The Honorable Jeff Duncan

1. With grid authorities warning that reliability risks to American families are real and growing, I'm concerned about what happens as growing industries compete for the power that is already in short supply. How do regulators, utilities, policy makers assure that residential customers are not stuck with large costs, and more unreliable power?

A key to the success of electric companies in meeting these challenges for over a century has been our regulatory model. EEI members have worked closely with their communities and regulators for nearly a century to delivery reliable, affordable power. That balance has been foundational to the mission of the Federal Power Act and state statutes as executed through FERC and statute public utility commission to ensure just and reasonable rates and an increasing focus on reliability. We are the sole industry that has both an obligation to serve customers and mandatory reliability standards. This well-established and tested system has proven time and again over the decades that this industry can meet the future demands of all customers.

Electric companies invest more than $160 billion per year on average to make the energy grid more dynamic, secure, reliable, and increasingly clean. These investments, along with investments from the federal government, further enable investor-owned electric companies to improve system operations and reduce costs for customers. Those investments are meticulously screened and reviewed by regulators, consumer advocates and other parties. The regulators ultimately approve those investments based on sound cost causation principles, which ensure those who pay the costs also receive the benefits.

Addressing supply chain issues that delay projects and increase costs, as well as robust siting and permitting reform for energy infrastructure are two important steps Congress can take to benefit the energy grid. The House of Representatives has already taken action on a number of these items via H.R. 1, H.R. 7023, and other efforts to address distribution transformers and issues around the Clean Water Act. We look forward to working with all members of Congress to address key supply chain and permitting challenges.

2. After more than a decade of flat electricity demand, the United States is beginning to experience a significant increase in demand growth, especially as AI continues to develop. Even when demand was flat, federal permitting and related litigation took years, including for clean energy projects. The final NEPA permitting rule issued by CEQ defaults to the status quo that is making permitting worse and introduces more uncertainty for project developers. Judicial review remains the biggest wildcard in project development timelines yet this rule invites more litigation to oppose project permits. What are the two most important judicial review reforms Congress needs to take to introduce more predictably to the process?

Domestic energy infrastructure projects frequently require Federal permits and are therefore subject to environmental reviews under a variety of federal and state statutes, including the National Environmental Policy Act, Clean Water Act, and Endangered Species Act, among others. Increasingly, these statutes have become the focus of protracted litigation that disrupt the deployment of clean energy resources, delay the creation of clean energy jobs, and add time and cost to these critical infrastructure projects. EEI supports environmental processes that are clear,

transparent, and as efficient as possible while meeting all environmental requirements.

To that end, EEI has recommended actions Congress can take to contribute to an efficient, environmentally sound, and defensible process for energy infrastructure and energy technology deployment. Judicial review is one component of the larger energy infrastructure permitting reforms we need and look forward to working with you and the Committee to tackle these issues. While lengthy judicial review and protracted litigation delays are one component, there are many other hurdles that contribute to project delays and we remain committed to working with Congress in addressing those issues. In fact, the House has passed or is working on a number of positive bills in this space, including H.R. 1, H.R. 7023, and an ESA reform bill being led by Rep. Dan Newhouse. The Energy and Commerce Committee has taken important steps on energy permitting as well with a recent bipartisan bill to improve Nuclear Regulatory Commission processes.

The Honorable Lisa Blunt Rochester

1. While the focus of today's hearing is the impact of Artificial Intelligence and emerging technologies on the balance of electric supply and demand, I want to focus my question on the role AI can play to enhance, modernize, and improve the delivery of electricity. Digital Twins, which are highly detailed virtual models of physical objects that provide a platform to test and simulate changes, when combined with AI are enabling energy providers to further enhance the reliability and environmental footprint of electricity used by industrial customers to help inform decisions on grid deployment and generation mix. The better the data on electricity production and consumption, the better the efficiencies achieved. Crucially, these efficiencies often mean reductions in environmental impact too.

   We have seen recent announcements between AI companies like C3.AI and distributed energy providers like Bloom Energy in Delaware that are working together to synthesize the data created from the operation of their fuel cells to improve system efficiencies and I expect that the same types of relationships are being cemented with AI companies and our traditional electric utilities.

   a. What are the advantages of integrating AI into the operations of microgrids and stationary fuel cells?

Integrating AI into microgrids and stationary fuel cell operations can offer several key advantages that enhance efficiency, reliability, and overall system performance. Inverter-based resources (IBRs) including stationary fuel cells, solar, and wind form the backbone of many microgrids. Integrating AI could potentially improve the controllability of these systems, particularly in terms of power electronics. For example, in battery storage systems, where traditional DC/DC and DC/AC converters as well as the innovative one stage DC/AC approach require sophisticated control, AI may enhance power flow management and improve overall performance. In fact, as the grid, which is already the most complex machine on the planet, continues to increase in complexity, the industry will likely adopt more AI solutions to ensure safe, reliable and affordable power. However, achieving this improvement will depend on the commercial availability, quality and reliability of the AI algorithms and their ability to understand and handle the complexity of these systems.

AI could also be helpful in detecting early signs of equipment failure, potentially reducing unexpected downtime. While many current control systems already employ strategies like closed-loop reinforcement with early warnings and fault detection, AI could build on these approaches by offering more advanced predictive maintenance capabilities. That said, integrating AI introduces additional layers of complexity, and its effectiveness in reducing troubleshooting and downtime will depend on how well it's implemented and maintained.

Finally, as IBRs generate large volumes of data due to the bidirectional flow of energy, AI could assist in processing and analyzing this information. However, using AI for dynamic modeling and control requires careful consideration, as these new technologies can sometimes introduce unforeseen challenges. While AI can contribute to innovative control systems, it's essential to remain aware of its limitations and the potential need for continuous oversight and adjustments in a rapidly evolving energy landscape.

b. Are there any roadblocks or challenges hindering wider application of AI in electric delivery?

Electric companies are using Artificial Intelligence (AI) to enhance operational efficiency, workforce productivity and safety, and achieve cost reductions through automation and accuracy in data analytics and business process. AI is also being applied by electric companies to transform the customer relationship and improve customer service. These include customer service, customer energy management, grid operations and management, forecasting, transmission and distribution maintenance, vegetation management, resilience measures, and others.

Our members' goals is to ensure the delivery of safe, reliable, and affordable power to all customers. When deploying new technology, companies need to ensure it meets these metrics and also works to maintain robust reliability and cybersecurity standards. Electric companies will continue deploying AI to the benefit of customers.

One significant challenge is data security and integrity. Many AI solutions depend on cloud computing, which involves the transmission and storage of large amounts of operational data. This can create vulnerabilities, as data become exposed to multiple telemetry points, making traceability difficult. Moreover, the sensitive nature of these data — such as energy market information and device reliability patterns — means that any breach could introduce serious cyber and infrastructure risks.

Another challenge lies in protecting intellectual property rights. When AI is integrated into power systems, questions about the ownership and copyright of the AI solutions arise. It's unclear how intellectual property should be handled, particularly when AI developers wish to apply their solutions to other customers and in other fields. This also introduces the question of whether the original data providers should receive benefits from the any resulting revenue to the developers. This remains a gray area that is difficult to navigate and enforce, potentially hindering broader adoption.

Additionally, while AI isn't entirely new to power systems, particularly in the control of power electronics, defining the incremental value AI brings is crucial. Not all AI solutions are created

equal, and their effectiveness can vary significantly. Expertise in the power sector is essential when training AI models, as solutions designed for other industries, such as online retail, may not translate effectively. In some cases, these models might generate false positives or fail to deliver meaningful improvements, particularly in complex environments like microgrids and stationary fuel cells. Therefore, it's essential to clearly demonstrate the incremental benefits of AI before claiming success or scaling up its use. It is also essential to consider life-safety issues related to the deployment of AI within power systems. Working with electricity is inherently dangerous, so any application of automated or autonomous operations directed by AI systems must be carefully designed to maintain safety.

Given the importance and criticality of safe and reliable operations related to the delivery of electricity and the highly regulated nature of our industry, it is essential that AI implementations are transparent and explainable. These attributes are not inherent to most AI applications; therefore, they must be intentionally integrated, often increasing the cost and complexity of the applications. In addition to building general trust, transparency and explainability allow for the necessary careful monitoring, control, and corrections, if needed.

These challenges highlight the need for a cautious and well-considered approach to AI implementation in electric delivery systems, balancing innovation with security, intellectual property concerns, and the need for sector-specific expertise.