DOE Quadrennial Energy Review 1.2, Electricity: Generation to End-Use
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Statement of Thomas R. Kuhn, President, Edison Electric Institute

Good morning. I am Tom Kuhn, president of the Edison Electric Institute (EEI). EEI is the association that represents all of the nation's investor-owned electric utilities. Our members provide electricity for 220 million Americans, operate in all 50 states and the District of Columbia, and directly employ more than 500,000 workers.

I am pleased to be here, and I want to thank Secretary Moniz and the Administration for this opportunity to participate in today's first public meeting to launch the Department of Energy's (DOE's) second phase of its Quadrennial Energy Review (QER), or QER 1.2.

The scope of today's meeting covers the core of the electric industry and the challenges we face as the industry evolves. EEI was actively engaged in the QER 1.1 process, and worked to focus attention on key issues and to coordinate efforts among our member companies. We look forward to working with DOE and the Administration throughout QER 1.2 as well.

Industry Vision

The electric power industry is an integral and robust component of our nation's economy. Safe, reliable, affordable, and clean electricity powers our everyday lives. It brings us comfort in our homes, runs our businesses and industries, builds strong communities, and enables us to plug in and connect without a second thought. With every advancement in technology, we depend on electricity even more.

The timing of these discussions is appropriate, as we are in the midst of a significant transformation in our industry. Today, EEI's member companies are investing in renewable energy, transitioning from coal to natural gas, and pursuing energy efficiency. They are partnering with technology companies and start-ups to bring innovation to the forefront and to make the grid smarter and stronger. And, they are leading the way in reducing emissions and making electricity even cleaner. In fact, it is projected that our members will spend more than $300 billion over the next three years to enhance the grid and to make our generation fleet even cleaner.

Our customers are paying attention to what is coming next, and they want their electric utilities to be at the center of change. As an industry, we have an opportunity to push the boundaries of innovation and to craft a vision for the future.

Our vision for the future is focused squarely on three core driving principles:

- A modern, reliable, and resilient grid
- Innovative customer solutions
- Even cleaner energy

At the same time, we have the responsibility for finding ways to deliver the future that customers want and expect from us without jeopardizing reliability, resiliency, and affordability.

A Modern, Reliable and Resilient Grid

We all know that the power grid is the backbone of our electric system. Today, our grid is evolving, from a one-way system to a dynamic, multi-directional network that delivers electricity and information to customers and back to the utility.

The continued deployment of digital smart meters—with more than 60 million installed in U.S. households to date—is one key building block of a smarter, stronger grid. Utility investments that hasten the integration of new technologies—such as small-scale wind and solar, energy storage, microgrids, and other devices in our homes and businesses—are another.

As we think about the future, I want to be very clear that utilities will fill a number of roles. They will continue to function as the Distribution System Integrator that plans, builds, and operates the grid. Utilities have performed these roles well for more than 100 years, providing affordable and reliable electricity to all customers.

The experience and capabilities housed within utilities are extremely valuable as the grid continues to evolve, especially as the distribution grid transforms into a multi-directional network and additional technologies, such as microgrids, are integrated. The transformation of the distribution grid has broad implications for the bulk power transmission system and the development of competitive wholesale electricity markets.

We also believe that utilities should function as the Distribution System Operator that manages the various transactions between suppliers and customers being carried out on the grid. In order to fully realize the potential of new technologies, utilities must be able to go "behind the meter" to provide a wide range of services and options to their customers.

I would now like to highlight some areas that need to be addressed in order to support the grid's ongoing transformation to provide more options for customers.

First, visibility and operational control are needed to ensure the reliable integration of distributed energy resources, efficiency measures, and storage. At the same time, there needs to be greater coordination of the evolving transmission and distribution systems to reliably integrate new conventional and distributed energy resources. And, it is critical that utility operations experience and customer relationships are valued and fully utilized going forward.

EEI strongly believes that the efficiency of transmission planning and siting processes must be improved for the clean energy future envisioned in the Clean Power Plan. DOE and other federal agencies have been focused, in recent years, on coordination of federal permitting processes. DOE has issued an interagency memorandum of understanding and initiated rulemakings.

Coordination of these processes is increasingly important given the ongoing transition of our generation mix and the regional diversity that exists throughout the country.

EEI applauds Congress and the Administration for supporting the recently enacted transportation bill—Fixing America's Surface Transportation Act (FAST Act)—that creates a steering council of federal agency chief environmental review and permitting officers to improve the permitting and siting processes.

State regulators also continue to play a key role in permitting and siting transmission. It is vitally important that the states are engaged in transmission planning and expansion efforts to ensure that needed transmission is built to integrate more renewables and to support the changing resource mix. State and federal regulators also must be engaged in more coordinated transmission and distribution planning.

Transmission planning processes established by the Federal Energy Regulatory Commission (FERC) under Order No. 1000 aimed at facilitating the building of transmission through an open, competitive process have added additional uncertainty to the challenging process of building transmission. Under this rule, the competitive solicitation process required for certain projects has, in some areas of the country, added delays, confusion, and litigation to the process.

Interregional planning processes must mature to achieve the goals of Order No. 1000 for a more efficient transmission system. Additional attention is warranted in the competitive and interregional processes to improve the efficiency of these planning processes. I understand that FERC may be considering a technical conference to assess the benefits and challenges of implementing Order 1000, and we believe such a conference would be useful.

It is critical that regulators provide compensatory returns on investment that recognize transmission development risks. Transmission development typically is a six-to-ten year process, but can stretch even longer for some projects. The long development timeline, coupled often with strong opposition to siting certain transmission projects, increases uncertainty and presents development and cost-recovery risks to infrastructure that has the potential to provide access to some of our country's most promising cleaner energy resources.

Finally, as the distribution system evolves, jurisdictional lines may become more blurred. Careful attention is needed to develop effective federal and state partnerships, for example, as distributed energy resources (DER) are aggregated and sold into wholesale electricity markets.

States will continue to have jurisdiction over retail electricity sales, permitting and siting of distribution, transmission and generation resources, and reliability of the distribution system. FERC will continue to have jurisdiction over wholesale sales, transmission, and reliability of the bulk power system.

States, federal regulators, and other federal agencies must work cooperatively to address jurisdictional issues. Distribution system planning must evolve and be closely aligned with transmission system planning, and regulatory oversight of each must be more closely coordinated to achieve more efficient outcomes. The grid must be viewed as an integrated system—which recognizes the value of central station and distributed generation, transmission, distribution, and microgrids—in order to achieve reliability, resiliency, and affordability goals.

Grid Security and Reliability

Not surprisingly, cybersecurity, physical security, storm response and restoration, and other business continuity issues that are critical to reliability remain top priorities for EEI. EEI's member companies are proactively safeguarding the grid and have a strong record of working across all sectors of the industry and with government partners at the federal, state, and local levels to prepare for, assess, and respond to a variety of emergency situations that could impact the grid.

The electric sector often is described as the most critical of the critical infrastructure sectors. And, while it is true that the other critical sectors depend on a reliable supply of electricity for their operations, the electric sector is dependent on them as well.

At the national level, industry-government coordination continues to take place through the Electricity Subsector Coordinating Council (ESCC). The ESCC is CEO-led and meets three times a year with senior Administration officials to address national security threats to the grid. One of the primary areas of focus is cross-sector coordination. The ESCC has CEO liaisons assigned to the communications, financial services, transportation, water, and downstream natural gas sectors.

While the industry already engages in information sharing and has mandatory and enforceable reliability and cybersecurity standards in place, taking steps to improve the sharing of actionable security information between the government and industry is vital to protecting the electric grid.

To that end, EEI supported congressional passage last year of cybersecurity information sharing legislation that was included as part of the omnibus appropriations bill. This legislation provides legal and regulatory incentives for the voluntary sharing of cyber threat information between the private sector and the government, and will enhance communication among the federal government, electric utilities, and other critical infrastructure industries.

Separately, Congress also clarified DOE grid emergency authority and enacted important protections against public disclosure of critical electric infrastructure information shared with FERC and DOE as part of a major transportation bill.

Among our priorities this year, EEI will be focused on establishing an industry-wide cyber mutual assistance program in coordination with federal agency partners. This will help to

reinforce industry efforts to strengthen cyber and physical security defenses and to enhance grid resiliency. We also will continue our work to expand transformer reserve resources and to coordinate with the railroads and other private- and public-sector transportation partners to develop transformer transportation processes and procedures. And, we will continue to strengthen our restoration capabilities through enhanced mutual assistance and emergency equipment-sharing programs to respond to natural disasters and manmade threats. We appreciate the efforts of our federal partners to help us develop these efforts and look forward to continued collaboration.

Further supporting these grid security efforts, investor-owned electric utilities and stand-alone transmission companies invested $42 billion in transmission and distribution infrastructure in 2014 alone. This includes significant expansion and fundamental improvements to integrate new resources, to improve situational awareness, and to increase system hardening, resiliency, and security.

The true value of this investment was highlighted in media coverage of the historic blizzard that struck the East Coast just a few weeks ago. This was one of the most powerful winter storms in history, and, as the coverage highlights, our industry was well-prepared for the event, activating our mutual assistance network and coordinating response efforts with state and local officials.

While there were power outages caused by the storm, particularly in areas hard hit with ice and high winds, utilities' ongoing investments in grid-hardening measures and technology advances—including upgrading transmission lines; replacing wires and switches; installing wider, heavier power poles; and raising the height of substations vulnerable to flooding—helped to improve situational awareness and to minimize the number of outages and the impact on customers.

Innovative Customer Solutions

We know that our customers want more flexibility in their energy use. They want clean energy, and they expect reliability. As an industry, we need to balance these services with affordability—customers expect maximum value. This is the beginning of a new era where customers have greater control over their energy supply and usage, and customized services for electricity customers will continue to grow.

In addition to enhancing offerings for residential customers, EEI's member companies also are partnering with major industrial and commercial customers to help them meet their corporate sustainability goals through specialized offerings such as increased renewable energy, as well as electrification and energy efficiency incentives. Large commercial customers increasingly want renewable energy to meet their corporate sustainability goals, while cities and towns are requesting customized services, such as help with microgrids, smart city services, and renewable energy.

EEI members are working with regulators, customers, technology providers, and others to increasingly customize and individualize services to meet and exceed customer needs and expectations. Through strategic partnerships with technology companies and major national key accounts customers, utilities are creating positive change for our customers, demonstrating their value as full service energy providers. Lisa Wood, Executive Director of the Institute for Electric Innovation, will discuss these issues in more detail and provide more depth on utility engagement in addressing customer solutions during the second panel today.

Our Clean Energy Future

Many exciting trends are shaping the future of our industry, and utilities are leading the way to a clean energy future. Our industry is the largest investor in renewable energy in the U.S. Virtually all of the wind, geothermal, and hydropower energy in the country—and the majority of installed solar capacity—is provided by utilities. As we continue to transition to a cleaner generation fleet, utilities are integrating increasing amounts of renewable energy resources into the grid each year. The Energy Information Administration estimates that output from renewable energy will more than triple between 2010 and 2040.

One area where we are seeing incredible growth and opportunity is in solar. Large-scale utility solar projects account for about 60 percent of all installed solar capacity in the U.S. This capacity is expected to triple by the end of this year. [Estimates by GTM/SEIA, Solar Market Insight 2014, show that utility-scale solar capacity will reach 28.9 gigawatts (GW) in 2016, up from 10.2 GW in 2014.]

Fuel Diversity & Wholesale Market Issues

EEI's member companies always have relied on a variety of domestic fuels to generate electricity. As energy markets change and our generation fleet continues to evolve, maintaining fuel diversity and flexibility remains at the forefront of our industry's priorities. This is the only way to preserve the clean, reliable, and affordable electricity that our customers expect.
In addition to the growing investment in renewables, the use of natural gas for electric generation continues to grow. Both create opportunities and challenges for the markets.

In wholesale electricity markets run by regional transmission organizations (RTOs) and independent system operators (ISOs), energy price formation and capacity market rules need to evolve to ensure that the price signals are incenting efficient and economic behavior. This means market clearing prices should reflect the cost of operating the system by, for example, minimizing the out-of-market payments or uplift made to generators. These payments are not reflected in the market clearing price, which means that the market clearing price does not reflect the true cost of the operating system.

In markets run by RTOs and ISOs, electric generators rely on the market to provide both the short- and long-term price signals necessary to sustain and promote investment in generation and to recover capital costs. FERC reforms of competitive wholesale power markets as to market rules and grid operator practices are needed to improve investment signals for existing and new generation resources. This will help generators make economic decisions on the infrastructure needed to maintain reliability. Changes to the energy price formation in the markets operated by RTOs and ISOs especially are needed in order to ensure that the markets provide the correct price signals to incent and retain needed generation.

This is particularly critical now. The nation cannot achieve its long-term carbon-reduction goals without building new nuclear plants and continuing to operate the existing nuclear fleet. Electricity markets need to properly recognize and value the important attributes that all resources, including nuclear energy and coal-based facilities, provide to the grid and, ultimately, to our customers.

Nuclear plants provide large-scale baseload electricity production, clean air, and the highest level of carbon-free electricity of any generating source, but current market policies and practices do not accord value to these benefits. This threatens the diversity of our nation's generating portfolio and our ability to meet environmental goals.

In wholesale markets, nuclear and other generating resources typically receive more than 80 percent of their revenue from energy markets. If the price signals are not accurate and do not compensate these resources, the market signal is that these resources are not needed to maintain reliability and resource adequacy. It is important to have a variety of resources with different fuel supply options so that our industry can respond to extreme weather events or other emergency situations that can affect the fuel supply of one particular resource.

The reality is that we are not building coal plants; getting approval to build nuclear remains difficult; and we cannot maintain the fuel diversity that ensures affordable and reliable electricity for customers with natural gas and renewables alone.

The industry is committed to working with FERC on thoughtful and effective solutions that promote accurate price signals, unit commitment, and transparency, while minimizing out-of-market solutions and payments. Proper energy price formation is critical to efficient markets and to ensuring that resources are compensated for the attributes that they provide to the grid.

The Clean Power Plan

I think it is important to emphasize that utilities are—and have been for more than two decades—taking meaningful actions to address climate change and to move us toward a low-carbon energy future. Whether it's by expanding the use of solar energy and other renewables,

by improving energy efficiency, or by steadily retiring coal-based power plants, the nation's utilities are intensifying efforts that, so far, have cut carbon dioxide emissions 15 percent below 2005 levels. In addition, between 1990 and 2014, utilities cut emissions of nitrogen oxides by 74 percent and sulfur dioxide emissions by 80 percent, during a period when electricity use grew by 36 percent.

The reality is that electricity is already even cleaner. Every utility today is transforming itself for the future, and nearly one-third of U.S. power generation (32.3 percent) comes from zero-emissions sources (e.g., nuclear and hydropower and other renewables). This trajectory will continue and will be accelerated under the Clean Power Plan.

It goes without saying that the final Clean Power Plan is one of the most sweeping and far-reaching environmental regulations ever promulgated by the federal government to affect our industry. The Environmental Protection Agency (EPA) projects that the Clean Power Plan will lead to a 32-percent reduction in power sector greenhouse gas emissions from 2005 levels by 2030. In many ways, the Clean Power Plan will be a driver of market forces already underway.

Throughout the Clean Power Plan rulemaking process, EEI led industry efforts to improve the final guidelines to minimize the costs to customers and to protect the reliability of the electricity system. While presenting challenges, particularly in certain states, the Clean Power Plan will spur additional investment as we transition to a cleaner generation fleet.

The final Clean Power Plan affords a good deal of flexibility for the states. It also acknowledges a need to make resources available to states as they work to meet targets and to maintain reliable electricity. EEI continues to promote cost-effective Clean Power Plan implementation options by supporting member company efforts to work with the states to develop practical compliance plans, and by advocating for a federal plan and model trading rules that preserve flexibility to address state-specific concerns, while creating broad, liquid trading markets that promote least-cost compliance.

Achieving the goals set forth in the Clean Power Plan will require the use of all fuels, including natural gas, renewable energy, nuclear energy, and energy efficiency. It also will require continued coordination with FERC, states, and regions.

Key Policy Issues

In closing, I would like to reiterate that our industry's core values and strength remain focused on delivering the safe, reliable, affordable, and clean electricity that powers our customers' everyday lives and drives our nation's economic growth. That commitment will continue in 2016 and beyond, which is why we are addressing, and must resolve, a number of key policy issues.

Specifically, we must:

- Reform rates to better reflect the cost structure for providing electric service, for maintaining grid reliability and resiliency, and for meeting customers' changing needs and expectations (e.g., bill control, reliability, sustainability through energy efficiency, demand response, distributed generation, storage, microgrids).
- Recognize the regional diversity in the evolution of electric markets at the bulk power and distribution levels.
- Recognize the value of fuel diversity in strengthening grid reliability and resiliency.
- Preserve an all-of-the-above energy mix and adopt a strategy that recognizes the utility as the partner and platform for the transition to a more integrated, hybrid grid network of central station and distributed generation and the development of intensive data capabilities.
- Properly integrate DER into the entire electric system, and recognize utilities' role in the ownership, integration, and operation of the DER marketplace.
- Ensure that there is adequate spectrum to transition to a more digitized, distributed, and integrated grid.

We look forward to continuing to work with you to address these issues. Again, thank you for the opportunity to participate in today's discussion.