Department of Energy
Washington, DC 20585

September 15, 2016

The Honorable Pete Olson
Vice Chairman
Subcommittee on Energy and Power
Committee on Energy and Commerce
U. S. House of Representatives
Washington, DC 20515

Dear Mr. Vice Chairman:

On March 2, 2016, Secretary Ernest Moniz testified regarding "The Fiscal Year 2017 DOE Budget". To complete the hearing record, please find enclosed answers to questions submitted by former Chairman Ed Whitfield, Representatives Bill Flores, Mike Pompeo, and Markwayne Mullin.

Also enclosed are answers to questions separately submitted by Ranking Member Bobby Rush.

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]

Aaron Shapiro
Acting Deputy Assistant Secretary for House Affairs
Congressional and Intergovernmental Affairs

Enclosures

cc: The Honorable Bobby Rush
Ranking Member

QUESTIONS FROM CHAIRMAN ED WHITFIELD

Q1. What percentage of the $2.9 billion EERE budget is intended to facilitate the President's environmental agenda, Climate Action Plan, and Paris commitments?

A1. The Office of Energy and Renewable Energy (EERE) works with many of America's best innovators and businesses to research, develop, demonstrate and deploy cutting-edge technologies and work to break down market barriers in sustainable transportation, renewable power, and energy efficiency. EERE implements a range of strategies aimed at reducing U.S. reliance on oil, increasing energy affordability, ensuring environmental responsibility, enhancing energy security, offering Americans a broader range of energy choices, and creating jobs. All of these efforts are supportive of the President's Climate Action Plan goals.

Q2. DOE request's $360 million for Fossil Energy R&D and add in another $240 million in de-obligated carry over from prior years. This fossil energy R&D for 2017, therefore, represents only about 10% of DOE's applied energy research. More than 75% of DOE's applied energy R&D –about $4.2 billion—you propose to go to DOE's renewable energy and efficiency research.

Q2a. Why is the Department of Energy proposing to spend only 10% of R&D on fossil fuel energy, when this source accounts for about 90% of our nation's delivered energy?

A2a. The Fiscal Year 2017 (FY 2017) budget request maintains priority on key research and development (R&D) activities that address the critical issues of reducing greenhouse gas emissions, improving efficiency and addressing critical environmental challenges such as water management. In addition to the Fossil Energy (FE) R&D budget request, there are other key initiatives and programs throughout the Department of Energy (DOE) that support fossil energy. The Loan Guarantee Program Office (LPO) has $8.5 billion in authority specifically for innovative advanced fossil energy projects that reduce greenhouse gas emissions. The crosscutting initiatives also being conducted by DOE leverage the expertise in multiple programs and the national laboratories to address common scientific and technical challenges. Examples of these activities include Energy-Water Nexus, Advanced Materials, Supercritical Carbon Dioxide (CO2) Technology, and Subsurface Science, Technology, and Engineering R&D. The Office of Science has three energy frontier research centers that are focused on carbon capture and

storage (CCS) technologies by conducting a wide range of scientific research activities. Finally, there are other initiatives throughout the FY 2017 Budget request that support fossil energy, such as $5 billion in tax incentives for carbon capture, utilization, and storage. The credit would be allowed for a maximum of 20 years of production.

Q2b. When we look at where the greatest need is for improving technologies and efficiencies, can you explain why we are not prioritizing our research on the source of energy that dominates our economy—and the world economy?

A2b. The FE R&D FY 2017 budget request is prioritized to focus on the key challenges facing the fossil energy industry today: the reduction of greenhouse gas emissions such as carbon dioxide (CO2), and address other environmental consequences of development of unconventional oil and gas resources. The FY 2017 budget request reflects these priorities, focuses Federal resources on areas that industry is unlikely to fund on its own, and is a first step toward fulfilling the United States pledge to double Federal clean energy R&D investments government-wide over the next five years as part of Mission Innovation.

Q3. Does DOE track how much money the agency is spending on "clean energy"?

A3. The Department actively tracks funding for clean energy activities, and reports this data to the Office of Management and Budget (OMB) for use reporting and the President's Budget as needed.

Q3a. How much DOE spending on "clean energy" is proposed in the FY 2017 budget?

A3a. DOE's FY 2017 budget request includes $6.8 billion for clean energy research, development, demonstration, and deployment support activities. Included in that total is $5.8 billion for support of Mission Innovation clean energy science and technology R&D activities through the demonstration phase (RD&D). The remaining $1 billion supports clean energy deployment activities.

The particular appropriations accounts that support these activities are: Energy Efficiency and Renewable Energy, Electricity Delivery and Energy Reliability, Fossil Energy R&D,

Nuclear Energy, Office of Science, Advanced Research Projects Agency-Energy (ARPA-E), and a very small amount for the Bonneville Power Administration (BPA).

Q3b. How much has DOE spent on "clean energy" since 2009 when the President took office?

A3b. DOE has identified on the order of $37 billion in support of clean energy research, development, demonstration, and deployment support efforts in base programs from FY 2009 through FY 2016. An additional $25 billion was included in the American Reinvestment and Recovery Act of FY 2009.

Q4. One of the stated priorities in your FY 2017 budget request is to "support ongoing implementation of the President's Climate Action Plan."

Q4a. What specific actions is DOE undertaking to further the President's climate goals?

A4a. DOE continues to implement the President's Climate Action Plan through the development and deployment of clean energy technologies. DOE defines clean energy technologies as products or processes that can be applied at any stage of the energy cycle from production to consumption, whose application will reduce net greenhouse gas emissions and can meet one of the following characteristics: reduced demand for water resources; reduced waste; reduced emissions of other air pollutants; or reduced concentrations of contaminants in wastewater discharges.

While clean energy technologies facilitate reductions in carbon pollution, DOE's work also has benefits unrelated to greenhouse gas emissions. DOE's research in basic energy, renewable energy, energy efficiency, sustainable transportation, nuclear energy, fossil energy, and the electricity grid of the future has the potential to drive down technology costs and improve technology performance. By undertaking an all-of-the-above strategy, DOE seeks to reduce risks and provide new solutions across all sectors to help achieve our clean energy goals, system resilience and reliability, and economic competitiveness.

Q4b. If you had to estimate, what percentage of DOE's $32.5 billion budget request will go toward furthering the President's climate goals?

A4b. Of the $32.5 billion Departmental Request, about 22%, or $7.0 billion is for clean energy research, development, and demonstration ($6.8 billion) and climate science R&D ($0.2 billion).

Q5. At the Paris Climate Conference, President Obama announced that the United States would participate in a new initiative called "Mission Innovation," a joint plan by 20 countries to "dramatically accelerate public and private global clean energy innovation." For "Mission Innovation," President Obama pledged to seek to double R&D spending by the United States for "clean energy" from the current $5 billion to $10 billion over the next 5 years.

Q5a. When did negotiations regarding "Mission Innovation" begin and was DOE involved in those negotiations?

Q5b. Prior to the President's announcement, was any documentation developed at DOE about "Mission Innovation?" Please provide any such information including public and non-public.

A5a-b. DOE, along with other components of the United States Government, was involved in discussions with other country partners that culminated in the launch announcement of Mission Innovation on November 30, 2015. These discussions began in the summer of 2015 and involved an increasing number of countries leading up to the November 30 launch. As Mission Innovation is not a legally-binding commitment, these were discussions among mutually-interested country partners. There were never any negotiations or discussions beyond the voluntary effort that culminated in the Mission Innovation launch. The central document, of which the United States participated in drafting along with the 19 other Mission Innovation country partners, is the November 30 joint launch statement, which can be accessed at www.mission-innovation.net.

Q5c. Prior to making this $5 billion "Mission Innovation" commitment, what consultations did Administration officials have with Congress? With whom and when did those consultations take place?

A5c. In the lead up to the Mission Innovation launch, Secretary Moniz and DOE staff had several informal conversations with key House and Senate Members and their staff. As is done with most Administration announcements, key Members and Committees were formally notified before the announcement was made.

Q6. Prior to the President's "Mission Innovation" announcement, did DOE prepare any documentation identifying what the additional $5 billion annually would be spent on?

a. If yes, please provide us with that documentation.

A6. The President's FY 2017 Budget Request takes a significant first step toward fulfilling the U.S. pledge to seek to double federal clean energy research and development investment over the next five years as part of Mission Innovation, an initiative launched by the U.S. and 19 other countries to accelerate widespread clean energy technology innovation and cost reduction.

DOE did not prepare documentation of a specific spending plan prior to the President's announcement of Mission Innovation – all funding decisions are made through the standard budget development processes and Mission Innovation is a government-wide initiative. However the need for a substantial investment in clean energy research and development is clear. Many studies have examined the contribution of technological innovation to U.S. economic growth, examples of which are provided below.

In 2010, the American Energy Innovation Council, comprised of Chief Executive Officers from multiple industries, called for the tripling of energy research and development, citing the need for a dramatic expansion of the energy innovation pipeline to meet critical national priorities. The Council found that "…innovation is the essence of America's strength"; that "[p]public investment is critical to generating the discoveries and inventions that form the basis of disruptive energy technologies"; and that "[t]he costs of RD&D are tiny compared with the benefits."

A 2010 National Academies report from the National Academies*, Rising Above the Gathering Storm*, Revisited, called the nation to double the real federal investment in basic research in mathematics, the physical sciences, and engineering over the next seven years. Another report that same year from the President's Council of Advisors on Science and Technology also recommended accelerating the pace of technology innovation to meet economic competitiveness, environmental and energy security needs.

Further, the need for greater regional innovation efforts was highlighted in a 2012 National Research Council report, *Rising to the Challenge*, calling for the establishment

of regional innovation cluster initiatives that build upon existing knowledge clusters and comparative strengths of a geographic region. The report noted that "until very recently, U.S. federal agencies have done little to support state and regional innovation cluster initiatives" and recommended that "…regional innovation cluster initiatives by state and local organizations should be assessed…and where appropriate provided with greater funding and expanded geographically."

The FY 2017 Budget Request's increases in funding for clean energy RD&D will implement the President's pledge under Mission Innovation.

Q7. Does the U.S. government track how many "clean energy" programs exist across the government?

Q7a. How many programs are there across DOE? Please provide us with that information.

A7a. DOE's FY 2017 Budget Request includes $6.8 billion in spending towards clean energy within the Office of Science and the applied energy offices. Included in that total is $5.8 billion for support of Mission Innovation clean energy science and technology research and development (R&D) activities through the demonstration phase. The remaining $1 billion supports clean energy deployment activities, which occur in the following offices: Energy Efficiency and Renewable Energy; Electricity Delivery and Energy Reliability; Fossil Energy R&D; Nuclear Energy; Science; Advanced Research Projects Agency-Energy; and the Bonneville Power Administration.

Q7b. How many programs are there across the government? Please provide us with that information.

A7b. DOE does not track the number of clean energy programs that exist across the U.S. Government. However, the Department of State recently published the 2016 Second Biennial Report of the United States of America Under the United Nations Framework Convention on Climate Change. The document provides a list and brief description of U.S. policies and measures related to clean energy from 1935 to present day.

Q8. I understand the "Mission Innovation" investments are intended to be leveraged by private capital. Specifically, the budget mentions a group known as the Breakthrough

Energy Coalition, a global group of private investors that intend to provide investments in promising early-stage clean energy technologies.

Q8a. What exactly is the relationship between "Mission Innovation" and the Breakthrough Coalition?

Q8b. What measures does DOE intend to put in place to ensure that Breakthrough Innovation investors do not get preferential treatment or access to promising technologies coming out of the DOE research pipeline?

A8a-b. Mission Innovation and the Breakthrough Energy Coalition (BEC) are independent, parallel efforts each separately seeking to increase global investment in clean energy technology research and development. Neither the BEC nor any of its members will get preferential treatment or preferential access to DOE research or technology. BEC and its members will be treated equally along with all parties interested in DOE research or technology. They will be subject to all existing and applicable statutory, regulatory and other requirements which ensure integrity and transparency in DOE programs.

Q9. Close to 50% of the Nation's natural gas transmission and gathering pipelines were constructed in the 1950's, presenting both a safety and logistical challenge today. The QER suggests that natural gas interstate pipeline investment will range between $2.6 and $3.5 billion per year over the next 15 year and identifies "a new urgency to improve siting and permitting."

Q9a. What areas of the federal permitting process need the most improvement?

A9a. The first installment of the Quadrennial Energy Review (QER) identified the complexity and pace of the Federal permitting and review process as key challenges to proposed infrastructure projects. While siting timetables and process approvals vary depending on the scope and type of a project, one central challenge is that appropriation cuts and staff reductions at Federal agencies responsible for infrastructure siting, review, and permitting can cause delays.

The QER, which summarized ongoing efforts by various Federal agencies to modernize the Federal permitting and review process, made the following recommendations:

1. Allocate resources to key Federal agencies involved in the siting, permitting, and review of infrastructure projects.

2. Prioritize meaningful public engagement through consultation with Indian Tribes, coordination with state and local governments, and facilitation of non-Federal partnerships.
3. Establish regional and state partnerships and co-locate dedicated cross-disciplinary energy infrastructure teams.
4. Expand landscape- and watershed-level mitigation and conservation planning.
5. Enact statutory authorities to ensure coordination across agencies.
6. Adopt Administration proposals to authorize recovery of costs for review of project applications.

The Administration also launched the Interagency Rapid Response Team for Transmission (RRTT), which aims to improve the overall quality and timeliness of electric transmission infrastructure permitting, review, and consultation by the Federal government on both Federal and non-Federal lands. RRTT seeks to accomplish this by:

- Coordinating statutory permitting, review, and consultation schedules and processes among involved Federal and state agencies, as appropriate, through Integrated Federal Planning;
- Applying a uniform and consistent approach to consultations with Tribal governments; and
- Resolving interagency conflicts and ensuring that all involved agencies are fully engaged and meeting timelines.

Q9b. Why does it take longer to permit midstream energy infrastructure, such as pipelines, than generation and production sources?

A9b. Midstream energy infrastructure projects, especially major infrastructure like pipelines, take longer to permit because they often span multiple jurisdictions, including those at the state level. The QER examined this issue and determined that jurisdictions often have overlapping and sometimes conflicting statutory responsibilities for siting and permitting projects. The interplay among the diverse sets of participants and statutorily defined responsibilities is challenging, and for particularly large and complex infrastructure projects, multiple permits and approvals can lead to inefficiencies and delay.

Q9c. What steps is DOE taking to implement its QER recommendations related to natural gas infrastructure?

A9c. DOE is actively working to implement the three QER recommendations specific to natural gas infrastructure. Specifically, the Department has allocated $12 million to implement two recommendations related to emissions mitigation for midstream and natural gas infrastructure. The first recommendation will "improve quantification of emissions from natural gas transmission, storage, and distribution infrastructure," while the second will "expand natural gas transmission and distribution research and development programs… to develop and demonstrate cost-effective technologies to detect and reduce losses from natural gas transmission and distribution systems" and enhance operational efficiency

The third recommendation calls for Congress to "establish a competitive program to accelerate pipeline replacement and enhance maintenance programs for natural gas distribution systems." Legislative language authorizing such a program was approved by the House Energy and Commerce Committee as part of H.R. 8; however, this language was removed before consideration by the full House of Representatives. DOE is eager to continue working with Congress to find a path forward on enacting the legislative language necessary for the Department to implement this recommendation. In the absence of legislation, DOE continues to work with other Federal agencies, state policymakers, and industry to provide technical assistance in support of achieving the same goals.

Q10. To its credit, the QER not only shines a spotlight on the depth of our energy integration north and south of the border – it also proposes some options for further bolstering those relationships.

Q10a. How will the Administration apply the QER's positive view on the benefits of North American energy integration to Administration actions, such as approval of cross-border infrastructure, namely transmission lines and liquid and gas lines?

A10a. DOE is applying the Quadrennial Energy Review (QER) view of energy integration in our engagements with Canada and Mexico. I led discussions of energy integration with Canada and Mexico as part of the North America Energy Ministers Meeting in Winnipeg

in February of this year. Among the expanded areas for joint collaboration that we three Ministers agreed to pursue is work focused on reliable, resilient, and low-carbon electricity grids. One potential task under consideration is to extend an existing U.S.-Canada side-by-side comparison of cross-border electricity permitting requirements to include Mexico. DOE also expects to invite Canada's and Mexico's input for the second QER, which will focus on electricity.

A number of DOE offices are working on the topic of energy integration in North America. The Office of Energy Policy and Systems Analysis (EPSA) is supporting modeling and analysis of the benefits of regional energy integration and interconnectivity in the electricity sector for the second installment of the QER. Last fall, EPSA also sponsored two workshops about harmonization of regulations with Canada and Mexico in the electricity sector and will be sponsoring an additional workshop on the harmonization of regulations with Mexico and Canada in the oil & gas sectors this year. The Office of Energy Efficiency and Renewable Energy (EERE) is embarking on a multi-year, comprehensive trilateral renewables integration study with support from Canada and Mexico, which will inform planning for renewables integration and promote an understanding of impacts on the regional electricity system. The Office of Electricity Delivery and Energy Reliability (OE) is assisting EERE in the management of that study.

DOE will continue to apply the QER's positive view on integration in our work on policy analysis, through modeling studies and workshops. Additionally, we will continue to discuss energy integration in the electricity and oil & gas sectors as part of our trilateral and bilateral engagements with Canada and Mexico.

Q10b. The cross-border energy infrastructure language in the committee's energy bill – H.R. 8 – would address some of the unnecessary delays in the permitting of cross-border pipelines and transmission lines. What recommendation does DOE have to improve the cross-border permitting process?

A10b. The QER recommended that, for integrating North American energy markets, programs be established for academic institutions and not-for-profits to develop legal, regulatory, and policy roadmaps for harmonizing regulations across borders. To achieve this, the

DOE sponsored two workshops at the University of Idaho in Boise and at the University of New Mexico in Albuquerque with participants from Canada and Mexico, respectively, in collaboration with the not-for-profit organization Resources for the Future (RFF). At those workshops, participants discussed harmonization of electric power regulations for the environment, operations and planning, and data sharing. Following the conclusion of the workshops, RFF published a synopsis paper that contains several of their recommendations for harmonizing cross-border regulations.

Additionally, in July 2015, OE published a U.S.-Canada cross-border regulatory side-by-side comparison of electricity permitting requirements (available at http://www.energy.gov/sites/prod/files/2015/07/f24/Cross%20Border%20Side-by-Side_2015_0714.pdf). The side-by-side presents a series of tables that describe the U.S. and Canadian regulatory and statutory requirements necessary to site, permit, and construct transmission facilities at the U.S.-Canada border. It is intended to function as a reference document that can be used by government officials, potential developers, and other stakeholders as a means to understand the permitting requirements in both countries.

OE has proposed working on a similar effort with Mexico that will compare regulations in U.S. southern border states with those in Mexico. Pending agreement, OE anticipates the project will start once energy regulatory reform implementation in Mexico has been completed.

The Administration has been working actively for many years to increase the efficiency of infrastructure permitting. On May 17, 2013 the White House released a Presidential Memorandum on "Modernizing Federal Infrastructure Review and Permitting Regulations, Policies and Procedures." On June 7, 2013, the President issued another Memorandum directing Federal agencies to "develop an integrated, interagency pre-application process for significant onshore electric transmission projects requiring Federal approval."

OE, in collaboration with the Member Agencies of the Steering Committee (Member Agencies) created under Executive Order 13604 of March 22, 2012, and pursuant to the June 7, 2013 Transmission Presidential Memorandum, sought public input on a draft Integrated, Interagency Pre-Application (IIP) Process. The proposed IIP Process is intended to improve interagency and intergovernmental coordination focused on ensuring that project proponents develop and submit accurate and complete information early in the project planning process to facilitate efficient and timely environmental reviews and agency decisions. On February 2, 2016, the DOE published a Notice of Proposed Rulemaking in the Federal Register (81 FR 5383) to amend its regulations for the timely coordination of Federal Authorizations for proposed interstate electric transmission facilities pursuant to Section 216(h) of the Federal Power Act. The proposed amendments are intended to improve the pre-application procedures and result in more efficient processing of applications. While the proposed IIP rule does not apply to electric transmission projects crossing the U.S. international border, DOE has and will continue to encourage potential applicants to engage in pre-application coordination activities with DOE, other agencies, and stakeholders.

Q11. The second installment of the QER will conduct a comprehensive review of the nation's electricity system, from generation to end use, including a more comprehensive look at electricity transmission, storage, and distribution infrastructure.

Q11a. What was the agency's motivation for focusing solely on the electricity sector for the next installment?

A11a. DOE's motivation for focusing on electricity stemmed from our work in the first installment of the (QER). That analysis, which reviewed energy transmission, storage, and distribution infrastructure, underscored the importance of electricity to the Nation's energy system. In addition, most components and sectors of the Nation's infrastructure depend on electricity to function, and the intersection of electricity with national—and energy—security, economic competitiveness, and environmental responsibility merits a closer examination in the second installment of the QER.

The first installment of the QER also highlighted major transformations that are occurring within the electricity sector. These include a changing generation mix; increasing

vulnerability to severe weather and climate-related incidents; new technologies, services, and market entrants; cyber and physical threats; and growing overlaps between jurisdictions. Expanding our focus in the second installment to include generation and end use—and how key areas such as innovation, technology, and finance interplay—will enable DOE to examine these transformative issues and also utilize the analysis from the previous installment to create a comprehensive review of the changing energy landscape in the United States.

Q11b. What is the schedule for public participation?

A11b. DOE is actively seeking public participation as we develop the second installment of the QER. The QER Task Force has scheduled seven public meetings in cities across the country to engage the broadest possible representation of stakeholders. The first meeting occurred on February 4, 2016 in Washington, DC and the remaining sessions will be held through the spring of 2016: Boston, Massachusetts on April 15th; Salt Lake City, Utah on April 25th; Des Moines, Iowa on May 6th; Austin, Texas on May 9th; Los Angeles, California on May 10th; and Atlanta, Georgia on May 24th.

Stakeholder meetings are designed to enhance the QER Task Force's current understanding of the issues and considerations facing the Nation's electricity system. Relevant reports, data, advice, and inputs from all stakeholders—to include the general public—are collected at each meeting. For stakeholders unable to attend a meeting in person, DOE created an online portal on DOE's website (https://epsa.energy.gov/qer-comments/) where individuals are able to submit comments, reports, or other data electronically.

All public comments, whether submitted at a stakeholder meeting or online, must be provided to DOE by July 1, 2016. The information will then be reviewed and incorporated into the vast analytical work that is currently underway to arrive at eventual insights, trend analysis, data, policy options, and recommendations for the second installment of the QER.

Q11c. When is the expected release date of the final draft?

A11c. It is the intention of the QER Task Force to publish the second installment of the QER before January 2017.

Q11d. How much has DOE budgeted to spend on the development and issuance of the second installment?

A11d. EPSA, which leads DOE's QER efforts, serves as a focal point for policy coordination within DOE on the analysis, formulation, development, and advancement of energy policy and related programmatic initiatives. EPSA carries out strategic studies, policy analyses, and coordinates a supporting set of analytical capabilities internally or from other sources that have multiple benefits, which include informing the development of the QER and supporting Departmental and national goals. Due to the crosscutting nature of EPSA's activities and the inextricable link between the QER and DOE's core/ongoing work, DOE does not prepare or execute a separate budget for the development and issuance of the QER.

Q12a. Part of the mission of the program is to "accelerate transformational energy technologies from concept to market." Has anything come to market yet since the program's inception 6 years ago? For example, has there been any wide-scale deployment of a commercialized product that has resulted from the ARPA-E program? Please provide a list of such products and companies.

A12a. As of March, 2016, 14 ARPA-E projects have substantially contributed to the development of a commercial product already being sold on the market. These products range from a distributed power flow controller which allows electric grid operators to better manage unused and overall transmission capacity, an enhanced zinc-air grid energy storage unit which is competitive with conventional lead-acid batteries and backup diesel generators, and air flow panels which passively remove heat and humidity from incoming fresh air resulting in a 25-50% HVAC energy savings.

While commercial products on the market are a key indicator of success, they are by no means the only metric ARPA-E employs to measure success. Due to the Agency's focus on the early stages of technology development and the limited duration of projects, ARPA-E expects each project team to establish a credible path to move technologies toward the market through follow-on-funding; public and private partnerships; and/or

commercialization once the ARPA-E award is complete. ARPA-E refers to this as a "hand-off" for the next stage of the project. To facilitate these hand-offs, ARPA-E has a dedicated technology-to-market team that provides awardees with practical training and critical business information for their projects. Awardees are given a clear understanding of market needs to guide their projects' technical development and help their projects succeed. In addition, ARPA-E facilitates relationships with investors, government agencies, small and large companies, and other organizations that are necessary to move awardees to the next stage of their project development.

ARPA-E measures several different types of "hand-offs" across its entire portfolio of completed and active projects. These hand-offs include new company formations, partnerships with other government agencies, and partnerships with existing companies. As of February 2016, ARPA-E has successfully facilitated many hand-offs:

- At least 45 ARPA-E project teams have cumulatively received more than $1.25 billion in private sector follow-on funding;
- At least 36 ARPA-E project teams have formed new companies to advance their technologies;
- Several ARPA-E awardees have announced strategic partnerships with established industry participants, ranging from jointly developing a demonstration site to being acquired by the larger company; and
- Over 60 ARPA-E projects have partnered with other government agencies for further project development.

Q12b. What metrics does DOE use to evaluate the success of its ARPA-E projects?

A12b. DOE utilizes a wide range of metrics to evaluate ARPA-E's impact. Preliminary indicators of likely success include: handoffs of supported technologies to other organizations, technical achievements, follow on funding, and, to a lesser degree, publications and patents. In addition to the "hand-offs" described in the prior section, as of February 17, 2016, ARPA-E projects have resulted in more than 1,000 Subject Invention Disclosures, more than 350 U.S. Patent Applications, and approximately 100 issued U.S. Patents (based upon performer reporting).

ARPA-E funds potentially transformative energy technologies that are currently too high risk to likely garner private sector support. ARPA-E plays a key role in the Administration's energy strategy by seeking to fund innovations to help meet our stated goals[1]. ARPA-E does not seek to fund incremental improvements to existing technologies; instead, we focus on technologies that would make possible a fundamental shift in the energy sector.

ARPA-E seeks to enable the nation's innovators and entrepreneurs to generate breakthrough technologies that do not exist today. Some ARPA-E projects may ultimately encounter insurmountable technical barriers while others will succeed and change the landscape of what is possible. However, even when ARPA-E projects achieve technical successes, they will not change the energy market overnight – it may take 10 or more years to scale many of these technologies in cost and volume.

Q12c. When an ARPA-E funded project isn't resulting in progress or benefits, what are DOE's protocols for ending the project? How often does this happen?

A12c. ARPA-E awardees are competitively selected to conduct challenging research based on aggressive milestones for deliverables. By their very nature, these aggressive research milestones will often not be met despite the best efforts of recipients. ARPA-E actively manages these research efforts by requiring quarterly progress reports by project awardees, and conducting regular site visits.

Since the inception of ARPA-E in 2009 and as of February 19, 2016, 25 ARPA-E project have been cancelled out of 235 closed projects (i.e. closed projects includes alumni and cancelled projects, but not presently active projects). Most of the 25 cancelled projects were terminated by mutual agreement for inability to meet milestones. ARPA-E provided each recipient a formal notice of the unmet milestone(s) and opportunities to correct the situation in hopes that the project could meet the milestone(s) and continue to be funded. If not, a notice of intent to suspend the research award was sent to the recipient. When necessary, ARPA-E always works with project awardees to reach

[1] See ARPA-E statutory goals at 42 USC §16538(c)(1).

amicable determinations to discontinue the research projects, and to focus efforts elsewhere on more promising initiatives. For additional details on ARPA-E termination process, please visit http://arpa-e.energy.gov/?q=site-page/termination-guidance)

Q13. DOE is proposing a new initiative called the "Regional Clean Energy Innovation Partnerships." The intent is to "support regionally relevant technology neutral clean energy R&D needs and opportunities to support accelerated clean energy technology commercialization, economic development, and manufacturing."

Q13a. How is this different from existing federal programs, such as DOE's State Energy Program, Clean Energy Hubs, or the Energy Technology Innovation Accelerators, to name a few?

A13a. Current DOE budget and appropriations structure constrains funding by fuel type and technology, not geographic regions. Under this proposal, the Regional Partnerships would be geographically-focused to address the regional differences in energy resources, market structures, infrastructures, economies, and innovation ecosystems, including research universities, laboratories, industries and workforces.

Programs such as the Energy Innovation Hubs, or Energy Technology Innovation Accelerators are typically federally-directed activities and that target funding at specific types of entities and/or defined scientific and engineering challenges, all managed within budget control points.

In contrast, the FY 2017 budget request proposed a new crosscutting line item within the EERE appropriation. The Regional Partnerships would have latitude to identify challenges, set priorities, assemble teams, award funding to RD&D performers, and manage new activities. DOE's competition for Partnerships would be technology neutral, allowing the Partnerships to propose activities that fall anywhere within the clean energy RD&D space, including activities in fossil, nuclear, and renewable energy, as well as transportation, electric grid, advanced manufacturing, energy-water nexus, and energy efficiency. DOE will provide guidance, performance expectations, and technical support and will hold the Partnerships accountable through regular oversight and reporting, as is done with award recipients across DOE.

Partnerships would be managed by local entities and draw upon the strengths of a geographic region's innovation ecosystem, linking the needs of industry and energy decision-makers with the unique capabilities at nearby universities, laboratories, and other local institutions. In the process, this model could attract energy stakeholders and RD&D performers not typically engaged through other government-funded research or technical assistance programs. They would serve as forums for end-to-end coordination across the scope of clean energy innovation constituencies including industry, utilities, entrepreneurs, academia, state and local governments, tribal and native Alaskan communities, non-governmental and economic development organizations, the financial sector, project developers, and energy producers and consumers.

Q13b. How much of a say would each region actually have in which projects or technologies they get to pursue? Would they need DOE approval to pursue a particular project?

A13b. The Partnerships would have latitude to set priorities across all clean energy technologies based on regional needs, opportunities, R&D capabilities, and other factors as appropriate. More detailed options for the Regional Partnerships' operating principles are under consideration, with careful program design, stakeholder input, and analysis needed to determine the relative roles and interactions between the geographic regions, RD&D performers and the Federal government. For example, one option is for selected Partnerships to submit a plan, prior to initial funding and annually thereafter, for Departmental approval, based, in part, on broader stakeholder input. After the initial year, annual plans could include a review of previous year's activities, status of ongoing projects, and metrics for measuring their success.

Q13c. Is anything preventing states and regions from doing this themselves, without the need for yet another federal program backed by federal dollars?

A13c. The U.S. energy system is composed of regions with distinct energy innovation needs, resources, infrastructures, customer demands, markets, capabilities and stakeholders, and the country has already seen significant advancement of the energy economy at the regional and sub-national levels. However, the pace and scale of clean energy innovation need to be substantially increased and reach beyond existing efforts to accelerate the energy transformation that is underway.

Through the proposed Regional Energy Innovation Partnerships, federal research funding can be leveraged to create synergies among disparate regional stakeholders that may currently lack sufficient resources and incentive for robust and long-term, multi-party collaboration. The proposed Partnerships would help achieve what leaders from government, academia, and industry have called for, a regional approach to innovation. The National Research Council 2012 Report, *Rising to the Challenge*, noted that:

- "Historically, federally funded R&D has not been connected to state and regional industrial development. Bridging that gap can create the local talent and technology base needed to convert these U.S. investments into domestic companies, industries, and jobs."
- "Private businesses and local education institutions and economic-development agencies are in the best position to identify opportunities, gauge competitive strengths, and mobilize wide community support for regional cluster initiatives."
- "Regional innovation cluster initiatives should be built upon existing knowledge clusters and comparative strengths of a geographic region."

Q14. DOE already has in existence or plans to establish several Hubs, Institutes, and Initiatives. A few examples: a Clean Energy Manufacturing Initiative; Energy Technology Innovation Accelerators funding; Next-Generation Clean Energy Technology Pathways; a Critical Materials Institute; Energy-Water Desalination Hub; a Small Business Partnership Program; and Regional Energy Innovation Partnerships.

Q14a. What metrics does DOE use to evaluate the success of these types of programs?

A14. Metrics are crucial to accomplishing DOE's mission. DOE employs a variety of metrics in support of furthering activities across its diverse portfolio. By delineating, implementing and managing a progression of SMART milestones (objectives that are at once Specific, Measurable, Assignable, Realistic and Timely) DOE measures performance against metrics to forge and ensure progress to meaningful outcomes. For example, Clean Energy Manufacturing Innovation Institutes are asked to adhere to metrics included in the Statement of Program Objectives (SOPO) in the cooperative agreement, negotiated in partnership with DOE. Metrics used for these Institutes include the technical progress through Technology Readiness Levels (TRLs) and follow-on

investment. Additional metrics in the progression include the development of intellectual property and the development of public-private partnerships. And, because the Institutes are part of the National Network for Manufacturing Innovation, which includes Institutes across multiple agencies, the DOE metrics directly map into measures applied across the network.

Q14b. When a program isn't resulting in progress or benefits, what are DOE's protocols for ending the program? How often does this happen**?**

A14b. DOE manages progress metrics in the active management of its programs. Active program management includes quarterly reviews of progress by DOE technology managers, as well as annual merit based peer reviews by independent technologists. Through this approach, our performers and our technology managers are held accountable for meeting aggressive targets and goals, and if those targets or goals are not met, developing corrective actions, or ending the program when appropriate. In some cases, where an alternative technology pathway to achieving the overall goals of a project is not viable, discontinuing federal funding for projects may be appropriate. "Go" or "No-go" decision points within the metrics framework are used to decide whether required corrective action including possible project termination is needed. When feedback from these metrics and decision points indicates an outcome not in line with the ultimate goals of the project, DOE corrects course, thereby mitigating risk and reducing costs.

Q14c. Please provide to the committee a list of all Doe's existing and proposed Hubs, Institutes, and Initiatives, including funds allocated to each or proposed for each?

A14c. DOE uses the term "initiative" to account for various efforts, both programmatic and strategic. For example, DOE efforts as cited in the Question span many diverse activities touching most of the Department.

Below is a list of all of DOE's existing and proposed Hubs and Institutes:

* America Makes pilot: $11.5 million through FY 2016; no funds proposed in FY 2017.

* Wide-Band Gap (PowerAmerica) Clean Energy Manufacturing Innovation Institute: $56 million through FY 2016; $14 million proposed in FY 2017.

* Advanced Composites (IACMI) Clean Energy Manufacturing Innovation Institute: $42 million through FY 2016; $14 million proposed in FY 2017.

* Smart Manufacturing Clean Energy Manufacturing Innovation Institute: $42 million through FY 2016; $14 million proposed in FY 2017.

* Clean Energy Manufacturing Innovation Institute #4: $28 million through FY 2016; $14 million proposed in FY 2017.

* Clean Energy Manufacturing Innovation Institute #5: $14 million through FY 2016; $14 million proposed in FY 2017.

* Clean Energy Manufacturing Innovation Institute #6: $14 million proposed in FY 2017.

* Critical Materials Hub: $115 million through FY 2016; $20 million proposed in FY 2017.

* Manufacturing Demonstration Facility: $61 million through FY 2016; $10 million proposed in FY 2017.

* Energy-Water Desalination Hub: $25 million proposed in FY 2017.

* Joint Center for Artificial Photosynthesis (JCAP): $124.7 million through FY 2016. $15 million proposed in FY 2017

* Joint Center for Energy Storage Research (JCESR): $116.2 million through FY 2016. $24.08 million proposed in FY 2017

* Consortium for Advanced Simulation of Light Water Reactors (CASL): $166.8 million through FY 2016. $24.3 million proposed in FY 2017

* Grid Clean Energy Manufacturing Innovation Institute #7: $14.0 million proposed in FY2017.

Q15. What is the Department's strategy for addressing potential cybersecurity challenges presented by existing and future grid and energy infrastructure technologies?

A15. The Office of Electricity Delivery and Energy Reliability's (OE) Cybersecurity for Energy Delivery Systems (CEDS) program aligns with the five-part strategy in the energy sector's Roadmap to Achieve Energy Delivery Systems Cybersecurity:[2]

- Build a culture of security
- Assess and monitor risk

[2] http://energy.gov/oe/downloads/roadmap-achieve-energy-delivery-systems-cybersecurity-2011

- Develop and implement new protective measures to reduce risk
- Manage incidents
- Sustain security improvements

DOE coordinates activities with industry, vendors, academia, and government stakeholders for energy delivery systems security along these strategic directions, working toward the Roadmap vision of resilient energy delivery systems that are designed, installed, operated, and maintained to survive a cyber incident while sustaining critical functions for existing and future grid energy infrastructure technologies.

Q15a. What programs or research and development efforts does the Department intend to pursue to understand potential cybersecurity vulnerabilities created by networked or digitally connected energy technologies?

A15a. The CEDS program structure aligns with the 2011 Roadmap to Achieve Energy Delivery Systems Cybersecurity, which presents a strategic framework and advances the vision that resilient energy delivery control systems are designed, installed, operated, and maintained to survive a cyber-incident while sustaining critical functions.[3] As the energy sector-specific agency (SSA), DOE's ongoing collaboration with energy sector utility owners, operators, and vendors strengthens the cybersecurity of critical energy infrastructure against current and future threats. Presidential Policy Directive 21, Critical Infrastructure Security and Resilience, directs the SSAs to provide, support, or facilitate technical assistance and consultations for each sector to identify vulnerabilities and help prevent or mitigate the effects of incidents, as appropriate.4 In meeting this requirement for DOE, OE's CEDS program is supporting activities with key objectives:

- Researching technologies to improve energy reliability and resilience: the CEDS program will continue supporting research partnerships led by national laboratories, universities, and industry to reduce the risk of energy disruption resulting from a cyber adversary's efforts to exploit a vulnerability. Examples of research and

[3] *Roadmap to Achieve Energy Delivery Systems Cybersecurity*: http://energy.gov/sites/prod/files/Energy%20Delivery%20Systems%20Cybersecurity%20Roadmap_finalweb.pdf
[4] Presidential Policy Directive 21: http://www.whitehouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil

development efforts that have enabled energy sector stakeholders to identify problems include the following:

- DOE's national laboratories such as the Idaho National Laboratory (INL), Sandia National Laboratory (SNL), and Pacific Northwest National Laboratory (PNNL) develop several innovative cybersecurity technologies for critical energy infrastructure through research partnerships with Industry. These national laboratories then apply their red-teaming5 techniques that help strengthen the cyber-resilience of the technologies being developed.
- INL, SNL, the National Renewable Energy Laboratory (NREL), and Oak Ridge National Laboratory (ORNL) participated in the Electric Power Research Institute National Electric Sector Cybersecurity Organization Resource project, which developed cybersecurity failure scenarios to help energy sector stakeholders strengthen cybersecurity measures. These scenarios are widely used by energy asset owners and operators for cyber risk assessment, planning, procurement, training, tabletop exercises, and security testing.

- Cyber incident management and expanding implementation of the Cybersecurity Capability Maturity Models and Risk Management Process:6 DOE has worked closely with the Electricity Subsector Coordinating Council (ESCC) to strengthen the ESCC playbook, which outlines coordination procedures for the private sector and DOE in case of an incident. DOE also identifies and promotes best practices that energy companies can use—regardless of their size—to strengthen the resilience of their systems. The two most notable efforts in this area include the Cybersecurity Framework and the Cybersecurity Capability Maturity Model (C2M2):
  - The Cybersecurity Framework is a voluntary guide for the critical infrastructure community. It was the result of a year-long, public/private-

[5] "Red Teaming is a process designed to detect network and system vulnerabilities and test security by taking an attacker-like approach to system/network/data access" https://www.sans.org/reading-room/whitepapers/auditing/red-teaming-art-ethical-hacking-1272

[6] Cybersecurity Capability Maturity Models: http://energy.gov/oe/services/cybersecurity/electricity-subsector-cybersecurity-capability-maturity-model; Risk Management Process: http://energy.gov/oe/services/cybersecurity/cybersecurity-risk-management-process-rmp

sector collaborative effort led by the National Institute of Standards and Technology to establish guidance for how to protect infrastructure from cyberattacks. OE built on that work and developed implementation guidance to assist the energy sector, serving as a model for other sectors.

- C2M2, which DOE developed in collaboration with the public and private sector, helps the utilities and other companies gain a comprehensive understanding of their existing cybersecurity capabilities and their needs going forward in a dynamic threat environment. This enables them to make informed decisions about cybersecurity investments, and helps DOE better understand how to partner with them to raise our collective security posture.

Q16. As you're aware, this committee was successful in getting legislation signed into law last year that helps facilitate the establishment of a Strategic Transformer Reserve. What steps has DOE taken to implement this legislation? Your budget requests $15 million for "transformer resilience and advanced components." Is this money intended to go toward implementing our transformer reserve legislation?

A16. The FAST Act directed DOE to submit a plan to establish a strategic transformer reserve. OE selected a research team, led by Oak Ridge National Laboratory, to complete a rigorous technical analysis to underpin a decision on the appropriate size, scale, and scope of the reserve. EPSA is preparing a companion policy analysis. The results of these two studies will inform Administration decisions on the Strategic Transformer Reserve Plan.

The Transformer Resilience and Advanced Components (TRAC) program focuses on increasing the resilience of existing critical grid assets and on the development of cost-effective, next-generation components that are more resilient and have advanced capabilities needed in the future grid. For FY 2017, the $15 million TRAC request increases investments in the development of technologies and component assessments to mitigate system vulnerabilities such as geomagnetic disturbances and electromagnetic pulses. Activities will also focus on developing next-generation transformers to fill a critical gap identified through the 2015 Quadrennial Technology Review.
TRAC program activities are being coordinated with the development of the Strategic Transformer Reserve Plan. While the plan preparation focuses on identifying the

technical and policy options for a potential transformer reserve, details of a stockpile are part of a broader portfolio of activities to increase the resilience of the grid from the loss of multiple large power transformers. Next-generation transformers being developed under TRAC will promote greater standardization and be more flexible and resilient than existing designs, which could augment some of the plan recommendations.

Q17. What steps is DOE taking to better integrate advanced energy technologies, such as energy storage and micro-grids, into the electric grid? What about utilizing "big data" and energy information technologies?

A17. We welcome the opportunity to work with the Committee to develop practical solutions to address the needs of the 21st century electric system. The Office of Electricity Delivery and Energy Reliability's (OE) Energy Storage program is engaged in research to drive down costs and increase average lifetimes of energy storage technologies. OE-funded energy storage technologies have been licensed in the private sector and are being utilized on the grid. New energy storage use cases are being explored and tools for evaluating cost and benefits for specific applications have been developed to improve resilience of the grid. For integrating microgrids into the electric grid, OE has ongoing R&D in planning and design and in operations and control, following the activity plan jointly developed with industry stakeholders. For planning and design, an integrated toolset is being developed in FY 2016 to aid microgrid planners and designers to meet stakeholder-defined objectives for cost, reliability, environmental emissions, and efficiency. For operations and control, advanced microgrid controllers, developed through projects selected in FY 2014, will be ready for testing of their grid-interactive functions in FY 2016. Field demonstration of advanced controllers in combination with microgrid system designs is planned for FY 2017. In addition, new projects to coordinate and optimize operations of multiple microgrids with the electric grid will be pursued through a planned networked microgrid R&D funding opportunity.

On the subject of Big Data, the Nation's energy infrastructure is transforming into a tightly integrated energy and information infrastructure. We are learning to use increasing amounts of information to increase the efficiency, flexibility, and resilience of our grid, and to capitalize on the potential contributions of customer-owned assets of all

types. The process has begun with Federal, state, and private investments in grid modernization and continues at the R&D level in OE's activities in Transmission Reliability, Advanced Grid Modeling, Advanced Distribution Management Systems and Market-Based Controls.

Q18. The budget includes a request of $15 million to establish a new State Distribution-Level Reform Program. The request also states that DOE plans to develop the specifications for an "open source distribution operating system" and "advanced distribution grids."

Q18a. What assurances can you give me that DOE's new State Distribution-Level Reform Program and other distribution-level activities aren't yet another federal intrusion into state jurisdiction?

A18a. The availability and economic productivity of many new grid-related technologies, particularly at the distribution level, has raised many questions about how best to design and operate future distribution systems. Officials from state and local agencies and utilities are turning to DOE and its national laboratories for technical assistance in dealing with these challenges. Our role is to provide these officials with useful information and analytic tools, while respecting their authorities and responsibilities.

The traditional divide between state and Federal jurisdiction still holds, with the Federal Energy Regulatory Commission responsible for regulation of wholesale electricity sales, and the states responsible for the regulation of retail sales. Although some new technologies are blurring this boundary, we believe that any resulting problems can be managed through increased coordination and cooperation.

Q19. The budget mentions the need to better coordinate federal transmission permits, including streamlining permits, special use authorizations, and other approvals required under Federal law to site electric transmission facilities. What specific steps is DOE taking to improve federal coordination to site transmission?

A19. On February 2, 2016, DOE issued a Notice of Proposed Rulemaking to amend its regulations for the timely coordination of Federal authorizations for proposed interstate electric transmission facilities pursuant to section 216(h) of the Federal Power Act by establishing an Integrated Interagency Pre-Application (IIP) process. The IIP is intended to provide a roadmap and encourage early coordination between electric grid

transmission project proponents and permitting agencies on transmission projects. The IIP process, as proposed, is designed to improve interagency and intergovernmental coordination, to encourage early engagement with stakeholders, and to help ensure project proponents develop and submit accurate and complete information early in the project planning process.

Q20. DOE has made some progress in completing work on LNG export applications, and just a couple weeks ago the first tanker set sail from the Gulf Coast. However, there are at least 30 applications that are still under your review and some of them have been sitting on your desk for years.

Q20a. I understand that DOE has taken the position that FERC should complete their environmental review of the proposed facility, but aren't there aspects of an application that you could begin work on immediately?

A20a. Section 3(a) of the Natural Gas Act requires DOE to conduct a public interest review of applications to export LNG to countries with which the United States does not have a free trade agreement that requires national treatment for trade in natural gas (non-FTA countries) and to grant the applications unless DOE finds that the proposed exports will not be consistent with the public interest. Under this provision, DOE performs a thorough public interest review before issuing an order. DOE must also meet its obligations under the National Environmental Policy Act (NEPA)[7] before issuing a final order.

In 2014, in order to reflect changing market dynamics, DOE changed its procedures for processing LNG export applications. DOE now acts on applications to export LNG from the lower-48 states to non-FTA countries only after the review required by NEPA has been completed, suspending its practice of issuing conditional decisions prior to final authorization decisions. Prior to the change, DOE could waste Federal resources on projects that might never get regulatory approval or necessary market backing. Since the procedural change, DOE has established a pattern of issuing final LNG export decisions

[7] See: 10 C.F.R. Part 1021, Subpart D, Appendix C to Subpart D of Part 1021 - Classes of Actions that Normally Require EAs but not Necessarily EISs, section C13*: Import or Export Natural Gas Involving Minor New Construction;* and 10 CFR Part 1021, Subpart D, Appendix D to Subpart D of Part 1021 - *Classes of Actions that Normally Require EISs*, section D8: *Import or Export of Natural Gas Involving Major New Facilities*, and D9: *Import of Export of Natural Gas Involving Major Operational Change*.

promptly after FERC has issued its order denying rehearing requests. As of August 12, 2016, seventeen of these long-term authorizations have been granted under our revised procedures. In these cases, as you suggested, DOE had begun work on the public interest review of these applications while the environmental review was ongoing. DOE has also granted one long-term authorization to export compressed natural gas to non-FTA countries.

The change has done exactly what it was intended to do: streamlined the regulatory process for applicants, prioritized DOE resources on the more commercially advanced projects, and ensured that applications that have completed NEPA will not be delayed by their position in the previous order of precedence. Note that in the Energy Policy Act of 1992, Congress introduced a new section, 3(c), to the NGA. Section 3(c) created a different standard of review for applications to export natural gas, including LNG, to those countries with which the United States has in effect a free trade agreement requiring national treatment for trade in natural gas (FTA countries). Section 3(c) requires such applications to be deemed consistent with the public interest, and requires such applications to be granted without modification or delay. In that regard, DOE grants authorization of those complete applications promptly.

Q20b. What are the components of the "public interest" review? Over time, has DOE modified these criteria or have you used the same formula from the start?

A20b. For applications requesting long-term authority to export domestically produced LNG from the lower-48 states to non-FTA countries, DOE conducts a full public interest review. While section 3(a) of the NGA establishes a broad public interest standard and a presumption favoring export authorizations, the statute neither defines "public interest" nor identifies criteria that must be considered. In prior decisions, DOE's Office of Fossil Energy (FE) has identified a range of factors that it evaluated when reviewing an application for export authorization. These factors included: economic impacts, international considerations, U.S. energy security, and environmental considerations, among others. To conduct its review, DOE looks to the record of evidence developed in the application proceeding.

Applicants and intervenors are free to raise new issues or concerns relevant to the public interest that may not have been addressed in prior cases. The factors considered in each public interest review are identified in each final order issued. Because each application may have different issues identified by commenters, protesters and intervenors during the review, not every application will have the same criteria used in the public interest evaluation.

In the first conditional long-term authorization order to export domestically-produced lower-48 LNG to non-FTA countries, issued to Sabine Pass Liquefaction, LLC (May 20, 2011), DOE stated that it would evaluate the cumulative impact of the Sabine Pass authorization and any future authorizations for export authority when considering subsequent applications. DOE then commissioned a two-part study[8] of the cumulative economic impact of LNG exports. In that study, the macroeconomic impacts of LNG exports of the equivalent of 6 and 12 billion cubic feet per day (Bcf/d) of natural gas were evaluated. In 2015, DOE released another DOE-commissioned macroeconomic study[9] that evaluated LNG exports of the equivalent of between 12 and 20 Bcf/d of natural gas, which DOE is using in evaluating LNG export applications and orders.

Additionally, DOE commissioned two environmental studies to help inform its public interest evaluation that were prepared by the National Energy Technology Laboratory. These two studies, and comments received on those studies were added to the proceedings of pending long-term applications to export domestically produced lower-48 states LNG by vessel from the United States, and have been included in the public interest evaluation of final authorizations granted since September 2014. The studies are: Addendum to Environmental Review Documents Concerning Exports of Natural Gas From the United States, 79 FR 48132 (Aug. 15, 2014); and Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas From the United States, 79 FR 32260 (June 4, 2014).

Q21. According to the President's budget proposal, the anticipated budget for DOE's fossil energy R&D extending out ten years will average just about $394 million per year—down from roughly $600 million this year.

[8] See the 2012 LNG Export Studies at: http://www.energy.gov/fe/services/natural-gas-regulation/lng-export-study
[9] See the 2015 LNG Export Studies at: https://fossil.energy.gov/app/docketindex/docket/index/11

Q21a. This would suggest that DOE is turning away from fossil energy R&D as a source of innovation, why is that?

A21a. The out year projections in the President's Budget are generally formulaic extrapolations of the Budget's policy beyond the budget year in question. The proposal to use prior year balances reduces the formulaic numbers for Fossil Energy in the out years. These numbers are not indicative of future policy decisions as the President reserves the right to propose new programs and amounts in future Budgets.

As noted earlier, the Department of Energy (DOE) is not turning away from fossil energy (FE) research and development (R&D) as a source of innovation. In fact, FE is investing in many advanced technologies to improve the efficiency of power plants that will reduce costs and emissions. For example, FE is leading the DOE effort on development of supercritical carbon dioxide (CO2) technology which has the potential to significantly improve the efficiency and economics of providing low-carbon power from sources such as coal. FE is also initiating new efforts on modularization that can take advantage of advancements in advanced manufacturing, reactor modeling, and coal conversion science. Development of modular systems can reduce costs but also open up opportunities for coal systems that are compact and flexible without impacting reliability and availability. FE's R&D activities have also positioned the United States as a world leader in the RD&D of carbon capture and storage (CCS). Finally, FE is also a critical partner on other initiatives throughout the DOE where it has strong skills and capabilities such as in subsurface and advanced materials and energy-water nexus.

Q21b. Why is fossil energy R&D only a small percentage of your focus if it is the dominant energy source for the world?

A21b. The FE R&D Fiscal Year (FY 2017) 2017 budget request is prioritized to focus on the key challenges facing the fossil energy industry today: the reduction of greenhouse gas emissions such as carbon dioxide (CO2), and address other environmental consequences of development of unconventional oil and gas resources. The FY 2017 budget request reflects these priorities and is a first step toward fulfilling the United States pledge to

double Federal clean energy R&D investments government-wide over the next five years as part of Mission Innovation.

Q21c. How much is DOE working with China and India on cleaner fossil energy technologies?

A21c. China and the United States are working together to advance the demonstration of clean coal technology and carbon capture, utilization, and storage (CCUS) through a variety of bilateral and multilateral platforms. These include the U.S.-China Clean Energy Research Center (CERC), the U.S.-China Climate Change Working Group, the U.S.-China Fossil Energy Protocol, the annual U.S.-China Clean Coal Industry Forum, the U.S.-China Clean Coal Exchange Program, the Carbon Sequestration Leadership Forum, and the Asia Pacific Economic Cooperation platform. CCUS projects provide foundational information for decision-making in clean fossil energy and underpin CCUS investment, operation, regulation, and planning decisions. In addition to the programs noted above, DOE is also working with Chinese counterparts to ensure the success of two important CCUS projects announced by President Obama and President Xi in November 2014 – a large scale international CCUS project in Shaanxi Province and a joint collaboration to demonstrate carbon dioxide utilization in enhanced water recovery. The Office of Fossil Energy provides $2.5 million per year in funding to support U.S. activities for the CERC Advanced Coal Technology Consortium, which is matched by U.S. companies, and paired with parallel investments by Chinese government and companies. For the CERC effort, U.S. funds go directly to U.S. researchers who are working in collaboration with Chinese researchers. These activities enable us to accelerate technology development in the U.S. by applying lessons learned from new energy infrastructure being deployed in China.

In the lead-up to the Paris climate talks, DOE submitted a proposal to the Department of State for collaboration with India on clean coal technologies. This proposal acknowledged India's current and growing commitment to coal-fired power generation and builds upon decades of support that the DOE National Energy Technology Laboratory provided to the U.S. Agency for International Development in designing and implementing several technical assistance projects in India's coal and power sectors.

Moving forward, DOE seeks to work with India to improve existing coal power fleet efficiency. Several percentage point improvements in heat rate (i.e., efficiency) are possible in most existing Indian coal-fired power plants through deployment of U.S. technologies and sharing of best practices that could foster potential sales from U.S. companies. A single (1) percentage point improvement in the efficiency of India's existing 150 GW[10] of coal-fired power plants can avoid 30-40 million metric tons of CO2 emissions annually. Additionally, DOE has offered to exchange best practices with India related to new coal plants, including supercritical and ultra-supercritical technologies by working with U.S. industry to provide guidelines for high-efficiency plants. Finally, DOE hopes to advance the value of CCUS in India through joint assessments of facilities, study tours of CCUS power projects in North America, and simulation of CCUS retrofits for existing Indian plants.

Q22. DOE is proposing to comingle funding traditionally appropriated for coal based technology development with development of natural gas technologies. What is the agency's rationale for combining the coal and natural gas funding?

A22. Fossil Energy (FE) proposes a budget restructuring in FY 2017 to support clarity in the budget request and improve execution. Thus, the request consolidates and re-organizes several budget lines to provide more transparent accountability. For example, a new budget line for natural gas carbon capture is included in the overall Carbon Capture budget request. This is responsive to prior congressional language and including it as part of the Carbon Capture budget request allows FE to strategically leverage the existing knowledge and activities of this research and development (R&D) portfolio.

Q23. How many carbon capture and storage (CCS) commercial scale power projects are up and running today in the U.S.?

A23. Currently there are no commercial scale CCS power projects running in the U.S. However, within the next year two CCS commercial scale power projects that are in the final stages of construction and are expected to start commercial operation. These two power projects are the Kemper project (Southern Company) in Kemper County, MS, and the Petra Nova project (NRG) near Houston, TX. The Kemper project is in the

[10] Http://www.cea.nic.in/reports/monthly/installedcapacity/2016/installed_capacity-03.pdf

commissioning phase while Petra Nova is in the final construction phase and together will represent the largest scale commercial application of CCS technology. The Kemper project is a newly built (greenfield) integrated gasification and combined cycle power plant that will use the abundant local lignite coal. The Petra Nova project represents a retrofit application to an existing (W.A. Parish) power plant that will process flue gas for CCS from its units. These power projects plan to use enhanced oil recovery to sequester the CO_2.

Q24. According to a number of news reports out of Saskatchewan, Canada, the SaskPower Boundary Dam project in the first year of operation has operated at less than half its design rate and actually required extensive modification this past September and October.

Q24a. How much time was DOE provided for and to what extent was DOE involved in interagency review of EPA's final version of the NSPS regulation?

A24a. DOE participated in the interagency review process for the Carbon Pollution Standards for New Plants and the Clean Power Plan. In addition, DOE provided technical documents, materials, and reports to EPA to assist in the rulemaking process.

Q24b. When did DOE first become aware that (a) the first year performance of the Boundary Dam CCS demonstration unit was at less than half the design carbon capture rate and (b) that major CCS equipment modifications were required in September and October 2015.

A24b. DOE does not have financial and technical participation in the Boundary Dam project, it therefore relies on information available in the public domain on the project's progress or information shared directly by our international partners. The media first began reporting on issues at the site in October 2015.

Q24c. Regarding its new source performance standards for new coal power plants, EPA states: "For the final standard, the EPA made particular use of the most recent NETL cost estimates for post-combustion CCS, which reflect up-to-date vendor quotes and incorporate the post-combustion capture technology—the Shell Cansolv amine-based process—that is being utilized at the Boundary Dam Unit #3 facility." However, the cited DOE publication specifically states that "The CO2 recovery process… is based on data given by Shell Cansolv in 2012." Given the 3 year lapse and the steep technology learning curve experienced for Cansolv technology, do you believe EPA represents an adequate and up-to-date view of CCS costs?

A24c. The cost estimates provided by NETL are periodically updated using vendor quotes obtained through discussions with technology suppliers. The Shell Cansolv quote referenced was the most recent cost information provided, along with a host of other quotes from different vendors. NETL is currently in the process of obtaining new cost information which will include a new quote for the Shell Cansolv system, which is expected to reflect updates based on project experience and installed systems. At the time of publication, the NETL baseline reflected the most recent cost information available for all system components.

Q24d. What is DOE doing now to update its cost estimates for CCS, based on Boundary Dam and Kemper, and any other demonstration projects for CCS?

A24d. Consistent with the existing methodology, cost estimates continue to be updated as new information becomes available. Many of the quotes are obtained from equipment manufacturers, and it is expected that updated equipment costs will be available once vendors have a full accounting of costs through the demonstration projects. NETL is currently working on an update to the latest Cost and Performance Baseline, which will reflect the updated costs.

Q25. In 2012 Congress passed the American Medical Isotope Production Act of 2012. In testimony before this Committee in 2009 as that legislation moved through our committee, the Department of Energy's representative projected domestic production facilities that DOE was funding could come online in 2013. To date, however, none of the projects DOE was funding have come online and a number have been canceled.

Q25a. What is the status of development of domestic production facilities?

A25a. DOE's National Nuclear Security Administration (DOE/NNSA) is partnered with three commercial entities to develop four independent technical pathways to produce the medical isotope molybdenum-99 (Mo-99) in the United States without the use of highly enriched uranium. These are: (1) SHINE Medical Technologies – accelerator with low enriched uranium (LEU) fission technology; (2) NorthStar Medical Radioisotopes – accelerator technology and neutron capture technology; and (3) General Atomics – LEU fission technology.

Q25b. Please provide an update on the status of these development efforts and what barriers DOE sees to developing a competitive domestic supply of medical isotopes by 2020?

A25b. As of the October 2015 report to Congress titled *Encouraging Reliable Supplies of Molybdenum-99 Produced without Highly Enriched Uranium*, SHINE's schedule to production is June 2018, assuming the project receives full commercial funding. The NorthStar accelerator project's schedule to production is October 2017, assuming the project receives full commercial funding. The NorthStar neutron capture project's schedule to production is October 2016, pending approval of NorthStar's RadioGenixTM generator by the U.S. Food and Drug Administration. The General Atomics project's schedule to production at the time this is written is February 2018.

All of DOE/NNSA's cooperative agreement partners are projecting schedules to production prior to 2020, however these schedules assume that all technical, regulatory, and economic challenges are overcome.

Q26. What is the difference between the SPR's "design" distribution capacity and the "actual" distribution capacity? Is the SPR underperforming in your opinion? If so, what are the major issues?

A26. DOE uses three key concepts to assess different aspects of the SPR's ability to move oil to market:

Drawdown rate is the rate that crude oil can be pumped out of SPR storage caverns. The drawdown rate has a designed and actual capability.

- **Design rate** is the max rate if the entire system is fully functional.
- **Actual rate** is the current drawdown rate, which can fluctuate when parts of the system are offline for repairs, maintenance, etc.

Physical distribution capability focuses on the actual physical connectivity that the SPR maintains to physical distribution assets, such as pipelines, refineries, and terminals.

Effective distribution capability is the distribution rate at which SPR crude oil can be incrementally added to the oil market in the event of a supply disruption without displacing domestic production or Canadian imports.

The only one of these measures that has a "design" level is the drawdown rate. The critical metric for evaluating the amount of oil that the SPR can move to the market is the

effective distribution capability. This measure varies with the supply disruption that the SPR is tasked with addressing. DOE recently conducted a barrel-by-barrel analysis of numerous oil supply disruption scenarios in which the SPR would likely be used, with preliminary findings suggesting that product flow congestion and infrastructure limitations would make it difficult – if not impossible – for the SPR to adequately address supply disruptions and meet its IEA obligations in certain cases.

The impending SPR Modernization will include life extension of SPR infrastructure and marine terminal distribution enhancements intended to address this issue by providing the SPR with revitalized infrastructure and improved marine distribution capability.

Q27. Congress has directed you to drawdown and sell some of the oil from the Reserve to clear the extensive maintenance backlog and modernize the infrastructure. The volume of oil to be sold each year is about the same amount you would use to test the SPR's drawdown and distribution capabilities.

Q27a. Is the SPR ready today to perform these drawdowns? Or will some front-end investment be required to get the SPR in better shape?

A27a. The actual volume of crude oil to be sold each year over a four year period encompassing FY 2017 through FY 2020 for SPR Modernization will be higher than the five million barrels sold during the SPR's 2014 test sale. Even at these higher levels, the SPR is ready to perform these drawdowns.

Q28. Last year the President signed H.R. 22, the FAST Act (also known as the highway bill) which contained a section that requires you to collaborate with the State Department to 1) establish and define U.S. energy security goals; and 2) identify uniform and transparent procedures to evaluate the energy security impacts of federal decision-making.

Q28a. What's the status of this review? Will you complete this review by the legislatively mandated deadline at the end of this year?

A28a. DOE has scoped this requirement in H.R. 22 (P.L. 114-94) and will work collaboratively with the State Department to enhance our collective understanding of the issues and considerations facing U.S. energy security. At DOE, the Office of Energy Policy and Systems Analysis (EPSA) is leading our efforts to conduct this review. EPSA is planning to host a public meeting in the next few months to receive feedback from stakeholders

and other interested parties that can be incorporated into analytical work that is already underway. These efforts will enable us to complete the review by the legislatively mandated deadline.

Q28b. How would this review be useful to the Department of Energy? Would this type of information bring more transparency and consistency to LNG export public interest reviews?

A28b. The review will be useful to DOE because it will 1) assess the U.S. energy security posture with respect to petroleum and other liquid fuels, natural gas, and electricity; 2) identify metrics for evaluating energy-related actions with respect to their effects on energy security, and 3) include an implementation strategy for ensuring that metrics are applied consistently throughout the government. These components will provide an analytical framework to the many different types of policy questions DOE evaluates, including DOE's participation in the evaluation of proposed Federal regulations and many policy issues that affect energy security. The review could also help to harmonize regulatory review and rule-making with respect to energy security across various executive branch offices. With respect to LNG export public interest reviews, DOE has a transparent and consistent process as defined by the Natural Gas Act in assessing those applications and does not believe this analysis will change our practices.

Q29. The U.S., Mexico, and Canada recently launched a framework for sharing North American energy information.

Q29a. What types of energy information will be shared through this new framework?

A29a. At the North American Energy Ministers' Meeting in Winnipeg in February 2016, I, along with Secretary Joaquin Coldwell (Mexico) and Minister Carr (Canada), signed an updated Memorandum of Understanding concerning energy collaboration and officially launched the North American Cooperation on Energy Information (NACEI) website (www.nacei.org). North American energy information available through this URL and on all three countries' websites includes: an initial suite of static and interactive North American energy infrastructure maps; an exchange of views and projections on cross-border energy flows; data tables and methodological guides to inform the comparison of

energy trade data among the three countries; and a cross reference of terms and definitions in each country's official language(s).

Q29b. Why is it important to improve energy information sharing between the U.S., Canada, and Mexico?

A29b. It is important to improve energy information sharing between the U.S., Canada, and Mexico in order to create a single continental body of knowledge and energy data that addresses previous gaps in information. The achievements to date and the ongoing work on trilateral data sharing will serve to promote North America's integrated energy security and reliability, while also benefiting the individual partner countries, national industries, and the analytical community.

Sharing additional information will also assist in the further development of a detailed process for the comparison of definitional differences and a process for reconciling trade data. This is important given the energy trade that exists between the U.S., Canada, and Mexico. According to the U.S. Energy Information Administration, Canada was the largest source of U.S. crude oil and refined product imports at 37%, or over 3.4 million b/d in 2014. In the same year, Mexico accounted for 11% of U.S. crude oil imports, or 781,000 b/d.

Q29c. Will this information help to identify cross-border energy infrastructure needs? How so?

A29c. Information on energy infrastructure in the United States, Mexico and Canada, including maps and data, is a key input for determining cross-border energy infrastructure needs. The new website of the North American Cooperation on Energy Information (NACEI), including infrastructure maps, cross-border energy flows, and guides to inform the comparison of energy trade data will be a resource for industry and policymakers alike. DOE's Office of Energy Policy and Systems Analysis plans to use trilateral energy information to inform analysis of cross-border infrastructure needs for the second installment of the Quadrennial Energy Review, which is a key Administration policy document focused on electricity.

Q29d. What benefits might result from a better integrated North American energy system?

A29d. A better integrated energy system creates many benefits for the U.S., Canada, and Mexico to advance North American energy security through bilateral, trilateral, and multilateral initiatives (such as Mission Innovation and the Clean Energy Ministerial). DOE is working cooperatively through the existing framework provided by the North American Energy Ministers Meeting, and sharing technical information, research plans, and best practices in areas such as unconventional oil and gas development; reliable, resilient, and low-carbon electricity grids; carbon capture, use, and storage; industrial energy efficiency; and meeting national, regional, and global climate goals.

Enhanced integration also creates bilateral opportunities for the U.S. DOE and the Canadian Department of Natural Resources work together under a Memorandum of Understanding and engage in regional and multilateral fora to advance shared priorities, including global energy security. DOE also works with the Mexican Secretariat of Energy (Secretaría de Energía (SENER)) under the U.S.-Mexico High-Level Economic Dialogue, and co-chairs with Mexico's Secretariat of the Environment a Task Force on Clean Energy and Climate Policy, which also involves SENER. Lastly, DOE anticipates Canada and Mexico will provide input for the second Quadrennial Energy Review, which will focus on electricity.

Q30. The DOE budget requests $48 million for appliance and equipment standards activities. Since 2009, DOE has issued 40 new or updated appliance standards covering more than 45 products. The DOE budget request states that the agency plans to issue 14 additional final energy efficiency standards as part of the Administration's goal to "reduce carbon pollution."

Q30a. The original intent of the Energy Policy and Conservation Act with respect to efficiency standards was to reduce kilowatt-hours, not to reduce emissions. Why the shift from energy savings to emissions reductions?

A30a. All rules that DOE promulgates maximize energy savings and are technologically feasible and economically justified. Since carbon pollution reduction generally scales with energy savings, when DOE maximizes energy savings it typically maximizes emissions reductions as well. The FY17 budget request for Appliance and Equipment

Standards will fund all necessary and feasible steps to finalize legally required efficiency standards, consistent with statutory direction. For products that do not have statutorily mandated deadlines, DOE will prioritize completing those rulemakings that deliver a high level of energy savings and CO2 reductions.

Q31. DOE's legislative authority to set appliance standards is now many decades old, and some appliances have now been subject to three, four, or even five rounds of successively tighter standards. Many of these new standards achieve diminishing marginal returns but impose considerable costs. Is it time for DOE to consider some rational stopping point beyond which it ceases to re-regulate an appliance?

A31. DOE's Appliance Standards Program is compelled by statute to regularly review its energy conservation standards and test procedures at intervals of 6 and 7 years, respectively. 42 U.S.C. 6295(m)(1) and 42 U.S.C. 6293(b)(1)(A). Additionally, specific products or equipment types may be subject to additional statutory mandates for review of energy conservation standards at more frequent intervals. For example, if the equipment standards contained within ASHRAE Standard 90.1 (an industry energy code for commercial buildings) are updated by that organization, DOE is compelled by statute to initiate rulemakings reviewing the appropriateness of those standards and either codifying them as presented by ASHRAE or setting standards at a more stringent level. 42 U.S.C. 6313(a)(6)(A)(i).

DOE realizes that technologies are constantly evolving, with new innovations and features entering product portfolios on a regular basis. Such evolution of the product landscape in turn produces new data sets for analysis, both with respect to equipment performance and equipment cost. DOE examines these data sets through its rulemaking analyses in order to ensure that it maintains standards consistent with its requirement that they be at a level which is technologically feasible and economically justified given available data.

Results of rulemaking analyses to date maintain that appliance and commercial equipment standards remain a very cost-effective policy tool, producing large nationwide energy cost savings. For example, DOE estimates that as a result of its appliance and

equipment standards, energy users saved about $63 billion on their utility bills in 2015. (Source: http://energy.gov/eere/buildings/appliance-and-equipment-standards-program)

Q32. The regulatory process for establishing DOE efficiency standards is overly burdensome to manufacturers. Many manufacturers have told us that DOE should have a final test procedure in place before it promulgates a new standard but often does not, and that DOE's analysis justifying its standards should be available for independent review but frequently is not. This and other process reforms were included in our energy bill, H.R. 8. What recommendations does DOE have to improve this process?

A32. The guidance issued by the Department at 10 CFR part 430, Appendix A to Subpart C, describes procedures, interpretations, and policies for the development of new or revised energy efficiency standards for certain products. These guidelines are designed with stakeholders in mind to provide for greater and more productive interaction between the Department and interested parties throughout the rulemaking process. This enhanced interaction, in turn, has increased the quality of the resulting rules, most typically through additional analysis conducted as issues are raised by stakeholders.

The Department seeks to engage stakeholders actively in its energy conservation standards rulemaking process through a number of different steps, each of which involves an opportunity for public comment and a public meeting. The Department's energy conservation standards rulemaking process typically begins with a framework document, which describes the data the Department will seek for the rulemaking, the issues the Department believes will be presented and a description of the analyses the Department will perform. The framework stage results in publication of the second document in the process, a preliminary analysis. The preliminary analysis presents the data gathered from the framework stage and the initial results of the analyses performed. At preliminary analysis stage DOE suggests possible efficiency levels without making a specific proposal. Only after both of these stages are complete, does DOE initiate the typical notice and comment rulemaking process.

In November 2010, DOE announced that it would, in appropriate cases, implement changes to further improve its rulemaking process while maintaining collaboration and interaction with stakeholders. See http://energy.gov/eere/buildings/plans-and-schedules.

First, DOE stated that it would seek to engage in negotiated rulemakings, a collaborative process in which the government and interested stakeholders create a consensus proposal for a rulemaking. Over the past several years, DOE has engaged in ten negotiated rulemakings, all of which resulted in a consensus with stakeholders. DOE has repeatedly heard from stakeholders that an overwhelming majority of the participants in these negotiated rulemakings appreciated the process.

A negotiated rulemaking also has the benefit of addressing test procedure issues during the course of the negotiations, which can ease issues such as timing between a standards and a test procedure rule. Often, an energy conservation standard rulemaking is held concurrently with a test procedure rulemaking, and in such cases discussions of test procedure amendments are frequently integral to the negotiated process and the resulting consensus standards agreement may include agreed upon changes to the test procedure.

Next, DOE stated that, in appropriate cases, DOE may gather preliminary data informally and begin the public rulemaking process with the issuance of a Notice of Proposed Rulemaking (NOPR) for public comment which requires a minimum comment period of 60 days. That is, in certain instances, DOE might seek to accomplish the outcome of the framework and preliminary analysis stages through alternatives means. For example, DOE has found that publishing a Request for Information (RFI) requesting input and data from interested parties to aid in the development of the technical analyses is an effective means to receive input and comments on issues relevant to the conduct of a rulemaking. In other circumstances, DOE might publish a Notice of Data Availability (NODA) containing the analysis and the underlying assumptions and calculations, which may be used to ultimately support a proposed energy conservation standard. If circumstances require DOE to re-propose its energy conservation based on the public comments received, DOE will issue a Supplemental Notice of Proposed Rulemaking (SNOPR). DOE encourages stakeholder comment on all of these documents – whether the RFI, NODA or NOPR – and invites additional data or information that may improve the analysis.

Additionally, to provide further clarity for interested parties, DOE maintains on its website a repository containing product-specific guidance and answers to frequently asked questions on the appliance standards program. Guidance types span all covered products and covered equipment and cover such topics as: definitions, scope of coverage, conservation standards, test procedures, certification, Compliance and Certification Management System (CCMS), and enforcement. The website offers users an easy-to-use search function for existing (draft and final) guidance and FAQs relating to the Department's appliance regulations. In addition, it provides interested parties with the ability to submit questions DOE. DOE is happy to consider further opportunities for improvements and has and will continue to better organize and detail manufacturer requirements in 10 CFR.

While the informal steps of the rulemaking process may vary depending on the particular circumstances of the product in question, DOE always maintains an open, consultative process that actively encourages the participation and interaction of all stakeholders. DOE intends to continue robust stakeholder outreach going forward with upcoming standards, including confidential interviews with manufacturers, public meetings, and negotiations with interested parties, among other forms of stakeholder outreach.

Q33. Appliance standards can often have unintended consequences. On several recent occasions we have been forced to legislate exemptions or technical fixes to DOE's standards – walk-in refrigerators, deli-style display cases, grid-enabled water heaters, and LEDs and ceiling fans to name a few. Wouldn't you agree that this piecemeal approach is further evidence that the standard-setting process needs an overhaul?

A33. Per Congressional direction, DOE implements minimum energy conservation standards for more than 60 categories of appliances and equipment. The process of developing an amendment to an energy conservation standard ordinarily involves extensive technical analyses, voluminous amounts of data, and opportunities for public comment. The calculations involved in deriving a standard are complex, which could result in an error that causes the regulatory text to codify a standard different from what DOE described in its preamble.

Regarding the matter of standards for deli cases, the initial standards to which the question refers came directly from legislation and were not in fact developed by DOE. The Energy Policy and Conservation Act (EPCA), as modified by the Energy Policy Act of 2005 (EPACT 2005), contains statutory definitions pertinent to commercial refrigeration equipment, along with standard levels which were included in EPACT 2005 for specific types of self-contained commercial refrigeration equipment with doors. These statutory definitions and standard levels were codified into the CFR in a 2005 final rule by DOE (70 FR 60407, 60414 (Oct. 18, 2005)), including standards for "refrigerators with transparent doors". In 2010, at the time of required compliance for equipment covered by these congressionally-developed standards, manufacturers realized that deli cases did in fact meet the definition, as included in the legislation, of "refrigerators with transparent doors", despite having very different operational profiles than other types of product covered by this definition. Manufacturers petitioned DOE for relief, but DOE was unable to adjust this standard level since it had been set directly by Congress through EPACT 2005. Therefore, it was only through the American Energy Manufacturing Technical Corrections Act legislation that this standard level could be adjusted, through the creation of a new equipment class and standard for deli cases.

Q34. While DOE sets standards for air conditioners and refrigerators, EPA is separately banning some of the most efficient refrigerants, and is doing so under deadlines that make it harder to comply with DOE's standards. In the past, there has been little if any coordination between the two agencies, despite Obama administration executive orders requiring agencies to minimize the cumulative regulatory burden and harmonize multiple regulations affecting the same industry. Will you commit DOE to coordinating better with EPA and other agencies on appliance standards rulemakings?

A34. DOE endeavors to coordinate with EPA and other agencies on appliance standards rulemakings and will continue to do so in the future. EPA Rule 19, which was published on April 10, 2015 at 80 FR 19454, finalized regulations that allow the use of particular hydrocarbon refrigerants in residential and commercial refrigeration applications. The use conditions specified for each newly-listed refrigerant address safe use of flammable refrigerants and include an incorporation by reference of portions of certain safety standards from Underwriters Laboratories (UL), refrigerant charge size limits, and requirements for markings on equipment using these refrigerants. The applicable UL

standard for commercial refrigeration is Supplement SB to the 10th edition of the Underwriters Laboratories Standard for Commercial Refrigerators and Freezers, UL 471, dated November 24, 2010. The UL requirements were developed through the long-term efforts of a UL working group and are designed to ensure maximum operational safety of applicable equipment. UL safety standards also have, historically, served as source material for many state and local building codes. In some instances, the EPA SNAP final rule mandates even more stringent requirements than UL 471, and Rule 19 states that "in cases where this final rule includes requirements more stringent than those of the 10th edition of UL Standard 471, the appliance would need to meet the requirements of the final rule in place of the requirements in the UL Standard." 80 FR 19454, 19459. DOE does and will continue to work with EPA to ensure continuing coordination between the two agencies on this rulemaking.

Q35. Unlike appliances, DOE does not have authority to issue efficiency regulations for buildings. DOE can only provide technical assistance. However, several stakeholders are concerned that DOE is pressuring states to set their building codes in accordance with the agency's preferences. Do you agree that DOE has no authority to either directly or indirectly set efficiency standards for buildings?

A35. Title III of the Energy Conservation and Production Act (ECPA), as amended, establishes requirements for building energy conservation standards, administered by the U.S. Department of Energy's (DOE) Building Energy Codes Program (BECP). (42 U.S.C. § 6831 et seq.) The U.S. Department of Energy (DOE) is required to establish mandatory energy efficiency requirements for new federal commercial and residential buildings. (42 U.S.C. § 6834) In addition, DOE is required to develop energy efficiency standards for manufactured homes. (42 U.S.C. § 17071) ECPA, as amended, also requires that DOE publish determinations as to whether new editions of the model commercial building code provisions (American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1) and the model residential building code provisions (International Energy Conservation Code (IECC)) will improve energy efficiency. (42 U.S.C. § 6833) If DOE makes an affirmative determination that the new model commercial building code provisions improve energy efficiency then States are required to certify that they have reviewed the provisions of their commercial building code

regarding energy efficiency, and, as necessary, updated their codes to meet or exceed the updated edition of ASHRAE Standard 90.1. (42 U.S.C. § 6833(b)(1)(B)(i)) If DOE makes an affirmative determination that the new model residential building code provisions improve energy efficiency then States are required to certify that they have reviewed the provisions of their residential building code regarding energy efficiency, and made a determination as to whether it is appropriate for them to revise their code to meet or exceed the updated edition of the IECC. (42 U.S.C. § 6833(a)(1)) DOE is also directed to provide technical assistance to States to support implementation of State residential and commercial building energy efficiency codes. (42 U.S.C. 6833(d)) Furthermore, DOE's BECP is directed to support the upgrading of voluntary building energy codes for new residential and commercial buildings. (42 U.S.C. § 6836) Therefore, DOE participates in the public process that produces the ASHRAE 90.1 and the IECC.

Q36a. Since you became Secretary, you have pursued a number of organizational and management reforms to improve the operations of the Department. What is the current status of these efforts and what additional steps do you intend to pursue in the coming years?

A36a. One of the first actions I took was a top-level Departmental reorganization to revise the roles of two Under Secretariats. This reorganization designated an Under Secretary position responsible for Management and Performance, focused specifically on increasing the efficiency and effectiveness of mission support functions across the Department, improving project management, and improving execution of the Department's environmental clean-up mission. It also merged the Department's Science and Energy Under Secretariats under the Under Secretary for Science and Energy to more effectively coordinate and carry out our science and energy missions.

In addition to this top-level reorganization, DOE is aggressively pursuing a range of actions to improve project management. We have established independent project review capabilities within each Under Secretary organization, implemented a central Project Management Risk Committee (PMRC) and formalized the Energy Systems Acquisition Advisory Board (ESAAB) including its proactive role in reviewing major projects.

Specifically, the FY 2017 budget includes $23 million to support a reorganized independent office on project management oversight and assessments as well as new independent cost estimating and program evaluation capability.

Moreover, DOE has established a number of Boards to engage senior laboratory leadership on an enterprise-wide basis, including (1) the National Laboratory Policy Council, which I chair and consists of the National Laboratory Directors Council leadership and senior Departmental leadership, and (2) the National Laboratory Operations Board, which is currently chaired by the Deputy Under Secretary for Management and Performance and includes representatives from the lab Chief Operating Officers and Chief Research Officers, the Under Secretary for Science and Energy, as well as the Chief Operating Officers from the Departmental programs which have laboratories.

Q36b. In a perfect world, what is your vision for the Department of Energy in the 21st century? What reforms or organizational changes are necessary to modernize DOE and ensure its continued success in the 21st century?

A36b. As noted in Part A of this response, the reorganization of DOE to designate an Under Secretary for Management and Performance focuses specifically on improving effectiveness and efficiency, which represents a reform that is integral to the continued success of the agency. Specifically, a primary focus of this organizational change is having DOE operate more as a collective enterprise. In addition to a new approach pertaining to project management, this reform also focuses on increasing the efficiency and effectiveness of mission support functions across DOE, including efforts related to cybersecurity, human resources, and information technology services. Persistent and focused efforts over time in these areas are essential to continued improvements in effectiveness and efficiency.

A second reform example that is necessary to ensure the continued success of DOE centers on continuous and improved engagement with the National Laboratories. With this in mind, new actions have been instituted to strengthen DOE's partnership with the National Laboratories to ensure full participation and support of the senior leadership at the Department and to reflect the engagement of the National Laboratory community. To

this end, we have established a regular strategic dialogue with the laboratories through several new leadership councils involving laboratory directors and other key managers. In addition, the Laboratory Operations Board led an effort to assess the condition of the general purpose infrastructure at the labs and National Nuclear Security Administration plants and worked closely with federal program leadership to provide input on prioritization of infrastructure management. This effort, which involves DOE and the laboratories working together, is seeking to establish a sustainable trajectory for the Department's infrastructure on an enterprise-wide basis.

In addition, starting in 2016, DOE will begin providing an annual report to Congress on the State of the Laboratory System. The purpose of the report will be to describe key initiatives of the National Laboratories, including how the system as a whole is serving the Nation through collective and cross-cutting activities. It also will articulate DOE's operational successes and continued challenges in stewarding the laboratories. The first of these reports will be more comprehensive, providing a background on the National Laboratories and establishing a foundation for future annual updates.

DOE will soon issue the Governance and Management Implementation Plan that was developed in response to a range of recommendations from the Congressional Advisory Panel on Governance of the Nuclear Security Enterprise, the Commission to Review the Effectiveness of the National Energy Laboratories, and other reviews. The plan catalogs the progress we have already made to improve the stewardship of the nuclear security enterprise since these reviews were conducted, as well as planned initiatives to further enhance performance.

Additionally, this year, DOE will hold the third annual Big Ideas Summit, where the labs generate and present ideas for innovative and impactful new research directions for consideration by the Department. Several of last year's laboratory ideas were incorporated into budget crosscuts and program proposals in DOE's FY 2017 Budget Request.

Institutionalizing these changes is an ongoing goal and necessary to ensure continued success and innovation in the coming decades.

Q36c. Will you commit to working with the Committee to ensure that DOE is a modern, resilient and forward-thinking 21st century agency?

A36c. Yes. DOE is committed to working with Congress to drive innovation, partnership, and stewardship that sustains DOE as a science and technology powerhouse for the Nation in the 21st century and beyond. For example, in addition to working with Congress on the Congressionally-mandated Augustine-Mies report, DOE is also embracing the reforms recommended by the independent Commission to Review the Effectiveness of the National Energy Laboratories (CRENEL), authorized in P.L. 113--76. The Secretary established the independent Commission in May 2014, and it published its Final Report on October 23, 2015. The Department recently released its response to the Final CRENEL Report.

A central finding of the Commission reinforces the unparalleled value of the National Laboratory system to the Nation, serving as a science and technology powerhouse, and occupying a critical role that cannot be carried out solely by universities or the private sector. However, the report also notes that since the end of the Cold War, oversight by DOE has grown increasingly transactional rather than strategically mission-driven. One of my priorities as Secretary has been to reset this critical relationship – to improve the strategic partnership between the Department and the National Laboratories and, in emphasizing an enterprise-wide approach to the laboratory system, to help maximize their unique role in the Nation's innovation ecosystem.

The Commission also recognized the importance of an overarching strategic approach for the laboratories. Steps that I have taken in recent years to underscore the value of such an approach include:

- reorganizing DOE to integrate and better coordinate basic research and applied energy programs under a single Under Secretary for Science and Energy;
- establishing a National Laboratory Policy Council and a National Laboratory Operations Board to convene a senior-level strategic dialogue on key priorities and

improve the effectiveness and efficiency of the laboratories' execution of the DOE mission;

- strengthening project management by establishing a Project Management Risk Committee, restructuring the Energy Systems Acquisition Advisory Board, and reinforcing the independent peer review process;
- launching cross-cutting research initiatives that involve coordinated efforts between DOE and multiple laboratories;
- creating an annual Big Ideas Summit that convenes lab scientists and Departmental program leadership to generate new mission-related research opportunities of importance to the Nation;
- initiating an integrated approach to cyber issues through the establishment of the DOE Cyber Council; and
- inaugurating a Technology Commercialization Fund for National Laboratory collaboration with the private sector on energy technology development.

Additionally, as DOE looks forward to the next five years and the Nation's commitment under Mission Innovation to double clean energy investment by FY 2021, it will be more important than ever to ensure that DOE continues to be a modern and nimble organization equipped to spur America's global leadership in clean energy innovation.

Q37. In Fiscal Year 2016, DOE's Equipment and Buildings Standards program was appropriated $57.5 million (page 237). So far, with the fiscal year not even halfway done, DOE has issued multiple appliance efficiency standards in FY 2016 with total costs of $17.6 billion, meaning every dollar appropriated resulted in over $300 in regulatory burdens for families, small businesses, and employers by raising the prices of appliances.

Q37a. How does the Department plan to minimize the regulatory burden of its standards in FY 2017?

A37a. The implementation of appliance and equipment standards has driven remarkable gains in the energy efficiency of household appliances and other products, translating into substantial savings for American consumers. The cumulative energy savings of standards phased in through 2015 will be about 70 quadrillion British thermal units (quads) of energy through 2020, and will amount to 132 quads through 2030. (The US consumes a total of about 100 quads of energy per year.) The cumulative utility bill savings to

consumers of these standards are estimated to be nearly $1 trillion through 2020, growing to nearly $2 trillion through 2030.

While some efficient products may cost more at the time of sale, they make up for this premium by saving consumers money through lower energy bills over the products' lifetime. A typical household today already saves about $320 per year off their energy bills and can expect to save $460 per year by 2030, as they replace their appliances with newer models that use less energy. Federal efficiency standards reduce the regulatory burden on manufacturers by pre-empting a potential patchwork of state standards with a single federal standard. Efficiency standards can also help lower the cost of innovative energy efficient technologies by facilitating their entry into the market and providing economies of scale.

Q38. Academic research by the George Washington University Regulatory Studies Center indicates that elderly and low-income Americans bear the biggest burdens from the Department's appliance efficiency standards, while high-income Americans gain the biggest benefit. This essentially makes DOE's appliance standard program a wealth transfer from low-income Americans to wealthy Americans.

Q38a. What actions is the Department taking to ensure that its rules do not continue to have a disparate impact on elderly and poor Americans?

A38. As part of each rulemaking, DOE conducts a consumer subgroup analysis, which evaluates impacts on groups or customers who may be disproportionately affected by any national energy conservation standard, such as the elderly or the poor. DOE evaluates impacts on particular subgroups of consumers by analyzing the life cycle cost (LCC) impacts and payback period (PBP) for those consumers from the considered energy efficiency levels. For example, in the central air conditioners and heat pumps rulemaking, DOE evaluated the impacts of the considered energy efficiency levels on low-income households and households occupied solely by senior citizens (i.e., senior-only households).

DOE analyzes subgroups to determine if the LCC Savings will be significantly lower (or negative) for a subgroup or if the PBP is significantly longer for a subgroup, relative to the results for the general population. Overall, for the central air conditioner and heat

pump rulemaking, the LCC and PBP results for Senior-Only Households and Low Income Households were similar to the results of the general population.

Q39. DOE is planning on promulgating 25 final energy efficiency rules this year, according to information in the Unified Agenda. One of these rules alone has total costs of almost *$15 billion*.

Q39a. How many of these rules does DOE plan to finalize after the election?

A39a. According to the Fall 2015 Unified Agenda, DOE is set to issue 14 energy conservation standards in 2016.

Q39b. Is the Department on track to get these rules to the Office of Information and Regulatory Affairs for public review in time before the election in November?

A39b. DOE is set to submit significant rulemakings for review by the Office of Information and Regulatory Affairs before November.

Q39c. Will the public have the opportunity to submit comment on these rules, or will they be rushed to the Federal Register after the election without public participation?

A39c. DOE has many options available for stakeholders to participate in its rulemaking process. Prior to publication of a notice of proposed rulemaking (NOPR), DOE will often publish both a framework document and a preliminary analysis and offer an opportunity for the public to submit both written and oral comments. Further, following a NOPR publication DOE provides a comment period of at least 60 days for the public to submit written comments on its proposed regulations, and routinely holds public meetings to receive comment from interested parties on the proposed standards and associated analyses and results. In addition to public meetings, open comment periods, and manufacturer interviews, DOE allows for ex parte communications by stakeholders during the rulemaking process. Stakeholders regularly use this process to express concerns to DOE on a variety of topics. These meetings are documented and placed in the rulemaking docket so that all stakeholders can be aware of the topics and issues discussed.

Additionally, to provide further clarity, DOE maintains on its website a repository containing product-specific guidance and answers to frequently asked questions on the

appliance standards program. Guidance types span all covered products and covered equipment and cover such topics as: definitions, scope of coverage, conservation standards, test procedures, certification, Compliance and Certification Management System (CCMS), and enforcement. The website offers users an easy-to-use search function for existing (draft and final) guidance and FAQs relating to DOE's appliance regulations. In addition, it provides interested parties with the ability to submit questions to DOE. The Department is happy to consider further opportunities for improvements.

Q40. In January, the Department published a direct final rule amending the Department's existing energy efficiency standards for commercial heating and cooling equipment, with a total cost of almost $15 billion.

Q40a. What is the Department's rationale for issuing such a massive final rule without first seeking public comment?

A40a. The contents of the above-referenced direct final rule for commercial heating and air-conditioning equipment were developed through a negotiation process requested by industry and other stakeholders. To initiate this process, DOE issued a Notice of Intent to Establish the Commercial Package Air Conditioners and Commercial Warm Air Furnaces Working Group to Negotiate Potential Energy Conservation Standards for Commercial Package Air Conditioners and Commercial Warm Air Furnaces (CUAC/CUHP-CWAF). 80 FR 17363 (April 1, 2015). The CUAC/CUHP–CWAF Working Group (in context, ''the Working Group'') was established in accordance with the Federal Advisory Committee Act and the Negotiated Rulemaking Act. The Working Group was designed from the outset to consist of parties that were fairly representative of relevant points of view and having a defined stake in the outcome of the rulemaking, and to consult, as appropriate, with a range of experts on technical issues. DOE received 17 nominations for membership. Ultimately, the Working Group consisted of 17 members, including one DOE representative.[11]

[11] The group members were John Cymbalsky (U.S. Department of Energy), Marshall Hunt (Pacific Gas & Electric Company, San Diego Gas & Electric Company, Southern California Edison, and Southern California Gas Company), Andrew deLaski (Appliance Standards Awareness Project), Louis Starr (Northwest Energy Efficiency Alliance), Meg Waltner (Natural Resources Defense Council), Jill Hootman (Trane), John Hurst (Lennox), Karen Meyers (Rheem Manufacturing Company), Charlie McCrudden (Air Conditioning Contractors of America), Harvey Sachs (American Council for an Energy Efficient Economy), Paul Doppel (Mitsubishi Electric), Robert Whitwell (United Technologies Corporation (Carrier)), Michael Shows (Underwriters Laboratories), Russell Tharp (Goodman

The Working Group met six times, with deliberations over the course of 48 days. As a result of these efforts, the Working Group successfully reached consensus on energy conservation standards for CUACs, CUHPs, and CWAFs. On June 15, 2015, it submitted a Term Sheet to the Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) outlining its recommendations, which ASRAC subsequently adopted. DOE carefully considered the consensus recommendations submitted by the Working Group and adopted by ASRAC, and determined that these recommendations comprised a statement submitted by interested persons that are fairly representative of relevant points of view, consistent with 42 U.S.C. 6295(p)(4). In reaching this determination, DOE took into consideration the fact that the Working Group, in conjunction with ASRAC members who approved the recommendations, consisted of representatives of manufacturers of the covered equipment at issue, States, and efficiency advocates. Thus all of the groups specifically identified by Congress as potentially relevant parties to any consensus recommendation submitted by ASRAC participated in approving the recommendations submitted to DOE. (42 U.S.C. 6295(p)(4)(A)). DOE incorporated these recommendations into the direct final rule published in the Federal Register, January 15, 2016 (81 FR 2420).

The direct final rule incorporating the inputs of the Working Group was issued under the authority granted to DOE by 42 U.S.C. 6295(p)(4) and 6316(b)(1). Additionally, consistent with that authority, at the time of the publication of the direct final rule, DOE also published a supplemental notice of proposed rulemaking that proposed the identical energy conservation standards to those detailed in the direct final rule. 81 FR 2111 (Jan. 15, 2016). As part of this process, DOE followed a provision regarding the review of potential adverse comments received. For the direct final rule, DOE provided a comment period of 110 days. If DOE receives adverse comments on the January 2016 direct final rule by May 4, 2016, and that those comments provide a reasonable basis for withdrawal of the direct final rule, a timely withdrawal of the rule would be published in the Federal Register. Therefore, the direct final rule provides numerous mechanisms for further

Manufacturing), Sami Zendah (Emerson Climate Technologies), Mark Tezigni (Sheet Metal and Air Conditioning Contractors National Association, Inc.), and Nick Mislak (Air-Conditioning, Heating, and Refrigeration Institute).

public comment and treatment of potential adverse comments beyond even the broad and far-reaching level of stakeholder engagement incorporated into the negotiation process forming the basis of the rule.

Q40b. In 2011, DOE received 45 adverse comments on its direct final rule establishing energy efficiency standards for air conditioners and heat pumps, and the Department still went forward with the rule. How can we have assurances that the Department will not continue to disregard adverse public comments on its billion-dollar direct final rules going forward?

A40b. DOE has and will continue to follow the provisions of 42 U.S.C. § 6295(p)(4)(C) (i) for the withdrawal of direct final rules (DFRs).

Q41. DOE is statutorily required by the EPCA to consider "the impact of any lessening of competition… that is likely to result from the imposition of the standard" before issuing new appliance standards. The Department of Justice (DOJ) has statutory authority to review DOE's appliance standards to see whether they impede competition; however, DOE continues to ignore DOJ's analysis, which puts competition on the line and threatens small businesses and startups in violation of the EPCA.

For example, when it initially reviewed DOE's 2009 Lamps Rule, DOJ found that the standards would have anti-competitive impacts on industry. However, DOE promulgated the standards despite DOJ's warning that the standards could adversely affect competition. DOE even went on to finalize a rule that increased the stringency of the standards just five years after issuing its 2009 Lamps Rule.

Q41a. What actions is the Department taking to address the effects of appliance efficiency standards on competition? How is the Department verifying that its standards do not negatively affect competition?

A41a. Section 325(o)(2)(B)(i)(V) of EPCA directs DOE to consider any lessening of competition that is likely to result from imposition of standards. It further directs the Attorney General to determine in writing the impacts, if any, of any lessening of competition. The competitive analysis focuses on assessing the impacts to smaller, yet significant, manufacturers. DOE bases its assessment on manufacturing cost data and on information collected from interviews with manufacturers, including small businesses. The manufacturer interviews focus on gathering information that would help in assessing asymmetrical cost increases to some manufacturers, increased proportion of fixed costs

potentially increasing business risks, and potential barriers to market entry (e.g., proprietary technologies).

As part of every proposed energy conservation standards rulemaking, DOE continues to send a copy of the NOPR to DOJ to see if the proposed rule could result in the lessening of competition. DOE takes DOJ's comments into consideration when adopting standards as part of the final rule, while determining whether the benefits of the standard exceed its burdens. DOE publishes DOJ's comments in the final rule and response accordingly to any issue raised.

The only time in the past 10 years that DOE has adopted a standard that DOJ stated could result in the lessening of competition, was for Incandescent Reflector Lamps as part of the 2009 Lamps Rule. 74 FR 34080 (July 14, 2009). DOE did this because, based its own market analysis, DOE continued to believe that all three manufacturers would be able to meet the proposed IRL standards, despite DOJ concerns that, "one or more IRL manufacturers will not produce products that meet the proposed standard."

In a rulemaking five years later for the same products, DOE was able to confirm that all three IRL manufacturers produced lamps that complied with the IRL standard adopted in the 2009 Lamps Rule. Therefore, none of the three IRL manufacturers exited the IRL market, which was described as a risk by DOJ. Furthermore, in the later rulemaking, DOE proposed adopting an even higher standard level for IRLs than that adopted in the 2009 Lamps Rule. DOJ reviewed the proposal and concluded that adopting the higher standard level was unlikely to have a significant adverse impact on competition. DOE ultimately did not adopt the higher standard level for IRLs and maintained the existing standards in the 2015 Lamps Rule, citing potential impacts on manufacturers, among other reasons.

Q42. DOE is required by statute to review its efficiency rules at regular intervals to determine whether stricter standards are feasible. However, the Department doesn't actually review the costs and benefits of its previous standards, only whether there is room to tighten efficiency standards. On more than one occasion, DOE's reviews have determined that it's necessary to update its standards very shortly after they are implemented, which doesn't allow sufficient time for a retrospective review of the standards' effectiveness or

how the public is affected. This does not allow the Department to learn from implementation of past standards before issuing new rules, and it overwhelms industry by continually moving the goalpost.

Q42a. How does DOE plan to actually review the effectiveness, costs, and benefits of its rules going forward?

A42a. DOE is conducting retrospective analyses on the realized impact for several products. A recent report can be found at this link: http://www.rff.org/research/publications/confronting-regulatory-cost-and-quality-expectations-exploration-technical. This project took the form of a retrospective review of regulation on five products, namely room air conditioners, refrigerator-freezers, dishwashers, clothes washers, and clothes dryers. These five products are the full set of large household appliances which were subject to federal efficiency standards informed by rulemaking analyses conducted by DOE from 1990 to 2012.

Key findings of the report include that the rulemaking analyses generally overestimated the observed product prices of units compliant with amended standards and that the energy efficiency of products purchased after regulation generally exceeded the regulated standards. Furthermore, it was found that unregulated aspects of product quality at the time of sale often improved in conjunction with higher standards.

Q42b. How does the Department plan to measure the costs of implementation on families, small businesses, and employers?

A42b. During the course of every rulemaking DOE performs an assessment of the benefits and costs associated with new or amended standards on consumers, including residential and commercial end-users, as applicable and product manufacturers, including small businesses.

EPCA requires that DOE's assessment consider the economic impact of potential standards on consumers. (42 U.S.C. 6295(o)(2)(B)(i)(I)). To address this provision, DOE determines changes in Life-Cycle-Costs (LCC) to consumers that would likely result from a proposed standard. The LCC is the total consumer expense over the life of the equipment or appliance, including the purchase and installation price, and the operating

expense— including operating energy, maintenance, and repair expenditures— discounted over the lifetime of the appliance or equipment. In estimating operating energy costs, DOE uses the full range of consumer marginal energy prices, which are the energy prices that correspond to incremental changes in energy use. The LCC analysis also defines a range of energy price forecasts for each fuel used in the economic analyses. A distribution of real discount rates is also used for the calculations.

The Regulatory Flexibility Analysis (RegFlex) seeks to identify and assess the economic impacts on small businesses that arise from regulations. When disproportionate impacts on small businesses are identified, the RegFlex serves to explore alternatives to regulation and other means of mitigating these impacts, so as to not put small businesses at a disadvantage. There are two stages of the RegFlex, the Initial Regulatory Flexibility Analysis (IRFA), which is published as part of the NOPR, and the Final Regulatory Flexibility Analysis (FRFA), which is published in the Final Rule.

The assessment of small business impacts is part of a broader Manufacturer Impact Analysis conducted by DOE. EPCA also directs DOE to consider the economic impact of potential standards on manufacturers. (42 U.S.C. 6295(o)(2)(B)(i)(I)). The goal of the Manufacturer Impact Analysis is to qualitatively and quantitatively assess the impacts on manufacturers of potential energy efficiency standards. The qualitative assessment is based on a series of site visits and manufacturer interviews. The interviews aim to understand the engineering, operational, and financial impacts that companies would experience under regulation. Quantitative information including sales impacts, financial ratios, and required capital investments are gathered during the interviews which subsequently feed into a discounted cash flow model called the Government Regulatory Impact Model (GRIM).

Q43. There is a certain standard that must be met to guarantee emergency operations perform during an actual emergency. Nuclear emergencies don't happen every day, but when they do, such as the Fukushima crisis, all facets of response must perform flawlessly. As we consider the Department's budget proposal, particularly in the emergency operations, counterterrorism and nonproliferation area, we need to know that the money spent today meets the standards we expect from these critical operations if something goes wrong. Currently, the functions encapsulated through integrated mission support for emergency

operations, field deployment of response assets, integration of Federal teams into local command structures, radiation modeling and data capture, delivery, and product analysis report to you and the White House to make timely, informed decisions during a radiological emergency.

Q43a. Will you please provide an update on the status of your emergency operations program and how this fits into the Department's mission?

A43a. The Emergency Operations program provides overarching policy and guidance to manage the Comprehensive Emergency Management System, which includes the Continuity of Operations Program (COOP), the DOE Emergency Operations Center, and the Emergency Communications Network (ECN). These subprograms support an integrated, enterprise-wide process and structure for the Department by managing and synchronizing the response to all-hazards events and emergencies and interagency planned events. The Emergency Operations program increases DOE's all-hazards emergency preparedness and response capability during complex, cascading, or enduring incidents and allows for DOE to have situational awareness and analysis leveraging by integrating the expertise of all relevant offices; providing a single DOE voice to the White House, Congress, and our partners. Emergency Operations' equips DOE/NNSA Senior Leadership and all stakeholders with a fully-integrated Common Operating Picture of steady state situational awareness and Departmental operational capability or readiness status on a near-real time basis 24/7.

In November 2015, the nuclear incident response assets, including Crisis Response, Accident Response, and Consequence Management elements were transitioned from the Emergency Operations program, funded under the Weapons Activities Appropriation, to the Office of Counterterrorism & Counterproliferation, funded under the Defense Nuclear Nonproliferation Appropriation. With this realignment, DOE/NNSA aligns all funding for preventing, countering, and responding to global nuclear dangers in one appropriation, and improves its readiness to protect the United States and its allies through the development, implementation, and maintenance programs designed to address a nuclear terrorist incident or other types of radiological accidents such as the Fukushima crisis. The program strategically manages and deploys expert scientific teams and equipment to provide a technically trained, rapid response to nuclear or radiological

incidents worldwide. It evaluates and assesses nuclear or radiological threats and leverages that knowledge to provide interagency policy and contingency planning, training, and support to national and international counterterrorism, counterproliferation, and incident response capabilities across the nuclear threat continuum.

Q43b. Will you assure us that the Department will consider the need for continuity of these programs if DOE determines to revise the current contract?

A43b. NNSA's Office of Emergency Operations, Office of Counterterrorism and Counterproliferation, and Office of Acquisition and Project Management improves and enhances the effectiveness of the Federal government during both steady state operations and emergency activations and will take all measures necessary to ensure continuity of these programs. On a micro level, standard clauses within our contracts allow the Government to ensure continuity of services when a contract transitions.

Q44. In 2015, DOE's H-Canyon facility at the Savannah River Site experienced multiple safety events, which resulted in a safety pause.

Q44a. Please briefly explain the two criticality events at the H-Canyon facility.

A44a. Two safety events occurred in H-Area in 2015; the first event occurred on January 7, 2015 in the Phase II area of the HB-Line facility and the most recent event occurred on September 3, 2015 in the Phase III area of the HB-Line facility. In the January event, there was a loss of agitation in seven HB-Line facility tanks after loss of power, resulting in the violation of two nuclear criticality safety (NCS) controls, as well as a violation of a Technical Safety Requirement (TSR) required to be in place to protect H-Canyon Tank 9.6 from a potential criticality. This TSR violation was determined to be of low safety significance based on material configurations. Only the operations in the HB-Line facility were placed in a stand-by condition. H-Canyon continued normal operations.

The September 3rd event was noticed when the site contractor discovered that a small team of workers violated procedural requirements by placing samples of plutonium in unauthorized storage containers resulting in the inability to maintain proper material spacing. This resulted in both a violation of a criticality safety limit and technical safety requirements. Because limiting the mass of plutonium was maintained, at no time was

the facility unsafe or employees at risk. In response, SRNS entered a Safety Pause within all of its facilities, during which a number of actions were taken, including adding more senior leadership in the field. SRNS has lifted the safety pause, transitioned to deliberate operations, and then resumed normal operations in a phased-approach for site-wide activities.

Q44b. What was the length of time that H-Canyon was placed into a safety pause as a result of these two combined events, effectively shutting down the facility?

A44b. H-Canyon remained in a safety pause for 5 months. As a result of the September event in HB-Line, SRNS proactively paused operations for all nonessential nuclear and non-nuclear activities of the site. The safety pause created an opportunity to evaluate the extent of condition from these events and to develop and execute actions focused on improving adherence to the applicable procedures. In the last six months, SRNS has lifted the operational pause, transitioned to deliberate operations, and then resumed normal operations in a phased-approach for activities site-wide.

Q44c. What is the cost of these events and the related lack of continued operations of H-Canyon at the Savannah River Site?

A44c. The costs for the safety pause have not been calculated. It is difficult to quantify the total cost for the safety pause because the impacts were mainly reflected in the productivity of the operations. During the safety pause, efforts at the site were focused on ensuring lessons learned from the initiating events were incorporated into normal operations.

Q44d. After the events and the recent Defense Nuclear Facilities Safety Board concerns related to H Canyon, how will this facility be DOE's solution to plutonium disposition as a consequence of the proposal to halt the MOX project at the Savannah River Site?

A44d. DOE is currently reviewing various options and analyzing their cost effectiveness for implementing its nuclear materials disposition mission. DOE has directed the SRS contractor for this activity to evaluate alternatives, including the use of H-Canyon, for plutonium oxide conversion as part of DOE’s analysis.

Q44e. What is the current status of H-Canyon? Has DOE identified any potential issues relating to the structural stability of the facility?

A44e. H-Canyon is currently operating. DOE has identified degradation in several sections of the H-Canyon Ventilation Exhaust Tunnel which is a critical part of the H-Canyon Facility safety class ventilation system. Based on current observations and calculations, it has been determined the existing degradation does not adversely impact the tunnel in performing its intended safety function.

Q44f. Has the Department estimated necessary costs to maintain H Canyon in a state of safe operational readiness for the next 20 years? If so, please provide this estimate.

A44f. DOE is currently reviewing various options and analyzing their cost effectiveness for implementing its nuclear materials disposition mission. When complete, DOE will be able to provide cost estimates related to H-Canyon requirements.

QUESTIONS FROM RANKING MEMBER BOBBY RUSH

Q1. Please provide an update on the progress being made with the research labs in terms of their outreach and diversification initiatives? Specifically, I would like to see the data on contracting and vending opportunities at Argonne and Fermi, as well as any other labs you think might be significant.

A1. Through the National Laboratory Directors' Council (NLDC), the Department Of Energy laboratories are working together on strategic and operational common interests and interfacing with DOE organizations on a regular basis. An outcome of the NLDC is a collaborative focus on diversity initiatives, supported by strong relationships with the DOE Office of Economic Impact and Diversity (ED). Diversity and inclusion challenges are recurring topics of discussion at the NLDC meetings. Each Lab maintains a required diversity plan that includes outreach and engagement of small business enterprises in accordance with the Small Business Act. In FY 2015, Argonne subcontracted over $118.2 million to small business concerns out of a total of $260.3 million and Fermi subcontracted $98.5 million to small business concerns out of a total of $189.3 million.

Q2. Please provide an update on information regarding diversity plans in terms of laboratory leadership, hiring practices, as well as providing internships and outreach programs to K-12 schools and minority-serving higher education institutions.

A2. Diversity and inclusion at all 17 National Laboratories is a priority for DOE. Each Lab maintains and implements a required diversity plan in coordination with the corresponding programmatic sponsor at DOE. The diversity plans also provide a foundation for collaborative efforts between the Labs and ED on workforce diversity and involvement with diverse communities. For example, DOE partnered with the NLDC to coordinate the Diversity and Leadership Workshop last fall. The Lab Directors took the recommendations from this workshop as priority action items for their December Lab Director's retreat.

DOE outreach and recruitment efforts are based on the ongoing collaboration between the Office of the Chief Human Capital Officer, Office of Minority Education and Community Development, Office of Diversity & Inclusion, and the National Laboratories. DOE fully engages its federal and laboratory workforce, including those in STEM (science, technology, engineering, and mathematics) fields who can serve as role

models to underrepresented groups. In addition to the individual Lab internship programs, DOE's Minority Educational Institution Student Partnership Program (MEISPP) provided 15 interns to Argonne and Lawrence Livermore last summer to participate in a pilot entrepreneurship program that promotes opportunities for minority businesses. MEISPP interns also worked at Oak Ridge National Lab on technology projects. Other Labs directly sponsored interns through a variety of programs, including the Mickey Leland Energy Fellowship sponsored by the Office of Fossil Energy.

Examples of specific diversity-related efforts include Argonne's inclusive leadership workshop pilot program for senior managers; collaboration with an external firm to conduct a climate/engagement survey in support of attracting, retaining, and engaging employees from diverse backgrounds; establishment of baseline benchmarks for recruiting, mentoring, leadership, and educational programs; and increased outreach to organizations that support minority participation from elementary school through professional careers. Future efforts at Argonne will include a new diversity & inclusion implementation plan, an internal network of mentoring champions, implicit bias training, emphasis on employee resource groups, and designation of a university program partnership lead. Other Labs are implementing similar initiatives that are driven by emphasis placed on diversity by the NLDC.

Q3. How have DOE Labs supported the Minorities in Energy Initiative? How are DOE labs performing in terms of partnerships and technology transfer agreements with minority serving institutions and minority businesses?

A3. Most recently, DOE Labs have supported the Minorities in Energy Initiative (MIE) by collaborating with the My Brother's Keeper's (MBK) taskforce to host MBK Day events at the Laboratories. Also, Argonne National Laboratory and Lawrence Livermore National Laboratory implemented a pilot Lab-to-Market summer internship program to enable college students within our MEISPP to develop mock commercialization plans that showcase viable business opportunities for intellectual property that resides within the DOE Labs.

DOE has been and remains committed to providing small businesses access to its technological expertise through its various Technology Transfer Program mechanisms. DOE sites and contractors have worked to develop standardized agreements tapered toward partnering with small businesses.

Q4. Please provide additional information on the minority internship program in order to make sure this program is being continued and strengthened in the next Administration, regardless of who might be in the White House.

A4. ED coordinates the MEISPP, which has reached nearly 250 students since 2014. The program is funded by DOE program elements, including the National Nuclear Security Administration. DOE entered into an Interagency Agreement to extend the program to the Environmental Protection Agency. During this Administration, support for MEISPP has grown significantly. To ensure sustainability of the MEISPP, ED will continue to work closely with future DOE senior leaders to encourage agency-wide support through dedicated funding.

Q5. How do you plan to ensure major initiatives like Mission Innovation are reflected in the budget to support the Minorities in Energy Initiative?

A5. ED is collaborating with the heads of program offices to develop a framework to ensure that underserved communities are afforded strategic opportunities to engage in relevant initiatives such as Mission Innovation. In addition, ED will partner with the program offices to identify and track cross-cutting funding requirements and activities in support of MIE initiatives so that this information can inform DOE's budget formulation.

Q6. What has been the progress of Minorities in Energy Initiative as measured by research dollars and ARPA-e and other grants to minority businesses and minority serving institutions?

A6. In Fiscal Year 2015, DOE's research support for minority serving institutions (MSIs) increased by $12 million to $77 million. In 2015, DOE implemented the inaugural Advancing Research and Technology in the Sciences (ARTS) Forum to build stronger relationships between MSIs and our program offices. Last year, and again this past April, approximately 40 senior representatives spent a day at DOE, which included small group discussions with each of our program offices on a rotational basis throughout the day.

The institutions had an opportunity to discuss specific upcoming research opportunities, as well as procedures for submitting proposals.

ARPA-E supports its statutory mission to accelerate "transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty." ARPA-E has worked with Minority Serving Institutions (MSI) to fund initiatives such as the Energy, Water, Food Nexus at Florida A & M University, a global public-private partnership that seeks to provide sustainable and innovative solutions for energy, water, and food security.

ARPA-E's competitive selection process for funding announcements — in addition to technical merit criteria — permits application of six "Program Policy Factors", one of these being "portfolio balance." A sub-factor of "portfolio balance" is "Diversity (including gender) of technical personnel in the proposed Project Team."

Additionally, ARPA-E has engaged MSIs through the ARPA-E Annual Summit, and going forward plans on engaging MSIs and businesses through workshops in ARPA-E's competitive award structure. ARPA-E will also use targeted outreach initiatives such as the Advancing Research and Technology in the Sciences (ARTS) Forum that aims in part to broaden the Department's knowledge of MSI capabilities and to increase MSI knowledge about DOE funding opportunities.

Q7. Have you established goals and metrics for the Minorities in Energy initiative? What does success look like this year and 3-5 years from now?

A7. Yes, goals and metrics have been established for MIE as outlined in the Initiative's 2015 – 2018 strategic plan. The three goals of MIE with their corresponding performance measures are:

1) Establish and implement a framework for achieving enduring growth of minority participation in the energy sector through enhanced public awareness of energy-related careers and the promotion of both STEM education and workforce development.

Performance measures: number and effectiveness of K-12, MSI and other institution initiatives; number of students reached; and number of partnerships developed that support technical and skill program initiatives.

2) Establish and implement an energy economic development framework for increased minority-owned business growth and participation in innovation and commercialization, access to capital, and investments in the energy sector, including energy research and development, production and distribution, manufacturing, and services.

   Performance measures: number of partnerships and initiatives developed that provide minority-owned businesses access to energy sector opportunities; number of offices and laboratories engaged with minority business assistance organizations and minority-owned businesses.

3) Establish and implement a framework to engage minority and tribal communities on awareness, policy development, and technology solutions to advancing climate change mitigation and resilience.

   Performance measures: quality and quantity of partnerships with minority and tribal communities; effectiveness of the strategy and number of stakeholders and/or communities informed.

This year, integration of DOE program office activities into MIE will signal success. In the next 3-5 years, success will be achieved when MIE is fully integrated and self-sustaining within each DOE program office and national laboratory. ED will serve as a liaison and trusted advisor on strategic oversight of the program to ensure continuity and holistic solutions are provided to underserved communities in a contextually relevant and authentic manner that adequately addresses the unique needs of minority communities. The MIE Ambassador Program will continue to engage diverse communities in energy activities.

Q8. Are you confident that all of your department heads have bought into your vision and policy initiatives regarding the objectives of the MIE Initiative? What are the objectives for other departments within the agency for obtaining the goals of the MIE initiative?

A8. All of DOE's program office leaders are aligned with the vision and policy initiatives regarding the objectives of the MIE initiative. In the last two years, they have supported the initiatives such as the place-based minority business initiative in Southwest Louisiana, STEM education programs such as the DC Science Bowl, STEM education for disadvantaged youths, the MEISPP internship program, the pilot lab-to-market initiatives, STEM mentoring cafes, the MBK Taskforce initiatives, and the Council on Women and Girls initiatives, among other efforts.

QUESTIONS FROM REPRESENTATIVE BILL FLORES

Q1. While DOE participation in implementation of the National Ocean Policy is not referenced anywhere in the Administration's FY 2017 budget documents, pursuant to the July 2010 National Ocean Policy Executive Order, DOE serves on the National Ocean Council, and DOE officials have been participating in the policy's marine planning initiative in regions including the Northeast, Mid-Atlantic, and Gulf of Mexico. A NOAA document released in 2013 also listed DOE as a member of a "Coastal and Marine Spatial Planning Regional Team."

Likened by the Interior Dept. to a "national zoning plan," "coastal and marine spatial planning" (otherwise known as "marine planning") is a central feature of the National Ocean Policy, pursuant to the July 2010 Executive Order 13547. Under the initiative, new "regional planning bodies" are tasked with creating marine plans for review and approval by the new National Ocean Council.

Even in regions of the U.S. where all states decide not to participate on a regional planning body to carry out the policy's marine planning initiative, federal agencies nonetheless are directed to "identify and address priority science, information, and ocean management issues associated with marine planning as described in the Executive Order."

Furthermore, language adopted by the July 2010 National Ocean Policy Executive Order stated that the policy's marine planning effort will require "significant initial investment of both human and financial resources," and the National Ocean Council previously noted that federal agencies had been asked to provide information about how "existing resources [can] be repurposed for greater efficiency and effectiveness" in furtherance of the National Ocean Policy.

Q1a. Please describe in detail any DOE resources and personnel that have been or will be directed toward activities in support of the National Ocean Policy. In doing so, please provide a citation(s) to the FY 2017 budget request line item(s) that would be used to support continued participation in National Ocean Policy activities.

A1a. No funding is requested for activities directed, informed, or otherwise guided by the National Ocean Policy or National Ocean Council in the President's Fiscal year 2017 (FY 17) Budget for the Department of Energy (DOE). A small number of DOE staff in the Wind and Water Power Technologies Office participate in occasional meetings and review plans, documents, and data related to the National Ocean Policy.

Q1b. Please describe in detail DOE's planned and completed activities with regard to National Ocean Policy implementation.

A1b. Planning for wind and water development in our Nation's oceans, including DOE investments related to offshore wind and marine hydrokinetic energy, requires input from a variety of relevant stakeholders. In accordance with the National Ocean Policy Executive Order, the National Ocean Council establishes Regional Planning Bodies (RPB) in collaboration with States and Tribes. DOE, through its Wind and Water Power Technologies Office, participates in these RPBs by reviewing plans, documents, and data to understand how RPB actions may affect DOE equities.

Q2. While the National Ocean Council has stated that the National Policy "does not establish any new regulations or restrict any ocean uses or activities," recommendations adopted by the National Ocean Policy Executive Order state that effective implementation will require "clear and easily understood requirements and regulations, where appropriate, that include enforcement as a critical component."

As to marine plans developed under the policy, federal agencies are "expected to formally incorporate relevant components…into their ongoing operations or activities consistent with existing law," and the Executive Order requires federal entities to implement the National Ocean Policy to the maximum extent. National Ocean Policy actions thus serve as precursors to regulatory activity.

Q2a. Please describe in detail how DOE intends to support implementation of National Ocean Policy activities. In doing so, please specify which such activities or types of activities might necessitate requirements or regulations for implementation.

A2a. No DOE activities related to the National Ocean Policy will necessitate new regulations. In accordance with the National Ocean Policy Executive Order, the National Ocean Council establishes Regional Planning Bodies (RPB) in collaboration with States and Tribes. DOE, through its Wind and Water Power Technologies Office (WWPTO), participates in these RPBs by reviewing plans, documents, and data to understand how RPB actions may affect DOE equities.

Q2b. What if any commitment can you make that DOE will not participate in any actions that could have a regulatory impact pursuant to the National Ocean Policy?

A2b. DOE cannot speak to impacts of the National Ocean Policy on the regulatory authorities of other agencies. However, as noted above, DOE does not believe any of its National Ocean Policy-related activities will impact DOE regulatory authorities as DOE does not regulate the use of ocean, coastal or Great Lakes resources or activates.

Q3. The National Ocean Policy foundation documents and subsequent National Ocean Council guidance and Regional Planning Body charters make clear that Regional Planning Body federal members approval of final coastal and marine spatial plans will commit the respective entity to aligning all future actions in accordance with the plan(s), including through regulations where necessary.

Q3a. Please describe and explain your views and understanding of the power of a DOE signature on a marine plan in terms of impacts on future DOE decision-making and regulatory activities.

Q3b. Do you agree that DOE representatives serving on Regional Planning Bodies charged with developing marine plans under the National Ocean Policy have the power to commit DOE to indefinite compliance with a marine plan by virtue of affixing their signature to the plan?

Q3c. In reviewing draft marine plans and determining whether to sign the document, what is the extent to which federal Regional Planning Body representatives representing DOE will be required to seek review and approval from senior DOE officials and the Office of Management and Budget, and which if any specific officials would be involved in any such review/approval process?

A3a-c. As directed in Executive Order 13547, Stewardship of the Ocean, Our Coasts, and the Great Lakes, DOE participates in the National Ocean Council (NOC). As a NOC member, DOE participates in the process of developing coastal and marine spatial planning as described in the Final Recommendations of the Interagency Ocean Policy Task Force and subsequent NOC guidance, including the National Ocean Policy Implementation Plan.

As noted above, Regional Planning Bodies (RPB) have been established in accordance with E.O. 13547. DOE participates in these RPBs by reviewing plans, documents, and data to understand how RPB actions may affect DOE equities. The RPBs have no independent legal authority to regulate or otherwise direct federal, state, tribal, or local entities.

Like other Federal agencies, DOE seeks to adhere to the RPB regional or sub-regional plans to the extent possible consistent with their existing authorities. Federal members of the RPBs are subject-matter experts with sufficient seniority and expertise to represent their agencies on the RPB. While RPB charters recognize that Federal representatives do not have authority to direct all relevant actions in their respective agencies, the Federal

representative is responsible for encouraging regional consistency with national programs and activities across their agency.

To date, DOE's RPB representatives have consisted of senior technical staff in DOE's Office of Energy Efficiency and Renewable Energy (EERE), Wind and Water Power Technologies Office. Once a draft marine plan is developed, DOE anticipates that the referenced technical staff members will seek approval from the director of the Wind and Water Power Technologies Office as well as DOE's Under Secretary for Science and Energy.

Q4. On February 12, 2016, the National Ocean Council announced the public release of new Guidance on Marine Plans and a 2016 Annual Work Plan.

The marine planning guidance document includes critical new details, including guidance related to public review of draft marine plans (e.g. minimum of 30 days and maximum of 90 days, without specifying the particular type of public review required and excluding an absolute Federal Register publication requirement), as well as the National Ocean Council's marine plan review/certification process.

However, rather than providing stakeholders and the public with an important and transparent opportunity to provide insight and input on the proposed guidance through public review and comment, the National Ocean Council merely released the document in final form.

As to the 2016 Annual Work Plan, without providing further information, that document notes that there are ~150 remaining National Ocean Policy implementation actions which cannot be completed due to changing circumstances or that are continuing to progress as originally envisioned or with modifications. It further notes that a "longer-term, higher-level" implementation guide is under development and will be posted online when completed. The 2016 Annual Work Plan states that the longer-term guide "will provide the overarching context and vision for crafting the Annual Work Plans and implementing the NOP in future years."

Q4a. As a member of the National Ocean Council, please fully describe and explain DOE's involvement with the development and approval of the new marine planning guidance document.

A4a. DOE staff have reviewed the "Guidance for Marine Plans" and offered no substantive comments. DOE was in attendance at the May 27, 2015 Deputies meeting at which the "Guidance for Marine Plans" was approved.

Q4b. As a member of the National Ocean Council, did DOE at any time recommend the release of the guidance in draft form for public review and comment. If so, please fully describe and explain the response to the DOE recommendation, and if not, why not?

A4b. No. DOE has deferred to other National Ocean Council agencies and the National Ocean Council Office to define the process for developing and finalizing the document, as the guidance has limited impact on DOE authorities and programs.

Q4c. As a member of the National Ocean Council, please fully describe and explain DOE's involvement with the development and approval of the 2016 Annual Work Plan.

A4c. DOE has reviewed the 2016 Annual Work Plan and has not provided any comments on the document.

Q4d. As a member of the National Ocean Council, did DOE at any time recommend the release of the 2016 Annual Work Plan in draft form for public review and comment? If so, please fully describe and explain the response to the DOE recommendation, and if not, why not?

A4d. No. DOE has deferred to other NOC agencies and the NOC office to define the process for developing and finalizing the document, as the 2016 Annual Work Plan has limited impact on DOE authorities and programs.

Q4e. As a member of the National Ocean Council, please fully describe and explain DOE's involvement with the development and approval of the longer-term guidance document that has not yet been completed.

A4e. DOE has reviewed the early draft material of the longer-term guidance document. The draft is still being developed and DOE will provide comments or edits, if necessary, on the full draft.

Q4f. As a member of the National Ocean Council, has or does DOE intend to recommend the release of the longer-term guidance in draft form for public review and comment. If such recommendation has already been made, please fully describe and explain the response to the DOE recommendation. If not, does DOE intend to make a public review/comment recommendation, and if not, why not?

A4f. DOE has no position on this matter, as the draft is still in early development.

Q4g. As a member of the National Ocean Council, please fully describe and explain each of the ~150 remaining National Ocean Policy implementation actions that DOE is involved in but has not yet completed. In doing so, for each such action please describe whether the action is proceeding as originally intended or has been modified, and list any actions that DOE was directed to complete but cannot complete due to changing circumstances.

A4g. DOE is responsible for two NOP implementation actions that it coordinates through the Federal Renewable Ocean Energy Working Group, an ad hoc staff-level working group of federal agencies to coordinate on issues related to offshore wind and marine and hydrokinetic energy. This group pre-dates the NOP and is otherwise unrelated. The NOP actions include:

ACTION 1: Compile and make available relevant climate, water, wind, and weather data; environmental models of seasonal and extreme conditions; and other information to support development of the Nation's coastal and offshore renewable energy, including wind, ocean thermal, and hydrokinetic (e.g., waves, tidal energy) resource (due 2017).

DOE develops these products as part of its broader research and development activities to support offshore wind and marine and hydrokinetic technology development. As relevant data products are completed, they are made available to various National Ocean Policy bodies as part of DOE's dissemination of these products to the general public.

ACTION 2: Develop an analysis of the contribution and impacts (including job creation) of emerging uses–including renewable energy, aquaculture, and biotechnology–on the economies of the communities and regions dependent on marine and coastal resources (due 2015).

Beyond general discussion with other agencies named under this Action, DOE has taken no concrete steps to develop this analysis. DOE would need National Ocean Council guidance on what form this analysis should take and this effort would have to be completed jointly with other agencies who have expertise in relevant areas, such as aquaculture and biotechnology.

Q5. In conjunction with the development of the Northeast Regional Planning Body's marine plan, RPB members last summer discussed the need to convene a workshop or series of

workshops with agency staff to discuss draft marine plan products and the development of agency guidance on their use.

Despite public requests for any such workshops to be public and that a written meeting record subsequently be made available, at a subsequent October 2015 Northeast Regional Planning Body Stakeholder Forum, it was noted that at least one interagency workshop took place (without any accompanying public notice or record).

In addition, despite public requests for more time for public review and comment on the Northeast and Mid-Atlantic draft marine plans, Regional Planning Bodies in both regions continue to move forward with planning for mere 45-day public comment periods.

Q5a. Please fully describe and explain DOE's involvement associated with any non-public governmental workshops held in 2015 related to the development and implementation of the Northeast marine plan.

In doing so, please include any and all notes, correspondence, and other documentation associated with such workshops. In addition, please explain whether DOE requested that any such workshops be open to the public and/or recorded for subsequent public dissemination, and if so, what the response was to any such DOE recommendation, and if not, why not.

A5a. DOE attended a Northeast Regional Planning Body (RPB) Interagency Workshop held in Boston on September 10-11th, 2015. The purpose of this meeting was for Federal Agencies to review marine life and human use data, draft actions for the Northeast Ocean Plan, and develop agency guidance to be ready for public release and review at the next RPB meeting. DOE does not take a position on whether these workshops are open to the public and/or recorded. DOE has offered limited recommendations to these materials and has deferred to other NOC agencies and the NOC office to define the process for developing and finalizing the document.

Q5b. Do you believe that a 45-day public comment period for the draft Northeast and Mid-Atlantic marine plans is sufficient, particularly given that these will be the nation's first such plans and the associated regulatory uncertainty and potential impacts they will have on a variety of commercial and recreational interests that contribute trillions of dollars to the U.S. economy?

A5b. The Department of Energy does not have regulatory authority that is affected by the National Ocean Policy and defers to other NOC agencies and the NOC office to define the process for developing and finalizing the document.

Q6. Section 6(b) of Executive Order 13547 that established the National Ocean Policy in July 2010 requires "[e]ach executive department, agency, and office that is required to take actions under this order shall prepare and make publicly available an annual report including a concise description of actions taken by the agency in the previous calendar year to implement the order, a description of written comments by persons or organizations regarding the agency's compliance with this order, and the agency's response to such comments."

Q6a. Pursuant to this requirement, for calendar years 2010, 2011, 2012, 2013, 2014, or 2015, has DOE prepared and published the annual report required under the Executive Order? If so, please describe the information provided, and if not, why not?

A6a. DOE has neither prepared nor published an annual report during this time.

QUESTION FROM REPRESENTATIVE MIKE POMPEO

Q1. As you may know, on February 23, I and 17 other members of this Subcommittee filed an amicus brief before the DC Circuit regarding the Clean Power Plan. I'd like to draw your attention to some of the reliability issues that were raised by state utility commissioners in the same case and that should be of concern to the Energy Department.

Q1a. Your budget request explains that "reliable and resilient power grid is critical to U.S. economic competiveness." Yet, a brief was recently filed by Eighteen Former State Public Utility Commissioners representing 14 states including Kansas that found that the Clean Power Plan violates state utility regulation, the Federal Power Act, current state institutional arrangements, and the regulatory compact, resulting in profound threats to electric reliability. How does the Budget Request for resources help DOE to address the potential risk to the grid associated with this violation of the regulatory compact and the Federal Power Act that have served to maintain reliability for decades?

A1a. Historically, the electric utility sector has a strong track record of protecting the reliability of our Nation's electric grid. Regulators, utilities, vendors, and other stakeholders, working collaboratively with Federal and state governments, have developed technologies, tools, processes, and procedures that protect our Nation's critical infrastructure. Recognizing the importance of maintaining reliability, and as part of the Fiscal Year 2017 (FY) Request for the Grid Modernization Initiative, the Department of Energy (DOE) proposes to fund a set of regional projects that will demonstrate co-optimization of reliability, affordability and other key grid attributes in; (1) a transmission and distribution system operating reliably on a lean reserve margin, (2) resilient distribution feeders with high percentages of distributed energy resources, and (3) an advanced modern grid planning and analytics platform.

As demonstrated in the FY 2017 Budget Request, DOE provides a host of technical assistance resources to state, local, tribal, and territorial entities on energy issues, including energy system planning and reliability. (For additional background, please see the DOE State, Local and Tribal Technical Assistance Gateway: http://energy.gov/technicalassistance.) DOE technical assistance resources on topics relevant to reducing pollution take an "All-of-the-Above" energy approach, including but not limited to energy efficiency, generation efficiency, renewable energy, natural gas, carbon capture, and storage, and nuclear energy.

DOE is also committed to working with the Federal Energy Regulatory Commission, the North American Electric Reliability Corporation, the Environmental Protection Agency, and other stakeholders to successfully maintain grid reliability.

Q1b. I turn now to resources for the states. Specifically, the 2017 DOE budget requests resources to assist "state, local, tribal, and territorial stakeholders in planning, training, and exercising in advance of energy emergencies." Yet, this same brief I already mentioned found that: "The only historic role left to state utility regulators is to present customers with the bill for the Power Plan's implementation." How will DOE's efforts be directed to ensure an appropriate and meaningful role for state and local government utility regulators as they strive to maintain reliability in light of the interference of the Clean Power Plan?

A1b. While there are a number of technical assistance resources available to states across DOE, the FY 2017 Budget Request language for State Energy Assurance Planning is specific to responding to and recovering from energy emergencies. This program is designed to test, train, and exercise regional groups of state, local, tribal, and territorial governments alongside energy sector representatives to enhance energy assurance through coordination of response elements. In an energy emergency, state, local, tribal, and territorial governments will have a response role, and DOE's Budget Request aims to support that response through a combination of capacity building and coordination at the Federal level.

Q2. As President Obama's Administration begins its final year, the Committee is interested to know more about the regulatory actions the Department plans to take. We have reviewed your February 2016 Report to Congress and we further request from you a detailed timeline on all proposed and final rules for the remainder of the calendar year. We ask that this request be fulfilled within 30 days of this hearing.

A2. DOE's planned regulatory actions are published as part of the Unified Agenda by the Office of Information and Regulatory Affairs. Information regarding the Department's planned regulatory actions can be found on their website at: http://www.reginfo.gov/public/do/eAgendaMain.

Q3. Over the years, scientists have discovered that while refrigerants have the positive impact of producing cooled (or hot) air, they can have a negative impact on the environment. The industry has identified alternatives to hydrochlorofluorocarbon (HCFC) and, more recently, to hydrofluorocarbon (HFC) refrigerants to address these environmental

concerns. Because HFCs have been identified as contributors to global warming, the Environmental Protection Agency (EPA) began the process of disapproving the continued use of some of these refrigerants, and international discussions are underway to phase-down the use of high GWP HFCs. However, research has shown that many promising alternatives are classified by as flammable or mildly flammable, which limits their ability to be used in most U.S. applications without changes to current safety codes and building codes.

Your agency has issued ever increasing minimum efficiency standards for many heating and cooling products that currently use HFC refrigerants. Manufacturers will soon face the intractable challenge of having to meet these higher efficiency standards without the use of commercially available and safety certified refrigerants.

Q3a. What is the Department of Energy planning to do to help conduct the research necessary to facilitate the modifications to current safety and building codes required so these lower GWP refrigerants can be used to meet the very efficiency standards you have promulgated?

A3a. In FY 2016, DOE fully funded a three-year program of research at NIST to address the issue of flammability of low GWP refrigerants working fluids. This work will develop methods to estimate the flammability behavior of arbitrary mixtures of a few compounds, at varying ambient conditions (humidity and temperature). These modeling tools and testing methods would consist of developing the capability to predict the burning velocity of arbitrary mixtures of R32, R125, R134a, R152a, 1234yf, and 1234ze(E), so that flammability of a blend can be minimized, while simultaneously maximizing efficiency. This effort supports the heating, ventilation, air conditioning, and refrigeration (HVAC&R) industry in the development of these methods.

In addition, the FY 2017 budget request proposes a Low-GWP Advanced Cooling (HVAC) R&D funding opportunity announcement to advance cooling and heating technologies. The goal of this effort is to enable a paradigm shift in HVAC technologies, moving beyond today's refrigerants with potentially harmful environmental impacts to develop near-term low-GWP solutions and, over the long-term reach an end-state with no refrigerants required. This approach enables U.S. manufacturers to innovate in ways that enhance their competitiveness. The program will also develop vapor compression improvements to help bridge the technology gap, to meet obligations aligned with the millions of existing systems that have decades of life remaining, which is expected to

result in economic benefits. Consequently, drop-in solutions will be a major part of the near-term focus. This effort will also develop better and different types of component and sub-component solutions for successful integration into a comprehensive system. The five-year objectives are:

- Develop and demonstrate at least three emerging technologies full-scale prototype systems for advanced low-GWP vapor compression systems with at least 10 percent lower energy usage, at least 50 percent lower lifecycle GWP, and a high-volume modeled cost that is comparable to the current 2015 commercial state-of-the-art vapor compression technologies. These include drop-in low-GWP solutions.
- Develop and demonstrate full-scale non-vapor compression (zero GWP cooling fluids) systems achieving efficiencies equivalent to or greater than current state-of-the art commercial vapor compression systems, and are life cycle cost effective using a high-volume modeled cost.

Q4. In December 2012, Congress passed the American Energy Manufacturing Technical Corrections Act (AEMTCA) which directs the Department of Energy (DOE) to establish a uniform efficiency descriptor for residential water heaters and with it, a mathematical conversion factor for existing water heaters. AEMTCA, now Public Law 112 – 210, gave the Department one year to issue both of these descriptors. It is now February 2016, and your department is more than two years behind schedule issuing the conversion factor. This has left the existing stock of water heaters in limbo as to what their published efficiency rating should be. Without the required conversion factor, manufacturers must spend millions of dollars to retest products that have already been tested and certified under the prior test procedure as meeting federal standards. In addition, the lack of a conversion factor hinders new products from entering the market since new water heaters must meet the new UEF requirements but those minimums are yet to be established since they rely upon converting the minimum efficiency level under the prior efficiency descriptor to the new minimum under UEF, using the long-awaited DOE-issued conversion formula.

The lack of the required conversion factor has left manufacturers with the risky choice to publish product ratings under the old efficiency descriptor, hoping the conversion factor, once published, will not disqualify existing products from compliance. Not only has DOE failed to meet congressionally mandated deadlines, but it is hindering manufacturers' ability to properly plan their product development.

Q4a. Why has the Department failed to perform this task assign assigned to them by Congress?

Q4b. What is the Department's timeline for issuing this overdue conversion factor?

Q4c. What does the Department plan to do with manufacturers' products that currently comply with federal standards, but may find themselves in non-compliance after the conversion factor is issued?

A4a-c. The development of a mathematical conversion to a new efficiency metric from a prior metric is a complex task that must be given careful consideration in order to denominate standards and ratings in the new metric that are equivalent to those under the previous metric. This process requires a large amount of product testing and analysis, and an opportunity for stakeholders to provide comments, all of which can be time-intensive activities. DOE published a notice of proposed rulemaking (NOPR) on April 14, 2015 that proposed a mathematical conversion and accompanying standards denominated in the new efficiency metric. 80 FR 20116. DOE also convened a public meeting to discuss its proposed conversions as set forth in the NOPR, a meeting which generated significant stakeholder comment. After the publication of that NOPR, the industry trade association – the Air-conditioning, Heating, and Refrigeration Institute (AHRI) – provided additional test data to DOE to be used in the development of the mathematical conversion factor. During this period, DOE also conducted further testing of its own. Accordingly, DOE undertook a re-analysis to incorporate such additional data and is currently developing a supplemental NOPR that proposes a mathematical conversion factor and accompanying standards based on the expanded dataset. DOE plans to publish the supplemental NOPR this spring and a final rule later this year.

EPCA contains requirements to ensure that manufacturers' products that currently comply with Federal standards remain compliant after the conversion factor is issued. Specifically, EPCA requires that a covered water heater must be considered to comply with the final rule and with any revised labeling requirements established by the Federal Trade Commission to carry out the final rule if the covered water heater was manufactured prior to the effective date of the final rule and complied with the efficiency standards and labeling requirements in effect prior to the final rule. (42 U.S.C. 6295(e)(5)(K)) DOE plans to adopt an approach that would determine compliance consistent with the requirements of EPCA.

Q5. In the past five years, the Department of Energy (DOE) has been forced into litigation over three rules affecting air conditioning, heating and refrigeration products, alone. Either through settlements or by judicial decree, the Department has had to reissue rules affecting residential furnaces, commercial refrigerators, and walk-in freezers. These lawsuits cost the federal government money and time in not only redoing the rulemakings but also because of the Department of Justice's work needed to prepare legal briefs, filings and proceedings. On top of all this, manufacturers were left with market uncertainty, not knowing on what types of products to invest their precious research and development dollars. In summary, the current regulatory process has become inefficient, confrontational and, at best, onerous to all stakeholders.

Q5a. Do you, Mr. Secretary, think the current "notice and comment" process involved in writing product regulations is still the most effective way to promulgate minimum efficiency standards?

Q5b. In 1995, the Clinton Administration, of which you were a part of, worked with stakeholders to produce the Process Improvement Rule, which created greater input from stakeholders regarding economic impact, market trends and engineering analyses. Why has your Department moved away from many of the provisions contained in the Process Improvement Rule as you craft regulations?

A5a-b. DOE's Process Rule in the Code of Federal Regulations at 10 CFR 430 Appendix A to Subpart C, describes the procedures, interpretations, and policies that guide DOE in establishing new or revised energy-efficiency standards. These guidelines are designed to provide for greater and more productive interaction between the Department and interested parties throughout the rulemaking process. The process was designed with stakeholders in mind and with the intent to enhance the productivity of the program through improved communication and has enhanced the quality of the resulting rules, most typically through additional analysis conducted as issues are raised by stakeholders through the open and transparent process DOE follows in all of its rulemakings.

In November 2010, DOE announced that it would, in appropriate cases, implement changes to expedite its rulemaking process while maintaining collaboration and interaction with stakeholders. See http://energy.gov/eere/buildings/plans-and-schedules. In nearly all rulemakings conducted by DOE, the energy conservation standards rulemaking process typically begins with a framework document, followed by a preliminary analysis, with the publication of each document opening a period for

comment including holding a public meeting. Only after these steps are completed does DOE issue a proposed rule for public comment.

While the traditional process consisting of a framework document and a preliminary analysis provides useful information, the Department believes that a more flexible process, one adapted to a product's specific circumstances - such as its regulatory history- is a more efficient way of gathering data. To this end, in recent years, DOE has decided to use the negotiated rulemaking process to develop proposed energy efficiency standards. This process was used to develop a proposed rulemaking for commercial and industrial pumps, which was finalized earlier this year. DOE believes such a regulatory negotiation process will be less adversarial and better suited to resolving complex technical issues. An important virtue of negotiated rulemaking is that it allows expert dialog that is much better than traditional techniques at getting the facts and issues right and results in a better proposed rule. A regulatory negotiation enables DOE to engage in direct and sustained dialog with informed, interested, and affected parties when drafting the regulation, rather than obtaining input during a public comment period after developing and publishing a proposed rule. Gaining this early understanding of all parties' perspectives allows DOE to address key issues at an earlier stage of the process, thereby allowing more time for an iterative process to resolve issues. Additionally, DOE has found that publishing a Request for Information (RFI) requesting input and data from interested parties to aid in the development of the technical analyses is an effective means to receive input and comments on issues relevant to the conduct of a rulemaking. In other circumstances, DOE publishes a Notice of Data Availability (NODA) containing the analysis and the underlining assumptions and calculations, which may be used to ultimately support a proposed energy conservation standard. DOE encourages stakeholder comment on the NODA or Notice of Proposed Rulemaking (NOPR) and invites additional data or information that may improve the analysis.

DOE also routinely holds public meetings to listen to and respond to stakeholder comments. DOE is happy to consider process improvements that maintain transparency and stakeholder engagement.

Q5c. Is there a better, more transparent and efficient way for the Department of Energy to issue minimum efficiency regulations that meet EPCA's requirements that any efficiency standard reducing the energy use of a product be both technologically feasible and economically justified?

A5c. See above.

Q5d. What are your recommendations on reforming or updating this 40 year standard setting process, beginning with the Energy Policy and Conservation Act of 1975? Is it time to again bring all parties together to discuss ways to make the process work better so as to avoid ligation and the constant involvement of Congress in individual efficiency standards?

A5d. DOE has worked under the direction of Congress to establish appliance standards that provide substantial savings to consumers, provide a level playing field for manufacturers, and avoid a patchwork of state-standards. The improvements to its processes that have been instituted in recent years maintain a good balance of robust and transparent process that incorporates extensive stakeholder input. .

QUESTIONS FROM REPRESENTATIVE MARKWAYNE MULLIN

Q1. Mr. Secretary, there has been an effort to identify the many possible threats to our national grid, from cyber-attacks, natural disasters and terrorist threats. In response, this Committee has passed legislation affecting your department, such as making DOE the lead agency for addressing cyber threats against the bulk power systems and studying ways to stockpile spare transformers for grid restoration. With the Department's unique relationship with the national labs and as part of the national intelligence community, and your work with the Electricity-Sector Coordinating Council, what interaction is your Department planning for Fiscal Year 2017 to support the utility industry to protect against electromagnetic pulses? For example, is the Department working with industry to share important information on research already completed that could be used to better understand what preparations could be done in advance to protect the grid from an EMP threat?

A1. The Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability (OE) plans to continue to support industry in understanding how best to mitigate and protect against electromagnetic pulses (EMPs) by building off of work being done in FY 2016. These efforts include the development of a Strategies, Protections, and Mitigations for the Electric Grid from Electromagnetic Pulse Effects report; a report on the vulnerability of the grid to an EMP event and its potential impact on reliability and delivery of electric power; a methodology to assess the risk in the near and medium term to energy systems from low-frequency, high-impact events with the potential to damage infrastructure; and research to develop methods to analyze the hazard environments, impacts, and consequences of different sources of EMPs and geomagnetic disturbances (GMDs) on U.S. power infrastructure.

In Fiscal Year 2017 (FY 2017), OE's Transformer Resilience and Advanced Components program will expand modeling and testing of EMP and GMD vulnerabilities by including other critical components and technologies such as circuit breakers and relays. The FY 17 Budget Request also includes plans for OE to collaborate with the Electric Power Research Institute and the electric industry to develop a joint action plan between DOE and industry to implement the Joint Strategy on EMP. DOE also plans to begin implementation of DOE's EMP action plan, which will continue into FY 2018.

Q2. Mr. Secretary, there has been an ongoing effort I know you and the Department of Energy have been working closely with the Electricity-Sector Coordinating Council to

coordinate efforts with the public and private sectors to identify and protect against the many possible threats to our national grid, from cyber-attacks, natural disasters and terrorist threats. However, the ESCC is limited to those participants from industry who are invited to serve on the group. Therefore, I would like to ask how the Department is working with industry outside of the ESCC to ensure sensitive and classified information is being shared on a broader approach.

A2. The Cybersecurity Risk Information Sharing Program (CRISP) was launched in 2013 and is a key way DOE is working more broadly with the industry than just the ESCC. CRISP is open to electricity subsector companies across the Nation. CRISP provides the capability for government and industry to exchange and analyze cyber threat data so we can understand what's happening and figure out what to do about it. Companies from across the electricity subsector are currently participating in CRISP, and the North American Electric Reliability Corporation (NERC) is working with industry to add more by the end of the year. NERC's CRISP participants provide power to over 60 million electricity subsector customers, about half of the 130 million customers in the United States.

In addition to CRISP, DOE collaborates with the industry on multiple fronts and has a good working relationship with the industry trade organizations like Edison Electric Institute and American Gas Association. DOE also works with National Electric Rural Cooperative to address challenges faced by the cooperatives.