

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

In the Matter of an Investigation of the Cost to)
Missouri's Electric Utilities Resulting from) **File No. EW-2012-0065**
Compliance with Federal Environmental Regulations)

EMPIRE'S RESPONSE TO ORDER DIRECTING RESPONSE TO CERTAIN QUESTIONS

STAKEHOLDER QUESTIONS

I. Building Block 1 – Reduce CO₂ emissions by 6% due to heat rate improvements

- a. The EPA has estimated that a 6% reduction in the CO₂ emission rate of the coal-fired EGUs in a state, on average, is a reasonable estimate of the amount of heat rate improvement that can be implemented at a reasonable cost through a combination of best practices and equipment upgrades. By plant, list (and describe) the heat rate improvements necessary to achieve a 6% improvement from most cost-effective to least cost-effective. Include the cost (both O&M and capital) for each improvement and the expected heat rate increase

*Response: The following efficiency projects have been considered or have recently been implemented at the Asbury plant: steam turbine retrofit; boiler insulation upgrade; and a neural network for control optimization. The estimated total heat rate improvement of these projects would be approximately 4.45% at an estimated cost of **_____**.*

*For the State Line Combined Cycle (SLCC) unit the following efficiency projects could be or have recently been implemented: combustion turbine (CT) upgrade to FD3; and improved seal and blade design. The estimated total heat rate improvement would be approximately 1.73% at an estimated cost of ***

As the proposed language of the rule indicates, projects that have been completed prior to 2012 will not be counted toward the 6% heat rate improvement goal and will make it extremely difficult, if not impossible, to achieve an additional 6% improvement.

In addition, some heat rate improvement projects will fall under the requirements of New Source Review (NSR) and will result in a more onerous and limiting process that units must encounter. EPA should place into effect exemptions from NSR for projects that are required for heat rate improvements under the Clean Power Plan.

Note: Empire District Electric (Empire) is part owner of Iatan 1 and Iatan 2. Please refer to the Kansas City Power and Light (KCP&L) data for additional information.

Projects implemented in recent years prior to the baseline year should be allowed to count toward this goal.

II. Building Block 2 – Re-dispatch generation from coal to existing natural gas combined cycle (NGCC)

- a. Is the EPA's assumption of 4.8 million MWhs for NGCC dispatch in 2012 accurate?

Response: Empire can account for only the SLCC unit. In 2012 SLCC operated at 44.37% capacity factor (CF). In order to achieve a 70% CF the unit would need to produce an additional 1,114,413 MWhs. Although SLCC does have the technical potential to reach a 70% CF there could exist other limiting factors that are not in Empire's control such as regional transmission constraints.

- b. EPA's representation of SLCC's, 2012 baseline net generation is accurate within approximately 326 MWh. Are there transmission constraints (either gas in or electricity out) or operational or market constraints that make the EPA's target of 12.78 Million MWhs for NGCC problematic? Explain. If there are any constraints, what steps would be necessary to relieve them? What are the costs of those steps?

Response: Natural gas supply deficiencies and historical price volatility experienced by Empire continue to drive the decision to maintain fuel diversity in our generation mix. Too much reliance on natural gas does create additional risks since there is not an inventory of fuel at the Electric Generating Unit (EGU). There will be events which cause deliverability issues and in some cases shortage of the commodity due to circumstances of risk that exist today. Empire and others will need to continue to have alternate fuel capability in the region to allow for such contingencies. Each state that has a NGCC unit needs to perform a robust natural gas feasibility study in order to determine what is achievable through re-dispatch of units, and its associated costs.

III. Building Block 3 – Increase generation from zero – and low-emitting sources

- a. Is the EPA's assumption of 1.3 million MWh of renewable generation in 2012 correct?

Response: Yes, including wind, solar, and biomass (hydro not included).

- b. How could Missouri grow renewable generation from 1.3 million MWh to 2.8 million MWh? What would be the difference in cost of taking this path versus the business-as-usual path? What would be the difference in rate impact versus the business-as-usual path?

Response: Under the proposed regulation, Missouri would be expected to develop renewable energy (RE) generation within the state, or accomplish this through partnering with other states. Currently there are new or proposed wind farms, solar farms, and biomass facilities within the state. Modeling indicates Missouri is not the optimum location for wind or solar installations, so it will be difficult to meet the standard set by states with more favorable conditions. EPA indicates the cost to reduce emissions through RE ranges from \$10 – \$40 per metric ton of CO₂.

In a business-as-usual path, the least cost options determined by our integrated resource plans do not currently favor these energy sources as compared to other options. The EPA references the low cost of meeting the current Renewable Portfolio Standard (RPS) requirements, but it does not acknowledge the cap set on the Missouri standard by voters, indicating the low level of cost willing to be paid for RE in the state.

Utilities such as Empire that operate in multiple states will meet obstacles in complying with the regulation. Empire has customers in Kansas (KS), Missouri (MO), Oklahoma (OK) and Arkansas (AR). Empire either owns, operates and generates, or purchases power in KS, MO and AR. Although the rule allows for a multi-state approach, the likelihood of these three states working together is very small. This makes it extremely difficult for a company like Empire to comply with the rule as it may not have all of the building block options for carbon dioxide (CO₂) reduction in each respective state.

Further complicating Empire's above-mentioned issue when operating in multiple states is how each state will deal with RE resources. There are unanswered questions regarding how RE resources produced in a state such as KS will be treated when sold to utilities such as Empire and consumed in other states. This issue greatly affects how, when and if Empire complies with the rule in each state. Empire fully supports the wind energy it purchases from KS to be used for compliance in other states, especially those states where its customers are paying for said energy.

- c. EPA's proposed rule solicits comment on an alternative method of calculating the renewable energy target under building block 3 based on economic and technical potential of renewable energy generation in each state. Under this alternative method in the proposed rule, Missouri's RE target under building block 3 would be 12.8 TW-h of renewable energy beginning in 2020 (0.5 TW-h of Utility scale solar, 4.9 TW-h of wind generation, 0.2 TW-h of biomass, and 7.2 TW-h of hydropower)

(vs. 2.7 TW-h of renewable energy generation by 2030 in the proposed method). Could Missouri achieve this alternative RE target. If so, at what cost?

Response: The requirements for the alternate are based on a National Renewable Energy Laboratory assessment of what it believes can be achieved in MO and presents a metric that brings all states up to a designated proportion of RE generation that has been achieved by certain states – it does not take into account the costs with reaching that benchmark. The alternate can be achieved if cost is of no consideration.

IV. Building Block 4 – Increase cumulative benefits of energy efficiency programs

- a. What will it take for Missouri to achieve the demand-side EE targets in the proposed rule: Starting in 2017 ramp up incremental demand-side EE by 0.2% per year until it reaches 1.5% per year, and then continue achieving 1.5% incremental EE growth each year thereafter with cumulative demand-side EE savings of 9.92% of electricity sales in 2030? Please include in your response an analysis of the EPA's findings on energy efficiency potential in comparison to the utility's findings from its most recent potential study, and from actual results from Missouri Energy Efficiency and Investment Act (MEEIA) programs, if applicable.

Response: Achieving this aggressive level of energy efficiency (EE) savings will be challenging. Utilities cannot guarantee EE savings, as it takes customer participation, and in many cases some level of financial investment from customers. Therefore, EE savings are not as predictable as other resources. In addition, the EE savings are subject to after-the-fact evaluation, measurement and verification, which makes the ultimate savings levels difficult to estimate.

Empire also faces another EE hurdle somewhat unique among the state's investor owned utilities (IOUs). It has a service territory that is predominately rural, and rural customer EE participation rates are typically lower. Additionally, much of Empire's EE savings today come from lighting retrofits. Lighting has been one of the more cost effective methods to achieve EE savings. With many of Empire's lighting retrofits already completed under Empire's current EE portfolio and the evolving lighting standards, it may be difficult to maintain today's EE savings rate into the future.

Empire has been offering EE programs to MO customers since 2007. Empire currently has not implemented any MEEIA approved EE programs. The EE programs it has implemented were approved prior to MEEIA's enactment (but a MEEIA case is currently open). MEEIA has a goal of achieving all cost-

effective demand-side management (DSM) savings. A key to this goal is that the programs must be cost-effective. At this time, the industry is facing low load growth and relatively low fuel costs which make it more difficult for EE programs to pass cost effectiveness tests.

Empire has a potential study as part of the integrated resource planning (IRP) case in File No. EO-2013-0547. It is important to note that there are different types of demand-side potential.

- **Technical Potential.** Total feasible savings using all efficient technologies and design practices, unconstrained by budgets or cost-effectiveness.
- **Economic Potential.** Feasible savings unconstrained by budgets, using only cost-effective efficient measures.
- **Achievable Potential.**
 - **Maximum Achievable Potential (MAP).** Hypothetical upper-boundary of achievable potential, as it presumes ideal conditions not typically observed.
 - **Realistic Achievable Potential (RAP).** Realistic savings targets a utility can expect to achieve through its demand-side programs.

In order to realistically answer questions about future EE savings, the realistic achievable potential should be considered. Again, ramping up EE savings in the future at a level suggested by the EPA would take a major shift in Empire's customers' response to EE programs. The total EE calculated by the EPA in 2030 for Missouri is 20-fold the actual 2012 data.

- b. How could Missouri achieve the 8.7 million MWh of avoided generation attributable to energy efficiency used in EPA's calculation? What would be the difference in cost of taking this path versus the business-as-usual path? What would be the difference in rate impact versus the business-as-usual path?

Response: This is difficult to quantify. As part of Empire's most recent IRP several different plans were presented with various levels of future DSM, ranging from no DSM to very aggressive DSM cases. The present value revenue requirements (PVRR) can be compared in these cases. Not surprisingly, given the assumptions in the IRP related to load growth, fuel costs and relatively low avoided costs, the lower DSM cases were more cost effective and resulted in lower customer rates. However, even if the more aggressive DSM cases were implemented, there is no guarantee that the EE savings levels used for planning purposes could actually be achieved or maintained since these aggressive DSM cases must make assumptions about EE savings and customer participation. The difference in cost is incalculable at this time.

IV. General Questions

- a. Do you agree with the methodology EPA used to come up with Missouri's proposed emissions reduction goal? If no, what about the proposed methodology do you disagree with?

Response: Empire doesn't necessarily disagree with the methodology. The EPA proposes four building blocks that it believes are achievable for the state. In addition, the building blocks are simply a guide to how the EPA developed the MO goals and are not intended to be rigidly applied. However, as noted in previous answers, each building block has its own potential issues that need to be addressed prior to its finalization.

Empire also adds that the only portion of EPA's methodology that allows for electrical demand growth is the RE portion. In order for RE to remain reliable it must have a fossil fuel fired source to back up that energy demand. Therefore, demand growth must be allowed in other sectors. The RE building block could be accomplished with much coordination, and to be cost effective, would require allowing KS wind to be allocated to MO customers .

- b. Is the statewide goal established by EPA for Missouri achievable?

Response: The Clean Power Plan is a proposed rule at this time which the EPA proposes to finalize in June of 2015. Under the current proposal, each state would then have 12-36 months to develop a Compliance Plan dependent upon whether they partner with other states or choose to comply within their own boundaries. As such, there are too many unknowns at this time for Empire to make any claim on its ability to comply with the rule. However, Empire's current interpretation of the rule leads us to believe ultimate compliance will hinge on successfully implementing a multi-state approach that includes the states where it has generating units. Additionally, this multi-state approach would have to take into consideration energy generated by wind power resources in a single state that is used to serve customers in various states.

- c. Should Missouri convert to a mass-based standard? Please explain.

Response: See comments in (d).

- d. Is there an advantage of implementing a rate-based standard or a mass-based standard? Please explain. Each utility should answer these questions from both a utility-specific perspective and from a statewide perspective. EPA staff indicated that EPA may be open to allowing a state to split geographically, with one part doing mass-based and one part doing rate-based, so long as the split was along an RTO seam. Are there advantages to this approach for Missouri?

What would the most advantageous split be?

Response: In general, a rate-based standard provides flexibility to accommodate changes in the overall quantities of electricity generated in response to increases in electricity demand. Mass-based provides relative certainty as to the absolute emission levels that would be achieved as well as simplicity in accounting for the emission impacts of a wide variety of emission reduction strategies. A cap-and-trade scenario would foster the mass-based approach.

Empire would like EPA to show compliance demonstration mechanics of rate-based and mass-based approaches. A mechanism for converting from a rate-based goal to a mass-based program should be explained by EPA.

Also, Empire would like to see the rule include language that allows retiring coal units to receive credit similar to the RE credit under a rate-based approach.

- e. Can a state compliance plan be written in such a way that actions taken to comply with the MEEIA and/or the Renewable Energy Standard become a part of the compliance plan, without explicitly citing or referencing state statutory requirements? Please explain.

Response: This question will require a legal determination. A federal requirement could be developed much like the state requirement, using the established North American Renewables Registry (NARR) for tracking and reporting. The current RPS allows for the costs or benefits attributed to compliance with a federal RES or portfolio requirement to be considered as part of compliance with the MO RES if the costs or benefits would otherwise qualify under the MO RES without regard to the federal requirements

The Commission will clarify that question V e is asking whether including the Missouri Energy Efficiency and Investment Act and the Renewable Energy Standard in a state compliance plan would make those statutes subject to federal enforcement

Response: Items contained in a state implementation plan (SIP) are approved by the EPA and become federally enforceable. There is a great concern with the proposed CPP and the potential for EPA to regulate “beyond the fence line” of the affected source.

- f. Please identify projects that you have already implemented or started that should be considered toward satisfying the various EPA building blocks. Please include any calculation for determining credit toward compliance for

each project identified.

Response: At the Asbury plant these projects include the main turbine retrofit;, the retirement of small turbine; -boiler -insulation upgrade; and re-dispatch from coal unit to natural gas units as the market dictates. A project being considered is a neural network for control optimization. (Reference the attached worksheet)

For the State Line combined cycle units the projects being considered include CT upgrade to FD3; and CT improved seal and blade design. (Reference the attached worksheet)

Empire began to develop its wind renewable energy portfolio in -2004, when it entered into a 20-year contract with Elk River Windfarm, LLC to purchase all of the energy generated at the 150-megawatt (MW) Elk River Windfarm located in Butler County, KS. On June 19, 2007, Empire enhanced its renewable energy portfolio when it entered into a 20-year purchased power agreement with Cloud County Windfarm, LLC . Pursuant to the terms of the agreement, Empire purchases all of the output from the 105 MW Phase 1 Meridian Way Wind Farm located in Cloud County, KS. In addition, the Ozark Beach Hydroelectric Project, owned by Empire, has produced renewable hydropower for many years.

Empire launched its first MO EE portfolio in 2007, and has been conducting programs and reporting to its stakeholders on a quarterly basis since that time. Empire's EE portfolio was not approved under MEEIA, but Empire has a MEEIA portfolio filed with the MO Public Service Commission, but the case has not yet been resolved. Empire's current MO EE programs are listed below.

- *High-Efficiency HVAC*
- *Home Performance w/ Energy Star®*
- *Energy Star® New Homes*
- *Low-Income Weatherization*
- *Low-Income New Homes*
- *C&I Custom and Prescriptive Rebate Program*
- *Building Operator Certification*

- g. Please identify any best practices that you have already implemented to comply with other environmental regulations, and indicate if those best practices can be considered toward satisfying the various EPA building blocks. Please include any quantification or calculation for determining credit toward compliance.

Response: A work practice standard is included in the Utility MATS rule to

control organic hazardous air pollutants. This performance tune-up is required every 36 months which may be extended to 48 months if a neural network is installed. Designed to optimize combustion, a co-benefit is the reduction of CO2 by efficiency and heat rate improvements which satisfy building block 1.

- h. Please explain whether an Independent Operator's control over the dispatch of the generation will affect the utility's ability to control emissions and comply with EPA's proposed 111(d) requirements.

Response: Although the independent operator's control over dispatch makes it more difficult, the information below outlines how we could potentially remediate the problem:

To the extent we provide unit offers that reflect the cost of emissions we should cause the RTO to re-dispatch to meet limits. To the extent this method does not cause adequate re-dispatch on a price sensitive basis we can impose environmental-based limits on the energy output of the coal units. If that is sufficient, we would have to de-commit the units to maintain compliance. These methods should all be allowable under the market rules.

- i. Does EPA's proposal give rise to any concerns about reliability? If so, what are those concerns?

Response: Without revisions, the EPA proposal does bring some concerns about reliability, as utilities will have to take units offline to modify or even retire the units altogether to meet the new regulations. This potentially could result in a power shortage in the region. Empire believes this could have an impact on price as well, as coal generating plants are some of the most economic generation resources in our region. Certainly to the extent that units are retired and less capacity is available there will be more concern on reliability. Empire would expect there would be enough flexibility in dispatch that extreme events such as last year (extreme cold, restricted natural gas supply) would allow the remaining coal units to run at full load capability.

- j. Please explain your perspective on the effect, if any, of HB 1631 on the utility's compliance strategy with the proposed 111(d) requirements.

Response: MO House Bill (HB) 1631 is consistent with the proposed Clean Power Plan (CPP) in that they both anticipate a State Implementation Plan (SIP). The CPP apparently offers MO the flexibility to consider anything it believes is applicable (including the first three paragraphs of HB 1631).

What the proposed CPP does not provide is the idea included in paragraph four of HB 1631 (excerpt below). The CPP would not contemplate less stringent emission standards or longer compliance schedules than those required by the EPA. HB 1631 states that MO “may develop”, therefore it is possible that MO would adopt standards consistent with the CPP and be acceptable to EPA. However, if Missouri’s ultimate SIP does not conform with the CPP, it is likely that Missouri’s SIP would not be accepted by the EPA and MO would be subject to a Federal Implementation Plan (FIP).

Of importance to Empire is the allowance in the CPP for multi-state implementation plans. Since Empire has customers in four states and generation in three states the interplay between these states is important.

HB 1631 paragraph four: “The commission may develop, on a unit-by-unit basis for individual existing sources emissions of carbon dioxide at these existing sources, consistent with federal regulation, emission standards that are less stringent, but not more stringent, than applicable federal emission guidelines or longer compliance schedules than those required by federal regulations”.

- k. For utilities: Describe in detail the most cost-effective way for each utility to meet the 21% reduction on its own. What would that path cost compared to a business-as-usual path?

Response: Empire’s current interpretation of the rule leads us to believe the most cost-effective means for compliance will hinge on successfully implementing a multi-state approach that includes the states where it has generating units. Additionally, this multi-state approach would have to take into consideration energy generated by wind power resources in a single state that is used to serve customers in various states.

- l. Describe in as much detail as possible the comments you intend to submit to EPA. If you have already submitted comments, please provide them.

Response: Empire is attending meetings with stakeholders including Kansas Department of Health and Environment (KDHE), Missouri Department of Natural Resources (MDNR), Arkansas Division of Environmental Quality (ADEQ) and the various public service commissions (PSC). All these groups are organizing comments to EPA in response to the rule. Comments have been submitted to the Kansas Corporation Commission. In addition, Empire typically utilizes EEI for comment guidance and will respond accordingly.

In addition, please refer to Empire’s presentation under this docket on August 18, 2014. It outlines the primary items for comment.

- m. Under a rate-based approach, how can Missouri get credit for energy efficiency improvements made by industrial customers of IOUs that have opted out of MEEIA? If regulatory or statutory changes are necessary to get credit, what are those changes?

Response: MEEIA is currently a voluntary legislation which encourages utilities to invest in energy efficiency. Shifting the legislation to a mandatory requirement developed to capture all industrial energy efficiency improvement for the good of Missouri will take planning and stakeholder input. Empire currently does not track the opt-out customers' energy efficiency savings and believes the opt-out customers should be involved in the solution.

- n. Under a rate-based approach, how can Missouri get credit for energy efficiency improvements made by customers of non-IOUs under programs that are not subject to rigorous evaluation, measurement and verification? If regulatory or statutory changes are necessary to get credit, what are those changes?

Response: This question is best suited for those who conduct non-IOU EE programs. Third party verification from a rigorous certification such as Green-e should be required for all utilities.

- o. Do any of the utilities favor the idea of Missouri partnering with another state(s) on a multi-state plan. If so, which state(s) should Missouri consider partnering with? Please explain.

Response: Response: Empire fully supports a multi-state approach that includes KS and Arkansas, at a minimum, as we have generators in each of these states.

However, the EPA needs to allow more time for states that are considering a partnership. Each state must formally adopt the state plan through certain procedures which typically takes at least 18 months. Existing multi-state example such as the Regional Greenhouse Gas Initiative (RGGI) took years to develop a workable solution. If deemed appropriate, it will take time to develop a cap and trade framework

- p. EPA's proposed rule established the state goals by crediting renewable energy generation in the state where it is generated. EPA is soliciting comment on how credit for renewable energy generation under 111(d) could be traded across state lines (similar to RECs) without double counting the RE credit. Do utilities have any thoughts about the appropriate method of crediting renewable energy generation and whether the credit could be traded across state lines without double counting?

Response: A multi-state or regional emissions trading program could take the form of a system such as a zero carbon MWh credit that is very similar in nature to a REC. The use of the recognized North American Renewables Registry (NARR) has worked well for the MO RES and the USEPA is already listed in the NARR under the Green Power Partnership Program.

- q. EPA's proposed rule established the state goals by crediting RE and demand-side EE targets under building blocks 3 and 4 by adding RE generation and avoided generation from demand-side EE to the denominator. If the state elects to go with a rate-based approach, EPA is soliciting comment on the appropriate method of crediting EE/RE programs under state plans (i.e. add RE generation and avoided generation from EE to denominator, or determine emissions avoided and subtract the avoided emissions from the numerator). Do utilities have a preference on the appropriate method of crediting EE/RE programs under a rate-based approach. If so, why is one method preferred over another?

Response: Empire is in favor of the EPA's proposal so long as wind generated in KS will be appropriately allocated. In terms of which method is better is dependent upon the allowable offset in avoided tons to the numerator.

- r. EPA's proposed rule solicits comment about whether the final rule should establish presumptive mass-based goals for each state or if states should be able to develop the mass-based goals using their own assumptions and methodologies. Do you have a preference?

Response: Empire is in favor of the EPA's proposal so long as wind generated in KS will be appropriately allocated. In terms of which method is better is dependent upon the allowable offset in avoided tons to the numerator.

- s. EPA's proposed rule solicits comment about establishing consistent national guidelines for performing EM&V in order to credit EE/RE under the rule if a state uses a rate-based approach. Do you think EPA should establish such guidelines? Empire Response:

Response: The cost of this approach, and who bears the burden of the cost should be a consideration. If national guidelines were developed, it would need to consider variations in utility size, demographics, climate, etc. Empire would ultimately prefer a state-approved verification method.