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SUPPLEMENTAL MEMORANDUM

May 31, 2015

To: Subcommittee on Energy and Power Democratic Members and Staff

Fr: Committee on Energy and Commerce Democratic Staff

Re: Supplemental Memorandum on the Quadrennial Energy Review

I. BACKGROUND ON THE QER

On January 19, 2014, President Obama issued a Presidential Memorandum directing the federal government to conduct a Quadrennial Energy Review (QER) and establishing a task force to conduct that review and "submit a Quadrennial Energy Review Report to the President every 4 years…"[1] The task force, co-chaired by the Director of the Office of Science and Technology Policy and the Director of the Domestic Policy Council, includes all the Cabinet-level Departments, as well as numerous agencies and offices such as the Environmental Protection Agency (EPA), Council on Environmental Quality (CEQ), the Army Corps of Engineers and the National Economic Council.

The Memorandum defined the scope for the initial installment of the QER to be the nation's "infrastructure for transporting, transmitting and delivering energy" (TS&D) and that it build on the Obama Administration's March 2011 *Blueprint for a Secure Energy Future* and June 2013 *Climate Action Plan*.[2] The task force was directed to prepare a report that:

- provides an integrated view of, and recommendations for, Federal energy policy in the context of economic, environmental, occupational, security, and health and safety priorities;

- reviews the adequacy…of existing executive and legislative actions, and

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[1] The White House, *Presidential Memorandum – Establishing a Quadrennial Energy Review* (Jan. 19, 2014) (online at www.whitehouse.gov/the-press-office/2014/01/09/presidential-memorandum-establishing-quadrennial-energy-review).

[2] *Id.*

recommends additional executive and legislative actions;

- assesses and recommends priorities for research, development, and demonstration programs to support key energy-innovation goals; and

- identifies analytical tools and data needed to support further policy development and implementation.[3]

The Secretary of Energy was specifically tasked with supporting the task force's efforts "including support for coordination activities related to the preparation of the…Report, policy analysis and modeling, and stakeholder engagement."[4]

With regard to stakeholder engagement, the White House and Department of Energy (DOE) conducted public stakeholder meetings in Washington D.C. and in 13 other locations around the country regarding key regional and energy sector specific issues. They also met with officials from Canada and Mexico, as well as held briefings with industry and nonprofit group representatives, state officials, Congressional staff. Additionally, DOE developed a public comments portal to allow for more widespread input into the task force's efforts.[5]

The Obama Administration released the task force's first report, *Quadrennial Energy Review: Energy Transmission, Storage and Distribution Infrastructure*, on April 21, 2015.

The QER covered the following areas:

- Increasing the Resilience, Reliability, Safety, and Asset Security of TS&D Infrastructure;

- Modernizing the Electric Grid;

- Modernizing U.S. Energy Security Infrastructures in a Changing Global Marketplace;

- Improving Shared Transport Infrastructures;[6]

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[3] *Id.*

[4] *Id.*

[5] Senate Committee on Energy and Natural Resources, Testimony of Secretary of Energy Ernest J. Moniz*, Hearing on The Administration's Quadrennial Energy Review*, 114th Cong. (Apr. 28, 2015).

[6] Some of the findings and recommendations in this section of the QER may not be germane to the jurisdiction of the Committee on Energy and Commerce. For further information please *See* U.S. Department of Energy, *Quadrennial Energy Review, Chapter V: Improving Shared Transport Infrastructures* (Apr. 2015) (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch5.pdf).

- Integrating North American Energy Markets;
- Addressing Environmental Aspects of TS&D Infrastructure;
- Enhancing Employment and Workforce Training;
- Siting and Permitting of TS&D Infrastructure.[7]

The findings and recommendations within the above areas are summarized immediately below in the next section of this memo.

II. SUMMARY OF SELECT QER FINDINGS AND RECOMMENDATIONS

A. Increasing the Resilience, Reliability, Safety, and Asset Security of TS&D Infrastructure

This chapter of the QER finds that TS&D infrastructure is vulnerable to a wide and growing range of natural phenomena and attacks, both physical and cyber. While these threats and vulnerabilities tend to be region-specific, increasing interdependence between energy systems heightens those vulnerabilities.[8] The chapter specifically identifies high-voltage transformers as being a critical vulnerability for the electric grid. With regard to natural gas, the chapter identifies aging pipeline distribution systems as a safety and environmental concern; important difficulties in recovering from gas (and liquid fuel) supply interruptions; and the growing dependence on natural gas as presenting challenges with regard to the electric grid.[9]

Recommendations in this chapter include: establishing a competitive program to accelerate pipeline replacement and enhance maintenance programs for natural gas distribution systems; establishing a competitive grant program to promote innovative solutions to enhance energy infrastructure resilience, reliability, and security; undertaking analyses necessary to mitigate the risks associated with loss of transformers; and, analyzing the need for additional or expanded regional product reserves and integrating the President's

[7] U.S. Department of Energy, *Quadrennial Energy Review, Energy Transmission, Storage and Distribution Infrastructure*, at S-2 (Apr. 2015) (online at energy.gov/sites/prod/files/2015/05/f22/Summary%205.18.15.pdf).

[8] Senate Committee on Energy and Natural Resources, Testimony of Secretary of Energy Ernest J. Moniz*, Hearing on The Administration's Quadrennial Energy Review*, 114th Cong. (Apr. 28, 2015).

[9] U.S. Department of Energy, *Quadrennial Energy Review, Energy Transmission, Storage and Distribution Infrastructure*, at S-11, S-12 (Apr. 2015) (online at energy.gov/sites/prod/files/2015/05/f22/Summary%205.18.15.pdf).

authorities to release products from regional petroleum product reserves into a single, unified authority.[10]

B. Modernizing the Electric Grid

With regard to the nation's electric grid, the QER found that, in general, investments in transmission and distribution upgrades and expansions will likely continue to grow, though within historic build rates. Costs are also likely to rise. Further findings highlight the benefit of both distributed energy resources and long distance transmission connections to renewables. Similarly, the QER found that demand response, efficiency, storage and distributed generation can reduce the costs of new transmission, and that many of these investments have additional environmental and resiliency benefits. One problem noted by the QER is how a growing lack of clarity between federal and state electricity jurisdictions is leading to impediments to evolving the grid.[11]

In this area, recommendation highlights include: establishing a five year program providing up to a total of $350 million per year in state financial assistance "to promote and integrate TS&D infrastructure investment plans for electricity reliability, affordability, efficiency, lower carbon generation, and environmental protection;"[12] step up federal efforts to improve grid communication through standards that promote connectivity and interoperability[13]; implement a comprehensive review of transmission, including impediments to and incentives for the development of new transmission, as well as assessing impediments to the implementation of existing plans;[14] analyze state and regional electric storage deployment in service of evaluating and, ultimately, implementing a strategy for electricity enabling "storage and grid flexibility"[15]

C. Modernizing U.S. Energy Security Infrastructures in a Changing Global Marketplace

The QER discusses our nation's need to adapt and modify our understanding of energy security, due to changed circumstances in energy production and use in the United States. Increased oil and gas production, coupled with decreased energy demand through improved efficiency, have resulted in the U.S. significantly decreasing demand for imported energy.

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[10] *Id.* at S-12.

[11] *Id.* at S-14 - S-15.

[12] Senate Committee on Energy and Natural Resources, Testimony of Secretary of Energy Ernest J. Moniz, *Hearing on The Administration's Quadrennial Energy Review*, 114th Cong. (Apr. 28, 2015).

[13] U.S. Department of Energy, *Quadrennial Energy Review, Energy Transmission, Storage and Distribution Infrastructure*, at S-15 (Apr. 2015) (online at energy.gov/sites/prod/files/2015/05/f22/Summary%205.18.15.pdf).

[14] *Id.* at S-16.

[15] *Id.*

The QER found that the United States is emerging as a leader in petroleum and natural gas production; the Energy Information Administration (EIA) projects that this trend will continue, with U.S. net imports of oil dropping to 21% of consumption in 2016, the lowest level since 1969.[16] These changes have put added strain on our expanding energy distribution system, and the capacity of the Strategic Petroleum Reserve (SPR), and "the degree to which it can protect the U.S. Economy from oil disruptions."[17] Ultimately, the QER found that we should be looking beyond oil security, and that "energy security needs to be more broadly defined to cover not only oil but other sources of supply, and to be based not only on the ability to withstand shocks but also to be able to recover quickly from any shocks that do occur."[18]

To aid in modernizing U.S. energy security infrastructure, the QER makes a number of recommendations, primarily focused on increasing the effectiveness of the SPR. First, the QER recommends a change in SPR release authority to reflect modern oil markets, allowing for anticipatory releases in the event of "an economy-damaging price increase as a result of a severe energy supply interruption."[19] It is further recommended that DOE analyze size and configuration of the SPR, and make necessary investments to both "optimize the ability of the SPR to protect the U.S. economy in a supply emergency,"[20] and extend the life of current infrastructure to "increase the incremental distribution capacity."[21] Continued coordination with U.S. allies on energy security issues is also recommended.

Going beyond the SPR, the QER recommends promoting energy security through enhanced fuel diversity, building on existing research partnerships with the Department of

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[16] U.S. Department of Energy, *Quadrennial Energy Review, Chapter IV: Modernizing U.S. Energy Security Infrastructures in a Changing Global Market* (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch4.pdf); U.S. Energy Information Administration, *Short-Term Energy Outlook May 2015* (May 12, 2015) (online at www.eia.gov/forecasts/steo/pdf/steo_full.pdf).

[17] U.S. Department of Energy, *Quadrennial Energy Review, Chapter IV: Modernizing U.S. Energy Security Infrastructures in a Changing Global Market*, at 4-6 (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch4.pdf).

[18] The White House, *FACT SHEET: Administration Announces New Agenda to Modernize Energy Infrastructure*, at 6 (Apr. 21, 2015) (online at energy.gov/sites/prod/files/2015/04/f22/QER%20SUMMARY%20FACT%20SHEET%20final.pdf).

[19] U.S. Department of Energy, *Quadrennial Energy Review, Chapter IV: Modernizing U.S. Energy Security Infrastructures in a Changing Global Market*, at 4-7 (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch4.pdf).

[20] *Id.* at 4-9.

[21] The White House, *FACT SHEET: Administration Announces New Agenda to Modernize Energy Infrastructure*, at 6 (Apr. 21, 2015) (online at energy.gov/sites/prod/files/2015/04/f22/QER%20SUMMARY%20FACT%20SHEET%20final.pdf).

Defense on the development of drop-in biofuels and fuels with higher-level ethanol blends, especially for use in aviation.[22] DOE is advised to provide technical assistance to those who wish to make investments in infrastructure for these types of fuels, and to ensure there is necessary support for data collection and analysis of these fuels as they continue to play a role in the nation's energy mix.[23] Finally, the QER recommends "the relevant agencies should conduct a study of the economic, engineering, logistics, workforce, construction, and regulatory factors affecting the domestic shipping industry's ability to support U.S. energy security."[24]

D. Integrating North American Energy Markets

The QER takes a broad look at the current state of energy trade between the U.S. and our North American neighbors, and how increased coordination and other external factors can impact current and future energy infrastructure. The U.S has "significant energy trade with Canada and Mexico, including oil and refined products, gas and electricity,"[25] but our relationships with these countries are not the same. The U.S. has a well-established energy relationship with Canada, due to our interconnected energy systems and the movement of oil and gas produced in Canada to the United States.[26] The recent reforms to Mexico's energy sector are currently "present[ing] an opportunity to increase energy trade with the United States and enhance energy security for the region."[27] The QER also found that climate change is leading to increased energy development in the Arctic, and a greater need for coordinated mitigation activities. And finally, the current energy mix used in Caribbean presents an opportunity deploy natural gas to help lower emissions and reduce energy prices.[28]

The QER makes several recommendations to "enabl[e] the region to achieve economic, energy security, and environmental goals."[29] Continuing the energy dialogue between the U.S., Canada and Mexico is recommended, and should include a focus on

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[22] U.S. Department of Energy, *Quadrennial Energy Review, Chapter IV: Modernizing U.S. Energy Security Infrastructures in a Changing Global Market*, at 4-13 (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch4.pdf).

[23] *Id.*

[24] *Id.* at 4-14.

[25] U.S. Department of Energy, *Quadrennial Energy Review, Chapter VI: Integrating North American Energy Markets*, at 6-2 (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch6.pdf).

[26] *Id.* at 6-5 – 6-7.

[27] *Id.* at 6-8.

[28] *Id.* at 6-2.

[29] The White House, *FACT SHEET: Administration Announces New Agenda to Modernize Energy Infrastructure*, at 7 (Apr. 21, 2015) (online at energy.gov/sites/prod/files/2015/04/f22/QER%20SUMMARY%20FACT%20SHEET%20final.pdf).

increased energy data sharing and "comparative and joint modeling, planning, and forecasting activities."[30] The QER also recommends establishing programs, partnering with academic institutions, non-profits, and government officials, to assist in developing "policy roadmaps for harmonizing regulations across borders."[31] There is a recommendation for the United States, in close coordination with Canada and the Arctic Council, to enhance greater "energy safety, reliability, and environmental protection in Arctic regions."[32] Finally, the QER recommends "support [of] the diversification of energy supplies, including actions to facilitate the introduction of cleaner forms of energy and the development of resilient energy infrastructure in the Caribbean."[33]

E. Addressing Environmental Aspects of TS&D Infrastructure

The QER makes clear that while energy TS&D does have direct negative environmental impacts, it can also be a source of opportunity to make environmental improvements. Apart from negative impacts of TS&D infrastructure, proper siting – or even the decision not to build TS&D infrastructure – can be an important opportunity to improve the environment.

For instance, while the siting of transmission lines and pipelines poses risks of spills and other ecological impacts, reductions of methane from gas pipelines can also be a substantial source of emissions that can help fight climate change. Siting of transmission that enables renewable energy to be brought to market can also help fight climate change, and the use of distributed generation can obviate the need for transmission that would have negative ecological impacts. Moreover, energy infrastructure like carbon sequestration and smart grid technologies can be a part of active efforts to improve environmental conditions and reduce emissions.

Some of the QER findings regarding the environmental aspects of TS&D infrastructure include the following: 1) TS&D infrastructure can serve as a key enabler for—or barrier to—better environmental outcomes; 2) TS&D Infrastructure contributes a relatively small share of total air and water pollution from the energy sector; 3) Energy Transport, refining and processing sector contribute to emissions of criteria air pollutants; and 4) Transportation of crude oil by pipeline, rail and waterborne vessels has safety and environmental impacts.[34]

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[30] U.S. Department of Energy, *Quadrennial Energy Review, Chapter VI: Integrating North American Energy Markets*, at 6-20 (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch6.pdf).

[31] *Id.* at 6-13.

[32] *Id.* at 6-16.

[33] *Id.* at 6-19.

[34] U.S. Department of Energy, *Quadrennial Energy Review, Energy Transmission, Storage and Distribution Infrastructure*, at S-25 (Apr. 2015) (online at energy.gov/sites/prod/files/2015/05/f22/Summary%205.18.15.pdf).

A few of the key recommendations include: 1) Improve quantifications of emissions from natural gas TS&D infrastructure; 2) Expand R&D program at DOE on cost effective technologies to detect and reduce losses from natural gas TS&D systems; 3) Support funding to reduce Diesel Emissions; 4) Work with States to promote best practices for regulating and siting CO_2 pipelines; and 5) Enact financial incentives for the construction of CO_2 pipeline networks.[35]

F. Enhancing Employment and Workforce Training

According to the QER, in 2013 the energy transmission and distribution sector directly employed roughly one million people, and another 900,000 people indirectly.[36] The entire energy sector is projected to support directly 1.5 million jobs by 2030, including jobs in the transmission, storage, and distribution sectors.[37] The growth of new technologies has led to a shift in the types of skills needed for energy sector employment, "creating opportunities from blue-collar, semi-skilled and skilled workers to white collar information technology and management positions."[38] The QER found that to meet the energy workforce's challenges of the future, there needs to be significant development of new job-driven training strategies to cover the wide area of skills that will be needed. There is a particular need to find new and innovative ways to both attract new talent for the energy jobs of the future, and expand and develop curricula using the latest educational tools and techniques to train these workers.[39]

In the area of workforce training, the QER recommends supporting an energy-job skills training system through the interagency Skills Working Group. The training system should include new curricula, apprenticeship programs, industry-based credentialing standards, and innovative online learning systems. The QER also recommends expanding support for an open-source learning community to "develop, facilitate, and expand use of state-of-the art courses in energy-related fields."[40] In close coordination with the Department of Labor and the National Science Foundation, DOE should work to enhance the development of needed apprenticeship programs and curricula to train workers in the high-quality energy and manufacturing fields. The QER recommends that DOE play a role in both supporting and facilitating the creation of defined national credentials for energy occupations, while also assisting military veterans to transition into civilian jobs in the energy sector. Finally, the QER recommends that DOE convene an interagency working group with the Departments of

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[35] *Id.* at S-27.

[36] U.S. Department of Energy, *Quadrennial Energy Review, Chapter VII: Enhancing Employment and Workforce Training*, at 8-2 (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch8.pdf).

[37] *Id.* at 8-3.

[38] *Id.* at 8-2.

[39] *Id.* at 8-6 -8-7.

[40] *Id.* at 8-10.

Labor and Commerce, to reform and improve existing energy jobs data collection systems in order to provide an accurate picture of energy sector employment across the country.[41]

G. Siting and Permitting of TS&D Infrastructure

The final chapter of this QER installment focuses on issues relating to the permitting of TS&D infrastructure, noting that "there has been a growing awareness of the gap between the times typically needed to permit new generation and production sources of energy and the much longer times needed for TS&D infrastructure."[42] The QER found that the involvement of multiple entities (federal, state, tribal, etc.) with sometimes overlapping and conflicting jurisdiction and statutory responsibilities adds time to siting, permitting, and review of TS&D projects. Moving TS&D projects forward requires collaboration and coordination of federal entities with state, tribal and local governments as well as sufficient knowledge of resource concerns that arise in the permitting process. Furthermore, it is critical to engage the public early and thoroughly to ensure the credibility necessary to avoid or effectively address impacts on communities and associated delays. Due to the complexity of projects and the varying mechanisms for siting a particular type of TS&D facility, the timeframes and intricacies of the siting process can vary greatly depending on the project's type and scope. The QER noted that the Administration has been taking steps to make its siting, permitting, and review processes more efficient and more effective.[43]

To address the issues raised in this chapter, the QER recommends a number of steps, including: providing sufficient funds to federal agencies involved in TS&D permitting to ensure that the level of staffing and other resources necessary to efficiently and effectively process siting and permitting; ensuring timely and thorough public engagement to identify and swiftly mitigate siting conflicts; enacting proposals to authorize cost recovery of federal permitting, siting and review from applicants.[44]

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[41] *Id.* at 8-10- 8-11.

[42] U.S. Department of Energy, *Quadrennial Energy Review, Energy Transmission, Storage and Distribution Infrastructure*, at S-2 (Apr. 2015) (online at energy.gov/sites/prod/files/2015/05/f22/Summary%205.18.15.pdf).

[43] U.S. Department of Energy, *Quadrennial Energy Review, Chapter IX: Siting and Permitting of TS&D Infrastructure*, at 9-2 (Apr. 2015) (online at energy.gov/sites/prod/files/2015/04/f22/QER_Ch9.pdf).

[44] *Id.* at 9-19.