EAST KENTUCKY POWER COOPERATIVE

A Touchstone Energy® Cooperative

Case No. 2022-00439

December 21, 2022

VIA ELECTRONIC TARIFF FILING SYSTEM

Linda Bridwell
Executive Director
Kentucky Public Service Commission
211 Sower Boulevard
P.O. Box 615
Frankfort, Kentucky 40602

Re: East Kentucky Power Cooperative, Inc. – Pilot Residential Electric Vehicle Off-Peak Charging Program

Dear Ms. Bridwell:

Please find enclosed for filing with the Commission the above-referenced East Kentucky Power Cooperative, Inc. ("EKPC") proposed tariff for a Demand Response ("DR") Pilot Residential Electric Vehicle Off-Peak Charging Program ("pilot program"). The pilot program is being offered in order to offer incentives for residential members to delay their daily electric vehicle ("EV") charging until off-peak hours.

EKPC is proposing this pilot program in order to try to influence when EV owners use their residential charging stations to charge their EVs. EKPC's research shows that 80% of EV charging occurs at the residence and mostly during EKPC and PJM Interconnection, LLC ("PJM") system peak hours. This program is a voluntary program. EKPC intends to use the same application process it currently uses for the Cooperative Solar program. The proposed pilot program proposes an off-peak incentive for residential members to delay their daily EV charging to off-peak hours. The DR Pilot Program provides a $0.02 per kWh incentive for energy consumed during off-peak hours, which are from 10:00 p.m. to 6:00 a.m. Eastern Prevailing Time. EKPC will provide $0.01 per kWh incentive and the owner-member cooperative ("Owner-Member") will provide the other $0.01 per kWh incentive.

A third-party vehicle data provider, who connects with individual EVs and Electric Vehicle Supply Equipment ("EVSE") will collect data regarding kWhs consumed off-peak by program participants. This third-party will be able to provide the hourly energy consumed by each participating EV while at the participating residence. By tracking the kWhs through the EV's metrology, the owner-member cooperative is able to avoid the cost of an installation of a second meter at each participant's home. This second meter would be needed to monitor energy consumption of the EV only, if the information was not collected by the third-party data provider. EKPC understands that this is not a traditional approach to sub-meter energy consumption, but this alternative allows EKPC to keep costs for the pilot program low and avoids socialization of any

4775 Lexington Road, POB 707
Winchester, KY 40392
859-744-4812

charges to all ratepayers. EKPC has issued a Request for Proposals ("RFP") for the service to be provided by the third-party. It was issued to six companies and five have submitted proposals in response tothe RFP. Since EKPC has not worked with these third-party providers in the past, as a precaution and to ensure that the data provided by the third-party is accurate, EKPC plans to install research meters in approximately 10-12% of the participants' homes. This sampling size should provide EKPC with the assurances that the data provided by the third-party is accurate.

The proposed pilot program is a three-year pilot program which would end June 30, 2026. The Owner-Members will submit to the Commission their request for approval of confirming pilot program tariffs after EKPC receives approval for the proposed tariff.

By offering this pilot program, EKPC believes that this will benefit both EV owners and non-EV owners by reducing the system peak production. EKPC has conducted a cost benefit analysis which is discussed below. EKPC has diligently worked with its Owner-Members and consultants to evaluate the cost-effectiveness and need for the proposed pilot program. An ad-hoc group was created consisting of EKPC and Owner –Member's staff to research and develop the proposed pilot program. This research found that all major car manufacturers have committed to electrifying their fleets. This pilot program and the research conducted were shared with EKPC's executive leadership and the Owner-Members' Chief Executive Officers ("CEOs") and a decision was made to propose the attached tariff as a pilot. Accordingly, please find attached the following materials to evidence the work performed by EKPC and the Committee as well as the proposed tariffs.

1. **Exhibit A – Proposed DSM Tariff**

EKPC's proposed DSM Pilot Residential Electric Vehicle Off-Peak Charging Program tariff is filed herewith as Exhibit A. Included with this exhibit is an update to EKPC's tariff general index.

2. **Exhibit B – Supporting Documents: Marked-Up Copy of Proposed DSM Tariff**

EKPC is also including a copy of the modified tariff sheets. The tariff is tendered in a format showing the strike-throughs of the existing tariff sheets for convenience.

3. **Exhibit C – Supporting Documents: DSM Program Explanation and Presentation, Cost-Effectiveness Assumptions and Summary Results**

EKPC retained an expert in DSM resources, Mr. John Farley, to analyze the cost-effectiveness of this pilot program. He used the widely accepted "DSMore" software tool to prepare benefit-cost ratios for the California standard tests.

Mr. Farley used equipment cost quotes from the potential supplier. He developed hourly load profiles for EV charging. He started with existing profile data from another regional utility, and adjusted it using updated annual kWh and peak kW information. Then he modeled changes to that profile when EV charging is limited to off-peak hours. In this way, he determined the impacts of the pilot program, including kWh shifted and peak kW reduced.

Mr. Farley used EKPC's avoided cost of energy and capacity to calculate the benefits of the pilot program. EKPC's avoided cost of energy is the forward price for energy in the energy market operated by PJM. EKPC's avoided cost of generation capacity is the forward price curve of the PJM Base Residual Auction ("BRA") for capacity. The avoided energy and capacity costs used in this evaluation represent the market value placed on future energy and capacity savings.

Finally, Mr. Farley calculated benefit-cost ratios in DSMore for the Total Resource Cost, Ratepayer Impact Measure, Participant Cost, and Societal Cost tests.

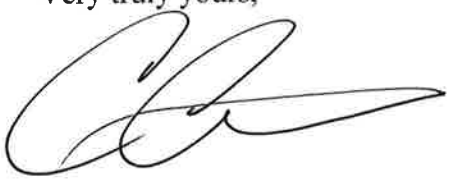
Attached as Exhibit C are the following documents: Presentation prepared by EKPC and presented to the Executive Leadership and Owner-Member CEOs, and Mr. Farley's Summary and Assumption Sheet.

Exhibit D – Supporting Documents: Customer Notice and Effective Date

Pursuant to KRS 278.180(1), EKPC must give at least 30-days' advance notice to the Commission. Therefore, the proposed effective date of these tariff revisions will be February 1, 2023. Pursuant to 807 KAR 5:011, EKPC has posted the requisite notice at its office located at 4775 Lexington Road, Winchester, Kentucky and will post the requisite notice on its website, no later than five (5) business days from today's date, which will include a hyperlink to the Commission's website where the tariff can be found. EKPC has also given written notice to its sixteen (16) Owner-Members by mailing a copy of the notice and proposed tariff to each of them, on this date. A copy of the Customer Notice is attached.

Please contact me if you have any questions.

Very truly yours,



Chris Adams
Director, Regulatory and Compliance Services

Enclosures

cc: L. Allyson Honaker

GENERAL INDEX

DATE OF ISSUE: December 21, 2022

DATE EFFECTIVE: Service rendered on and after February 1, 2023

ISSUED BY: Anthony S. Campbell

Anthony S. Campbell,
President and Chief Executive Officer

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DSM Pilot

Residential Electric Vehicle Off-Peak Charging Program

Applicability

In all territories of owner-members of EKPC.

Availability

The Residential Electric Vehicle ("EV") Off-Peak Charging Program ("Program") is available to end-use retail members ("retail members") in the service territories of EKPC owner-members and includes energy reporting from electric vehicles or compatible electric vehicle supply equipment ("EVSE").

The Program will be a three year pilot ending June 30, 2026. EKPC reserves the right to restrict the number of retail members in the pilot.

Purpose

The Program will encourage the reduction of growth in peak demand resulting from the adoption of EVs, allow EKPC to utilize its system more efficiently, manage market purchases, defer the construction of new generation, and promote the adoption of EVs.

Eligibility

To qualify for this program, the retail member's residence must be located in the service territory of a participating owner-member and the retail 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 retail member may either own or rent the residence where the qualifying EVSE or EV will be charging.

The retail member is responsible for obtaining the permission of the owner of the rented residence to participate in the Program.

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DSM Pilot (continued)

Program Incentives

EKPC will provide a monthly $.01 per-kwh credit to the owner-member, to be passed onto the retail member, for all registered EVs charging energy (kWhs) that occurs during the off-peak hours at the retail member's residence. The off-peak hours occur from 10:00 PM to the following 6:00 AM EPT for all days of the year.

Terms and Conditions

1. Prior to joining the program, the owner-members may inspect the retail member's electrical equipment to insure compatibility with the energy software platform, but the owner-members shall not be responsible for the installation, repair or maintenance of the electrical equipment or the electric vehicle.
2. Retail members may join the program at any time during the year.
3. If a retail member decides to withdraw from the program, the owner-member will endeavor to implement the change as soon as possible.

GENERAL INDEX

DATE OF ISSUE: ~~April 11, 2022~~ December 21, 2022

DATE EFFECTIVE: Service rendered on and after ~~March 29, 2022~~ February 1, 2023

ISSUED BY: Anthony S. Campbell,
President and Chief Executive Officer

~~Issued by authority of an Order of the Public Service Commission of Kentucky in Case No. 2021-00429 dated March 29, 2022.~~

DSM Pilot

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Kentucky's Touchstone Energy® Cooperatives

EV Home Charging DR Program Pilot

Managing EV Charging at Home

- Significant kWh sales possible from EV charging at home – much like a water heater
- But, demand tends to hit during peak hours in the summer
  - Diversified demand is between 1kW-4kW per EV (but we don't know for sure)
  - Telsa chargers 11.2kW
  - Ford 19.2kW (some)
- Can we influence when EV owners charge at home to mitigate demand during peak hours?

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Managing EV Charging at Home

- Traditional ways to manage home charging
  - TOU or TOD rates
    - Whole Home (LG&E-KU offers this rate and is not popular)
    - EVs only – requires second meter at the home or 3rd party data
    - TOU requires significant on-peak vs off-peak rates (2-3 Xs)
      - The Carrot and Stick pricing
- Utility-controlled chargers
  - Level 2 home chargers, with Wi-Fi, controlled by the utility
    - Much like direct load control switches
    - Requires utility investment in the EV chargers at the home
    - Not popular with EV owners

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Managing EV Charging at Home

- TOU rate is a rate structured to shift EV load to off-peak. Simulates demand costs with-in the energy rates.
- TOU rate is the option currently used by most utilities
  - Studies show TOU works to shift charging to off-peak - if on-peak vs off-peak pricing is 3Xs differential
  - Causes less revenue for the utility (impacts rates for non-EV owners)
- TOU rates, in general, are not preferred by co-op end-use members
- For owner-member cooperatives, requires a rate tariff
  - Cost of Service “like” study required for each co-op
  - EV TOU rate cases for all owner-members (16)

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Managing EV Charging at Home

- Can we develop a DR incentive program that?:
  - Requires DR tariffs for EKPC and owner-members instead of rate cases
  - Avoids forcing the entire home to go to a TOU rate
  - Avoids the utility “control” of when the EV is charged
  - Avoids a 2nd meter – no one wants a second meter
    - Implement a metered hourly consumption data system 1-time supported by EKPC - much like Co-op Solar
    - KWh data to determine incentive amount only
  - Causes a shift in charging times to off-peak without a “stick” pricing approach – incentive program
  - Captures EV locations – better infrastructure planning
  - Captures load shapes of energy and demand – better load forecasting

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EV Home Charging DR Pilot

- Pilot for 3 years with up to 500 EVs – residential only
- Cost-effective per TRC – 2.47, combined RIM 1.32
- $0.02 incentive per kWh charged off-peak (~20% discount on kWhs)
- No disincentives from TOU rates and no “control” by the utility
- Requires EKPC to obtain kWh charging per hour at participating homes
  - Several companies offering to utilities kWh consumption data for the EVs while at the residence
- Program sign-up online webpage and portal – similar to Cooperative Solar
- No cost to the participants to implement!
- Participants program their EVs (1 time) to start charging at 10 PM and stop at 6 AM

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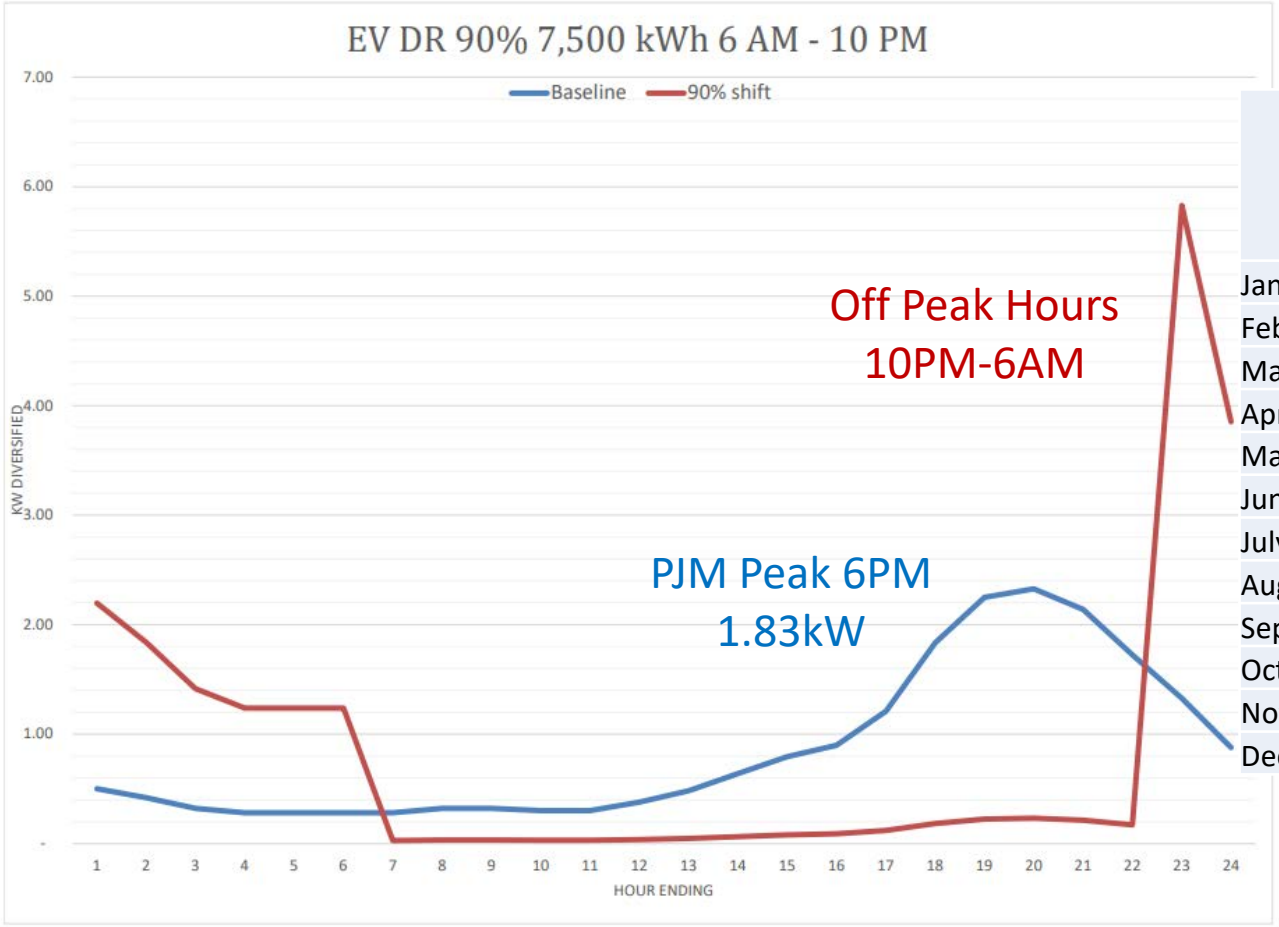

	EKPC CP (HE), 2021	Electric Vehicle average kW per vehicle (diversified)
January	9	0.32
February	8	0.32
March	8	0.32
April	8	0.32
May	18	1.83
June	18	1.83
July	19	2.25
August	18	1.83
September	18	1.83
October	17	1.21
November	8	0.32
December	8	0.32

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EV Home Charging DR Pilot

- Deliverables
  - Measure program effectiveness to shift energy and demand to off-peak hours
  - Measure cost and benefits of the program
    - Costs: incentives, usage data, admin, advertising, etc.
    - Benefits: avoided energy, demand/capacity, 2nd meter costs, etc.
  - Gauge impact of incentive levels, etc (survey participants)
  - Stand-up the hourly metering for participating EVs
    - 1-system at EKPC to collect hourly charging of EVs for all owner-member's participants
    - Incentive credit provided automatically by EKPC via CIS systems - like Cooperative Solar
    - Incentive credit automatically placed on end-use participant's monthly electric bill

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EV Home Charging DR Pilot

- Deliverables
  - Capture EV home charging load shapes
    - Load shapes known today via published studies are for urban and suburban locations, not rural KY
    - Impacts future load forecasting
    - Could provide some understanding of Beneficial Electrification risks
  - Identify homes that have an EV!
    - We don’t know for sure where EVs are located
    - Impacts owner-member cooperative’s system planning for Evs
  - EKPC will work closely with the owner-members to communicate the program offering to EV owners via different communication/advertising mediums.

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Questions/Discussions

Kentucky's Touchstone Energy® Cooperatives

Mar-22	**Electric vehicle demand response**
Unit is 1 EV with Level 2 charging	***Year 1 is 2022*** Demand response with API tracker with incentive based on kWh shifted from on-peak to off-peak and kW reduction at time of PJM peak
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 PJM peak. (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).* ***4,423 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.**
Discount rate for TRC and RIM **Lifetime of impact: 10 years**	**5** percent per EKPC data, March 2021; 3.5 % societal test from Mercatus Center report to determine the annual $ value of the demand response provided
Generation Capacity Cost -PJM Market, 100% summer **$36.50** per kW-year in 2022	**PJM capacity performance market March 2021, start year is 2022. Updated escalators to match.** 100% allocation to summer
Avoided Electricity Energy Costs - PJM Market, AEP-Dayton hub, **$30.31 /MWh** in 2022	based on March 3,2021 ACES Forward prices for AEP_Dayton hub. **$30.31 /MWh** in 2021. DSMore **Scenario 2, 1.193 esc in 2022**
Transmission Capacity Cost - OATT tariff **$ 24.31 per kW-year in 2022**	Network rate, 2020-21. 2.3% escalation rate. Applied to **summer** coincident peak.
Participant Costs $0	EKPC pays all costs for this program
Administrative Cost EK **$ $100** per participant per year, 0% 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 August 2022
Rate Schedule - Wholesale East Kentucky E-2 rate.	Current rates in effect as of August 2022
Participation - **1** unit in 2022 unit is 1 vehicle.	Using 1 participant to get per partic numbers
Rebates Co-op to Participant **$ 88.00** EK to Co-op **$ 44.00**	**2 cents per kWh shifted times 4,423 kWh shifted per year** EKPC pays **50%** of the rebate

Electric Vehicle DR shift: 7,500 kWh per year/2 kW case. 90% of on-peak kWhs shifted to off-peak hours of 10PM - 6AM. 2 cent/kWh incentive. 10 year analysis.

Distribution System Benefits		Distribution System Costs	
Power Bill Declines	$ 1,003	Revenue Declines	$2
Rebates From EK	$357	Administrative Costs	$0
		Rebates Paid To Consumers	($713)
Total Benefits	$1,360	Total Costs	($712)

Benefit / Cost Ratio: 1.91

Participant Benefits		Participant Costs	
Electric Bill Declines	($1)	Up Front Investment	$0
Rebates From Distribution System	$ 540		
Reductions in O&M costs	$0		
Total Benefits	$538	Total Costs	$0

Benefit / Cost Ratio: #DIV/0!

Total Resource Benefits		Total Resource Costs	
Avoided Energy Costs	$639	Up Front Customer Investment	$0
Avoided Gen Capacity Costs	$978	Distribution System Admin. Costs	$0
Avoided Transmission Expense	$386	EK Administrative Costs	($811)
Reduced Customer O&M costs	$0		
Total Benefits	$2,003	Total Costs	($811)

Benefit / Cost Ratio: 2.47

EK Benefits		EK Costs	
Avoided Energy Costs	$639	Decrease In Revenue	($1,003)
Avoided Gen Capacity Costs	$978	Rebates Paid	($357)
Avoided Transmission Expense	$386	Administrative Costs	($811)
Total Benefits	$2,003	Total Costs	($2,171)

Benefit / Cost Ratio: 0.92

Societal Benefits		Societal Costs	
Avoided Energy Costs	$679	Up Front Customer Investment	$0
Avoided Gen Capacity Costs	$1,046	Utility Admin Costs	($861)
Avoided Transmission Expense	$411		
Environmental Externalities	$0		
Total Benefits	$2,137	Total Costs	($861)

Benefit / Cost Ratio: 2.48

Combined RIM:

Total Benefits	$2,003	Total Costs	($1,523)

Benefit / Cost Ratio: 1.32

EAST KENTUCKY POWER COOPERATIVE

MEMORANDUM

TO: **Member System CEOs**

FROM: **Anthony S. Campbell**

DATE: **December 21, 2022**

SUBJECT: **East Kentucky Power Cooperative, Inc. ("EKPC") - Residential Electric Vehicle Off-Peak Charging Program**

Today, EKPC filed with the Kentucky Public Service Commission ("Commission"), a tariff for a Pilot Residential Electric Vehicle ("EV") Off-Peak Charging Program ("pilot program"). The proposed effective date for the tariff is February 1, 2023. The pilot program is voluntary in nature. None of the Owner-Member Cooperatives ("owner-members") have a DSM Rider in effect, so there will be no change in the rates charged for electric service to any customer class. However, if the proposed tariff is approved, the pilot program will offer an incentive for residential members to delay their daily EV charging until off-peak hours.

You may examine this tariff filing at the offices of EKPC located at 4775 Lexington Road, Winchester, Kentucky. This tariff filing may also be examined at the offices of the Commission located at 211 Sower Boulevard, Frankfort, Kentucky, Monday through Friday, 8:00 a.m. to 4:30 p.m., or through the Commission's Web site at http://psc.ky.gov. Any comments regarding this tariff filing may be submitted to the Commission through its Web site or by mail to the Public Service Commission, P. O. Box 615, Frankfort, Kentucky 40602.

The proposals contained in this notice are the items being proposed by EKPC, however, the Commission may order a program that differs from the proposed program contained in this notice. Each owner-member is eligible for the proposed tariff. The proposed tariff does not amend or revise existing rates of EKPC and does not include any proposed new rates for EKPC. Consequently, an analysis of the amount of change in dollars and percentage change or the effect upon an average bill for each customer classification is not provided.

A person may submit a timely written request for intervention to the Commission, P. O. Box 615, Frankfort, Kentucky 40602, establishing the grounds for the request including the status and interest of the party. If the Commission does not receive a written request for intervention within thirty (30) days of the initial publication or mailing of the notice, the Commission may take final action on the tariff filing.

4775 Lexington Rd. 40391
P.O. Box 707, Winchester,
Kentucky 40392-0707

Tel. (859) 744-4812
Fax: (859) 744-6008
www.ekpc.coop