its primary source of heat to an electric furnace; and

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Anthony S. Campbell,
President and Chief Executive Officer

DSM – 10 (continued)

A Heat Pump-Ineligible Home is a single-family or multi-family individually metered residential dwelling (that does not utilize electricity as the primary source of heat but cools the home with central or window unit air conditioners. Each Heat Pump-ineligible home must also have an electric water heater and use an average of 500 kWh monthly from November to March.

Payments

HEAT PUMP - ELIGIBLE HOMES

EKPC will reimburse the owner-member for incentives paid to a CAA or AHO at the rates detailed below. T
The maximum incentive possible per household is $3,000, which can be reached by using any combination of the following improvements not to exceed their individual maximums: T

- HEAT PUMP:
  Upgrading from low-efficiency electric heat source to a heat pump will be reimbursed at a rate of one-hundred percent (100%) of the total incremental cost (material + labor) up to a maximum of $3,000 per household. Incremental cost is the additional cost of upgrading from a low-efficiency electric heat source to a heat pump above and beyond any costs associated with the electric furnace. The existing heat source must be electric (or switching from wood to electric) to qualify. T

- WEATHERIZATION IMPROVEMENTS:
  Any of the following weatherization improvements made to the home will be reimbursed at a rate of fifty percent (50%) of a CAA's or AHO's cost (material + labor), up to a maximum of $1,500: T
  - Insulation
  - Air sealing
  - Duct sealing, insulating, and repair
  - Water heater blanket

Health and safety measures completed at the home do not qualify for the incentive and documentation required from a CAA or AHO must adhere to the program guidelines. Quality assurance sampling will be conducted by the owner-member at a rate of ten percent (10%).

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Anthony S. Campbell,
President and Chief Executive Officer

DSM – 10 (continued)

HEAT PUMP - INELIGIBLE HOMES

EKPC will reimburse a CAA's or AHO's energy efficiency efforts through the owner-member at the rates detailed below. The maximum incentive possible per household is $1,250, which can be reached by using any T combination of the following improvements not to exceed the maximum:

- WEATHERIZATION IMPROVEMENTS:
  Any of the following weatherization improvements made to the home will be reimbursed at a rate of twenty-five (25%) of a CAA's or AHO's cost (material + labor) up to a maximum of $1,250: T
  - Insulation
  - Air sealing
  - Duct sealing, insulating, and repair
  - Water heater blanket

Health and safety measures completed at the home do not qualify for the incentive and documentation required from a CAA or AHO must adhere to the program guidelines. Quality assurance sampling will be conducted by the owner-member at a rate of ten percent (10%).

D

The owner-member will receive a transfer payment of $600 for lost margins and $100 for administrative costs for a heat pump-eligible home. For a heat pump-ineligible home, the owner-member will receive a transfer payment of $50 for lost margins and $100 for administrative costs. T T T

Term

The program is an ongoing program.

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Anthony S. Campbell,
President and Chief Executive Officer

ATTACHMENT SD-11

REDLINE TARIFFS

DSM
Button-Up Weatherization Program

Purpose

The Button-Up Weatherization Program offers an incentive for reducing the heat loss of a home. The ~~retail~~ residential end-use member may qualify for this incentive by ~~improving~~ making improvements such as increasing ~~attic~~ insulation, installing higher efficiency windows and doors, ~~and~~ by reducing the air leakage of their home, or by sealing their HVAC duct system. T T

Availability

This program is available in all service territories of ~~the~~ participating owner-members cooperatives (owner-members) of EKPC. T

Eligibility

This program is targeted at older single-family, multi-family or manufactured dwellings. Eligibility requirements are:

- Home must be 2-years old or older to qualify for the incentive.
  Primary source of heat must be electricity.
- Heat loss calculation of British thermal units per hour (Btuh) reduced will be made using the
- Manual J 8th Edition or through other methods approved by EKPC. Heat loss calculations in Btuh are based on the winter design temperature. [T]

The Button-Up program encourages homeowners to improve the thermal envelope of their home through improved insulation, upgraded windows/doors, and air-sealing, and EKPC approved contractor or owner-member representative must preform a "pre" and "post" blower door test to measure actual Btuh reduced. N

N

The following is a list of eligible Button-Up Program improvements:

- Insulating basement walls
- Insulating floor over unconditioned space
- Encapsulating a crawlspace
- insulating rim or band board
- Retrofitting uninsulated exterior walls with insulation
- Insulating ceiling
- Converted to a conditioned attic
- Insulating attic accesses
- Upgrading windows and doors
- Air-sealing the home envelope
- Air-sealing ductwork.

~~The Button Up incentive will promote the reduction of energy usage through air sealing on the part of retail members. Typical air sealing could include caulking, improved weather stripping, sealing attic accesses, etc. To receive this incentive either an EKPC approved contractor or owner-member representative must perform a "pre" and "post" blower door test to measure actual Btuh reduced.~~ [D]

~~The attic insulation portion of the Button Up incentive will promote the reduction of energy usage on the part of the retail member. Heat loss calculation of Btuh reduced will be made by using either the Manual J 8th Edition or through other methods approved by EKPC. Heat loss calculations in Btuh are based on the winter design temperature. In order to receive an incentive for attic insulation, an air seal must be completed.~~

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ISSUED BY: _____________________________
Anthony S. Campbell,
President and Chief Executive Officer

DSM
Button-Up Weatherization Program (continued)

The HVAC duct sealing portion of the Button up is a standalone measure that can be utilized to air seal HVAC duct systems located in un-heated spaces. Air sealing ducts with traditional mastic sealers is an effective way to lower energy costs.

- Limited to homes that have accessible centrally ducted heating systems in unconditioned areas.
- Initial duct leakage must be greater than 10cfm per 100ft2
- Contractor or owner-member ~~R~~representative are required to conduct a "pre" and "post" blower door test to verify leakage reductions. ~~Only contractors trained or pre-approved by EKPC may be used.~~ Contractors must be trained or pre-approved by EKPC or the Owner-Member.
- Duct leakage per system must be reduced to less than 8cfm per 100ft2 (Ex: Duct system serves 1200ft. 1200ft2/100ft2 x8cfm = 12 x 8cfm= Duct Seal Target of 96cfm)
- All joints in the duct system must be properly sealed with ~~foil tape and~~ duct mastic. Foil tape ~~alone~~ does not qualify as properly sealing the duct system.

For homes that have two or more separately ducted heat systems, each system will qualify independently for the incentive.

Payments

The Button-Up pays an incentive to the residential end-use member of $100 per one thousand British thermal unit per hour (Btuh) of heat loss reduced, up to $1,875. EKPC all also provided a transfer payment to the owner-member of $40 per thousand Btuh, up to $565 to cover lost margins. To assist with owner-member administrative cost, EKPC will provide a payment of $130. For enrollments that compete air sealing, the administrative payment will be $230. N

~~The air sealing and ceiling insulation portion of the Button Up incentive will pay a total payment of $70 per thousand Btuh reduced and the maximum rebate incentive up to $750 ($40 per thousand Btuh to the retail member and $30 per thousand Btuh to the owner-member). EKPC will also pay the owner-member an administrative fee of $230 and up to $565 for lost margins. EKPC will pay up to a total transfer payment of $1,545.~~ D

The HVAC duct sealing portion of the Button Up program will pay a ~~$400~~ $500 incentive to residential members (or their contractor) that meets the eligibility requirements for duct sealing listed above. EKPC will also pay the owner-member an administrative fee of $100 and lost margins of $150. EKPC will pay a total transfer payment of ~~$650~~ $750.

Term

The program is an ongoing program.

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Anthony S. Campbell,
President and Chief Executive Officer

DSM

Heat Pump Retrofit Program

Purpose

The Heat Pump Retrofit Program provides incentives for residential ~~retail~~end-use members to replace their existing resistance heat source with a heat pump. T

Availability

This program is available in all participating owner-member cooperative (owner-member) service territories served by EKPC. T

Eligibility

This program is targeted to ~~retail~~end-use members who currently heat their home with a resistance heat source; this program is targeted to site-built homes, manufactured homes, and multi-family dwellings. Eligibility requirements are: T

- Incentive only applies when homeowner 's primary source of heat is an electric resistance heat furnace, ceiling cable heat, baseboard heat or electric thermal storage.
- Existing heat source must be at least two (2)-years old.
- New manufactured homes are eligible for the incentive.
- Two (2) maximum incentive payments per location, per lifetime for centrally ducted systems. DOE Federal minimum standard heat pumps with be incentivized at a rate of $750.00 per unit, while ENERGY STAR® standard heat pumps will receive a $1000.00 incentive per unit. N
- Ducted and Ductless mini-splits ~~applying for the incentive~~ will be incentivized at a rate of $~~250~~ 500 per indoor head unit up to a maximum of three head units per location, per lifetime.
- ~~Participants in the Heat Pump Retrofit Program are not eligible for participation in the ENERGY STAR® Manufactured Home Program.~~ D

Payments

Owner-member cooperatives having an end-use member who replaces ~~Homeowners replacing~~ their existing resistance heat source with a heat pump will qualify for the following incentive based on the equipment type. T

Equipment Type

~~Central~~ Ducted Systems:

Current Energy Conservation Standard established by the Federal Department of Energy "DOE".	$~~1605~~ 1855 + $90 Admin Fee	T

~~Payment to Member System~~ D

Current EPA ENERGY STAR® level equipment or greater.	$~~1901~~ 2151 + $90 Admin Fee

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ISSUED BY:

President and Chief Executive Officer

~~Issued by authority of an Order of the Public Service Commission of Kentucky in Case No. 2019-00059~~

DSM - Heat Pump Retrofit Program (continued)

Mini Split Systems:

Ducted or Ductless Mini-Splits	$~~685~~ 935 per indoor heat unit + $90 Admin Fee T

EKPC will provide the payments outlined above to the owner-member for administrative costs, lost ~~revenue~~margin, and the recommended incentive to the ~~retail~~ end-use member. ~~Lost revenue calculations may fluctuate based on current rates.~~ T

Term

The program is an ongoing program.

DSM - 10 T

Community Assistance Resources for Energy Savings Program

Purpose

The EKPC Community Assistance Resources for Energy Savings ("CARES") program provides an incentive to enhance the weatherization and energy efficiency services provided to the retail residential end-use members (end-use member) of the owner-members cooperatives (owner-member) of EKPC by the Kentucky Community Action Agency ("CAA") network of not-for-profit community action agencies or by Kentucky's non-profit affordable housing organizations ("AHO"). EKPC will provide an incentive through the owner-member to the CAA or AHO on behalf of the retail end-use member. EKPC's program has two (2) primary objectives. First, EKPC's incentive will enable the CAA or AHO to accomplish additional energy efficiency improvements in each home. Second, the additional incentive from EKPC will assist the CAA or AHO in weatherizing more homes. T T T T

Availability

This U.S. Department of Energy's Weatherization Assistance Program is available to retail end-use members who qualify for weatherization and energy-efficiency services through their local CAA in all service territories of the participating owner-members of EKPC. T

Weatherization and energy efficiency services provided by Kentucky's AHO's are also available to retail end-use members in all service territories of the participating owner-members of EKPC. T

Eligibility

AGENCY QUALIFICATIONS

- CAA's and AHO's must be registered with the IRS as 501(c)(3) non-profit organizations and work to improve housing affordability for low to moderate income Kentuckians.

HOMEOWNER QUALIFICATIONS

- A participant must be an retail end-use member of one of EKPC's owner-members. T
- A participant must qualify for weatherization and energy efficiency services according to the guidelines of either the Federal Weatherization Assistance Program as administered by the local CAA or the AHO. Household income cannot exceed the designated poverty guidelines administered by the CAA or AHO.
- A participant must dwell in either a Heat Pump-Eligible Home or a Heat Pump-Ineligible Home. For purposes of this tariff:

  A Heat Pump-Eligible Home is a single-family or multi-family individually metered residential dwelling that utilizes electricity as the primary source of heat or that switches from wood as its primary source of heat to an electric furnace; and

DSM – 10 (continued)

A Heat Pump-Ineligible Home is a single-family or multi-family individually metered residential dwelling (that does not utilize electricity as the primary source of heat but cools the home with central or window unit air conditioners. Each Heat Pump-ineligible home must also have an electric water heater and use an average of 500 kWh monthly from November to March.

Payments

HEAT PUMP - ELIGIBLE HOMES

EKPC will reimburse the owner-member for rebates incentives paid to a CAA or AHO at the rates detailed below. The maximum incentive possible per household is $2,000 $3,000, which can be reached by using any combination of the following improvements not to exceed their individual maximums: [T] [T]

- HEAT PUMP:
  Upgrading from low-efficiency electric heat source to a heat pump will be reimbursed at a rate of one-hundred percent (100%) of the total incremental cost (material + labor) up to a maximum of $2,000 $3,000 per household. Incremental cost is the additional cost of upgrading from a low-efficiency electric heat source to a heat pump above and beyond any costs associated with the electric furnace. The existing heat source must be electric (or switching from wood to electric) to qualify. [T]

- WEATHERIZATION IMPROVEMENTS:
  Any of the following weatherization improvements made to the home will be reimbursed at a rate of fifty percent (50%) of a CAA's or AHO's cost (material + labor), up to a maximum of $1,000 $1,500: [T]
  - Insulation
  - Air sealing
  - Duct sealing, insulating, and repair
  - Water heater blanket

Health and safety measures completed at the home do not qualify for the incentive and documentation required from a CAA or AHO must adhere to the program guidelines. Quality assurance sampling will be conducted by the owner-member at a rate of ten percent (10%).

DATE OF ISSUE: April 22, 2022 November 20, 2024

DATE EFFECTIVE: Service rendered on or after May 22, 2022 January 1, 2025

ISSUED BY: ______________________________

Anthony S. Campbell,
President and Chief Executive Officer

DSM – 10 (continued)

HEAT PUMP - INELIGIBLE HOMES

EKPC will reimburse a CAA's or AHO's energy efficiency efforts through the owner-member at the rates detailed below. The maximum incentive possible per household is $750 $1,250, which can be reached by using any combination of the following improvements not to exceed the maximum: [T]

- WEATHERIZATION IMPROVEMENTS:
  Any of the following weatherization improvements made to the home will be reimbursed at a rate of twenty-five (25%) of a CAA's or AHO's cost (material + labor) up to a maximum of $750 $1,250: [T]
  - Insulation
  - Air sealing
  - Duct sealing, insulating, and repair
  - Water heater blanket

Health and safety measures completed at the home do not qualify for the incentive and documentation required from a CAA or AHO must adhere to the program guidelines. Quality assurance sampling will be conducted by the owner-member at a rate of ten percent (10%).

LOST REVENUE AND ADMINISTRATVE COSTS [D]

The owner-member will receive a transfer payment of $600 to cover for lost revenue margins and $100 for to cover its administrative costs for a heat pump-eligible home. For a heat pump-ineligible home, the owner-member will receive a transfer payment of $50 for lost margins and $100 for administrative costs. [T] [T] [T]

Term

The program is an ongoing program.

DATE OF ISSUE: April 22, 2022 November 20, 2024

DATE EFFECTIVE: Service rendered on or after May 22, 2022 January 1, 2025

ISSUED BY: ______________________________
Anthony S. Campbell,
President and Chief Executive Officer

EXHIBIT 11

DIRECT TESTIMONY OF THOMAS STACHNIK

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST	**)**	
KENTUCKY POWER COOPERATIVE,	**)**	
INC. FOR 1) CERTIFICATES OF PUBLIC	**)**	
CONVENIENCE AND NECESSITY	**)**	**CASE NO.**
TO CONSTRUCT NEW GENERATION	**)**	**2024-00370**
RESOURCES; 2) FOR A SITE COMPATIBILITY	**)**	
CERTIFICATE RELATING TO THE SAME;	**)**	
3) APPROVAL OF DEMAND SIDE MANAGEMENT	**)**	
TARIFFS; AND 4) OTHER GENERAL RELIEF	**)**	

DIRECT TESTIMONY OF THOMAS J. STACHNIK
VICE PRESIDENT OF FINANCE AND TREASURER
ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Filed: November 20, 2024

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST KENTUCKY POWER COOPERATIVE, INC. FOR 1) CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT NEW GENERATION RESOURCES; 2) FOR A SITE COMPATIBILITY CERTIFICATE RELATING TO THE SAME; 3) APPROVAL OF DEMAND SIDE MANAGEMENT TARIFFS; AND 4) OTHER GENERAL RELIEF	)	**CASE NO. 2024-00370**

A F F I D A V I T

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Thomas J. Stachnik, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand and that the matters and things set forth therein are true and correct, to the best of his knowledge, information and belief.

Thomas J. Stachnik

____

Subscribed and sworn before me on this 18th day of November 2024.

Gwyn M. Willoughby

Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.

A. My name is Thomas J. Stachnik. I am the Vice President of Finance and Treasurer for East Kentucky Power Cooperative, Inc. ("EKPC"). My business address is 4775 Lexington Road, Winchester, Kentucky 40391.

Q. PLEASE DESCRIBE YOUR EDUCATION AND EXPERIENCE.

A. I have a Bachelor of Science in Chemical Engineering from the University of Illinois and a Master of Business Administration from the University of Chicago. Additionally, I hold the Chartered Financial Analyst and Certified Treasury Professional designations. Prior to establishing a career in finance, I enjoyed working as a chemical engineer for approximately ten (10) years. I worked in the Treasury Department of Brown-Forman Corporation for thirteen (13) years before assuming my current role at EKPC in August 2015.

Q. PLEASE DESCRIBE YOUR DUTIES AS VICE PRESIDENT AND TREASURER FOR EKPC.

A. I am responsible for the management and direction of the treasury function of EKPC including borrowing, investing, and cash management. I also oversee the financial forecasting, budgeting, and risk management functions. I report directly to EKPC's Executive Vice President and Chief Financial Officer, Mr. Cliff Scott.

Q. HAVE YOU TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION BEFORE? IF SO, IN WHAT CASES?

A. I have provided written testimony pertaining to financing issues in several cases at the Commission. I have also assisted in the preparation of financing applications and provided testimony in other proceedings.[1]

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to describe how EKPC intends to finance the proposed construction of the Cooper Combined Cycle Gas Turbine ("CCGT"), the Cooper co-fire, and the Spurlock co-fire projects (collectively, "the Projects")

Q. ARE YOU SPONSORING ANY ATTACHMENTS?

A. No

II. FINANCING THE PROJECTS

Q. WHAT DO YOU EXPECT TO BE THE LOWEST COST FINANCING AVAILABLE FOR THE PROJECTS?

A. Ultimately EKPC intends to seek financing for the Projects from the Rural Utilities Service ("RUS"), which will be the lowest cost option. However, there will be a lag in receiving RUS funding due to pending environmental review, applications, and other standard procedures. EKPC cannot apply for RUS funding until environmental reviews are complete, and the application process itself can take several months. Once an application is approved for specific projects, EKPC has generally waited for projects to

[1] Case No. 2016-00116, *An Application of East Kentucky Power Cooperative, Inc. for Approval of the Amendment and Extension or Refinancing of an Unsecured Revolving Credit Agreement in an Amount Up To $800,000,000 of Which Up To $100,000,000 May Be in the Form of an Unsecured Renewable Term Loan and $200,000,000 of Which Will Be in the Form of a Future Increase Option* (filed Mar. 9, 2016); Case No. 2018-00115, *The Application of East Kentucky Power Cooperative, Inc. for Approval of the Authority to Issue up to $300,000,000 of Secured Private Placement Debt and/or Secured Tax-Exempt Bonds and for the Use of Interest Rate Management Instruments* (filed Mar. 27, 2018); and Case No. 2021-00473, *Electronic Application of East Kentucky Power Cooperative, Inc. for Approval of the Amendment and Extension or Refinancing of an Unsecured Revolving Credit Agreement in an Amount up to $800,000,000 or which up to $100,000,000 may be in the Form of an Unsecured Renewable Term Loan and up to $400,000,000 of which will be in the Form of a Future Increase Option* (filed Dec. 20, 2021).

be completed and in service before requesting advances on the loan. However, we have been discussing with RUS the possibility of advancing funds prior to completion of the projects on an approved loan after making significant payments, which would allow us to benefit from favorable interest rates sooner.

Q. HOW WILL EKPC FINANCE THE INITIAL EXPENDITURES FOR THE PROJECTS?

A. Initially any expenditures related to the Projects will be funded by general corporate cash and borrowings on the Revolving Credit Facility or with other interim financing (for which a separate financing authorization will be filed). EKPC will replace any temporary financing with long-term debt issued under the existing trust indenture from the RUS or other lenders.

Q. **DESCRIBE THE CAPACITY ON EKPC'S REVOLVING CREDIT FACILITY.**

A. EKPC recently expanded the Revolving Credit Facility, which was authorized under case number 2021-00473, by $100 million to $600 million and extended the maturity date to July 2029. As of October 31, 2024, $275 million is drawn and approximately $325 million is available on this facility. Amounts under the credit facility are fully pre-payable with funds from other debt issuances or operating cash flow, and those funds may be re-borrowed as needed for the term of the Credit Facility. The Credit Facility contains a provision by which the amount of the facility can be increased up to a total of $800 million with consent of the lenders also known as the Accordion Option.

Q. WHAT OTHER RESOURCES ARE AVAILABLE TO EKPC TO FUND CAPITAL PROJECTS?

A. EKPC maintains investment-grade credit ratings and strong relationships with the financial community to provide several sources of financing. As an example, in 2019, in anticipation of the expenditures for the CCR/ELG project, EKPC reduced borrowings under the Credit facility by issuing $250 million in term debt at reasonable interest rates in a combination of a Private Placement issuance and a term loan with the National Rural Utilities Cooperative Finance Corporation authorized by Case No. 2018-00115. EKPC is currently in discussions with our financial institutions to seek additional expansions of the credit facility, other short-term bilateral loans, and/or private placement financing to relieve the credit facility as funds are expended.

Q. CAN YOU ELABORATE ON HOW THESE SOURCES OF FINANCING MIGHT BE USED TO FUND THE PROJECTS?

A. The cash flows for the Projects contained in the Project Scoping Reports (Exhibits BY-1, BY-2, and BY-3) are summarized as follows:

Project Cash Expenditures

2024	$17 million
2025	$55 million
2026	$187 million
2027	$273 million
2028	$496 million
2029	$464 million
2030	$86 million

We expect to have an RUS loan for the Projects in place by 2028 at which time we intend to advance a progress payment for the approximately $550 million that will be expended up to that time, and continue to use progress payments throughout the project life to relieve the credit facility. As a result, EKPC expects the increased need for short-term funding for the Projects under the credit facility or other interim financing to peak at approximately $550 million in 2028.

With these additional Projects and considering all projects in our plan, the $600 million credit facility will not be sufficient to provide the necessary liquidity for these projects.

EKPC estimates that the current capacity of the credit facility will be capable of handling expenditures for this and for other capital projects through mid- to late-2025. However, EKPC always endeavors to have liquidity beyond the expected needs. Initially, it will be prudent to issue $300-500 million in intermediate term (5-10 years) debt in order to free up capacity on the credit facility in mid- to late-2025. Issuance of this debt will serve to pay down the Credit Facility and build up a cash reserve that will serve EKPC's general corporate needs in a prudent manner and will not cause a situation where we have borrowed too much at costly rates. The cost of this financing will be comparable to the current credit facility pricing.

After 2025, an additional $100 - 300 million of intermediate term debt (to be repaid after receiving RUS financing for all the Projects) will be needed over the next several years of construction, considering only these Projects. EKPC will endeavor to add debt in the most efficient way to be sure that it can be replaced with long term financing from RUS. EKPC will seek Commission approval for any financing that falls under KRS 278.300. If RUS progress payments are delayed beyond what we are expecting, additional interim financing may be needed.

Q. DESCRIBE THE ULTIMATE FINANCING OF THESE PROJECTS?

A. Ultimately, EKPC will seek RUS financing for the Projects, for which EKPC expects to receive up to 35-year loans at very favorable interest rates of the US Treasury security rate plus 1/8 of 1%.

Q. WHEN WILL THE INTEREST RATES ON THESE RUS LOANS BE DETERMINED?

A. The interest rates are set at the current rate at the time the funds are drawn.

Q. CAN ANYTHING BE DONE TO MANAGE THE ULTIMATE INTEREST RATE OF THESE LOANS?

A. Yes. Interest rate hedges can be entered into to hedge the risk of interest rate changes from the time the expenditures are known until the debt is ultimately issued. EKPC would have to receive approval from the Commission in a Financing Case to enter into such agreements.

Q. DO YOU BELIEVE THAT EKPC'S PLAN TO FINANCE THE PROJECT IS REASONABLE AND WILL RESULT IN THE LOWEST POSSIBLE DEBT COST TO EKPC'S OWNER-MEMBERS?

A, Yes.

Q. IN YOUR OPINION, HOW WILL FINANCING THE PROJECTS AFFECT EKPC'S FINANCIAL POSITION?

A. Financing the Projects will increase EKPC's debt and interest expense, however, EKPC has strong ratings and relationships with RUS and the financial community necessary to obtain the financing needed. EKPC projects that the rate increases needed to support capital plans going forward are reasonable and that the equity to asset ratio, while lower, will remain at acceptable levels.

III. CONCLUSION

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. Initially any expenditures related to the Projects will be funded by general corporate cash and borrowings on the Revolving Credit Facility or with other interim financing. EKPC will eventually replace any temporary financing with long-term debt issued under the existing trust indenture from RUS or other lenders.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.