Testimony for the Record
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I am Maria Korsnick, President and Chief Executive Officer of the Nuclear Energy Institute (NEI).[1] NEI appreciates the opportunity to provide testimony on the challenges facing our electricity system and what they mean for ensuring the system is reliable, resilient, and affordable in the long term.

The recent U.S. Department of Energy (DOE) report on electricity reliability described the adverse impact that market and regulatory policies are having on baseload power plants.[2] We commend DOE for its balanced analysis of the causes of baseload plant closures and urge federal policymakers to act on the report's recommendations.

A resilient and diverse portfolio of fuels and technologies—nuclear, coal, natural gas, hydro, wind, solar—is the core strength of our electric system. As recommended by DOE, the Federal Energy Regulatory Commission (FERC) should swiftly act to ensure each electricity generators' contribution to reliability and resilience is fully recognized in market prices. FERC has been considering these issues for years but significant problems persist. Comprehensive market reform is overdue. I urge members to encourage FERC to move on these issues. Action by FERC will benefit all Americans by helping to retain nuclear's contribution to reliability, system resilience, energy security and diversity, price stability, and clean air.

[1] NEI is responsible for establishing unified industry policy on issues affecting the commercial nuclear energy industry. NEI has more than 300 members, including all the companies licensed to operate commercial nuclear power plants in the United States, as well as nuclear plant designers, major architectural and engineering firms, entities that process nuclear fuel, and other organizations involved in the nuclear industry.

[2] DOE, *Staff Report to the Secretary on Electricity Markets and Reliability* (Aug. 2017).

Nuclear generation provides unmatched reliability while promoting clean air and national security.

Nuclear energy is the largest source of emissions-free electricity in the United States. Currently, 99 reactors in 30 states produce nearly 20 percent of our nation's electricity and approximately 60 percent of our carbon-free electricity. Nuclear produces electricity 24/7 and has the added benefit of having all its fuel on site for 18-to-24 months. The long horizon for nuclear fuel procurements also means nuclear generation is not subject to price spikes occasionally experienced by other generation sources in recent years.

Because nuclear facilities have onsite fuel and hardened facilities, they typically operate continuously in extreme weather conditions. During the Polar Vortex nuclear generators performed better than all other forms of generation—operating with an average capacity factor of 95 percent.[3] And despite Hurricane Harvey's devastating impact on the region, the two South Texas Project units in Matagorda County continued operating at 100 percent power during the storm, providing much needed electricity to those customers whose power lines remained intact. To be sure, operators do take nuclear plants offline for refueling and other reasons as dictated by the circumstances, but overall nuclear energy facilities have proven their unmatched reliability by operating with an average capacity factor greater than 90 percent over the last 15 years.

In addition, a robust commercial nuclear energy industry is vital for U.S. national security interests. It is important that we not allow nuclear plant closures to cede our nation's role as the world leader on nuclear energy. This is particularly important given that Russian and Chinese state-owned nuclear enterprises are aggressively moving to export their technologies to countries entering the global nuclear marketplace, such as Turkey and Pakistan.[4] Exporting U.S. nuclear

[3] DOE, *Staff Report to the Secretary on Electricity Markets and Reliability* at 95.

[4] *See* Mark Hibbs, Senior Fellow, Carnegie Endowment for International Peace, *Does the U.S. Nuclear Industry Have a Future?* (Aug. 10, 2017).

technologies means establishing a 100-year relationship with those countries as U.S. companies help to site, build, operate, service, and decommission those reactors. Nuclear exports also help embed our nation's high standards for safety, security, and nonproliferation worldwide. As recent reports have concluded, a viable domestic commercial nuclear industry is imperative to our energy security, balance of trade, and national security.[5]

Wholesale market structural defects undermine reliability, system resilience, and our national security.

The DOE study did a good job laying out the challenges facing the electricity system. Among these are unprecedentedly low natural gas prices, low electricity demand growth, and increased use of variable renewable (solar and wind) energy due to various regulations and mandates at the state and federal levels, which are creating unintended consequences for all electricity generators but particularly baseload plants. Although DOE found that independent system operator and regional transmission organization (RTO) markets have met short-term reliability needs at low cost, DOE determined that FERC—which regulates the RTOs—must reform the RTO markets to address system resilience and long-term grid reliability.

Comprehensive reform must resolve two pressing problems. First, market rules cause defects in what is known as "price formation"—essentially the rules that govern how market prices are set. For example, to ensure nuclear generation is available when needed during peak hours, RTOs rely on nuclear facilities—which cannot easily shut down and then restart—to run overnight, during periods of low demand when variable resources are flooding the market with power. Even though the RTOs rely on nuclear generation to meet reliability needs, RTO rules force nuclear facilities to be "price-takers," meaning nuclear facilities cannot set market prices. Instead,

[5] Energy Futures Initiative, *The U.S. Nuclear Energy Enterprise: A Key National Security Enabler* (Aug. 2017); Jeremy Carl & David Fedor, Hoover Institute, *Keeping the Lights on at America's Nuclear Power Plants* (2017).

variable resources or resources that can ramp-up quickly set market prices. As a result, nuclear facilities receive market prices that at times are below their true costs and even *negative*, which essentially causes nuclear generators to have to pay the RTOs to take their power. These RTO rules result in energy prices that, at least during some hours, do not reflect the true economic cost of resources actually providing power to the grid.

Second, RTO market designs fail to compensate nuclear generation for the unique set of valuable attributes it provides. This includes: (1) producing no criteria pollutants or carbon dioxide; (2) producing large quantities of electricity around the clock, safely, and reliably; (3) operating regardless of most weather conditions; (4) avoiding reliance on "just-in-time" fuel deliveries by having 18-to-24 months of fuel onsite; (5) providing price stability with respect to low marginal cost production; and (6) contributing to the fuel and technology diversity that is a bedrock characteristic of a reliable, resilient electric sector. These attributes play an important role in creating affordability for electricity customers. For example, customers benefit greatly from energy diversity because it serves as a hedge against unanticipated future market conditions. Significantly, the diversity of energy portfolio lowers U.S. customers' power bills by over $93 billion per year.[6]

FERC should expedite efforts to improve price formation and recognize nuclear generation's undervalued attributes.

NEI cannot overstate the need for FERC and the RTOs to expeditiously implement solutions to address these issues. Since 2013, three nuclear plants have prematurely retired due to market conditions and another six plants are scheduled to prematurely retire for market or policy reasons. Some of these plants will shut down more than a decade before their operating licenses expire. When a nuclear plant shuts down, the nation irrevocably loses a reliable source of continuous generation. We also lose the stability of energy diversity and the many other societal

[6] *See* IHS Markit, *The Value of US Power Supply Diversity* (July 2014).

benefits provided by nuclear power, including thousands of jobs. And when a nuclear plant shuts down, both air emissions[7] and electricity prices increase.[8]

FERC and the RTOs should undertake comprehensive efforts to: (1) improve price formation to ensure wholesale prices reflect the true economic marginal cost of the resources supplying electricity; and (2) provide compensation for undervalued benefits such as contributions to system resilience, long-term price stability, fuel diversity, and the environment.

FERC has been considering price formation issues for several years yet problems persist. Reforms that are more comprehensive should not be controversial: price formation improvements will allow the market to better reflect the actual cost of generating the electricity we need. Improving price formation to provide fair compensation would be good for all forms of generation. Although PJM for example is considering promising price reform efforts to recognize the reliability contributions of both baseload and flexible resources in price formation,[9] these efforts are likely to stay on a shelf unless FERC pushes the RTOs move forward. FERC has the tools and authority to initiate such action. FERC needs to act.

Beyond these price formation efforts, comprehensive long-term reforms are needed to ensure a coherent national policy framework that values the attributes important to our electricity system such as system resilience, onsite fuel security, fuel and technology diversity, long-term price stability, clean air, and public health. FERC should push the RTOs to develop market structures to value these traditionally overlooked, yet much needed, attributes.

Although FERC must urgently act to improve the wholesale market structure, FERC

[7] The loss of Vermont Yankee alone increased carbon emissions in New England by five percent. ISO New England, *2015 ISO New England Electric Generator Air Emissions Report* (Jan. 2017).

[8] California electricity customers paid $350 million more for electricity in the year following San Onofre's closure. Lucas Davis & Catherine Hausman, Energy Institute at Haas, University of California at Berkeley, *Market Impacts of a Nuclear Power Plant Closure* (May 2015).

[9] PJM Interconnection, *Energy Price Formation and Valuing Flexibility* (June 15, 2017).

should not limit legitimate state policy goals. The Federal Power Act expressly leaves decisions about generation (including the mix of resources) to states. States likewise retain broad powers over environmental regulation. When states operate within areas of state authority, FERC cannot take action to limit these authorities. Thus, it would be inappropriate for FERC to interfere with state-based nuclear programs that provide compensation for legitimate state interests, such as environmental benefits, that are not tied to wholesale energy or capacity sales.

Conclusion

On behalf of NEI and its members, I wish to thank the subcommittee for holding this hearing and encourage members to weigh in with FERC on these important issues. FERC has the authority to take these actions, and with additional direction from Congress, FERC can be expected to act in a timely and appropriate manner. The series of hearings on the Federal Power Act can also play a critical role shaping future legislation to address market flaws.