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**PUBLIC SERVICE
COMMISSION**

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

CASE NO. 2025-00186: ELECTRONIC INVESTIGATION OF NUCLEAR ENERGY, GENERATION,
STORAGE, AND RELATED MATTERS
INITIAL COMMENTS FROM THE KENTUCKY OFFICE OF ENERGY POLICY

The Kentucky Office of Energy Policy (“Office” or “KOEP”) provides the following initial public comments in response to the June 16, 2025, order of the Kentucky Public Service Commission (“Commission” or “PSC”) in this docket. In this order, the Commission solicited input from interested parties to identify and discuss pertinent issues involving the construction, operation, and funding of potential nuclear electric generating facilities. At a minimum, parties should consider the impact of the Commission’s existing regulations and rules as well as utilities’ tariffs on all aspects of the potential siting and operation of future nuclear facilities in the Commonwealth. Consideration should also be given by interested parties or affiliates with experience with the potential siting, operation and funding of nuclear facilities to any lessons learned.

Introduction

The Kentucky Office of Energy Policy’s (KOEP) mission is to support the use of Kentucky’s energy resources for the betterment of the Commonwealth while protecting and improving the environment. Kentucky’s energy policy acknowledges that the health and wellbeing of the Commonwealth is dependent upon citizens who are energy literate and an energy infrastructure that is safe, resilient, reliable, sustainable and affordable. It addresses our energy sector in a holistic and integrated manner and promotes the use of all of Kentucky’s energy resources, including energy efficiency and conservation. It recognizes that Kentucky’s economic prosperity is linked to the availability, reliability, sustainability and affordability of consumer energy supplies, and supports the commercialization of innovative energy technologies. It is equally important that this policy acknowledges that economic and national security is dependent on secure energy resources, recognizing that domestic production of energy resources and technologies along with fuel diversity enhance economic stability. With respect to nuclear and all forms of electricity generation, the energy policy tasks state agencies with ensuring that Kentucky’s regulatory oversight provides safe, reliable and adequate energy services at reasonable prices, while providing for the financial stability of and supporting the operational competence of our energy providers.

The KOEP would like to note that while the majority of comments filed in the record so far are associated with the development of nuclear energy generation, a spectrum of opportunities and challenges exists within the nuclear energy area, and many are outside the scope or jurisdiction of the Kentucky Public Service Commission; however, they do impact indirect associated costs and the success of future project developments. These include the front-end fuel cycle, advanced energy manufacturing for the supply chain, workforce development and the back-end waste and spent fuel management. These concepts were covered in the 2023 report from the Kentucky Nuclear Energy Development Workgroup¹ and will not be reiterated here, but are referenced for the record.

Specific to this case, in 2024 the KOEP coordinated with the National Renewable Energy Laboratory on Long Term Electricity Projection for the Commonwealth.² Under varying scenarios, modeling indicates that Kentucky would potentially need 100-300 megawatts (MW) of new nuclear capacity by 2035 and upwards of 3 gigawatts (GW) of new nuclear capacity by 2050 with most of that starting to come online by 2040. In these modeling conditions, new nuclear capacity and generation serves to mitigate against high natural gas price futures, serves new high load conditions, and provides a baseload resource in the event the siting of renewable generation becomes increasingly difficult.

It is noted that the comments provided here are advanced nuclear energy technology inclusive, meaning the KOEP acknowledges that the size and type of technology developed is indicative of site characteristics and customer demands. Comments provided should not be considered specific only to small modular reactors, but can be inclusive of micro to large nuclear reactors.

Enabling Site Screening, R&D Projects, and Early Site Permit Work

Given the timeline for when new nuclear energy generation would be needed in Kentucky, it is imperative that the Commission support regulated utility's immediate work around potential site screening, site data collection and early site permitting work or combined licensing work. An early site permit (ESP) and a combined license (COL) are both licensing pathways for nuclear power plants by the Nuclear Regulatory Commission (NRC), but they address different stages of the process and have distinct characteristics. An ESP focuses on site suitability and resolving site-related issues,

¹ https://eec.ky.gov/Energy/Documents/Final%20Report%20SJ79_11.17.23.pdf

² <https://docs.nrel.gov/docs/fy25osti/91633.pdf>

while a COL combines the authorization for both construction and operation. To meet 2050 goals, Kentucky must be in a position to submit applications to the NRC by 2030.

Historically, this is not the first time Kentucky's regulated utilities have been tasked with moving forward with innovative technology. In case 2008-00308, select regulated utilities jointly filed for authorization to establish regulatory assets and liabilities related to their payments to the Carbon Management Research Group ("CMRG") and the Kentucky Consortium for Carbon Storage ("KCCS"). The CMRG is a partnership between academia, the private sector and state government, in the form of the University of Kentucky Center for Applied Energy Research ("CAER"), which was created in response to the directive in Section 52 of House Bill 1 ("HB 1") of the Second Extraordinary Session of the 2007 General Assembly regarding the management of carbon and carbon dioxide associated with existing coal-fired electric generating facilities in Kentucky. This serves as precedent for cost recovery framework for utilities working together and pooling resources in a consortium environment to move technology forward while partnership with other entities. A potential framework exists where this cost recovery framework could work in conjunction with the Kentucky Nuclear Energy Development Authority."³

The Commission is encouraged to explore how Kentucky's regulated utilities can work within the existing incentive programs operated by the Cabinet for Economic Development to help drive down site development costs and prepare sites for nuclear energy generation projects. For example, the established Kentucky Product Development Initiative (KPDI) Program of 2024 is a statewide effort to support upgrades at industrial sites throughout the Commonwealth and position Kentucky for continued economic growth. KPDI, a collaboration between the Kentucky Cabinet for Economic Development and the Kentucky Association for Economic Development (KAED), includes \$35 million per fiscal year in state funding toward upgrades of sites and buildings across the state.

The Commission is encouraged to evaluate other state legislative and state commission activities that have enabled rapid deployment of permitting and technology deployment with responsible cost recovery oversight. The Commission could start this process by inquiring about the status of site evaluations and feasibility assessments completed or ongoing within Kentucky's regulated utilities and reviewing how those fit into utility Integrated Resource Planning processes.

³ KRS 164.2802(7)(g).

System Costs and Benefits

As noted in the NREL modeling previously noted by the KOEP, there are potential system (NPV calculations of the scenarios) savings that occur when adding nuclear energy generation capacity to a utility's system of energy generation infrastructure. While nuclear energy generation capacity today is unlikely to pass a least cost test compared to other generation resources, there are system benefits achieved that should be considered in the fuel and transmission areas as well as the co-benefits of industrial process heat applications and thermal energy storage. According to the World Nuclear Association, "Nuclear energy is an excellent source of process heat for various industrial applications including desalination, synthetic and unconventional oil production, oil refining, biomass-based ethanol production, and in the future: hydrogen production."⁴ In this context, systems thinking around costs and benefits should be evaluated by the Commission.

In addition, in the context lifespan and economic calculation of cost recovery or levelized costs, consideration must be given to evaluating costs over the expected lifetime which is 80-100 years with relicensing. Evaluating costs on the initial 40-year NRC license of a nuclear plant does not accurately reflect the potential life space to recover the costs of the project. Re-licensing is required to achieve 80-100 year lifecycle and therefore is dependent on a regulatory process outside the control of the state. How this is treated in Commission proceedings should be evaluated.

As noted by DOE's Pathways to Commercial Liftoff for Advanced Nuclear, communicating the value of nuclear in a least cost ratemaking environment highlights two key challenges in that (1) market power prices do not consistently compensate nuclear for the value it provides and (2) traditional decision frameworks and tools do not adequately value the full contribution of nuclear to the electricity system and to future ratepayers.

As noted by other interested parties, clarification around the implementation of existing Certificates of Public Convenience and Necessity (CPCN) processes and use of Construction Work in Progress (CWIP) accounts for nuclear energy generation projects should be addressed by the Commission.

Deployment Model Considerations

Nuclear energy generation projects present unique opportunities for deployment frameworks that may impact the Commission involving non-traditional partners. These frameworks,

⁴ <https://world-nuclear.org/information-library/non-power-nuclear-applications/industry/nuclear-process-heat-for-industry>

as illustrated from the DOE Commercial Lift Off report below, present an opportunity for the Commission to evaluate each one in terms of existing Commission regulations, policies, and procedures in order to identify gaps and potential changes necessary to accommodate these scenarios.

	Reactor design	Project management				Own (and/or invest equity)	Operate	Offtake
		Licensing and site dev	Project management	Construction	Multi project integration			
Multi-utility	Reactor designer	Utility	Utility	Constructor	Potential for new role	Utility	Utility	Utility ratepayers, large offtaker
Aggregated tech offtake	Reactor designer	Utility	Utility	Constructor		Utility or tech offtaker	Utility	Tech offtaker
Developer model	Reactor designer	Developer	Developer	Constructor		Utility or infrastructure fund	Utility	Utility ratepayers, large offtaker
Industrial offtaker	Reactor designer	Industrial offtaker	Industrial offtaker	Constructor		Utility or industrial offtaker	Utility	Industrial offtaker

□ Roles that differ from multi-utility

Merchant Generation Considerations

Kentucky’s Electricity Generation and Transmission Siting Board is governed by KRS 278.700-278,718. These siting board requirements include application to a merchant electric generating facility, which is defined as, “except for a qualifying facility... an electricity generating facility or facilities that, together with all associated structures and facilities are (a) capable of operating at an aggregate capacity of ten megawatts (10MW) or more; and (b) sell the electricity they produce in the wholesale market, at rates and charges not regulated by the Public Service Commission.”⁵

There could be future scenarios where a merchant nuclear energy generation facility would meet these conditions and there should be a review of how the Siting Board statutory requirements compare to requirements under the Nuclear Regulatory Commission (“NRC”) for siting and approvals, especially in terms of setbacks, financial assurance, public engagement and decommissioning. How would the Electricity Generation and Transmission Siting Board work with the NRC regulatory processes on siting and approvals?

⁵ KRS 278.800(2).

Behind the Meter Considerations

With the advancement of nuclear energy generation technologies at small or micro scale, there is the potential to consider nuclear energy generation technology as a distributed generation resource and therefore, co-located with an industrial or commercial entity. Microreactors range in size from 1-20 MW with small modular reactors range from 20-300 MW in size. This presents specific opportunities for high energy intensive industries to consider on-site nuclear generation as a means to reduce grid tied energy consumption and improve resilience of a facility on-site. Under this scenario, the most common method of interconnection for small power production facilities would normally be through the use of Qualifying Facility (QF) tariffs under the Public Utility Regulatory Policies Act (PURPA). However, the current definition of a QF under PURPA misaligns with micro and SMR nuclear reactors and is only somewhat accommodating if the nuclear energy generation facility is considered a combined heat and power facility.

As noted in the journal article, “The Case for Nuclear: How a Simple Amendment to PURPA Could Invigorate the Market for Advanced Nuclear and Help the United States Decarbonize Faster than Ever,” a microreactor or SMR is unlikely to qualify as a qualifying small power production facility but could potentially qualify as a qualifying cogeneration facility.⁶ Also noted in the article, the fuel use criteria for qualifying small power production facilities are where microreactors and SMRs run into challenges under PURPA. Acceptable fuels under FERC regulations include “biomass, waste, renewable resources, geothermal resources, or any combination thereof.” Because nuclear fuel is not “organic,” it would be unlikely to meet the definition of biomass based on the term’s definition under the relevant regulation.

Relevant to Kentucky, 807 KAR 5:054 governs the interconnection of small power production and cogeneration facilities under PURPA and incorporates by reference federal definitions under PURPA. Consequently, the Commission is encouraged to evaluate 807 KAR 5:054 and the ability to interconnect micro or small nuclear generation facilities under tariffs filed by Kentucky’s regulated utilities. Without changes to PURPA to accommodate nuclear generation facilities, the Commission should consider what interconnection regulation and tariffs would be necessary to accommodate a co-located behind-the-meter nuclear generation project.

⁶ <https://digitalrepository.unm.edu/nrj/vol65/iss1/3/>

Financial Risk Mitigation\Ratepayer Protections

As noted by many of the interested parties, financial risk and protection of ratepayers is of utmost importance given the lessons learned from the construction performance and regulatory oversight of the large nuclear reactors at the Vogtle plant in Georgia, as well as historical projects that were unsuccessful. For new advanced nuclear energy generation projects proposed by Kentucky's regulated utilities, the role of the Commission should be to ensure that new regulated utility projects come in on-time and on-budget.

Financial risk management in the nuclear energy generation space should include:

- Accurate cost estimation throughout the project and strong contractor and financial management controls including strong regulatory oversight to avoid cost overruns.
- Risk allocation so that all parties involved in the development of the project share in the risk to ensure that not all financial risk is shouldered by the ratepayers. This is important in the context of the role of federal government, state government, reactor designers, developers, off-takers, shareholders, and ratepayers in sharing risk.
- Insurance and hedging strategies to manage specific financial risks such as changes in market conditions.

Unlike some traditional generation technologies, nuclear energy generation could be considered essential for national security and therefore a question remains on the role of state and federal government in risk allocation and mitigating financial risk of these new advanced nuclear technologies. If a societal benefit exists for the development of advanced nuclear energy technologies, a question remains on how the risks should be shared across all ratepayers and not just those located in a regulated utility territory. A survey of state legislative activity around ratepayer protection and financial risk management would be essential to understand best practices.

An essential component to mitigating financial risk is for the state and the Commission to support continued investment in research and development activities that improve reactor design, manufacturing, and operations as well as enhancing efficiency, but more importantly standardizing design, manufacturing, construction, and operations to improve cost curves and avoid delays. It is necessary to maintain a consistent replicable order book of standardized design projects in order to lessen financial risk as new nuclear energy generation technology is deployed.

Community Engagement

For the deployment of nuclear energy generation technologies to be successful, community support is not only essential, but necessary. Utility engagement with stakeholders is often implemented as one-way communication where utilities are communicating plans or activities to a larger audience and there is rarely a dialogue or conversation outside of a regulated case or PSC ordered activity. To the contrary, engagement is dialogic in nature, intentional, ongoing, and it is focused on collaborative decision-making or problem-solving. Engagement is centered in listening and incorporating feedback into planning and processes. The Commission should consider how the development of nuclear energy generation forces regulated utilities to engage communities differently than with previous technologies and how this engagement might influence Commission public engagement processes.

Specific to nuclear energy generation reactor development projects, the concept of consent-based siting can be a useful engagement model for utilities in Kentucky to build upon and incorporate when engaging with communities. Consent-based siting is an approach to siting facilities that focuses on the needs and concerns of people and communities. While being utilized today for nuclear waste interim storage facilities, the framework provides a good opportunity to incorporate legally binding community benefit agreement contracts that outline the tangible benefits of the project to the community and ensure those benefits are realized. The Commission is encouraged to evaluate how these concepts can be incorporated into regulated utility public engagement strategies and processes with communities.

The Commission is also encouraged to evaluate how regulated utilities in Kentucky can help raise awareness about Nuclear Ready Communities and how utilities can support communities who choose to seek out the Nuclear Ready designation. Regulated utilities in Kentucky are positioned to be a source of subject matter experts to help communities understand nuclear energy generation and support K-12 learning opportunities around energy literacy.

Finally, the Commission is encouraged to evaluate how to support the existing NRC public engagement processes⁷ rather than duplicate these NRC processes. An emerging question is how the Commission will engage with the NRC in their processes and incorporate them accordingly into existing processes and regulatory requirements within Kentucky.

⁷ <https://www.nrc.gov/about-nrc/regulatory/licensing/pub-involve.html>