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Federal Energy Regulatory Commission

Before the
Committee on Energy and Commerce
Subcommittee on Energy and Power
United States House of Representatives

Hearing on
Evaluating the Role of FERC in a Changing Energy Landscape

December 5, 2013

Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee, thank you for the opportunity to share with you my thoughts on the role of FERC in a changing energy landscape.

My name is John Norris and I have served as a Commissioner on the Federal Energy Regulatory Commission (FERC) since January of 2010.

Summary

Significant change is occurring in the energy sector. This change is driven by a new, abundant supply of natural gas; technological innovations in grid operations, renewable energy and energy efficiency; and public policy initiatives and environmental regulations.

Much of our nation's electric generation fleet is aged and the replacement with modern and more efficient technology is occurring. Our coal generation fleet is retiring as a result of both economic factors and environmental regulations. We are also seeing some retirement of nuclear generation as a result of similar economic factors largely driven by low natural gas prices.

Our retiring generation facilities are being predominately replaced by natural gas, renewable energy generation, and the development and deployment of demand-side management technologies including energy efficiency.

Our aged grid infrastructure is attracting significant investment to replace it with a modern, smarter grid system capable of utilizing new technologies. These new technologies are enabling our energy production and consumption to be more efficient.

FERC is striving to provide a level playing field for all technologies to compete and enable consumers to benefit from the efficiencies and enhanced reliability provided by these new technologies.

Current and Changing Electric Infrastructure Landscape

No industry stays static over time. Change is inevitable for a number of reasons including the discovery of new resources and the development of new technologies. Having said that, the energy sector and the electric sector in particular experienced only modest, incremental change for much of the last century. Until recently the electric sector has predominately relied on coal and nuclear fueled generation to produce power, with relatively simple and straightforward transmission and distribution systems to deliver that power to customers. That time of incremental change is clearly over.

Today's aging coal and nuclear plants are being retired and replaced by natural gas, wind, and solar electric generation. In the past 20 years, natural gas has gone from supplying 13 percent of our electricity to more than 25 percent today, with that percentage continuing to rise.[1] Electricity generated by renewable resources, including wind, solar, and hydro-electric power, has increased by almost 20 percent during that same period, and as of 2011 supplied 13 percent of our electricity generation.[2] During this same time period, the U.S. supply of electricity generated from coal has declined from over 50 percent to a little over 40 percent, with a continued decline expected. Meanwhile, nuclear is expected to experience a slight decline.[3]

The primary drivers of this change have been the economics of fuel costs and the development of new gas extraction and generation technologies. For decades, coal was the low cost fuel for electric generation. Through the utilization of fracking technology, an abundant supply of shale gas is now being produced which has significantly lowered the price of natural gas. Also, over the past 15 years, we have witnessed the construction of an increasing number of more efficient combined cycle gas plants. With the

[1] U.S. Energy Information Administration, *Annual Energy Outlook 2013 Early Release Overview*, at 12 (Dec. 5, 2012), *available at* http://www.eia.gov/forecasts/aeo/er/pdf/0383er(2013).pdf.

[2] *Id.*

[3] *Id.*

combination of low gas prices and more efficient generation technology, gas has begun to displace coal in the economic dispatch order.

While this trend is likely to continue, natural gas prices have risen over the past year from a 10 year low of $3.52 per thousand cubic feet in 2012, when gas generation was commonly displacing coal-fired generation, to a 2013 average to date of $4.49.[4] If gas prices remain in the current range, the economic choice between gas and coal-fired generation may fluctuate back and forth.

An additional driver for the increasing utilization of gas-fired generation rather than coal-fired generation has been the recent retirements of older, less efficient coal plants due to increasing price competition and the cost to retrofit these less efficient coal plants to meet clean air standards, including the recent EPA rules on mercury emissions. As a result of all of these drivers, a portion of the U.S. coal generation fleet is being replaced by a modern and more efficient fleet of gas generation facilities to meet the U.S. base and intermediate load needs.[5] Indeed, evidence demonstrates that combined-cycle natural gas facilities are significantly more efficient than the typical coal-fired facility, with the heat rates of such combined-cycle natural gas facilities generally being 20 percent lower than the heat rates for coal-fired generators.[6]

This transition is occurring at a time when there is little if any load growth in the electric sector. By comparison, increased load growth had been a constant for over a century. Part of this flat demand is a result of the still struggling U.S. economy. But, another significant factor has been the increasing deployment of energy efficiency and demand-side management technologies. These technologies have provided a valuable additional tool that allows consumers to more efficiently utilize the resources connected to our nation's transmission grid.

Reliance on nuclear powered generation is also declining but at a slower rate than coal, at least thus far. Yet, nuclear powered generation is facing the same economic challenges impacting our coal fleet, including low gas prices and flat demand. In addition, low and sometimes negative wholesale electric prices during high wind

[4] U.S. Energy Information Administration, "U.S. Natural Gas Electric Power Price" (Oct. 31, 2013), *available at* http://www.eia.gov/dnav/ng/hist/n3045us3a.htm.

[5] Intermediate load units are those that typically run very little at night, but have higher capacity factors during the day. *See* U.S. Energy Information Administration, "Natural gas-fired combustion turbines are generally used to meet peak electricity load" (Oct. 1, 2013), *available at* http://www.eia.gov/todayinenergy/detail.cfm?id=13191.

[6] *See* http://www.eia.gov/electricity/annual/html/epa_08_01.html; *See also* http://www.eia.gov/electricity/annual/html/epa_08_02.html.

generation periods in certain markets are adding to the economic pressure these plants are experiencing. Indeed, recently, utilities have announced the retirement of four nuclear generation facilities.[7]

As more of our coal and nuclear fleet retires, all indicators point to our future electricity needs being met by the combination of new gas and renewable energy generation, including distributed generation and increased deployment of demand-side management.

When I began my first term at FERC in 2010, I met with numerous utility CEOs to ask them about their generation plans for the future. With the exception of one CEO who included new nuclear in his company's plans, every one of them cited gas and renewables. In addition to the economics driven by low cost and abundant natural gas, flat electricity demand, an aged and increasingly inefficient coal fleet, and public policies around energy efficiency and renewable energy, the additional and significant factor for all of them was the ongoing uncertainty around restrictions of carbon emissions. Faced with this combination of factors, those CEOs planned to turn to gas and renewables to meet their future needs. I believe the drivers in place today will have only solidified their positions.

With the exception of building new nuclear in a vertically integrated state where state regulation of generation provides a reasonable assurance of cost recovery, it seems unlikely that new coal or nuclear facilities will be constructed in the foreseeable future. While the political debate around climate change and the need for carbon constraints continues to go back and forth, the scientific indicators around carbon emissions and climate change have remained relatively constant. Numerous CEOs that I have met with since 2010 have concluded that some form of restriction on carbon emissions is likely at some point in the future, but have noted that just the potential for such restrictions on carbon emissions makes it extremely difficult to finance any new coal-fired generation facility. If carbon capture technology becomes economically feasible, that could change this thinking.

[7] These units include San Onofre Units 2 and 3 in California (Southern California Edison); Crystal River in Florida (Duke Energy Corp.); Vermont Yankee in Vermont (Entergy); Kewaunee in Wisconsin (Dominion). *See* http://www.nytimes.com/2013/06/15/business/energy-environment/aging-nuclear-plants-are-closing-but-for-economic-reasons.html?_r=2& (June 14, 2013); *See also* ISO New England Press Release "ISO New England Issues Statement on Entergy's Announcement to Retire Vermont Yankee Nuclear Power Plant" (Aug. 27, 2013), *available at* http://www.iso-ne.com/nwsiss/pr/2013/iso_new_england_issues_statement_vy_retirement_final.pdf.

While this significant change in our generation landscape is occurring, there is increasing pressure for utility businesses and the energy sector to modernize the transmission and distribution systems throughout America. Power transformers are on average over 40 years old[8] and 70 percent of our transmission lines are 25 years old or older.[9] Industry estimates of needed investment in America's transmission and distribution system range from 330 to 880 billion dollars over the next 15 to 25 years.[10]

For the past century, the transmission and distribution systems were relatively simple and straightforward in their operations. Because change to our electric transmission and distribution system components is slow to occur, a great deal of those early systems remain in place. To visualize how this system has been operating for decades, imagine a left-to-right flow chart. Fuel was delivered to a central station generation plant. That fuel was converted to electric energy. Electricity was injected on the transmission network out to the substations where power was transformed for the distribution network which sent the power through meters to provide electricity to homes, businesses, and industry. The only thing that traveled right to left was the bill payment.

That system is now being replaced with a more intelligent grid designed to meet the rapidly changing energy landscape. Imagine that same chart but now the system is supporting the free flow of electricity in all directions along with information flowing over the same network, designed to maximize the efficient utilization of energy. This new grid will provide the versatility to incorporate power from the existing fleet of central station power but also distributed generation produced on the rooftops of homes and businesses as well as intermittent sources of renewable generation from remote locations where wind farms and solar arrays are producing electricity at utility scale. In addition to handling electricity flowing in all directions, the modern grid system is

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[8] Richard J. Campbell, Congressional Research Service, "Weather-Related Power Outages and Electric: System Resiliency", at 10 (Aug. 28, 2012) (citing Thomas A. Prevost and David J. Woodcock, Transformer Fleet Health and Risk Assessment, Weidman Electrical Technology, IEEE PES Transformers Committee Tutorial, March 13, 2007, http://grouper.ieee.org/groups/transformers/info/S07/S07-TR_LifeExtension.pdf).

[9] Richard J. Campbell, Congressional Research Service, "Weather-Related Power Outages and Electric: System Resiliency", at 10 (Aug. 28, 2012) (citing K. Anderson, D. Furey, and K. Omar, Frayed Wires: U.S. Transmission System Shows Its Age, Fitch Ratings, October 25, 2006).

[10] *See* Edison Electric Institute (prepared by The Brattle Group), "Transforming America's Power Industry: The Investment Challenge 2010-2030", at 5 (Nov. 2008), *available at* http://www.eei.org/ourissues/finance/Documents/Transforming_Americas_Power_Industry_Exec_Summary.pdf; *See also* American Society of Civil Engineers (prepared by Economic Development Research Group, Inc.), "Failure to Act: The Economic Impact of Current Investment Trends in Electricity Infrastructure", at 6 (2011), *available at* http://www.asce.org/uploadedFiles/Infrastructure/Failure_to_Act/SCE41%20report_Final-lores.pdf.

incorporating new technologies ranging from smart meters at the home to synchrophasers on high-voltage transmission lines to utilize a nearly unimaginable amount of data also being transmitted over the transmission system. The deployment of this new smart grid technology, among other things: enables the operation of a more reliable grid; enables demand response to be incorporated into energy markets; allows consumers to be empowered in their energy use decisions; and enables utility service providers to be more efficient and timely in responding to customer needs.

As a result of the current uncertainty around investment in generation, a large portion of current and planned utility capital expenditures is in transmission and distribution. This will help replace our aged grid and speed up the development of a modern, more efficient grid. It will also help address areas of congestion in the wholesale electricity markets, enhance grid reliability, and provide access to remote renewable resources. The build out of this new, modern grid system or platform is also encouraging the investment in new technologies to continue the incredible advance in more efficient utilization of our energy resources that has taken place in just the last few years.

FERC's Role in the Changing Landscape

Given that FERC does not have jurisdiction over generation, I believe our role is to ensure that energy markets are fair, open, and transparent so that all resources can compete on a level playing field. We can achieve this by exercising our jurisdictional authority to ensure that our transmission system is meeting the needs of consumers and our economy at rates that are just and reasonable. In particular, we have taken the lead in areas such as transmission planning and reliability.

The Commission has taken or will take a number of steps to protect our energy markets and ensure that our transmission system is reliable, while also ensuring that rates remain just and reasonable. With respect to our transmission system, the Commission has acted to address regional transmission planning and incentives for new transmission infrastructure.

As the wholesale markets for energy expand, as transmission interconnects larger and larger regions of the country and as other operational walls come down in our electric grid, the need for greater regional and interregional planning has become imperative. For the grid to remain reliable and for consumers to be confident the costs for transmission services are just and reasonable, the Commission took action to require that transmission

planning regions establish a process for developing regional transmission plans and address the allocation of transmission costs.[11]

In 2006, as directed by Congress, the Commission established transmission rate incentives to encourage investment in transmission infrastructure in order to benefit consumers by ensuring reliability and reducing the cost of delivered power by reducing transmission congestion. After years of experience, the Commission refined its transmission incentive policies in 2012 to achieve the appropriate balance of incenting needed transmission investment, while meeting our statutory responsibilities to ensure that consumers are paying just and reasonable rates for needed power supply.[12] In refining these policies, the Commission identified three categories of transmission projects that are most likely to receive an incentive return on equity (ROE): 1) projects that relieve chronic grid congestion and provide access to lower cost resources; 2) projects that provide access to location-constrained resources, such as our nation's wealth of renewable resources, that previously had no or limited access to markets; and 3) projects that build the grid of the future by incorporating new advanced technologies that allow for a more efficient utilization and integration of resources.

One of FERC's primary roles with respect to transmission infrastructure is the setting of transmission rates, including providing entities with a reasonable return on investment. With respect to ROEs, FERC also must deal with a number of outstanding transmission ROE cases before us and provide a reasonable level of certainty for transmission investment so our infrastructure needs will be met.

The Commission also took additional action to refine our market rules to ensure that all resources are participating in our markets on a level playing field, while protecting consumers by ensuring that rates remain just and reasonable.

Recently, the Commission held a capacity market technical conference to assess how current centralized capacity market rules are supporting the procurement and retention of resources necessary to meet future reliability and operational needs. We will be receiving stakeholder comments in the next month or so, which will aid our efforts in evaluating whether the current market structures achieve efficient market-based outcomes, or whether rules changes are necessary to achieve that desired objective.

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[11] *Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities*, Order No. 1000, 76 Fed. Reg. 49,842 (Aug. 11, 2011), FERC Stats. & Regs. ¶ 31,323 (2011).

[12] *Promoting Transmission Investment Through Pricing Reform*, Policy Statement, 141 FERC ¶ 61,129 (2012).

The Commission also addressed market rules for demand response resources by requiring demand response resources to be paid the market price when such resources have the ability to balance supply and demand as an alternative to generation.[13] This reform will lower costs to consumers, provide more resource options for efficient and reliable system operation, encourage new entry and innovation in energy markets, and spur the deployment of new technologies. I believe that demand response is a cost-effective but sometimes underutilized resource, and am encouraged that this reform will remove barriers to its participation in the wholesale electricity markets.

The Commission has also recently required the ISOs and RTOs to modify their dispatch and resource procurement to ensure that resources that can more quickly and accurately provide balancing services are paid accordingly for their performance.[14] This pay-for-performance framework should enable ISOs and RTOs to procure and dispatch fewer resources, thereby lowering costs to consumers. It also sends a more appropriate market signal for further investment in valuable resources that enable the grid to be operated and utilized more efficiently.

Our recent reforms have also touched on rules to foster competition and transparency in the ancillary services markets. In the face of changing resource mixes in various regions of the country, the Commission recognized that there is a growing need for ancillary services to support grid functions and a growing interest from grid operators to have flexibility in meeting such needs. The Commission responded by implementing reforms to foster competition and transparency in the ancillary services markets by incenting new resources to provide ancillary services and enabling grid operators to procure such ancillary services more cost effectively.[15]

As I noted above, it is important that the Commission implement market rules that create a level playing field for all resources. To address the growing penetration of wind and solar generation that has variable or intermittent electrical output, the Commission evaluated existing grid operational practices which assume that the output of generation can be scheduled with relative precision. The Commission concluded that these practices were developed to accommodate the characteristics of existing conventional resources

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[13] *Demand Response Compensation in Organized Wholesale Energy Markets*, Order No. 745, 76 Fed. Reg. 16,658 (Mar. 24, 2011), FERC Stats. & Regs. ¶ 31,322 (2011).

[14] *Frequency Regulation Compensation in the Organized Wholesale Power Markets*, Order No. 755, 76 Fed. Reg. 67,260 (Oct. 31, 2011), FERC Stats. & Regs. ¶ 31,324 (2011).

[15] *Third-Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies*, Order No. 784, 78 Fed. Reg. 46,177 (July 30, 2013), FERC Stats. & Regs. ¶ 31,349 (2013).

and in some instances placed intermittent resources at an inherent disadvantage in the competitive markets. As a result, the Commission required grid operators to offer more flexible transmission scheduling and further empowered grid operators to acquire the necessary data to forecast the variable output from wind and solar generation.[16] These reforms will serve to reduce the costs of integrating renewable generation by mitigating the need for grid operators to purchase and deploy expensive backup generation or reserves.

Various regions of the country are experiencing significant penetration of small and distributed generation, along with associated generator interconnection requests. In response, just last month, the Commission streamlined our small generator interconnection process to minimize the time and cost necessary for grid operators to study whether small generators can safely and reliably be interconnected to the grid.[17]

Finally, it is important to emphasize our recent role in market oversight. The Commission has exercised our market oversight authority, which was expanded by Congress in the Energy Policy Act of 2005, to aggressively pursue multiple market manipulation schemes in the past few years. We will continue to be vigilant in protecting the integrity of our energy markets, and looking for ways to further bolster our market oversight to ensure that traders and other market actors are acting in accordance with market rules.

I highlight these above actions as examples of recent FERC actions that I believe have been taken to enable the changes occurring in our energy landscape to be integrated with the least disruption and cost to consumers. I believe one of our responsibilities in ensuring just and reasonable rates is to strive for overall efficiency in the operation of our energy system. Currently the integration of new technologies such as distributed generation, demand response, energy storage, smart meters, and intermittent generation resources pose perhaps the greatest challenges to both federal and state regulators.

[16] *Integration of Variable Energy Resources*, Order No. 764, 77 FR 41482 (July 13, 2012) FERC Stats. & Regs. ¶ 31,331 (2012).

[17] *Small Generator Interconnection Agreements and Procedures*, Order No. 792, 145 FERC ¶ 61,159 (2013).

Conclusion

My comments here have been predominately around the electric sector. I understand that one or more of my colleagues are providing more extensive testimony on the regulation of pipelines, hydro-electric facilities and other FERC-jurisdictional responsibilities. However with respect to gas or oil pipelines, hydro-electric facilities or any other infrastructure projects under FERC's jurisdiction, I believe that we have an important role in facilitating the construction of energy infrastructure to meet America's future energy needs. I believe it is important to understand that building new infrastructure is much more difficult today than in years past. You can count on significant resistance from multiple parties to the construction of any new infrastructure. New projects impact people's property rights and values, community planning, the environment, and many other concerns. Balancing those rights and concerns with society's needs for energy will never be easy. I believe our role is to reach a just and reasonable decision, respectful of due process in a fair and reasonable manner as expeditiously as practical and required under the law.

I appreciate the opportunity to testify today regarding FERC's role in the changing energy landscape. This is an extraordinary time to be involved in the development of our nation's energy future. While we face many challenges, there are also many opportunities. Our understanding of those challenges and opportunities benefits from continued dialogue.