Department of Energy
Washington, DC 20585

February 9, 2018

The Honorable Fred Upton
Chairman
Subcommittee on Energy
Committee on Energy and Commerce
U. S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

On October 12, 2017, Secretary Rick Perry testified regarding a hearing entitled "Department Of Energy Missions and Management Priorities".

Enclosed are answers to questions submitted by Representatives Barton, McKinley, Hudson, Cramer, Walberg, Pallone, Jr., Sarbanes, Welch, Tonko, Butterfield, and you.

If you need any additional information or further assistance, please contact me or Fahiye Yusuf, Office of Congressional and Intergovernmental Affairs at (202) 586-5450.

Sincerely,

[redacted]

Marty Dannenfelser
Deputy Assistant Secretary for House Affairs
Congressional and Intergovernmental Affairs

Enclosures

cc: The Honorable Bobby Rush
Ranking Member

QUESTIONS FROM CHAIRMAN FRED UPTON

Q1. In recent years, DOE has done a commendable job of establishing its role as a sector specific agency, especially related to cyber threats in the electricity sector. The collaboration and trust that has been developed between the Department and private sector partners is critical when faced with such a dynamic challenge. However, as the threats become more sophisticated and the energy landscape – especially the grid – continues to evolve, cyber threats will only become more challenging for the energy sector.

Q1a. I understand the department has a strong relationship with the electric sector but what is the current level of engagement with other areas of the energy sector – such as oil and gas, pipelines, nuclear?

A1a. Per Presidential Policy Directive 21 (PPD-21): Critical Infrastructure Security and Resilience, the U.S. Department of Energy (DOE) is the sector-specific agency (SSA) for the energy sector, which includes both the electricity subsector and oil and natural gas subsector. In that role, DOE leads the Government's coordination with the Electricity Subsector Coordinating Council (ESCC) and Oil and Natural Gas Subsector Coordinating Council (ONG SCC).

The ONG SCC has been the primary vehicle for coordination with all operational segments of the oil and natural gas industry—drilling, exploration and production, marketing, processing, refining, service and supply, transmission, distribution, and transportation (pipeline, marine, motor, and rail)—on a variety of security and resilience issues, with cybersecurity as a standing agenda item. The meeting is held three times a year with senior cybersecurity and physical security representatives from the oil and natural gas industry and with DOE Office of Electricity and Energy Reliability (OE) leadership and Department of Homeland Security (DHS) Infrastructure Protection (IP) leadership as co-chairs from the government side. Other Federal departments and agencies in attendance include the Federal Bureau of Investigation, Transportation Security Administration, U.S. Coast Guard, and Pipeline and Hazardous Materials Safety Administration. This forum allows the public and private sectors to coordinate oil and natural gas security strategies, activities, and communication across the sector to support the Nation's homeland security mission. Earlier this year, DOE also took the ONG SCC

to DOE's Oak Ridge National Laboratory to tour and discuss cutting edge research and development work in the areas of cyber and physical security.

Finally, DOE works closely with individual oil and natural gas companies and trade associations on specific projects such as the DOE Energy Sector Security Workshop. The DOE Workshop took lessons learned from the 2015 and 2016 Ukraine cyber incidents and developed a hands-on workshop to train natural gas operators on how to defend their networks against similar attacks.

DHS is the SSA for Nuclear Reactors, Materials, and Waste under the National Infrastructure Protection Plan, and DOE cooperates closely with the nuclear subsector as a supporting agency. Given its critical role in the electricity subsector, DOE maintains a close relationship and awareness of the subsector with nuclear generating companies through the ESCC, the Nuclear Regulatory Commission, and DHS.

Q1b. Is this something that can be improved? If so, how? If not, why not?

A1b. DOE is continuously working with its industry and government partners to improve coordination with the energy sector. For the oil and natural gas (ONG) subsector, for instance, following on the recommendations of the National Petroleum Council's 2014 Enhancing Emergency Preparedness for Natural Disasters Study, DOE conducts regular outreach with the ONG subsector through education, training, and continuous refinement of response coordination procedures at the Federal, State, and local levels.

DOE tests this coordination regularly during its Clear Path energy-focused exercise. This year's Clear Path V exercise occurred in Houston, Texas from May 31 to June 1, 2017, and focused on cross-sector response to a hurricane impacting the Gulf Coast, with particular attention to the interdependencies of the electricity, ONG, and communications sectors. The exercise focused on improving coordination of restoration crews across the different sectors, better integration of access and credentialing of energy responders, and a focus on improved unity of message across industry and government.

Q1c. As cyber threats become more sophisticated, our energy infrastructure – especially the grid – is becoming more connected. While this digitization and connectivity provide important benefits, it also creates new risk. What is DOE doing to help the sector anticipate threats in order to incorporate security and/or resiliency in grid modernization efforts?

A1c. Cybersecurity of the energy sector is a priority for DOE, and the Department is working closely with stakeholders across industry, law enforcement, the intelligence community, and state governments to ensure resilience is factored into ongoing grid modernization efforts. DOE works with its energy sector partners, through forums such as the ESCC and ONG SCC, to prioritize efforts to strengthen cybersecurity preparedness in the energy sector, improve capabilities to coordinate cyber incident response and recovery, and accelerate innovative research and development of resilient energy delivery systems.

DOE advances industry-wide cybersecurity risk management and practice by disseminating information through classified threat briefings and security workshops and by providing access to tools and technical resources that are used to improve decision making and inform investments by our sector partners. One of these resources, DOE's Cybersecurity Capability Maturity Model (C2M2), helps organizations evaluate their current cybersecurity capabilities and prioritize and improve future activities to improve them, and has been used by over 1,200 energy sector organizations.

DOE has also worked with Idaho National Laboratory and the Electricity Information Sharing and Analysis Center (E-ISAC) to host the Energy Sector Security Workshop series, which provides energy-sector owners and operators with a hands-on, simulated demonstration of a cyber-attack. The lessons learned from these workshops help to better inform future security and resiliency investments by furthering attendees' understanding of the range of methods and tools, as well as common targets, associated with a cyber-attack. These engagements are further complemented by DOE's partnerships with the E-ISAC, Oil and Natural Gas Information Sharing and Analysis Center (ONG-ISAC), and Downstream Natural Gas Information Sharing and Analysis Center (DNG-ISAC). DOE works with the energy sector ISACs to regularly share threat information and trends with a broad range of industry stakeholders to help them better protect their current networks and inform future security decisions.

In addition to cybersecurity preparedness and information sharing initiatives, maintaining a robust pipeline of cutting-edge technologies is essential to helping the energy sector continue adapting to the changing cyber landscape. As the technology landscape in the energy sector continues to advance, including the growing use of digital communications and control systems to improve reliability, so does the capabilities of the threat. DOE has been working with the energy sector for more than a decade to get ahead of this continual evolution through investments in advanced R&D to develop resilient systems that can survive a cyber event without loss of critical functions. More than 35 tools and technologies resulting from OE cybersecurity research, development and demonstration (RD&D) projects have transitioned to the energy sector and are in use today. And nearly 1,000 utilities in all 50 states have purchased technologies developed under our Cybersecurity for Energy Delivery Systems research program.

DOE's current RD&D portfolio of more than 60 projects builds on new concepts from past R&D to develop groundbreaking cybersecurity solutions. Researchers are developing tools and technologies that can be transitioned to the energy sector to prevent, detect, and mitigate cyber-attacks intended to disrupt the computers and networks that manage, monitor, protect, and control energy delivery, the power grid, and oil and natural gas.

For example, DOE recently worked with Chevron, the Department of Defense, and Sandia National Laboratories to demonstrate a resilient microgrid using a moving-target defense technology to dynamically and randomly change the virtual configuration of the network to prevent cyber reconnaissance and disrupt cyberattacks.

DOE also worked with ABB, Bonneville Power Administration, and the University of Illinois to develop and demonstrate a project for the Collaborative Defense of Transmission and Distribution Protection and Control Devices against Cyber Attacks (CODEF), which has the capability to automatically detect and reject malicious commands that could jeopardize physical grid operations if acted on. CODEF anticipates the effects of each command and only acts on those that will support grid stability. This

type of solution is especially effective in providing resilience as it can detect malicious activity regardless of the source, be it an insider threat or an external actor.

DOE also recently launched several new R&D projects with DOE's national laboratories and energy sector partners, including a project with Oak Ridge National Laboratory and Los Alamos National Laboratory focused on Quantum Key Distribution systems that enable real-time detection of adversarial intrusion on control system networks, and a project between Lawrence Livermore National Laboratory and San Diego Gas & Electric to develop a technology to rapidly detect interference in the precisely synchronized time signals used by phasor measurement units for wide area situational awareness of power grid operations.

Q2. A number of different National laboratories have programs in cybersecurity. How do you approach managing these efforts to avoid unnecessary duplication and ensure focus on our national and energy security needs?

A2. The DOE national laboratories are at the forefront of science and technology efforts to improve security and resilience of energy systems, including cybersecurity. The cybersecurity knowledge at and technologies from the 17 national laboratories inform DOE's comprehensive strategy for energy sector security. This strategy includes strong preparations (training, exercises, and threat intelligence gathering), a robust response, and scientific innovation. Working with the national laboratories, our sector partners, and interagency colleagues, DOE leads collaboration to develop and implement projects and programs to support the three strategic areas. DOE works closely with several coordinating councils, such as the Electricity Subsector Coordinating Council (which includes 21 utility CEOs) and Energy Government Coordinating Council, which lead government-industry partnerships to enable strong cybersecurity for U.S. energy systems.

Q3. Congress is committed to its strong relationship with Israel in areas of mutual energy interests. To that end, language has been included in both the House and Senate FY 2018 Energy and Water Appropriations bill to establish the U.S.-Israel Center of Excellence in Energy Engineering and Water Technology as authorized by the United States-Israel Strategic Partnership Act. This joint research and development center between the U.S. and Israel shall focus on collaborative research initiatives among universities, research institutions, and industry partners that could include hydrocarbon extraction and processing, energy infrastructure and policies, process water treatment, alternative energy

sources, and impacts on coastal communities. As you know, Louisiana has a deep history and level of expertise in these areas.

Q3a. Will you please provide the Committee an update on the status of discussions with Israel on this front and an expected timeline for DOE to establish this center?

A3a. The Department has had preliminary discussions with Israeli government officials regarding the expected timeline for the establishment of the Center. Currently, the Department is working with the State Department to complete the Circular 175 in order to have authority to officially begin negotiations with the Israelis regarding the Center. The notional timeline, subject to the availability of funds, is to have the Center operational between 12-16 months.

Q3b. In what ways is DOE ensuring that the center will have an impact on a national scale in these areas?

A3b. Since January, to encourage participation nationally, the Department has engaged in discussions regarding the Center with the Government of Israel and other potential stakeholders from the United States covering topics of potential mutual interest in energy. These discussions showed promising indications of interest in collaboration across multiple partners throughout the country, and also indicated strong interest on the part of the Department's National Labs in working with the Center. Utilizing the labs and the wide-ranging interest that already exists there will help ensure that the Center has an impact on a national scale in the U.S., and will support its sustainability as well as increase the profile of its work.

QUESTIONS FROM REPRESENTATIVE JOR BARTON

Q1. DOE has vital energy security responsibilities, but in the last Administration, we watched DOE sit on the sidelines as EPA set energy policy, undermining its role to protect the public interest. At the same time, fully 60% of DOEs $30 billion budget goes towards nuclear security missions, weapons modernization, and addressing its vast environmental liabilities. DOE's National Nuclear Security Administration has estimated weapons modernization will surpass $300 billion over the next two decades; the department will have to spend more than $250 billion to cleanup its sites. As Secretary, you have the ultimate ownership and responsibility for DOE's performance on all these areas—and you are working with agency put together in 1977.

Q1a. What are your plans to review whether DOE's existing structure is aligned with executing its most critical missions?

A1a. On December 15, 2017, the Department of Energy (DOE) announced its intent to modernize the agency's organizational structure to advance its policy goals consistent with its statutory requirements.

Under the DOE Organization Act, the Secretary of Energy has the authority to organize the Department in order to meet the needs of the current time and support and advance the policy priorities of the new Administration. Those priorities are: achieving U.S. energy dominance; protecting our energy and national security; advancing innovation; and improving outcomes in environmental management.

Under the new plan, the office of Under Secretary for Science and Energy (established in 2013 during the previous Secretary's tenure) has been separated into two Under Secretary positions so that there will once again be three Under Secretaries: the Under Secretary of Energy; the Under Secretary for Science; and the Under Secretary for Nuclear Security and NNSA Administrator, as is consistent with DOE's statutory mandate.

The Under Secretary of Energy will focus on energy policy, applied energy technologies, energy security and reliability, and certain DOE-wide management functions, while the Under Secretary for Science will focus on supporting innovation, basic scientific research, and environmental cleanup.

In addition, elements of the Under Secretary for Management and Performance's portfolio will fall under the responsibility of the Deputy Secretary of Energy. Another change to the agency's organization includes replacing the Office of Energy Policy and Systems Analysis with an Office of Policy.

These measures will enhance DOE's focus on early-stage scientific research and development and energy technology innovation, while improving environmental and legacy management outcomes.

Q1b. Will you work with the Committee to identify where statutes or authorizations need to be updated?

A1b. Yes, DOE consulted with bipartisan staff of the Committee on the administrative changes noted above and looks forward to working with the Committee on any future modernization initiatives.

Q1c. What are your priorities for performing your national security responsibilities and how do you intend to reassert DOE's role on setting energy policy for this nation?

A3c. Ensuring the safety of every American citizen from various national security threats such as cyber-attacks, nuclear proliferation, aging weapon stockpiles and environmental contamination is the top priority of DOE. Congressionally appropriated funding guides DOE's efforts in these areas. DOE is committed to the Administration's focus on promoting American energy dominance. By responsibly developing America's abundant resources, combined with the technical and engineering know-how of the American people in the private sector, at DOE and at the national laboratories, America can pursue an energy strategy that will benefit our people, our economy, our environment and our national security.

Q2. In the Energy Independence and Security Act of 2007, the Bureau of Energy Resources was created at the Department of State—effectively providing the State Department its own energy office.

Q2a. Please describe how DOE and State work together on energy policy?

A2a. As provided in the DOE Organization Act of 1977, DOE establishes and implements policies regarding international energy issues that have a direct impact on research, development, utilization, supply, and conservation of energy in the United States. DOE also undertakes activities involving the integration of domestic and foreign policy relating to energy, including provision of independent technical advice to the President on international negotiations involving energy resources, energy technologies, or nuclear weapons issues, in coordination with the Secretaries of State, Treasury, and Defense.

DOE coordinates its strategies and papers on international energy issues with the State Department, including its Bureau of Energy Resources (ENR), State's regional bureaus and our embassies, as well as with Defense, Treasury, Commerce, and other agencies as appropriate and participates in the interagency process directed by the National Security Council. DOE coordinates with the State Department on international energy issues in multilateral energy organizations and institutions, including the International Energy Agency (IEA), the International Energy Forum (IEF), G-7, and G-20.

DOE works with State Department officers and U.S. embassy locally employed staff, including with DOE overseas staff, where energy issues are critical to foreign policy objectives to provide DOE information and analysis on energy issues abroad and on the integration of U.S. domestic and foreign policy relating to energy to address regional and local energy objectives and support economic, political, and foreign policy objectives. State Department Foreign Service Officers and locally employed staff at U.S. embassies assist DOE officials and energy attachés to facilitate meetings with energy counterparts abroad, provide background briefings, and assist with reporting through official channels.

Q2b. Please identify whether and how cooperation may be improved?

A2b. State Department Foreign and Civil Service officers have long and demonstrated expertise in foreign policy and can provide insight into foreign country energy policies. However, DOE has worked with State to deploy DOE energy attachés with technical expertise in various regions. Mutual recognition of each agency's respective expertise and two-way coordination that allows DOE to better consult on State's efforts in the energy sector would strengthen overall foreign policy in the energy space and strengthen

relations with foreign energy counterparts. Furthermore, the establishment of delineated roles for both DOE and State regarding international energy policy, would help to establish optimal constructs for interagency consultation, reporting and overall effectiveness with international counterparts.

Q3. Please describe the role of DOE, Department of Commerce and the State Department to help facilitate US Energy businesses within foreign markets, including whether they have complementary roles or are duplicative in any way.

A3. DOE through its Office of International Affairs (IA) coordinates with U.S. embassies, including DOE representatives attached to select embassies, the Department of Commerce (DOC), and foreign energy ministries to identify potential market opportunities. DOE, unrivaled in its extensive energy policy expertise and technical and scientific expertise of its program offices and National Labs, utilizes its resources and expertise to assist our international allies and partners in identifying energy security risks within their own energy sectors, ranging from infrastructure to diversification of energy resources to energy efficiency and support efforts to enhance their energy security, including advice on policy and regulatory structures that encourage U.S. investment and trade. In identifying these risks and policy issues, DOE is able to emphasize the exceptional capabilities of U.S. companies to provide innovative technology and alternate, competitive sources of energy supply. U.S. embassy Chiefs of Mission, DOE energy attachés, State Economic and Commercial officers, as well as Foreign Commercial Service Officers share the responsibilities to help facilitate U.S. energy businesses within foreign markets and promote U.S. exports of energy products, services, and technology based on their unique areas of expertise. DOE, DOC, and State embassy officers advocate for U.S. energy businesses abroad to open new markets and protect U.S. investments abroad. It is important to note that it is often the case that the Secretary of Energy's counterpart is the key decision maker when it comes to the inclusion of U.S. companies within their energy markets. This feature further enhances the symbiotic relationship between DOE and DOC.

Q4. When DOE approves LNG export permits, it includes "clawback language" that says it can revoke the permit at any time. What is DOE's understanding/reasoning for including such specific language?

A4. Though it is important to preserves its authorities, DOE conducts all due diligence to avoid any rescindment of export authorizations once granted. DOE recognizes the importance of certainty in commercial contracts. It should be noted that DOE has never exercised this provision.

Q4a. Do you believe that you have the authority to revoke the permit without this language?

A4a. DOE's authority to modify or rescind existing export authorizations is prescribed by law. Under section 16 of the Natural Gas Act (15 U.S.C. § 717o), DOE is authorized "to perform any and all acts and to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate" to carry out its responsibilities.

Q4b. Do you believe that it increases uncertainty for companies?

A4b. DOE has heard from some authorization holders that reference to DOE's authority to rescind existing authorizations is a concern voiced by potential LNG buyers in the market. Again, we recognize the sanctity of contracts and have never used this authority.

Q4c. Will you assess options for removing or otherwise reducing the use of this language in permits?

A4c. DOE is in the process of reassessing the reference to section 16 of the Natural Gas Act in future orders granting authorization to export natural gas, including LNG. As a Department, from the Secretary on down we have sought to address the concerns of potential buyers of LNG and provide the certainty to suppliers and marketers.

QUESTIONS FROM REPRESENTATIVE DAVID McKINLEY

Q1. The Appalachian region is blessed with an abundance of natural gas resources. What are your thoughts on the need to geographically diversify the petrochemical business into areas like the Appalachian basin?

A1. The Appalachian region has experienced near-exponential growth in natural gas production, and that production is expected to increase for decades to come. The U.S. Energy Information Administration (EIA) forecasts that natural gas production in Appalachia will increase over 350 percent from 2013 to 2040.[1] The natural gas produced in Appalachia contains valuable resources in the form of natural gas liquids (NGLs), including ethane and propane. When separated from the natural gas stream, ethane and propane are key feedstocks for the petrochemical industry to produce compounds for making plastics. According to EIA, Appalachian NGL production is projected to increase over 700 percent in the 10 years from 2013 to 2023.[2] The abundance of these NGLs presents an opportunity for the private sector to invest in petrochemical plant capacity in the region to take advantage of these locally produced feedstocks. Businesses have already started making some of these investments. According to EIA, between 2010 and 2016, natural gas processing capacity in Kentucky, Ohio, Pennsylvania, and West Virginia, grew nearly tenfold, from 1.1 billion cubic feet per day (Bcf/d) to 10.0 Bcf/d. Fractionation capacity in the region has increased from just 41,000 barrels per day (b/d) in 2010 to nearly 850,000 b/d in 2016, and may grow as high as 1.1 million b/d in 2019.[3]

Q2. What could the Department of Energy do to help encourage the infrastructure required to deliver the value-added benefits of natural gas to the Appalachia region?

A2. The Department of Energy (DOE) invests in oil and natural gas research and development with industry, academia, and the national laboratories. Through the Office of Oil and Natural Gas, as well as the National Energy Technology Laboratory, DOE is conducting research to improve the productivity of production in unconventional shale

[1] U.S. Department of Energy, "Natural Gas Liquids Primer: With a Focus on the Appalachian Region," December 2017. https://www.energy.gov/sites/prod/files/2017/12/f46/NGL%20Primer.pdf
[2] Ibid.
[3] Ibid.

plays in such locations as the Marcellus and Utica plays in Appalachia. In addition, DOE is pursuing technologies and new processes for converting hydrocarbons into valuable products, which would increase the value of fossil resources in Appalachia.

Q3. What could Congress do on the regulatory and permitting side to encourage these types of projects?

A3. DOE does not have jurisdiction over natural gas liquids infrastructure projects. Generally, permitting of these types of projects falls to the states or local authorities.

Q4. Do you believe the Department of Energy's fossil energy research programs are an important part of the President's promise to support coal country?

A4. Yes. The Fossil Energy Research and Development program advances transformative science and innovative technologies that enable the reliable, efficient, affordable, and environmentally sound use of fossil fuels.

Fossil energy sources constitute over 80% of the country's total energy use, and are important to the nation's security, economic prosperity, and growth. While the percentage of coal used for electricity generation has dropped over the past decade due to increased capacity from renewables and generation by natural gas plants, according to EIA data, coal is projected to play a critical role to our national security and economy by providing electric power for decades to come.[4] In addition to power generation, coal is a crucial feedstock for the steel and cement industries, two industries that are essential to our infrastructure.

The Transformative Power Generation program, for example, would support improving the efficiency and reliability of existing and new power plants by developing and applying advanced new materials, instrumentation and monitoring equipment, and controls systems that improve the efficiency and reliability of existing units over the load range.

[4] U.S. Energy Information Administration, "Annual Energy Outlook 2017," January 5, 2017. https://www.eia.gov/outlooks/aeo/y

By enabling the continued operation of the coal fleet, this program can support domestic coal jobs by helping to revitalize the industry. It can also help to improve reliability of the nation's power grid by sustaining and potentially expanding reliable baseload power across the nation. DOE remains committed to creating commercially viable economic solutions to protect our environment and enhance our nation's energy independence. A reliable and resilient electrical grid is critical not only to our national and economic security, but also to the everyday lives of American families. Coal can play a significant role in ensuring grid resiliency and reliability.

Q5. Prior to any determination or response by FERC, according to some reports, the annual cost of the DOE-NOPR is anywhere from $890 million to $3.8 billion. For the sake of argument, let's assume the cost to be $2 billion per year and spread among 60 million customers. The total annual cost to a customer would be around $32.00. Most utilities charge their customers for tree trimming. As a point of comparison, one such utility charges each customer about $50.00 for tree trimming. Do you think $32.00 a year is a reasonable cost to make sure a customer's lights stay on during the next polar vortex?

A5. Ensuring that American families and their businesses have access to reliable, resilient and affordable electricity is vital to the economy, national security and quality of life. The 2014 Polar Vortex was a warning that the current and scheduled retirements of fuel-secure units could threaten the reliability and resiliency of the electric grid. In America, no one should have to choose between keeping their family warm and keeping the lights on. We need to be ready for the next Polar Vortex or any other shock to the system.

Q6. Do we, in your estimation, have an electric grid today that is reliable and resilient?

A6. A reliable and resilient electric grid is critical to our national and economic security. As our Staff Report to the Secretary on Electricity Markets and Reliability showed and as I made clear in our DOE Notice of Proposed Rulemaking and letter of September 28 to FERC, there are serious threats to the nation's electricity grid. It is the Commission's responsibility to determine how to take action to ensure that generation resources and the ancillary reliability services they can provide, including voltage support, frequency services, operating reserves, and reactive power, are fully valued. In particular, it is FERC's responsibility to exercise its authority to ensure market rules support this objective.

Q7. We have seen in Puerto Rico how catastrophic weather events can leave people without electricity indefinitely. How does the grid reliability and resilience pricing rulemaking that DOE has proposed help ensure that the United States has done all it can to protect itself against extreme weather events?

A7. Specifically for Puerto Rico, DOE has been supporting the efforts of the U.S. Army Corps of Engineers and the Federal Emergency Management Agency to ensure the restoration of power and will play a key role in planning for the future resiliency of the grid in Puerto Rico. For the continental United States, FERC has jurisdiction over the wholesale electric power system, including its reliability. DOE, under Section 403 of the DOE Organization Act, has authority to submit a proposed rule to FERC for its consideration. With the continued retirement of fuel-secure generation impacting grid reliability and resiliency during severe weather or other adverse events, I directed FERC to consider measures to ensure that the reliability and resiliency attributes of fuel-secure generation are appropriately accounted for in wholesale power markets.

The North American Electric Reliability Corporation (NERC), the FERC-authorized electric reliability organization for our Nation's bulk power system, filed comments with FERC affirming that "[r]eliable operation of the BPS [bulk power system] requires a generation resource mix that includes resources with fuel assurance and low sensitivity to disruptions of the fuel supply." NERC further recommended "that the Commission continue to pursue policy reform that recognizes the secure capacity and essential reliability service attributes currently and historically provided by coal and nuclear generation."

Given the trends pointing to future reliability and resiliency concerns, as subsequently noted by NERC, and with the experiences we have had with extreme weather events and the importance of electricity to our Nation, I utilized the authority that Congress has given DOE.

Q8. Mr. Secretary can you advise us of what has occurred relative to coal-fired baseload generation during the last 8-years and the impact or potential impact this has or might have on the reliability of our nation's electric grid?

A8. Between 2009 and 2016, about 49,000 MW of utility-scale coal-fired generation retired.[1] Thousands of megawatts of fuel-secure generation capacity, including environmentally compliant coal and emission-free nuclear resources, have been prematurely retired before reaching full life expectancy or will be placed into retirement soon. The resiliency of the electric grid is impacted by the retirements of these fuel-secure traditional baseload resources. During the Polar Vortex, PJM Interconnection ("PJM") struggled to meet demand for electricity because a significant amount of generation was not available to run. The loss of generation capacity could have been catastrophic, but a number of coal plants that were scheduled for retirement were dispatched to meet the need for electricity. Sixty-five million people within the PJM footprint could have been affected if traditional baseload units were not available.

Q9. Why is it important to have a diverse supply of electric resources on the grid?

A9. America's national security and energy dominance depends on a reliable, resilient electric grid powered by a diverse mix of generation resources that help mitigate disruptions and enable rapid response when disruptions occur. This diverse resource mix includes traditional baseload generation with on-site fuel storage that can withstand fuel supply disruptions caused by natural and man-made disasters. But the resiliency of the electric grid is impacted by the retirements of these fuel-secure traditional baseload resources that include coal and nuclear.

Q10. Do you believe that the reliability and resiliency of the electric power grid will be compromised if we continue to retire large numbers of baseload coal-fueled electric power plants?

A10. Yes. Thousands of megawatts of fuel-secure generation capacity, including environmentally compliant coal and emission-free nuclear resources, have been retired before reaching full life expectancy or will be placed into retirement soon. If we lose this capacity, we impact the resilience of the grid, specifically the ability of the grid to withstand and recover in times of major fuel supply disruptions.

[1] U.S. Energy Information Administration (EIA), "Form EIA-860 detailed data," 2016 Data, November 9, 2017, accessed: December 1, 2017, https://www.eia.gov/electricity/data/eia860/

During the Polar Vortex, PJM struggled to meet demand for electricity because a significant amount of generation was not available to run. The loss of generation capacity could have been catastrophic, but a number of coal plants that were scheduled for retirement were dispatched to meet the need for electricity. Sixty-five million people within the PJM footprint could have been affected if traditional baseload units were not available.

Q11. Mr. Secretary some have criticized your grid reliability and resilience pricing proposal as violating free market principals and picking winners and losers. During your testimony you stated that we don't have a free market system today given the subsidies that are afforded certain fuel sources. Do you think it's the government's role to subsidize selective energy sources or should we eliminate all subsidies to let market forces determine our power generation make-up?

A11. America's greatness depends on a reliable, resilient electric grid powered by a diverse mix of generation resources. This mix of generation resources includes traditional baseload generation such as coal and nuclear that have secure supplies of on-site fuel. For years, our fuel-secure generation resources have been impacted by regulation and pricing rules that arguably under-value fuel security.

Under the proposal, FERC would direct the organized markets to revalue the grid resiliency benefits provided by traditional baseload resources with on-site fuel storage capability.

Q12. Can you provide the committee with an analysis, by year, of the subsidies (tax credits) provides to developers of renewable energy sources – wind and solar?

A12. The President's 2018 budget estimates that the Energy Production Credit, which includes wind, costs $1.400B, $1.770B, $2.320B, $2.970B, and $3.570B from 2016 to 2020, respectively. The budget also estimates that the Energy Investment Credit, which includes solar, costs $1.190B, $2.440B, $3.450B, $3.830B, and $3.920B from 2016 to 2020, respectively. These figures do not include expenditures due to firms electing a grant in lieu of the production or investment credits; these outlays were $750m in 2016 and $500m in 2017.

Q13. What in your estimation will happen to the growth of wind and solar once the tax credits expire and should we burden taxpayers with the cost of these credits?

A13. EIA's most recent projections for renewables (which includes wind and solar) indicate approximately 2.5% annual growth in capacity through 2050. After the expiration of the production tax credit, EIA's forecasted wind investment growth rate slows to 1.9% per year between 2020 and 2050. After the reduction of the solar investment tax credit, solar capacity is projected to grow at 5.0% annually between 2022 and 2050 due to "substantial cost reductions, performance improvements, and a permanent 10% investment tax credit." [1]

Q14. Comments filed by a bi-partisan group of former FERC Commissioners on the grid reliability and resilience pricing proposed rule state, "Subsidizing resources so they do not retire would fundamentally distort markets. The subsidized resources would inevitably drive out the unsubsidized resources …" Isn't this exactly what's happening today by virtue of the tax credit wind and solar receive?

A14. Prices in the Commission-approved organized markets may not reflect full valuation of grid reliability and resiliency benefits provided by traditional baseload resources with on-site fuel storage, such as coal and nuclear. The rule would help ensure that each eligible reliability and resiliency resource will recover its fully allocated costs and thereby continue to provide the energy security on which our nation relies.

[1]Annual Energy Outlook 2017

QUESTIONS FROM REPRESENTATIVE RICHARD HUDSON

Q1. How could the DOE work with the Department of Commerce, including the National Telecommunications and Information Administration (NTIA), to facilitate a better understanding of the vital nature of communications networks to grid resilience? Frequent intergovernmental engagement will facilitate better understanding of the operational needs of various critical infrastructures, thereby enhancing homeland security and safety. Each agency should work to understand the cross-sector impacts of its decision-making, which will yield better policies overall. At a time when cross-sector interdependencies are increasing, cross-government engagement is essential. DOE, with its expertise about the energy sector, could provide needed education and collaboration with other agencies about the energy sector's ICT deployment and policy challenges. What can DOE do to ensure that our federal government is thinking holistically about these cross sector interdependencies?

A1. The U.S. Department of Energy (DOE) participates as an interagency partner in the NTIA, as a Federal spectrum holder and as a representative for energy sector stakeholders. Cross-sector interdependencies are indeed rising, and DOE considers electric infrastructure to be interdependent with oil and natural gas infrastructure, communications infrastructure, and, to some extent, water infrastructure.

DOE will continue its participation within NTIA, but is also investing in analysis and new engineering disciplines to better understand these interdependencies. Grid architecture is one such new discipline, incorporating system engineering, organizational design, and an understanding of control theory to allow this new level of complexity to yield benefits while revealing risks and weaknesses. Additionally, new research into the unique requirements of communications networks that serve electric infrastructure has been the subject of DOE-convened stakeholder engagements, revealing some unmet needs that will be shared with industry and interagency partners alike.

Q2. For the past few years, this Committee has heard from numerous witnesses who have stressed that the electric sector is the most critical of critical infrastructures. Our Committee has explored ways to ensure the resilience of the electric grid. I know that Duke in my district works hard to keep the lights on. Utility Information and Communications Technology (ICT) needs, such as access to spectrum for wireless communications free from interference and congestion, are integral to securing the country's energy infrastructure. Unfortunately, despite their vital importance to national security, energy and water providers face increasing challenges in accessing spectrum for mission critical communications, including those used for the Supervisory Control and Data Acquisition (SCADA) systems fundamental to grid operations. The need for

spectrum becomes more acute as utilities increasingly rely on wireless technologies that enable smart-grid devices and accommodate new generation resources such as solar and wind. Access to spectrum also allows utilities to deploy drones and other technologies that provide greater situational awareness and enhanced grid resilience, and were a vital component of damage assessment post Hurricane Harvey. Reliable communication systems are essential for maintaining operational safety, reliability and security, as well as resilience and restoration of service. My question to the DOE is, given the critical role communications networks play in keeping the lights on and what that means for both our national and economic security, how could DOE be encouraging the Department of Commerce, the FCC and others to develop policies that recognize the needs of critical infrastructure owners and operators in its spectrum allocation policies?

A2. DOE has an obligation to understand the evolving needs of modernized, resilient electric infrastructure across a variety of technical and policy dimensions, including communications. Once a level of understanding is achieved, our role is to advance the state of the art and educate the private and public sectors, to deliver on our mission of furthering of the economic security of the country.

The ICT role in electric infrastructure is developing rapidly, because the performance gains consistently outweigh the costs of such technology. That increased reliance creates a need for increased communications bandwidth, which in some cases translates to a need for wireless technology and therefore spectrum. Establishing a transparent, quantitative basis for how much bandwidth is necessary to support a reliable, secure and resilient electric system is a complex undertaking, with many needs unique to regional and regulatory situations. This basis, however, is very important in informing a justification for spectrum access, and for the special case of dedicated spectrum. DOE is enhancing its understanding and research agenda in communications tools, technologies, and policy challenges, and will engage with industry and interagency partners as we further develop our understanding.

Q3. Hydropower serves as the largest source of renewable electricity in the United States, providing clean, reliable, and affordable energy to hundreds of American communities. But our current capacity only scratches the surface. Last year, the Department of Energy released a report that found that the existing fleet could be realistically expanded by 25% by 2030, and 50% by 2050 with advanced hydropower technologies. This Committee has spent considerable time this year advancing policies --- the Hydropower Policy Modernization Act and the Promoting Small Conduit

Hydropower Facilities Act --- that would expand both small conduit hydropower development, as well as relicensing and expanding the existing fleet.

Q3a. In your opinion, what are the largest regulatory barriers to pursuing these ambitious hydropower expansion goals?

A3a. Existing regulatory processes are intended to ensure that hydropower development is carried out responsibly and consistently. As with many regulatory processes, the broad spectrum of the hydropower regulatory environment has evolved over time. As a result, hydropower project developers face a complex set of approval and compliance processes administered by various authorities including the Federal Energy Regulatory Commission (FERC), federal and state resource agencies, local governments, and tribes.

Under the Federal Power Act (FPA), FERC authorizes the construction and operation of non-federal hydropower projects. In addition to FERC's permitting powers under the FPA, authorizations by a number of other federal (Interior, Commerce, Corps of Engineers) and state agencies under other federal statutes (Clean Water Act, Endangered Species Act) are also needed prior to FERC authorization. While timelines for many such approvals are statutorily indicated, FERC has limited authority to enforce them and delays are common, often adding many years and substantial uncertainty to the overall licensing process. In addition, there is no formal process to agree on what studies must be conducted for a particular type of project and site; instead, study requirements are defined on an ad hoc, case-by-case basis, adding substantial cost and uncertainty to the entire licensing process. While many environmental studies are absolutely appropriate and necessary, the current process can lead to decisions that are highly costly, not based on best-available science, and lack consideration of existing information and/or cost-effectiveness.

Q3b. What should Congress do to improve the regulatory process to prevent hydropower projects from uncertainty and unnecessary regulatory delay?

A3b. The continued development of unified, well-established mechanisms for collaboration and dissemination of the best available scientific procedures and findings could allow participants and regulators to realize mutual benefits by increasing approval process efficiency.

DOE's Hydropower Vision report identifies actions intended to assist parties in navigating regulatory processes, identifying opportunities to make steps more efficient while also being consistent with environmental protection statutes and equally protective of affected resources.[1]

Q3c. Given the Administration is committed to advancing an infrastructure package, which reportedly will include alternative financing tools, what are some of the alternative funding models the federal government could utilize to pay for retrofits?

A3c. Hydropower facilities are typically long-lived assets with high upfront capital requirements relative to other generation technologies. Many hydropower units can operate reliably for more than 50 years, but project owners often cannot finance their assets over such a long duration. For example, few utilities sign power purchase agreements for terms of up to or beyond 20 years. Although power purchase agreements for 50 years or more would not be likely on a regular basis for any project, having certainty for a longer revenue stream would be beneficial. Financing for large-scale projects (i.e., $1 billion or more for a merchant pumped storage hydropower project) also faces challenges, such as high upfront risk and long development timeframes. Risk-sharing mechanisms and partnerships warrant an investigation relative to financing and ensuring maximum ratepayer value.

Any mechanism to effectively increase financing terms to match productive asset life would help align the cost of hydropower developments and upgrades with their long term value. In addition, many of hydropower's important contributions to grid reliability, from sub-second frequency response to black-start capabilities that can help the grid quickly recover from an outage, may not be fully compensated in current electricity markets. In order for hydropower to continue to provide these services to a rapidly evolving grid, operators should be compensated in a way that reflects the economic value of what they provide.

Q3d. The federal government is the largest owner of U.S. hydropower capacity. With most capacity built well over 50 years ago, there is a significant business case to modernize

[1] U.S. Department of Energy, *Hydropower Vision*, 2016, Chapter 4.4, Regulatory Process Optimization, page 379

these facilities. Will modernizing the federal hydropower fleet be an opportunity in the infrastructure package?

A3d. The Administration's infrastructure package has been undergoing development. The federal hydropower fleet is a national asset that has provided affordable, reliable electricity for generations.

Q3c. Would hydropower expansion fit in the Administration's vision of a robust infrastructure package?

A3e. DOE is committed to responsible and sustainable hydropower development, and recognizes the important opportunities for innovation in hydropower technology that simultaneously improve environmental outcomes and increase hydropower's contribution to a low-cost, reliable power system.

QUESTIONS FROM REPRESENTATIVE KEVIN CRAMER

Q1. Your grid reliability and resilience pricing proposed rule focuses on what we've considered to be traditional baseload generation, i.e. power generated at coal and nuclear plants given that they have fuel at the source, at all times. Responding to my question about how to define baseload, Marty Durbin with the American Petroleum Institute testified on October 3, 2017 that traditional baseload is no longer relevant. How would you respond to Mr. Durbin's comments?

A1. A reliable, resilient electric grid is powered by a diverse mix of generation resources that help mitigate disruptions and enable rapid response when disruptions occur. This diverse resource mix includes generation with on-site fuel storage that can withstand fuel supply disruptions caused by natural and man-made disasters, such as traditional baseload coal and nuclear generation. But the resiliency of the electric grid is impacted by the retirements of these fuel-secure generation resources.

The grid faces many challenges, made-made and natural. It is important that the grid have the support of fuel-secure generation resources that have essential reliability and resiliency attributes needed to keep the lights on for all Americans in times of crisis—including on-site fuel supplies and the ability to provide voltage support, frequency services, operating reserves, and reactive power. In particular, it is especially urgent to respond to retirements of the resources that have these critical attributes.

Q2. Why is it important to ensure that we have an adequate amount of coal and nuclear baseload power units on the grid?

A2. The American economy, its defense and its people depend on a reliable, resilient electric grid powered by a diverse mix of generation resources. This diverse mix of resources includes traditional baseload generation with on-site fuel storage – such as coal and nuclear – that can withstand major fuel supply disruptions caused by natural and man-made disasters. These fuel-secure generation resources have essential reliability and resiliency attributes needed to keep the lights on for all Americans in times of crisis. During the Polar Vortex, PJM Interconnection ("PJM") struggled to meet demand for electricity because a significant amount of generation was not available to run. According to the Staff Report to the Secretary on Electricity Markets and Reliability, the

loss of generation capacity could have been catastrophic, but a number of coal plants that were scheduled for retirement were dispatched to meet the need for electricity. Likewise, nuclear power plants "performed extremely well during the Polar Vortex, with an average capacity factor of 95 percent." Sixty-five million people within the PJM footprint could have been affected if these traditional baseload units were not available.

Q3. What is the role of baseload power today given the increased number of gas pipelines that have been constructed and the dramatic growth in renewable energy?

A3. Traditional baseload generation with on-site fuel storage – such as coal and nuclear – have essential reliability and resiliency attributes needed to keep the lights on for all Americans in times of crisis, including: on-site fuel supplies and the ability to provide essential reliability services. A reliable, resilient electric grid powered by a diverse mix of generation resources helps mitigate disruptions and enables rapid response when disruptions caused by natural and man-made disasters occur.

Q4. Is interruption of gas deliveries for power generation of concern to you?

A4. Yes. The DOE Staff Report recognizes that "system fuel supply chain disruptions can impact many generators during a single widespread fuel shortage event," and that "nuclear and coal plants typically have advantages associated with onsite fuel storage…"

Q5. Critics of the previous Administration criticize their failure to consider the fragility of the electric grid – the unfounded reliance on energy sources that are not always available to meet demand-driven circumstances. The DOE staff report speaks to this as have other experts. How much of a concern is this to you?

A5. For years, our fuel-secure generation resources have been impacted by regulation and pricing rules that under-value grid security. I am taking, and will continue to take action as needed to keep our diverse generation mix in place. America's greatness depends on a reliable, resilient electric grid powered by a diverse mix of generation resources. This mix of generation resources includes traditional baseload generation such as coal and nuclear that have secure supplies of on-site fuel.

Q6. Paul Bailey, CEO of American Coalition for Clean Coal Electricity October 3, 2017 that in his conversations with grid operators they would need at least three years for market

reforms to take effect. Can you comment on the need for the aggressive timeline for the proposed rule you released

A6. Under the proposal, FERC would direct the organized markets to revalue the grid resiliency benefits provided by traditional baseload resources with on-site fuel storage capability. The DOE Staff Report warns that the continued closure of traditional baseload power plants, especially coal and nuclear, means that "States and regions are accepting increased risks that could affect the future reliability and resilience of electricity delivery for consumers in their regions."

Q7. Do you believe that baseload coal and nuclear plants are inadequately compensated under current wholesale electric power markets? Why?

A7. Yes, baseload coal and nuclear plants are likely under-compensated within current wholesale electric power markets.

America's energy dominance depends on traditional baseload generation with on-site fuel storage that can withstand fuel supply disruptions caused by natural and man-made disasters. Baseload generation resources with on-site fuel supplies, such as coal and nuclear, help maintain the resiliency of the electric grid.

The resiliency of the electric grid is impacted by the retirements of these fuel-secure traditional baseload resources, including coal and nuclear. The reliability and resiliency attributes of these generation resources are likely under-valued. Prices in the Commission-approved organized markets may not reflect full valuation of grid reliability and resiliency benefits provided by traditional baseload resources, such as coal and nuclear.

Q8. Your grid reliability and resilience pricing proposal seeks to "establish just and reasonable rates for wholesale electricity sales" by having FERC finalize procedures to ensure that reliability and resiliency of baseload power are fully valued. This, as you know, will be limited to unregulated plants. Are the baseload concerns that drove you to propose this applicable to the entirety of the generating fleet and if so, did you consider alternatives that would address these concerns more broadly?

A8. The retirement challenge associated with traditional, fuel-secure baseload resources varies across the nation and depends on the regulatory context. The Staff Report to the

Secretary on Electricity Markets and Reliability found that vertically integrated utilities' coal and nuclear plants regulated by States under cost-of-service models stay open longer than those operating in centrally organized wholesale power markets.

This proposal could be a first step in seeking to ensure that we truly have an energy policy that first and foremost protects the interests and needs of the American people. Following the recommendations of the Staff Report, the DOE is continuing to study these issues and, if necessary, will be prepared to make a series of additional recommendations to improve the reliability and resiliency of the electric grid.

QUESTIONS FROM REPRESENTATIVE TIM WALBERG

Q1. The proposed rule asks FERC to require the RTOs who operate the deregulated markets to ensure full cost-recovery for certain types of generation. Does this mean that you also support full re-regulation of these markets? If not, how do you envision retaining a deregulated market along with participating resources receiving full regulated cost-recovery?

A1. No. The proposed rule allows for the recovery of costs of fuel-secure generation units frequently relied upon to make our grid reliable and resilient. Such resources provide reliable capacity, resilient generation, frequency and voltage support, and on-site fuel inventory – in addition to providing power for our basic needs, quality of life, and robust economy. The rule allows the recovery of costs of certain eligible units physically located within the Commission-approved organized markets. The rule requires the organized markets to establish just and reasonable rate tariffs for the recovery of costs and a fair rate of return.

All of this can be done within the existing organized markets. The Federal Energy Regulatory Commission (FERC) has adjusted its market rules for reliability and resilience purposes on numerous occasions and is authorized to do so again.

Q2. As noted in the DOE Staff Report on Electric Markets and Reliability, the North American Electric Reliability Corporation (NERC) identified three essential reliability services: voltage control, frequency response and ramping. But ramping capability, or the ability to respond to large swings in generation and/or demand, is not mentioned in the proposed rule. Do you consider ramping capability as essential to the reliability and resilience of the grid?

A2. Ramping capability is important for the reliable and resilient operation of the grid, and FERC has recently taken steps to ensure that ramping services are valued in markets. The FERC Fast Start NOPR, Docket RM17-3, introduced a proposal to value this important attribute and to ensure that fast-ramping generators including peaking plants can collect sufficient revenues in markets.

Q3. Mr. Secretary, I greatly appreciate the emphasis you are placing on the resiliency of the electric grid. I represent constituents who receive their electricity from rural electric co-ops and they appreciate you beginning the conversation about the need to reform the

nation's organized electricity markets. To ensure a reliable, resilient supply of affordable electric power, a dialogue over the appropriate role of the markets must occur

Could you explain your thoughts on the resiliency of the electric grid and how you will include rural electric co-ops in this discussion?

A4. The American economy, its defense and its people depend on a reliable, resilient electric grid powered by a diverse mix of generation resources. This diverse mix of resources includes traditional baseload generation with on-site fuel storage – such as coal and nuclear – that can withstand major fuel supply disruptions caused by natural and man-made disasters. These fuel-secure generation resources have essential reliability and resiliency attributes needed to keep the lights on for all Americans in times of crisis, including those located in the markets of rural electric co-ops.

In its comments filed with FERC the National Rural Electric Cooperatives Association (NRECA), the national service organization representing America's electric cooperatives, stated that NRECA agrees with the premise of the proceeding on grid reliability and resilience pricing, and said that the cooperatives share a concern that centralized markets are not fully realizing their promise and need reforms to ensure a reliable, resilient supply of affordable electricity in the years ahead. We look forward to continuing to work with and including the needs of rural electric co-ops in this effort.

Q4. States and RTOs/ISOs by design have ways to provide grid reliability and what they deem to be resiliency—sort of bottom up approaches driven by stakeholders on the ground to meet their unique needs—as an advocate of limited government and federalism, do you see this NOPR (and unprecedented quick timeline) as federal overreach?

A4. No. Ensuring that American families and their businesses have access to reliable, resilient and affordable electricity is vital to the economy, national security and quality of life. For years, our fuel-secure generation resources have been impacted by regulation and pricing rules that arguably under-value grid security. I am taking, and will continue to take, action as needed to keep our diverse generation mix in place. Our electricity supply powers our economy, lights our streets, heats our homes, and supports our way of life. As Secretary of Energy, I will not sit idly by when I see a threat to that reliability or resiliency, or a reasonable course of action that is within my authority to mitigate it. The

matters addressed in the NOPR are squarely within FERC's statutory jurisdiction over interstate wholesale power sales and I have urged FERC to act promptly.

Q5. In 2015, Congress signed into law the FAST Act, which included provisions authored by this committee that provided DOE new authorities to address grid security emergencies. DOE has a unique position in the federal government, with its institutional knowledge and specialized expertise and technological resources to provide vital assistance, especially in the cyber security space.

Q5a. What further efforts do you envision to strengthen DOE's role as the sector specific authority on protecting energy infrastructure?

A5a. DOE's future roles and responsibilities as a sector-specific agency for the energy sector will be focused on security and resilience. The well-developed, trusted relationships with private sector stakeholders facilitate joint efforts to improve information sharing and available Federal support, as well as identification of gaps to improve and refine developed programs and activities. DOE will continue to enhance cyber and physical security and resilience within the energy sector by leading collaboration between industry and states to better plan for energy disruptions and support the development of resilient energy systems. This collaboration will support DOE regional and national assessments to strengthen U.S. energy security.

Q6. In the past Administration, we witnessed resource priorities for DOE skewed to renewable energy projects at the apparent expense of fossil energy research and DOE's electricity office, which house DOE's emergency support functions. This Administration's initial budget actually proposed additional cuts to this office, and kept its emergency functions flat at about $9 million.

Q6a. Going forward, what do you see as necessary to ensure DOE has full capabilities to support and respond to critical infrastructure risks – from the power grid to the energy supply to that grid?

A6. DOE's Fiscal Year (FY) 2018 Budget Request reflects a prioritized assessment of the resources necessary to support and respond to critical infrastructure needs.

QUESTIONS FROM REPRESENTATIVE FRANK PALLONE, JR.

Q1. In your opening statement, you reassured the Subcommittee that you understand the importance of travel oversight and spending tax payer dollars "…appropriately and thoughtfully." You also noted your frequent travel from Washington, D.C. to your home state of Texas. Can you provide additional details about how your trips to Texas are financed?

A1. When I travel for official business, I comply with all Federal travel requirements. When I travel for personal reasons, I do not use government funds.

Q2. There are reports that your wife has accompanied you on official travel in multiple instances. Since you became Secretary, how many times has the Department of Energy paid for your wife's travel, and what is the total cost of these purchases?

A2. My wife Anita has accompanied me on four occasions during my tenure as Secretary of the Department of Energy (DOE). This has been reviewed and approved by DOE ethics officials in the Office of General Counsel. I know the high value we place on being good stewards of taxpayer dollars. Therefore, her travel is not done at taxpayer expense.

Q3. Does the DOE Grid Pricing Notice of Proposed Rulemaking only apply to power plants presently in operation, or could retired coal and nuclear plants come back on line and receive full cost recovery plus a profit to do so whether they are needed or not?

A3. After they are decommissioned, coal and nuclear plants generally cannot feasibly be returned to service. This underscores the urgency for the Federal Energy Regulatory Commission (FERC) to adjust market rules to help address retirement of these irretrievable, fuel-secure units.

QUESTION FROM REPRESENTATIVE JOHN SARBANES

Q1. President Trump's Executive Order dated September 29, 2017 cancelled mandatory Labor Management Forums but left the option for voluntary agency-labor partnerships. You were scheduled to address the DOE LM Forum but the meeting is now suspended. The Forum has been a productive vehicle increasing employee engagement and morale while improving pre-decisional involvement. Can you and your leadership support continuing a voluntary partnership of the DOE organized workforce and management?

A1. The Department of Energy (DOE) is committed to following the Presidential direction in Executive Order 13812, and will continue to work collaboratively and cooperatively with labor unions in a constructive, proactive way, consistent with past practices, honoring all collective bargaining unit agreements across the complex.

QUESTION FROM REPRESENTATIVE PETER WELCH

Q1. The Staff Report on Electricity Markets and Reliability released by DOE in August 2017 points out that appliance and equipment standards are projected to save more than $545 billion in utility costs between 2009-2030. Five standards – for air compressors, portable air conditioners, uninterruptible power supplies, walk-in coolers and freezers, and commercial packaged boilers – are projected to save more than $11 billion on consumer energy bills but have not yet been published in the Federal Register. What is the status of these efficiency standards?

A1. This question addresses a topic currently in litigation. As such, The Department of Energy (DOE) will not comment on the matter.

Q. Given the enumerated benefits of reduced energy bills enjoyed by U.S. consumers and spurred by these standards, what will you do to protect the integrity of the appliance and equipment standards program at DOE in the face of the Administration's intent to cut funding requests by up to $2.2 billion for the Department of Energy's energy programs, including a $1.4 billion reduction for the Office of Energy Efficiency and Renewable Energy?

A2. DOE remains committed to meeting its statutory obligations with respect to the appliance and equipment standards program.

Q3. In June 2017, you testified to the House Committee on Appropriations that you wish you "had been confirmed by the Senate earlier" so that you could "be a full participant in crafting" the FY 2018 budget proposal. A month later, in a July 2017 memo, OMB Director Mick Mulvaney indicated agencies should use the FY 2018 Presidential Budget Request figures as topline requests for FY 2019 budget planning. What are you doing during this early stage of the next budget cycle to ensure the Department of Energy has the budget needed to do its job, aside from changing the Department's mission?

A3. We have worked diligently throughout the budget formulation process to ensure that the President's Fiscal Year (FY) 2019 Budget works within budget constraints to be good stewards of taxpayer resources while also enabling DOE's critical missions of promoting America's energy security; spurring innovation; reducing regulatory burden; restoring the nuclear security enterprise and enhancing national security through the military application of nuclear science; and addressing the obligation of legacy management and nuclear waste.

To address these challenges and improve the lives and security of all Americans, DOE's world-leading science and technology enterprise engages in cutting-edge research that expands the frontiers of scientific knowledge and generates new technologies. We, through our national laboratories, must continue to support the world's best enterprise of scientists and engineers who create innovations to drive American prosperity, security and competitiveness for the next generation.

Q4. The Department of Energy has noted that one of the purposes of the Section 403 proposal is to maintain grid resiliency during a disaster by incentivizing utilities to have a 90-day supply of fuel on site. I agree we should be working to improve the resiliency of the grid, but don't believe this approach will solve the issue. There are several concerns with the proposed approach.

In regards to reliability, a report from the Rhodium Group noted that between 2012 and 2016, there were roughly 3.4 billion customer-hours impacted by major electricity disruptions. Of that amount, only 0.0007% of outages were due to fuel supply problems. Additionally, a recent ICF report noted this rule will cost anywhere between $800 million and $3.8 billion annually through 2030.

Given the small fraction of electricity disruptions attributable to fuel supply issues, how will DOE's proposal solve the grid resiliency challenges we face? Do you agree other sources of energy such as wind, solar, and demand response can provide other grid attributes that are currently uncompensated for? Given the significant cost and impact of this proposal, will you commit to extending the FERC deadline to at a minimum 90 days?

A4. The NOPR is not intended to address routine outages. It supports fuel security in the event of major fuel supply disruptions. As the Secretary's letter to the Federal Energy Regulatory Commission (FERC) (accompanying the NOPR) states, the NOPR is an effort to help build grid resilience, not a comprehensive solution to prevent all outages. It should also be noted that distribution outages are under State, not Federal, jurisdiction.

America's energy dominance depends on a reliable, resilient electric grid powered by a diverse mix of generation resources. This diverse mix of resources must include traditional baseload generation, and any other resource, with on-site fuel storage that can withstand major fuel supply disruptions caused by natural and man-made disasters. The resiliency of the electric grid is impacted by the retirements of these fuel-secure traditional baseload resources.

Under the proposal, FERC would direct the organized markets to revalue the grid resiliency benefits provided by traditional baseload resources with on-site fuel storage capability.

This proposal could be a first step in seeking to ensure that we truly have an energy policy that first and foremost protects the interests and needs of the American people. Following the recommendations of the Staff Report, DOE is continuing to study these issues and, if necessary, will be prepared to make a series of additional recommendations to improve the reliability and resiliency of the electric grid.

On December 8, 2017, I granted FERC a 30-day extension, giving the Commission a total of 90 days to act.

Q5. Secretary Perry, as you know DOE plays an important role in the successful management of the ENERGY STAR program, which has saved American families and businesses $430 billion on their energy bills since 1992. But as you also know, the Administration has proposed to eliminate ENERGY STAR as part of sweeping and debilitating cuts to EPA. Do you agree with the Administration's proposal to eliminate ENERGY STAR? If funding for ENERGY STAR at EPA is reduced, will you go along and cut DOE's role in the program? How will you ensure DOE is able to meet its ENERGY STAR responsibilities in the face of these proposed cuts?

A5. DOE is committed to meeting its legislatively mandated deadlines for covered appliances and equipment. The Energy Policy and Conservation Act (as amended) mandates the Department's test procedure and standards rulemaking activities. The rulemaking schedule, and thus the level of program activity, is determined by existing statute.

In FY 2018, the Appliance and Equipment Standards subprogram will fund all necessary and feasible steps to finalize legally required efficiency standards and test procedures, and meet all applicable judicial and statutory deadlines. DOE will, as appropriate, undertake activities regarding the certification and enforcement of existing energy conservation standards.

Q6. While U.S. manufacturing has a central role in our domestic energy efficiency industry, local, small business contractors also play a critical part. These contractors work to retrofit homes across the country and are supported by the technical guidance, certifications and standards developed at the Department of Energy. Home Performance with Energy Star within your Buildings Technologies Office is one example of a program

that works to support contractor jobs and training while helping consumers save money on their energy bill. Weatherization is another such program. What will DOE be doing to support these small businesses that are upgrading American homes and helping American consumers save money by installing American-made energy efficient products?

A6. Through a focus on early-stage research and development of energy efficiency technologies, DOE will enable small businesses and entrepreneurs to develop and deploy commercially viable solutions to help American consumers save money. DOE has played a role in supporting small contractors through programs such as the web-based information tools (called the Building America Solution Center) that include solutions for home improvement contractors retrofitting homes.

In addition, through the Department's SBIR/STTR program, DOE supports early-stage research and development on building technologies by small business in areas such as building envelope performance, HVAC, solid state lighting, and building energy modeling. DOE also uses SBIR/STTR grants to support technology transfer in areas such as improved window and envelope coatings.

QUESTIONS FROM REPRESENTATIVE PAUL D. TONKO

Q1. Your testimony states that spurring innovation is a core mission for DOE. What do you see as the primary benefits of energy innovation? For example, expanding opportunities for the private sector, empowering consumers, lowering energy costs, and reducing pollution.

A1. Innovations developed by the Department of Energy (DOE) through our 17 national laboratories provide a wide array of benefits for the American people. New energy technologies improve efficiency; enhance physical and cyber security; and strengthen, transform, and improve our energy infrastructure. These technology innovations enable consumers to access reliable, secure, and clean sources of energy. Transitioning DOE-funded innovation to private industry spurs further innovation, promotes economic prosperity, and contributes to growth in the energy, technology, and manufacturing sectors. Investing in innovation furthers the development of scientific knowledge that can transform society.

Q2. Do you believe that DOE must continue to play an important role in funding early-stage energy technology research to support the U.S. private sector in making innovative breakthroughs?

A2. Yes. DOE will continue to play a leading role in early-stage, fundamental energy research and innovation. This early-stage research is critical to advancing American energy innovation, and is often used by our private sector in competing across the globe. Continuing American scientific and technological leadership is important not only for improving our understanding of the world, but also for the economic growth of our nation. The Fiscal Year (FY) 2018 President's Budget refocuses the DOE's energy and science programs on early-stage research and development with a renewed focus on cutting-edge innovation and transitioning those breakthroughs to the private marketplace.

Q3. Innovation is going to be essential to reducing carbon pollution and addressing climate change. It also will unlock tremendous business opportunities, including domestic job creation. Do you believe DOE has a role to play in reducing carbon pollution through research and development investments? Why or why not?

A3. DOE has a fundamental research and development mission focused on facilitating the next generation of energy technologies. DOE's work often has a number of benefits including enhanced energy security, enhanced economic competitiveness, and reduced carbon and other emissions. Energy technology innovation at our 17 national laboratories helps enable consumers to have access to reliable, secure, and clean sources of energy.

Q4. In the context of DOE's Notice of Proposed Rulemaking, submitted to the Federal Energy Regulatory Commission (FERC) on September 29, how do you define resiliency?

A4. Resilience includes the ability of the grid to withstand and recover in times of major disruptions, including fuel supply disruptions. America's energy dominance depends on a reliable, resilient electric grid powered by a diverse mix of generation resources that help mitigate disruptions and enable rapid response when disruptions occur. The resilience of the electric grid is impacted by the retirements of these fuel-secure traditional baseload resources, including coal and nuclear, that can withstand fuel supply disruptions caused by natural and man-made disasters. If we lose this capacity, we can affect the resilience of the grid—specifically the ability of the grid to withstand and recover in times of major fuel supply disruptions.

Q5. How do you differentiate resiliency from existing and well-defined reliability standards?

A5. Resilience includes the ability of the grid to withstand and recover in times of major disruptions, including fuel supply disruptions. Existing and well-defined reliability standards may not adequately capture all aspects of grid resilience, such as the ability to withstand major fuel supply disruptions caused by natural and man-made disasters.

Q6. DOE's Second Installment of the Quadrennial Energy Review stated, "Electricity outages disproportionately stem from disruptions on the distribution system (over 90 percent of electric power interruptions), both in terms of the duration and frequency of outages, which are largely due to weather-related events. Damage to the transmission system, while infrequent, can result in more widespread major power outages that affect large numbers of customers with significant economic consequences." This finding was reinforced by recent analysis from the Rhodium Group, which found that from 2012 to 2016, 96 percent of lost service hours were due to severe weather, which highlights the vulnerability of transmission and distribution systems. Outages caused by emergencies or deficiencies at power plants, including fuel supply disruptions, accounted for 0.00007

percent of the total. What alternatives to fuel assurance were given consideration by DOE to promote greater grid reliability before settling on the proposal included in the NOPR?

A6. The NOPR is not intended to address routine outages. It addresses the need for fuel security in the event of major fuel supply disruptions. As the Secretary's letter to FERC (accompanying the NOPR) states, the NOPR could improve grid resilience, not a comprehensive solution to prevent all outages. It should also be noted that distribution outages are under State, not Federal, jurisdiction.

America's greatness depends on a reliable, resilient electric grid powered by a diverse mix of generation resources. This diverse mix of resources includes traditional baseload generation with on-site fuel storage that can withstand major fuel supply disruptions caused by natural and man-made disasters. The resiliency of the electric grid is impacted by the retirements of these fuel-secure traditional baseload resources.

Under the proposal, FERC would direct the organized markets to revalue the grid's resiliency benefits provided by traditional baseload resources with on-site fuel storage capability.

This proposal helps ensure that we truly have an energy policy that first and foremost protects the interests and needs of the American people. Following the recommendations of the Staff Report, DOE is continuing to study these issues and, if necessary, will be prepared to make a series of additional recommendations.

Q7. As FERC considers the NOPR, millions of Americans in Puerto Rico and the U.S. Virgin Islands have lived without power for over a month. How has the experience of Hurricane Maria informed your thinking on the best methods to promote grid resiliency?

A7. DOE has taken multiple actions to address the most immediate and future needs of hurricane affected areas. Upon being sworn into his current position as Assistant Secretary for the Office of Electricity Delivery and Energy Reliability (OE) in October, Bruce Walker's first order of business was to travel to Puerto Rico and the U.S. Virgin Islands, where he spent two weeks assisting with the response and recovery efforts. In

addition, DOE received $17 million in mission assignments from FEMA to provide technical assistance for hurricane response and recovery.

These engagements and the lessons learned following Hurricane Maria are helping to inform not only the actions that DOE will consider in support of power restoration and energy system development in the U.S. Virgin Islands and Puerto Rico, but more broadly, our efforts to improve grid resiliency across the nation. I look forward to a thoughtful conversation focused on our response to this season's hurricanes, and on the reliability, affordability, and resilience of the electricity system nationwide.

Q8. Did DOE do any cost estimates or cost-benefit analysis on the potential impact of the NOPR? If so, please share all relevant analysis related to potential costs to electricity consumers, including industrial consumers, with the Committee.

A8. The economic costs of blackouts are staggering. The Final Report of the U.S.-Canada Power System Outage, jointly authored by DOE and the Canadian Ministry of Natural Resources found that the total costs of the relatively brief August 2003 Blackout in the United States ranged between $4 billion and $10 billion. Today, a longer outage would likely be far more costly.

As the President's National Electric Grid Security and Resilience Action Plan (Dec. 2016) explains, a major cyber or physical attack on the grid "can have major consequences for the electric grid and adversely affect national security, economic stability, and public health and safety. Securing and encouraging investments in risk reduction in the existing electric grid and against such consequences is central to the national security goals of the United States."

Also, as the NOPR explains, the loss of electric generation fuel diversity could harm consumers. The NOPR cites an independent study by the IHS Markit group, which concludes that preservation of generation diversity provided by fuel-secure resources benefits consumers. Specifically, the current diversified generation portfolio "lowers the costs of electricity production by about $114 billion per year and lowers the average retail price of electricity by 27%"--i.e., compared with a "less efficient diversity case" involving "no meaningful contributions from coal or nuclear resources."

Q9. I was pleased to hear your support for the Advanced Research Projects Agency-Energy (ARPA-E) program; however, I am concerned that other valuable programs, despite tremendous performance and benefits, have been targeted for significant cuts in the President's Fiscal Year 2018 Budget Request.

Q9a. The Weatherization Assistance Program (WAP) reduces energy costs for low-income Americans while making their homes healthier and safer. Since 1976, the WAP has provided weatherization services to more than 7 million families. These households experience an average annual energy cost savings of $283. This program is critical for low-income Americans who have disproportionately high energy costs. The administration proposed eliminating the program. Given the energy, financial, and health benefits associated with the work funded by the WAP, do you believe DOE should continue to help low-income Americans weatherize their home?

A9a. The FY 2018 President's Budget proposes to reduce Federal intervention in State-level energy policy and implementation and to focus funding on limited, early-stage applied energy research and development activities where the Federal role is stronger.

Q9b. A new benefit-cost evaluation published last month, conducted by Research Triangle International, examined research and development portfolios at the Building Technologies Office (BTO) from 1978-2015. The analysis showed that a conservative estimate of the benefits of the BTO's research and development efforts from 1978-2015 are producing estimated benefit-cost ratios of between 20-1 and 66-1 using a seven percent discount rate, with an internal rate of return between 38 and 51 percent. The administration proposed cutting two-thirds from the BTO budget. Do you agree that BTO's research and development efforts have a proven track record of producing benefits that far exceed their costs and have resulted in significant electricity savings and energy security in the United States?

A9b. This evaluation of BTO's R&D portfolio demonstrates the value of innovation and early-stage applied research to American consumers. For example, the evaluation included a rigorous patent citation analysis that quantified the direct and indirect impacts on knowledge generated from DOE's research investment. These results are aligned with the administration's strategy to support early-stage applied R&D. Moreover, HVAC, Water Heating, and Appliances R&D activities that were studied in this evaluation remain a significant component of the President's Budget Request for BTO in FY 2018.

Q9c. In its Fall 2017 Better Plants progress update, the Advanced Manufacturing Office (AMO) highlighted a successful program that partners AMO technical experts with more

than 190 businesses, representing approximately 12 percent of the U.S. manufacturing energy footprint across nearly 3,000 facilities. In the last seven years, these U.S. companies achieved cost savings of $4.2 billion. The administration proposed a 68 percent cut to AMO programs. Do you agree the AMO plays an important role in supporting U.S. industrial efficiency and productivity by bringing the public and private sectors together through a voluntary program to increase the competitiveness of American manufacturers?

A9c. AMO plays an important role in supporting U.S. industrial efficiency and productivity by bringing the public and private sectors together through a voluntary program to increase the competitiveness of American manufacturers.

Q10. Earlier this year DOE launched the 50001 Ready program to accelerate the use of Energy Management Systems in the United States. What progress has DOE made to promote awareness and adoption of cost-effective and verifiable efficiency improvements for industrial and commercial energy users?

A10. In May 2017, DOE introduced 50001 Ready as a self-paced, no-cost recognition program to accelerate uptake of ISO 50001-based energy management business principles. To date, three facilities have earned DOE recognition and more than 200 organizations and 300 users have begun implementation through the 50001 Ready Navigator, a publicly available software tool developed by Lawrence Berkeley National Laboratory to democratize best-in-class energy management principles. In addition to supporting direct adoption of 50001 Ready, DOE is also engaging with trade associations, utilities, and energy efficiency organizations to include 50001 Ready in their efficiency program offerings, in order to build long-term relationships with customers, validate operations and maintenance savings, and develop a pipeline of future improvement opportunities. Since May 2017, three electric and natural gas utilities (TVA, Efficiency Vermont and Focus on Energy in Wisconsin) have committed to partnerships with DOE on pilots of the 50001 Ready program.

Other tools developed by DOE to help users quantify efficiency improvements achieved through energy management practices include the Energy Performance Indicator (EnPI) tool and EnPI Lite, energy savings calculators that employ best-in-class measurement and verification practices.

QUESTIONS FROM REPRESENTATIVE G.K. BUTTERFIELD

Q1. Secretary Perry, the Administration has made many proposals in the energy space that have baffled business leaders, advocates, Democrats, and Republicans across the country. Most recently, the September 28th Notice of Proposed Rulemaking to have FERC consider your proposal to essentially subsidize coal and nuclear generation has drawn criticism from many unlikely sources. Former Republican FERC Commissioner Nora Mead Brownell said of the request, "It's the antithesis of good economics. It's going to destroy the markets and drive away investment in new more efficient technologies, whether they be generating plants or energy efficiency, at a cost to business and ratepayers that is astronomical." Groups from the largest oil and gas organizations to renewable energy groups and rural electric cooperatives filed a motion against your request. Secretary Perry, how do respond to the fact that nearly every energy consumer group is opposed to this proposal?

Q1a. Many of those stakeholders have voiced concerns to you directly about the impact the proposal would have on electric rates for consumers. I have seen estimates that this proposal could lead to increased costs to ratepayers of $800 million per year or more. Will DOE move forward with this proposal if millions of dollars of costs are passed onto consumers?

A1a. The economic costs of blackouts are staggering. The Final Report of the U.S.-Canada Power System Outage, jointly authored by the Department of Energy (DOE) and the Canadian Ministry of Natural Resources found that the total costs of the relatively brief August 2003 Blackout in the United States ranged between $4 billion and $10 billion. Today, a longer outage would could be far more costly.

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benefits consumers. Specifically, the current diversified generation portfolio "lowers the costs of electricity production by about $114 billion per year and lowers the average retail price of electricity by 27%"--i.e., compared with a "less efficient diversity case" involving "no meaningful contributions from coal or nuclear resources."

Q1b. You have asked that this analysis be completed in 60 days. Can you explain why the Administration is trying to rush such a potentially costly proposal through?

A1b. The DOE Staff Report warns that the continued closure of traditional baseload power plants, especially coal and nuclear, means that “States and regions are accepting increased risks that could affect the future reliability and resilience of electricity delivery for consumers in their regions.”

Q1c. My home state of North Carolina is now second in the nation in solar energy capacity behind only California. Though solar is a variable source of generation, when coupled with low cost natural gas it provides a cost effective and reliable generation source for many North Carolinians. How do you think this NOPR will impact major investments in North Carolina in renewable and natural gas generation that are replacing older coal plants?

A1c. Natural gas and subsidized renewable benefit from current Federal Energy Regulatory Commission (FERC) rules that arguably undervalue the resilience benefits of fuel-secure coal and nuclear generation. The proposal could help correct this distortion. However, it may be worth noting only a portion of North Carolina is within a FERC approved organized market (PJM).

Q1d. Secretary Perry, there are other options to keep plants available that are less distortionary for markets and more technology neutral. Why does DOE prefer the cost-of-service approach to keep these plants available?

A1d. The proposed rule requires the Commission-approved organized markets to develop and implement market rules that re-price generation resources that help maintain the reliability and resiliency of our Nation’s electric grid. Specifically, the rule promotes the recovery of certain costs of fuel-secure generation units that make our grid reliable and resilient. The rule requires the organized markets to establish just and reasonable rate tariffs for the recovery of costs and a fair rate of return.

Q2. For an Administration that claims to be pro-business, it has been perplexing to see its approach to energy policy in our country. Secretary Perry, are you aware of an April 24th letter to appropriators from 1,050 organizations and businesses in support of the voluntary Energy Star program?

Q2a. Secretary Perry, can you tell me roughly how many manufacturing partners and product categories fall under Energy Star?

A1a. In 2015, more than 16,000 partners tapped the value of ENERGY STAR. Americans purchased over 300 million ENERGY STAR certified products across more than 70 product categories.[1]

Q2b. Secretary Perry, how does the Administration treat the Energy Star program in the FY2018 budget?

A2b. DOE's Fiscal Year (FY) 2018 budget request reflects the suspension of all DOE ENERGY STAR test procedure development and performance verification efforts.

Q2c. Secretary Perry, would you agree that it is true that American families and businesses have saved over $430 billion on their energy bills through the Energy Star program?

A2c. EPA estimates that families and businesses have saved $430 billion on utility bills since 1992.[2]

Q2d. Secretary Perry, does it concern you that so many companies and consumer groups oppose the defunding of the Energy Star program?

A2d. ENERGY STAR is a joint EPA-DOE program that encompasses more than 75 product types. EPA is the lead agency and brand manager for the ENERGY STAR program. DOE's role consists of supporting EPA through the development of all product test procedures and by administering a product verifying testing program.

Q3. Secretary Perry, in your testimony you claimed this Administration has a quote "clear focus on innovation" end quote. However, important research programs were eliminated in the FY2018 budget. Secretary Perry, DOE announced in February that the Advanced Research Project Agency – Energy, known as ARPA-E, attracted over $1.8 billion in follow on funding and that 56 projects have formed new companies. The program

[1] ENERGY STAR Overview of 2015 Achievements. Accessed at https://www.energystar.gov/sites/default/files/asset/document/ES_OverviewAchievements_040816-508.pdf
[2] ENERGY STAR Overview of 2015 Achievements. Accessed at https://www.energystar.gov/sites/default/files/asset/document/ES_OverviewAchievements_040816-508.pdf

received $306 million in 2017, so that is a great return on investment. How does the FY2018 Administration Budget treat ARPA-E?

A3. The FY 2018 Budget Request focuses resources on early-stage R&D, where the Federal role is strongest, for energy technologies best positioned to enable American energy independence and domestic job-growth in the near to mid-term. The Administration's budget reflects an increased reliance on the private sector to fund later-stage research, development, and commercialization of energy technologies by fostering collaboration between National Laboratories, universities and companies. Through careful prioritization and ensuring that funding goes to the most promising research, DOE will continue to be a world-leading science and technology enterprise that generates the innovations that fulfill our missions ensuring the Nation's security and prosperity.

Q3a. Secretary Perry, what is your rationale for zeroing out a successful program that attracts tremendous return on investment for American taxpayers and helps create jobs?

A3a. The President's Budget will, by focusing on basic research, spur world-leading energy innovation, while also reducing costs to the taxpayer. Applied research/commercialization should be left to the private sector. I look forward to working with this Committee and both houses of Congress as the budget process moves forward.