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THE FISCAL YEAR 2016 BUDGET REQUEST FOR THE U.S. DEPARTMENT OF ENERGY

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

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THE FISCAL YEAR 2016 BUDGET REQUEST FOR THE U.S. DEPARTMENT OF ENERGY

THURSDAY, FEBRUARY 12, 2015

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The Committee met, pursuant to notice, at 10:05 a.m. in room SD–366, Dirksen Senate Office Building, Hon. Lisa Murkowski, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

The CHAIRMAN. We are calling to order the Energy Committee this morning. Today we are honored to have the Secretary of Energy, Dr. Moniz, with us. Good morning.

As we visited yesterday in my office, I alerted you that we were going to have a very quick business meeting to conclude some business of the Committee relating to subcommittees and committees' rules. It will take, hopefully, no more than two minutes, and then we will be able to proceed with you and the introduction of the President's budget as it relates to energy.

We do have a sufficient quorum of members here this morning, so the transcript will reflect that the Committee is now in session in a business meeting.

[Recess]

The CHAIRMAN. We will now begin with the issues before the Committee. Again, welcome, Secretary Moniz.

We are here to consider the President's budget request for the Department of Energy for FY'16. This marks the first of three budget hearings that our Committee will hold before the end of this month. This is our first formal review of DOE's budget since April of 2013.

Mr. Secretary, I think it has been about a year and a half since you have been before the Committee. That is a long time. We would like to have you here more frequently.

In fairness and in thanks and appreciation to you, I know that you have made the effort to come and visit many of us outside of the formal Committee process and to keep us informed of what is happening within the Department, so I appreciate that personal outreach.

I do not think it comes as a surprise to anyone on the Committee, but I have been critical of the President's overall budget as it busts through statutory spending caps. It raises taxes by more than $2 trillion over the next decade. There has been a lot of dis-

cussion by many that the President's budget is going nowhere. Other terms have also been used, but I do think hearings like this are useful because it allows us to take a granular look at it and see if there aren't areas that we can be working together on.

The budget for the Department of Energy is hardly the most controversial part of the President's budget, and I would credit much of that to you, Secretary Moniz. I think you have been a steady leader. I think you have been one who is intent on improving the Department's performance. I think you have been successful in avoiding, perhaps, some of the drama that we sometimes see around here. Again, I have been appreciative of your leadership.

I am obligated to repeat my usual criticism of DOE's proposed budget. This request embraces the "all of the above" energy policy on paper and in words. I think if we look through our packets the term "all of the above" is certainly there in the handout that we have, but I worry that it is "all of the above" in words and not necessarily in practice.

We see significant increases for efficiency, vehicles, and renewable technologies, but virtually all the funding for fossil energy would be directed to carbon capture, methane, or some other environmental consideration.

I think we have gotten to that point. We have agreed, and we had settled the discussion about whether American energy production can affect global prices. I think it clearly does, and I think we recognize that. I think it is a good thing, and we are benefitting from it. The question is whether we are going to keep this going or instead allow the President to lock down our resources like we have seen just recently in the past several weeks in places like Alaska.

DOE clearly has a role here too. It should be researching methane hydrates and other unconventional resources to help ensure that energy remains affordable long into the future.

So as we discuss the budget aspects within the Department of Energy, Mr. Secretary, I would hope we can find some common ground. I have indicated my support for the opportunities and the innovation we see coming out of ARPA–E, that we can be doing more there, and we have had an opportunity to talk about that.

As you continue your leadership there, know this Committee will be working with you on those areas where we can advance America's energy policy. We are also going to be very cognizant and very careful as we shepherd taxpayer dollars into these innovations and technologies.

With that, I will turn to the Ranking Member, and then we will hear from the Secretary.

STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM WASHINGTON

Senator CANTWELL. Thank you, Madam Chair.

Secretary Moniz, it is a pleasure to see you again and I appreciate this opportunity to discuss the President's Fiscal Year 2016 budget request for the Department of Energy.

Overall, I am pleased that the proposal calls for more than a nine percent increase over last year and the President's proposal

demonstrates a strong commitment to investments that we need to build a competitive, innovative, energy economy.

As the overview this budget highlights that the Department is entrusted with four critical responsibilities.

One, maintaining our nuclear arsenal and playing a key role in our non-proliferation activities around the globe.

Two, protecting public health through a long term commitment to cleaning up the legacy of nuclear weapons production.

It is often overlooked that those two responsibilities typically account for more than half of the DOE budget. I should just say, as you know, we've discussed many times that Washington State is home to the Hanford Nuclear Reservation, one of the world's largest nuclear cleanup projects. The people in my state fully expect the Department of Energy to honor its responsibilities to finish this job.

As Senator Murray noted in our budget discussions that the budget contains some mixed news for Hanford in Fiscal Year 2016 while the Department is devoting significant resources to waste treatment plants and tank farms, there is concern that we may be giving some of the other clean-up priorities short shrift. So we need to make sure the resources are there for DOE to live up to the commitment to clean up this waste.

It is also the case that workers at Hanford have been exposed to chemical vapors with uncertain health effects multiple times, and this is certainly unacceptable. So I appreciate your attention to this issue. It has been critical. It is critical that we not only establish a process that works with this Department and this contractor, but that it also works in the future. I very much appreciate the attention to that.

Besides those two priorities DOE is also responsible through your Energy Innovation Agenda for transitioning to a low carbon energy future and to providing the backbone for our nation's research economy.

I want to commend you for the strong commitment to the advanced energy agenda reflected in the President's budget. This is a research community that has made much of the revolutionary change in our energy economy possible.

Wind and solar production have tripled since 2008. Gasoline consumption has dropped over eight percent since 2005. The electricity grid is becoming more resilient with wider deployment of smart grid and distributed technologies. Gas prices are lower now, but we know they won't stay that way permanently.

So DOE and the labs, like the Pacific Northwest lab and many others, have led the way in developing transportation alternatives such as advances in engine technologies, lightweight materials, battery technologies, biofuels, all critical to ensuring that consumers are better insulated from price fluctuations in oil and gasoline that regularly cause hardships.

The research and development and deployment activities of the Department of Energy are driving economic transformation. I'm pleased to see that the proposed increase in the Department's Office of Electricity includes a 94 percent increase in smart grid R and D, 75 percent increase for energy storage and 133 percent increase in infrastructure security and energy restoration and a

strong commitment to cyber security research and development. Similarly, I am pleased to see a 42 percent increase proposed for the Office of Energy Efficiency and Renewable Energy which is shepherding innovations in everything from building efficiencies, to drop-in biofuels, to new fuel cell applications.

This budget will boost the Office of Science a modest five percent, but we make sure that we are continuing to invest in our key innovation infrastructure which is fundamental to the advances in a low carbon energy technology. We need to build on our recent track record of success.

I think the key thing we want to get across about the budget is the energy transformation currently underway in our country is having a profound effect on our competitiveness as an economy. Decoupling the growth in our economy from energy growth is like ushering in a new era of energy productivity. For decades American energy consumption increased as the economy grew.

In the past seven years, however, we have dramatically decreased that trend. From 2007 to 2014 our economy grew over eight percent. At the same time energy consumption actually fell by 2.5 percent. This represents a dramatic increase in our energy productivity. By contrast during the same period, from 1990 to 2000 our GDP growth of 40 percent was linked to growth in the U.S. energy consumption of 17 percent. This recent decrease in the demand for energy represents billions of dollars of savings to American families and businesses each year, resources that can be spent or invested in other areas of the economy. De-linking economic growth from one of the most expensive inputs to it, energy, will help us to continue America's improved competitiveness for the future.

I also want to say I am pleased the budget will also continue our national commitment to the deployment of efficiency and renewable energy technologies—new clean energy technologies. Renewable efficiency and natural gas generated over $50 billion of investment in 2014. I look forward to this budget proposal that would put significant influences on modernizing and strengthening our electricity grid.

Although our nation's grid is vital to our economy and way of life, we need to make sure that it is even more efficient and resilient, and it likewise serves as a platform for innovation. We have made good progress as a country in improving this, but now is the time to expand our existing efforts to integrate technologies that will transform energy transmission and distribution.

One of the new programs in the budget would accelerate the replacement of outdated transformers and other important grid components with new technology. This would make the grid more resilient, particularly in response to disruptions that could be caused by disaster or cyber attacks. The program would also help state and local governments as they deploy new transmission and energy storage systems to the 21st century.

So Mr. Secretary, finally I just want to say I look forward to your upcoming release of the Quadrennial Energy Review. I expect we will have a chance to take an even broader look at the challenges we face that can't be done in just one budget year. I look forward to working with Chairwoman Murkowski and my colleagues here

on the Committee to ensure the Department of Energy continues to play a vital role in meeting our nation's challenges.

Thank you.

The CHAIRMAN. Thank you. With that, let's proceed to you, Mr. Secretary. Again, thank you for being here this morning.

STATEMENT OF HON. ERNEST MONIZ, SECRETARY, U.S. DEPARTMENT OF ENERGY

Secretary MONIZ. Great.

Well, thank you very much, Madam Chair, Ranking Member Cantwell and all members of the Committee.

Let me start by just responding to your statement, Chairman Murkowski, that we will continue to be available and our senior leadership available to all members of the Committee for discussions on the issues of concern. Of course, when we have even more confirmed people, we'll have more people available to come and talk to you. [Laughter.]

Secretary MONIZ. So we will look forward to that happening as well.

We have submitted a very detailed statement for the record, so I'll try to be brief in these opening comments.

As already noted, one of the major features of the energy scene is the dramatic increase in oil and natural gas production and natural gas liquids across the board.

This has been, as noted, a major factor in our economic recovery in many dimensions, at the household level. EIA predicts a $750, on average, household savings just in gasoline prices this year. Jobs and manufacturing, balance of payments, all very, very, very, very many facets of this economic recovery tied to energy.

Second point, I do want to address the "all of the above" energy strategy. Again, we feel that we are very strongly committed to that. As we drive to lower costs to clean energy technologies on the—to just address directly, for example, the coal issue.

Clearly carbon capture is a major focus but I want to emphasize that we have, of course, R and D programs that go beyond fossil energy, ARPA–E, for example. But also a new initiative in this budget, for example, is not in our budget, but in the Department of the Treasury, our investment tax credits for carbon capture projects and sequestration tax credits. I think we are bringing many tools to the table to address that.

Clearly I'm going to move on to other areas in these very brief remarks. In addition to energy we have major mission responsibilities in our basic science infrastructure for the country, in nuclear security and in environmental cleanup. As noted, our overall budget request for $29.9 billion is approximately a nine percent increase.

In science it's five plus billion, a five percent increase. I just want to note that among many features we continue to build the new cutting edge facilities that our research community needs. The 31,000 researchers that we serve each year in the national laboratories from completing, just dedicating, for example, the new light source at Brookhaven, on budget and under schedule, to doing new projects, coherent light source, for example, rare isotope beam facility in Michigan, et cetera.

Energy $5.4 billion, an increase of 27 percent. I think we will be discussing much of the innovation agenda there. I do want to emphasize, again, other aspects of the program like advancing efficiency standards, a very strong focus on advanced manufacturing which will have many impacts throughout the energy technology space. For example, our last manufacturing institute on composites will influence everything from wind to lighter weight vehicles for efficiency and also initiatives that we think are very important with international implications like super truck 2 with 100 percent efficiency gain in Class A vehicles.

I do want to single out ARPA–E since the Chair mentioned that. There's just a tremendous amount of innovation going on. We've requested an increase from $280 to $325 million, and I want to say that the fifth anniversary of the first contracts in ARPA–E is coming up this spring. That's now enough of a run and we are seeing that program blossoming in terms of products going into the marketplace and having spinouts of that now acquired by large companies in terms of investing considerable capital to develop those.

I will also mention that in addition to the technology programs in our budget and frankly, very much tied to what we will be discussing, hopefully soon, on the Quadrennial Energy Review, are things like two state grant programs that we propose for a total of $63 million, one on reliability planning and one on energy assurance planning.

Nuclear security, $11.6 billion for the NNSA, a ten percent increase. This will sustain the loose sight of it sometimes, I think, the remarkable science-based approach which has allowed us to sustain our deterrent with our testing. We moved 190 kilograms of weapons material out of six countries last year, three of them in collaboration with Russia. We delivered the first next generation nuclear reactor for our next aircraft carriers while in this budget continuing for the Ohio class replacements in submarines.

Finally, environmental management, $5.8 billion. Again, for perspective, we know we have some very, very tough problems. Senator Cantwell has mentioned some of those at Hanford, but for perspective, the EM program has cleaned up over 85 percent of its sites and 90 percent of the land area over its program life. Now we still have some of the most difficult projects ahead of us.

One thing is in terms of in New Mexico, WIPP, a very, very high priority to get that back online. We believe we're on schedule for roughly one year from now resuming operations at WIPP.

I think those are a few of the areas in our budget, and I think I look forward to discussion with the Committee.

Thank you.

[The prepared statement of Secretary Moniz follows:]

Testimony of Secretary Ernest Moniz
U.S. Department of Energy
Before the
U.S. Senate Committee on Energy and Natural Resources
February 12, 2015

Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee, thank you for the opportunity to appear before you today to discuss the Department of Energy's (DOE) Budget Request for fiscal year (FY) 2016. I appreciate the opportunity to discuss how the Budget Request advances the Department of Energy's missions.

Advancing Nuclear Security, Science & Energy, and Environmental Cleanup

DOE is entrusted with a broad and diverse portfolio across its three major mission areas of nuclear security, science and energy, and environmental management. The Budget Request for fiscal year (FY) 2016 for the Department of Energy is $29.9 billion, $2.5 billion above FY 2015 enacted, to support our mission responsibilities and to continue improving our management and performance in support of those missions.

For nuclear security, the Budget includes $12.6 billion, an increase of $1.2 billion over the FY 2015 enacted level, to support DOE's responsibilities of maintaining and modernizing, via life extension programs, the nuclear deterrent without testing; controlling and eliminating nuclear materials worldwide and providing nuclear and radiological emergency response capabilities in an age of global terrorism; and propelling our nuclear Navy.

For science and energy, the Budget includes $10.7 billion, an increase of $1.3 billion over the FY 2015 enacted, to support DOE's missions of enabling the transition to a clean energy future with low-cost, all-of-the-above energy technologies; supporting a secure, modern, and resilient energy infrastructure; and providing the backbone for discovery and innovation, especially in the physical sciences, for America's research community.

For environmental management, the Budget includes $5.8 billion, to support DOE's responsibility of cleaning up from the Cold War legacy of nuclear weapons production.

Approximately $18.9 billion, or 63 percent of the Department's Budget Request, is national security-related funding, including the nuclear security and most of the environmental management programs. The remaining 37 percent is for non-defense programs in energy, science, and other programs such as building capabilities to respond to energy disruptions, enhancing data collection and analysis in critical areas, and supporting obligations for international cooperation in clean energy and energy security.

Science: Leading Edge Research and World Class Research Infrastructure

Starting with basic research, DOE's Office of Science is the largest federal sponsor of basic research in the physical sciences, supporting 22,000 researchers at 17 National Laboratories and more than 300 universities. Informed by the latest science advisory council reports and recommendations, the FY 2016 Budget Request provides $5.34 billion for Science, $272 million above the FY 2015 enacted level, to continue to lead basic research in the physical sciences and develop and operate cutting-edge scientific user facilities while strengthening the connection between advances in fundamental science and technology innovation.

One of the signature aspects of our basic science research program is the Department's support for the construction and operation of major user facilities at the national laboratories that serve over 31,000 scientists and engineers each year on an open-access basis. We are committed to staying at the cutting edge of light sources, super computers, neutron sources, and other facilities essential to advancing our mission. In the last year, for example, we completed the brightest light source in the world, the National Synchrotron Light Source II at Brookhaven National Laboratory, ahead of schedule and on budget. We are at the commissioning phase of the 12 GeV Upgrade to the Continuous Electron Beam Accelerator Facility at the Thomas Jefferson National Accelerator Facility, and the National Spherical Torus Experiment at Princeton Plasma Physics Laboratory intends to begin research this summer after a significant upgrade.

Looking forward in the FY 2016 Budget, we continue construction of critical, new user facilities while ensuring increased investment in national laboratory infrastructure renewal to help sustain America's scientific enterprise. The Request supports a major upgrade of the Linac Coherent Light Source at SLAC and construction of the Facility for Rare Isotope Beams at Michigan State University. In addition, the Budget provides approximately $2 billion to fund operations of our 27 existing scientific user facilities.

These facilities investments and research grants funded by the Office of Science will ensure that we continue to support discovery science, as well as science that underpins future energy and other technologies.

For example, using the current Linac Coherent Light Source at SLAC, scientists last year mapped for the first time the structure of a protein within a living cell. This single example highlights the tremendous benefits of our national laboratories in a broad range of scientific and applied areas. In addition, the Office of Science supports research at hundreds of universities in all fifty states through competitive grants to advance our mission. For example, a university group recently developed a new class of polymer-based flexible electronics for solar cells and medical applications through DOE-funded research.

High performance computing is a traditional area of strength and responsibility for the Department of Energy that has been an important component of U.S. leadership in science and technology more broadly. The FY 2016 Budget grows our investment significantly to $273 million for a multi-year, joint Office of Science-National Nuclear Security Administration (NNSA) effort to achieve exascale computing—computing platforms with 100 to 1000 times more computational power than today's systems. This effort requires researchers and industry to overcome a number of technical challenges, including energy and big data management, as part of our push to develop enabling capabilities for exascale computing. We recently announced the joint Collaboration of Oak Ridge, Argonne, and Lawrence Livermore (CORAL) to advance within an order of magnitude of the exascale target within a few years. In addition, the Office of Science is supporting the Computational Science Graduate Fellowship program to support training in advanced scientific computing. These investments will ensure continued U.S. leadership of this critical capability in a very competitive global environment.

The Budget provides funding at the FY 2015 level for the U.S. contributions to the ITER project, a major international fusion facility currently under construction in France. ITER will be the world's first magnetic confinement long-pulse, high-power burning plasma experiment aimed at demonstrating the scientific and technical feasibility of fusion energy, and the request includes support for important critical-path items.

We will continue in this Budget to grow the Energy Frontier Research Center (EFRC) program by initiating five new centers and continuing support for existing Centers, for a total investment of $110 million in FY 2016. This EFRC program is our flagship investment in basic science that underpins future energy technologies.

With our Budget Request, we support Fermilab operations at a total of $135 million for operations, which includes operations of the NOvA neutrino experiment. We are also investing $20 million to move forward planning and design for the Long Baseline Neutrino Facility at Fermilab. Last year, the particle physics community came forward with a visionary strategic plan for the High Energy Physics program, and our Budget Request responds to their recommendations, specifically by aiming to develop a strong international consortium for the next generation of neutrino physics experiments.

Energy

All-of-the-Above Energy Approach for a Clean Energy Economy

Preparing for the clean energy economy in order to address climate change and energy security, principally through science and technology, is an essential focus of the Department of Energy. The President's Climate Action Plan is a guiding document for our efforts to mitigate climate change risks through clean energy technologies. The Administration remains committed to an all-of-the-above energy approach, and we believe that we need to enable technologies across all fuel sources to become competitors in a future clean energy marketplace.

In the last year, we have seen important accomplishments across the Department's technology portfolio that highlight our all-of-the-above approach. We have geologically sequestered over 9 million metric tons of CO_2 through DOE-supported projects. Two commercial-scale cellulosic ethanol facilities supported by

DOE grants or loan guarantees have commenced operations. We have commissioned one of the world's largest battery storage systems at the Tehachapi Wind Energy Storage Project. We have issued ten final appliance energy efficiency standards in calendar year 2014, which altogether will help reduce carbon dioxide emissions by over 435 million metric tons through 2030. Standards enacted since 2009 are projected to avoid a cumulative total of 2.2 billion metric tons of carbon emissions through 2030. The Office of Energy Efficiency and Renewable Energy (EERE) has achieved 70 percent of the SunShot goal of cost parity for utility scale solar energy.

The Advanced Research Projects Agency—Energy's (ARPA-E) grant program has attracted more than $850 million in private follow-on funding to 34 ARPA-E projects, with 30 ARPA-E teams forming new companies.

EERE has launched the Frontier Observatory for Research in Geothermal Energy (FORGE), a first-of-a-kind field laboratory to deploy enhanced geothermal energy systems, and we have seen battery technology improvements that are projected to reduce battery costs for electric vehicles by 40 percent. The Office of Nuclear Energy has successfully completed the first 5-year program at the Consortium for Advanced Simulation of Light Water Reactors (CASL) nuclear modeling Hub at Oak Ridge and has initiated a second award for design and licensing support of a small modular nuclear reactor with advanced safety features.

Consistent with an all-of-the-above energy strategy, the DOE Loan Programs Office has issued loan guarantee solicitations for innovative technologies in four areas, including $4 billion for renewable energy and energy efficiency, $8 billion for fossil energy, $12 billion for nuclear energy, and $16 billion for advanced vehicle technology manufacturing.

Projects that this program has supported include one of the world's largest wind farms; several of the world's largest solar generation and thermal energy storage systems; Tesla Motors; and more than a dozen new or retooled auto manufacturing plants. This program's accomplishments include issuing loan guarantees for projects that avoided more than 6.1 million metric tons of carbon dioxide cumulatively in 2014, and for companies that produced more than 2.1 million fuel-efficient vehicles in 2014. We are moving aggressively in finding good projects to

deploy innovative energy technologies using the remaining $40 billion in loan authority in the coming years.

Together, these accomplishments illustrate how DOE's programs invest in an all-of-the-above spectrum of energy technologies, and the FY 2016 Budget Request continues forward on that strategy with a $5.4 billion request for our applied energy programs.

Advanced manufacturing will continue to be a major focus of our investments. We will continue to help support an American manufacturing renaissance. The FY 2016 Budget fully funds two new clean energy manufacturing innovation institutes and continues funding for four institutes, as part of the larger National Network for Manufacturing Innovation, including the advanced composites manufacturing institute in Tennessee the President announced in January. To support these institutes, the Request provides $196 million out of a total request of $404 million for EERE's Advanced Manufacturing program.

In energy efficiency, the Request invests $264 million, an increase of $92 million, to develop and promote the adoption of technologies and practices that, when fully deployed, would reduce U.S. building-related energy use by 50 percent from the 2010 Annual Energy Outlook baseline. It also provides $228 million, $35 million above FY 2015, to support competitively selected projects, training and technical assistance, and residential energy efficiency retrofits to approximately 33,000 low-income households nationwide.

The FEMP Budget includes $15 million for the Federal Energy Efficiency Fund which provides direct assistance to agencies for investing in priority energy projects for efficiency and renewables. By providing direct funding and leveraging cost sharing at other agencies, the fund creates greater opportunities to develop Federal projects that may not otherwise be implemented.

The Request increases our investments in sustainable transportation, including $40 million for the SuperTruck II initiative to develop and demonstrate technologies to double class 8 freight truck efficiency by 2020 from a 2009 baseline. The Request also continues our focus on electric vehicles by investing $253 million in the EV Everywhere initiative, which aims to enable domestic production of plug-in

vehicles that are as affordable and convenient as gasoline vehicles by 2022. By continuing to make progress in core component technologies such as the dramatic reductions we are seeing in battery and fuel cell costs, we are looking to achieve transformative performance improvements for electric vehicles in the marketplace.

In biofuels, the Budget continues our focus on drop-in fuels, which can take advantage of existing infrastructure, and we will provide $45 million for the jointly funded USDA/DOD/DOE commercial scale biorefineries program to produce military specification drop-in fuels. We will also continue research and development efforts on supplying, formatting, and converting cellulosic and algae-based feedstocks to bio-based gasoline and diesel, with a $138 million investment in the FY 2016 Request.

The Budget continues to support accelerated advances in renewable energy. The SunShot Initiative has helped accelerate the reduction in solar costs, and our request of $337 million, an increase of $104 million, aims to continue progress to achieve cost parity without subsidies by 2020. For wind energy, the Request of $146 million, an increase of $39 million, includes funding for year five of a six fiscal-year Offshore Wind Advanced Technology Demonstration program supporting three offshore wind projects on track to begin operation in 2017. Our request of $96 million for geothermal energy, $41 million above FY 2015, implements the FORGE, an experimental facility aimed to advance enhanced geothermal systems, and pursues new approaches to hydrothermal development with a special focus on collaborative efforts with the Office of Fossil Energy on subsurface science, technology and engineering.

As we witness the transformation of our Nation's electric grid, the Department continues to drive electric grid modernization and resilience. In May 2014, with cost-share funding provided by the Office of Electricity Delivery and Energy Reliability (OE), Southern California Edison constructed and installed equipment for a prototype 8 megawatt/32 megawatt-hour battery storage plant for wind integration at Tehachapi, CA. The Tehachapi Wind Energy Storage Project is positioned to demonstrate the effectiveness of lithium-ion battery and smart inverter technologies to improve grid performance and assist in the integration of variable energy resources. In addition, we continue improving the security of the Nation's energy infrastructure. Oak Ridge National Laboratory announced in

January 2015 the licensing of its Hyperion software, which helps detect software that has been maliciously altered. Today, more than 20 new technologies that OE investments helped support are now being used to further advance the resilience of the nation's energy delivery systems.

In fossil energy, we will continue our across-the-board focus on carbon capture and sequestration and improving the environmental performance of natural gas development. In particular, the FY 2016 Budget includes funding to conduct initial R&D towards demonstration of carbon capture and storage for natural gas plants. While natural gas is an important bridge fuel, natural gas, as well as coal, will need carbon capture and sequestration to compete in a future clean energy economy.

And while the FY 2016 Budget does not request new authority in these areas, the Department has $8 billion in loan guarantee authority for advanced fossil technologies, as I mentioned earlier, and the Department will continue to work with prospective applicants. Through the President's Budget Request for the Treasury Department, the Administration is also proposing a new, $2 billion refundable investment tax credit, including support for the infrastructure for carbon capture and sequestration, as well as a sequestration credit for commercial carbon capture use and storage (CCUS) deployment to allow for enhanced oil recovery or injection into deep saline aquifers.

In the area of nuclear energy, the Request includes $62.5 million to continue technical support for moving a small modular reactor to the Nuclear Regulatory Commission licensing stage by the end of 2016, as a step towards industry's demonstration of this important technology early in the next decade. The Request includes $326 million to support research and development on reactor aging issues, advanced reactor concepts, and the fuel cycle. This request continues to support R&D on nuclear fuel issues at the Idaho National Laboratory. It also supports research on accident tolerant fuels and includes funding to continue laying the groundwork for implementing the Administration's Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste, including a consent-based approach to the siting of storage and disposal facilities for nuclear waste. The Request also focuses resources on maintaining operational readiness at the Idaho National Laboratory, including $23.2 million for major power

distribution infrastructure refurbishments and $11.7 million for critical security infrastructure investments.

The Request includes $325 million for ARPA-E, an increase of $45 million from FY 2015, to continue to grow this important program. The program, which received its first appropriation in 2009, is now showing impressive results. It has over 400 projects to date, and the first group of completed projects has led to 30 new companies, of which five have been acquired by large strategic investors. Altogether, 34 ARPA-E projects have attracted over $850 million in follow-on funding.

Through ARPA-E, we will continue to invest in early-stage innovation with the potential to lead to transformational energy technologies.

For the loan programs, while the Request does not propose new authority for the Title 17 or Advanced Technology Vehicles Manufacturing loan programs, the FY 2016 Budget does include $9 million for credit subsidy to support a new loan guarantee solicitation for new clean energy projects on Tribal Lands.

In addition to the new loan program, the Request provides $20 million for the Office of Indian Energy Policy and Programs, an increase of $4 million, for its technical and financial assistance programs, with increased emphasis on remote communities and the National Strategy for the Arctic Region.

The Department's final FY 2015 Budget supported a new workforce development effort for graduate and post-doctoral training in three areas of specific mission need for the Department: high performance computing in the Office of Science, advanced manufacturing in the Office of Energy Efficiency and Renewable Energy, and subsurface topics and project management in the Office of Environmental Management. These DOE traineeships are modeled in part after other federal programs for university-led graduate traineeships and include components that are uniquely focused on DOE mission workforce training needs. Our FY 2016 Budget Request proposes to add a fourth traineeship on radiochemistry, supported by the Office of Nuclear Energy, where we see a specific mission need.

Transforming Energy Systems, Investing in Resilient Energy Infrastructure

In addition to the clean energy investments I just discussed, our Nation's energy infrastructure is an area that needs—and is now getting—more attention.

We have had several recent accomplishments relating to our energy infrastructure. Following the aftermath of Superstorm Sandy, the Office of Electricity Delivery and Energy Reliability committed $500,000, along with EERE, totaling $1 million for Sandia National Laboratories to provide technical assistance to New Jersey Transit and the Board of Public Utilities to assess NJ Transit's energy needs and help develop a conceptual design of an advanced microgrid system that will avoid disruptions and make it easier to get the power back on after a major disaster.

Led by our Office of Energy Policy and Systems Analysis, we have also completed a nationwide public stakeholder process and analytical work in support of the upcoming release of the first-ever Quadrennial Energy Review (QER) of U.S. energy infrastructures.

The QER is a four-year interagency process, with the first year focusing on energy infrastructure—the transmission, storage, and delivery of energy. We expect the first QER installment to be released soon, and many of you may be interested in that document for its systematic analysis of the breadth of challenges with our current energy infrastructure. The QER will also include recommendations to drive future program directions.

The electricity grid underpins many other infrastructures, and the FY 2016 Budget Request includes $356 million, an increase of $160 million, for a major crosscutting initiative led by the Office of Electricity Delivery and Energy Reliability to focus on the modernization of the electricity grid. This initiative invests in technology development, enhanced security, and modeling to enable the electricity grid of the future. This initiative includes $10 million for R&D to improve resilience of large-scale electricity transformers and $14.5 million to transition to an integrated system at the distribution level and develop a platform for market-based control signals. In addition, the Request establishes a virtual collaborative environment for conducting real-time advanced digital forensics

cybersecurity analysis, which can be used to analyze untested and untrusted code, programs, and websites without allowing the software to harm the host device.

The Request includes $15 million to develop advanced technologies to detect and mitigate methane emissions from natural gas transmission, distribution, and storage facilities, and $10 million to improve methane leakage measurements.

We will focus new attention on state grants for energy assurance and reliability, recognizing that many authorities and actions in this area depend upon the states. The FY 2016 Request includes $35.5 million to provide grants to state, tribal, and local governments to update energy assurance plans to address infrastructure resilience, as well as $27.5 million that is part of the Grid Modernization crosscutting initiative to provide competitive grants to states and multi-state entities to address electricity reliability.

Finally, while we move toward implementation of recommendations on the first installment of the QER on infrastructure, DOE will move forward on future installments of the 4-year QER. The Budget includes $35 million for the Office of Energy Policy and Systems Analysis to provide integrated energy systems analysis and follow-on QER support activities.

In addition to the longstanding major mission areas of nuclear security, science and energy, and environmental cleanup, emergency response is an important mission for the Department. While we have had an ongoing responsibility for nuclear and radiological incident response, the Department has intensified its efforts for energy infrastructure emergency response, working with FEMA. Our Budget proposes an increase from $6 million to $14 million for Infrastructure Security and Energy Restoration, the lead program for these responses. While the budget for this emerging responsibility is relatively small, it is an increasingly important focus.

Enhancing Collective Energy Security

The Department's work in energy security is modest in budget requirements but greatly important for the Nation. Particularly given the events in Europe and Ukraine, we have an increased global focus on collective energy security—energy security for the United States and its allies.

In the last year, we worked with the G-7 and the European Commission to achieve a G-7 Leaders Agreement on a new collective energy security framework. Led by our Office of International Affairs, we also worked directly with Ukraine to provided technical support in developing its first ever energy emergency management plan, especially for the winter. In December, we also signed a Memorandum of Understanding with Canada and Mexico to initiate improved coordination of North American energy data. Led by DOE's Energy Information Administration (EIA), this will help us develop stronger active collaboration moving forward.

To continue on this progress for collective energy security, the FY 2016 Budget Request includes $24 million for the Office of International Affairs. While the funding level is not large compared with other parts of the Department, the Office of International Affairs is taking on increased responsibility, as I just highlighted, and funding at this level is needed to fulfill its important mission and strengthen international energy technology, information and analytical collaborations.

Similarly, the Budget increases investment in the EIA to $131 million, in order to fill gaps in current energy data, including transportation of oil by rail and integrating energy data with Canada and Mexico. The EIA recently initiated a data reporting program on oil and natural gas production trends by region, and the requested increase is needed to continue with this and other improvements in our data collection, analysis, and reporting.

Last year, the Department also completed a 5 million barrel test sale for the Strategic Petroleum Reserve (SPR) to look at infrastructure challenges resulting in large part from pipelines now flowing in opposite directions from when the SPR was originally established. Through the test sale, we found challenges confronting the SPR's distribution system, and the FY 2016 Budget proposes an increase of $57 million above FY 2015 for the SPR to begin addressing the operational readiness issues found through the test sale to enhance distribution flexibility and reliability and to begin to address the existing backlog of deferred maintenance projects.

Strategic Partnerships with National Laboratories to Advance DOE Missions

The Department is continuing its focus on building the strategic partnership with the National Laboratories. DOE is a science and technology agency, and our efforts across all of our mission areas are heavily grounded in science and technology. The National Labs are a major core asset in executing our missions, and strengthening our partnerships is critical to our success.

We are doing that in a variety of ways. For example, DOE is engaging the laboratories very early on in our program planning. The National Laboratories Ideas Summit helped shape FY 2016 budget initiatives and was instrumental in forming a special consortium of 14 National Laboratories arranged to implement the crosscutting grid modernization research.

We also have begun using the National Laboratories' expertise in science and technologies in some of our major challenges outside of the science and energy arena. When faced with what looked like major problems with the cost and schedule of the Uranium Processing Facility (UPF) at the Y-12 National Security Complex in Oak Ridge, or the major problem we had at the Waste Isolation Pilot Plant (WIPP), we engaged Laboratory leadership to help reformulate our approach to those issues. In those two examples, Oak Ridge National Laboratory led the Red Team review and restructuring of UPF, and the Savannah River National Laboratory led the forensics effort to investigate the cause of the failure of the waste canister at WIPP.

The Laboratory Operations Board (LOB), a body that we put in place in 2013, performed the first-ever uniform assessment of general purpose infrastructure at all Laboratories and NNSA plants. That has led to identifying over $100 million in the FY 2016 Budget in new investments for priority general purpose infrastructure projects guided by LOB assessments, while also avoiding an increase in deferred maintenance.

Finally, we have developed new strategies to strengthen institutional capability of the National Laboratory system based on advice from the Secretary of Energy Advisory Board (SEAB)

Enhancing Impact: Crosscutting Initiatives in Key Technology Areas

The FY 2016 Budget expands the crosscutting initiatives introduced in the FY 2015 Budget designed to advance key technology areas that have multiple energy resource applications. Each crosscut reflects an integrated plan of work to optimize programmatic objectives by efficiently allocating resources. Through deliberate and enterprise-wide planning and coordination of these research efforts, the crosscutting initiatives will help bolster DOE's efforts to institutionalize enhanced program management and coordination across program offices, while accelerating progress on key national priorities.

The programs and budgets within the three mission areas include over $1.2 billion in crosscutting R&D across six initiatives focusing on: electricity grid modernization, subsurface technology and engineering, supercritical carbon dioxide technology, energy-water nexus, exascale computing, and cybersecurity. These initiatives are the product of a concerted coordination effort among all three DOE Under Secretariats and program offices across the Department in close collaboration with the National Laboratories.

The FY 2016 Budget continues to build on the five crosscutting initiatives established in FY 2015. The Exascale Computing initiative invests to make progress toward a thousand-fold improvement over current high performance computers. Grid Modernization supports technology development, enhanced security, and stakeholder support to enable evolution to the grid of the future. The Subsurface Engineering initiative invests in new wellbore systems, seismic research, and other areas supporting a wide variety of energy sources. The Supercritical Carbon Dioxide initiative establishes a 10 MWe-scale pilot Supercritical Transformational Electric Power facility aiming to increase the efficiency of power generation, and the Cybersecurity crosscutting initiative strengthens cybersecurity across DOE's federal and laboratory sites, and improves cybersecurity for the nation's electric, oil, and gas sectors.

The FY 2016 Budget also proposes one new crosscutting initiative, the Energy-Water Nexus. This initiative recognizes that the Nation's energy system uses large quantities of water, and the Nation's water system uses large quantities of energy,

and that DOE's coordinated science and technology efforts can contribute to the Nation's transition to more resilient energy-water systems.

Nuclear Security

The FY 2016 Budget Request provides $12.6 billion for the NNSA, an increase of $1.2 billion over FY 2015, to carry out our missions for the nuclear deterrent, nuclear nonproliferation programs, and propulsion for the nuclear Navy.

Effective Stewardship of the Nuclear Deterrent

The Request includes $8.8 billion for Weapons Activities, $667 million above FY 2015, to maintain a safe and effective nuclear deterrent while continuing to reduce the size of the active stockpile.

In pursuit of this mission, we have recently achieved a number of major accomplishments. We have, first and foremost, had another year of science-based certification of the stockpile as safe, secure, and effective without nuclear testing. It is important to remember the remarkable story that a science research program has enabled the paradigm to shift since nuclear testing ceased to allow us to consistently certify the stockpile as safe and reliable without testing, even as it shrinks.

In the major life extension programs, we have now passed the halfway mark in Life Extension Program (LEP) for the W76-1 warheads for the Navy, and our FY 2016 Budget Request of $244 million will keep us on track to complete the program in 2019. We have conducted successful first integration testing of the B61-12 LEP for the Air Force on or ahead of schedule, and the Request of $643 million supports delivery of the First Production Unit in 2020. By the end of FY 2024, completion of the B61-12 LEP will shrink the number of active and inactive weapons, reduce the mass of nuclear material used in these weapons, and allow us to retire the B83, the last U.S. megaton class weapon. Our Request of $220 million for the W88 ALT 370 supports delivery of the First Production Unit with conventional high explosives refresh by FY 2020.

This Budget supports the Nuclear Weapons Council decision to accelerate a new cruise missile capability, and the selection of the W80 as the warhead for the Air

Force's Long Range Stand-Off system (LRSO). The FY 2016 Budget Request includes $195 million to accelerate the program by two years, to be completed in 2025, in order to meet military requirements.

We have begun operations in the new Kansas City Responsive Infrastructure Manufacturing and Sourcing (KCRIMS) facility with half the footprint and an improved operating environment compared to the old environment. And at the National Ignition Facility, we have significantly increased the shot rate and achieved impressive advances in experimental results in closer alignment with modeling predictions.

As I mentioned earlier, we have used strategic partnerships with the National Laboratories to rethink some of our challenging projects. As a result of the Red Team review of the Uranium Processing Facility at the Y-12 National Security Complex in Oak Ridge, led by the Director of the Oak Ridge National Laboratory, and a similar review of the Chemistry and Metallurgical Research Replacement Facility (CMRR) capability at Los Alamos National Laboratory, we are developing a disciplined modular approach for both sites that will remove risks early in the process and build to a more rigorous budget and schedule. This rigorous process will be an important and recurring project management theme at the NNSA and across the Department of Energy—in particular, at the Office of Environmental Management.

Controlling and Eliminating Nuclear Materials Worldwide

The FY 2016 Budget Request includes $1.9 billion for Defense Nuclear Nonproliferation, $325 million above FY 2015, to continue the critical missions of securing or eliminating nuclear and radiological materials worldwide, countering illicit trafficking of these materials, preventing the proliferation of nuclear weapon technologies and expertise, and ensuring that the U.S. remains ready to respond to high consequence nuclear and radiological incidents at home or abroad, and applying technical and policy solutions to solve nonproliferation and arms control challenges around the world. The Request is a $75 million, or 4 percent, increase from the comparable FY 2015 enacted level after adjusting for a budget structure change moving counterterrorism efforts from the Weapons Activities appropriation to the Defense Nuclear Nonproliferation appropriation.

We have completed the removal or disposal of a total of 190 kilograms of vulnerable nuclear material, through bilateral agreements, and trilateral agreements with Russia and countries with material of Russian origin. Despite a difficult relationship at the moment, we are continuing to work with Russia to repatriate weapons-usable material to the United States or Russia.

In 2014, we obtained a pledge from Japan at the 2014 Nuclear Security Summit in The Hague to remove and dispose of all highly-enriched uranium and separated plutonium from the Fast Critical Assembly in Japan. We also helped prevent the illicit trafficking of nuclear and radiological materials, technology and expertise by installing 37 fixed and 22 mobile radiation detection systems worldwide.

The FY 2016 Budget Request reorganizes the Defense Nuclear Nonproliferation program into four business lines: Global Material Security; Materials Management and Minimization; Nonproliferation and Arms Control; and Nonproliferation Research and Development. We have also strengthened Counterterrorism and Emergency Response by consolidating these efforts with Nuclear Nonproliferation programs in one account. Together, these reorganizations create a clearer set of business lines for the nonproliferation programs and represent the full continuum of our nonproliferation efforts as we prevent, counter, and respond to global threats.

In FY 2015, the Congress appropriated $345 million to continue construction of the mixed-oxide (MOX) project at Savannah River. The FY 2016 Budget includes $345 million, which is the current services projection from the FY 2015 enacted level, while we complete congressionally-directed studies on plutonium disposition costs and alternatives.

Advancing Navy Nuclear Propulsion

The FY 2016 Budget Request includes $1.4 billion for Naval Reactors, $142 million above FY 2015, to support the Navy fleet and maintain progress on current efforts to refuel the land-based research and training reactor. The Request increases funding for Naval Reactor's core objective of ensuring the safe and reliable operation of the Nation's nuclear fleet (73 submarines and 10 aircraft carriers), constituting over 40 percent of the Navy's major combatants.

The Naval Reactors programs achieved some significant accomplishments this year. In 2014, we began integrated testing of the lead A1B reactor plant of the next-generation FORD-class aircraft carrier and provided technical resolution support for the nuclear fleet which steamed over 2 million miles.

The FY 2016 Budget provides $187 million to continue development of the advanced *Ohio*-Class Replacement Reactor, and $133 million to initiate refueling of the Land-based Prototype reactor. We also provide $86 million to continue construction of the Spent Fuel Handling Recapitalization Project.

Cleaning up the Cold War Nuclear Weapons Legacy

The FY 2016 Budget Request includes $5.8 billion for Environmental Management, $43 million below the FY 2015 enacted level, to position DOE to meet the nation's Manhattan Project and Cold War legacy responsibilities. DOE is responsible for the cleanup of millions of gallons of liquid radioactive waste, thousands of tons of used nuclear fuel and special nuclear material, disposition of large volumes of transuranic and mixed/low-level waste, huge quantities of contaminated soil and water, and deactivation and decommissioning of thousands of excess facilities.

I will discuss in a moment the difficult challenges we face with some of our remaining Environmental Management projects. But I would like to start by pointing out that when the program started, there were 107 sites to be closed, and we have cleaned up all but 16 sites. To be sure, the remaining sites are not the simplest to remediate; however, we started with over 3,000 square miles to remediate, and we're down to only 300 square miles. And so, by some metrics, we have cleaned 90 percent of our total footprint. However, it will be decades before we finish the most difficult remaining sites.

Though we are down to some of the most difficult sites, progress is steady. Last year, we completed demolition of the K-25 facility at Oak Ridge, the largest demolition project DOE has ever undertaken. We have converted 15 million pounds of liquid waste into solid glass at the Defense Waste Processing Facility at Savannah River, enabling closure of six high level waste storage tanks.

We have put forward and are beginning to implement an alternative phased approach to completing the Hanford Waste Treatment Plant (WTP). We have cleaned up 479 square miles of the 586 square mile area at Hanford, including 90 percent of the River Corridor.

Going forward in FY 2016, recovery of the Waste Isolation Pilot Plant in New Mexico is one of our high priorities. The FY 2016 Budget includes $248 million to implement the WIPP recovery plan, leading to initial resumption of waste emplacement in the first quarter of calendar year 2016. The FY 2016 Budget will also support continued operations of the Integrated Waste Treatment Unit at Idaho and work towards closing the tanks.

With $1.4 billion for the Office of River Protection, we will move forward on our phased approach to begin vitrifying low activity waste early next decade. The Budget moves forward with construction of the Low Activity Waste (LAW) facility at the Hanford Waste Treatment Plant, including design of a new pretreatment system required for our phased approach. We will also continue technical issue resolution at the site, and we will bring the Plutonium Finishing Plant (PFP) at Hanford, once the highest risk nuclear facility at Hanford, down to slab-on-grade by the end of FY 2016.

Finally, we will continue construction and prepare for commissioning of the Salt Waste Processing Facility at Savannah River, which is on schedule to complete construction by December 2016.

Management and Performance: Improving Efficiency and Effectiveness

Building on the Department's FY 2015 emphasis on management and performance, the FY 2016 Budget moves forward on initiatives that continue to identify and institutionalize improvements across the DOE enterprise.

In the Department's efforts to improve management and performance, we have adopted project management reforms, including strengthening the Energy Systems Acquisition Advisory Board (ESAAB) from an ad hoc process into an institutionalized regular process for situational awareness on project progress and issues, as they arise. ESAAB will be supported directly by a Project Management Risk Committee, which brings together DOE experts for a continuous look at the

risk profile of major projects and issues. We have also taken steps to improve the project peer review process and institutionalize other project management reforms.

We have also continually worked to improve management, increase efficiency, and support diversity on a number of fronts. We have recruited 30 high-level Ambassadors from industry, academia, and nonprofits to increase participation of minorities in energy. We have resolved hiring issues at the Bonneville Power Administration, providing additional Human Resources training and restoring hiring authority. The Department's management and operating contractors have reduced pension plan liability by $100 million through lump sum buyouts. Our management and operating contractors have also established Health Reimbursement Accounts at 13 sites for their medical-eligible retirees, reducing long term financial statement liability by $2.8 billion.

Going forward, the Budget includes $25 million for the Office of the Human Capital Officer to implement a new Human Resources service delivery model to streamline our HR model and eventually consolidate 17 current service centers to five key delivery centers. We will also implement a new Energy Jobs Council to improve calculation of energy jobs data and strengthen technical support for state workforce development programs. We will also continue to strengthen Departmental cybersecurity programs, part of the Cybersecurity crosscutting initiative, through an enterprise-wide cyber council established in 2013 for securing personal data, our nuclear security data, and the privately-owned energy infrastructure.

Advancing the President's Vision: Implementing DOE's Strategic Plan

In conclusion, we have much to do to advance the President's vision and implement DOE's Strategic Plan.

We will continue implementing the President's Climate Action Plan, to reduce emissions at home and around the globe.

We remain committed to our all-of-the-above energy strategy, to encourage innovation, create jobs, enable economic growth, and contribute to domestic manufacturing and net exports.

We must maintain leadership in basic research in the physical sciences—and increasingly in the life sciences, develop the next generation of computation technology, and develop and maintain world-class scientific user facilities.

We will continue to maintain a safe, secure, and effective nuclear weapons stockpile in the absence of testing, and manage the infrastructure needed to meet national security requirements.

We must continue to reduce the global nuclear terrorism threat through measures to identify, control, and eliminate nuclear weapons worldwide.

We will address the legal and moral imperative of cleaning up legacy waste to protect human health and the environment.

We will strengthen DOE and its national missions through cross-cutting initiatives that leverage the science, technology, and engineering capabilities across programs and National Laboratory partners.

And we will continually improve DOE effectiveness and efficiency through project management reform and constant attention to maintaining a safe and secure workplace.

Thank you, and I would be pleased to answer your questions.

The CHAIRMAN. Thank you, Mr. Secretary. I think we are going to have good discussions, because we have got some new members here this morning so we will begin.

You mentioned the Quadrennial Energy Review, as Senator Cantwell did. We're looking forward to that release. We are going to have a hearing here in Committee focused on that.

I hope that we have got your commitment and that of your staff at DOE that as we move forward as a Committee in putting together a more comprehensive or a broader energy bill, we can work with you building off what we hope to see within this QER. Where we may need technical assistance or witnesses coming before the Committee, I hope we have your cooperation with that.

Secretary MONIZ. Absolutely, and I know that both in this body and in the House as well, there's a very strong interest in moving infrastructure projects forward. We very much look forward to that, and I can assure you that we will be able to deliver a lot of analysis to back up our infrastructure recommendations.

The CHAIRMAN. I appreciate that. As I mentioned to you yesterday and I will mention to my colleagues, I am going to use every budget hearing I have, as well as every appropriations hearing I participate in as a member of that Committee, to raise the issue of what this country is doing to advance the interests that we have as an Arctic nation. We are going to be assuming the Chair of the Arctic Council in just a matter of months, and this has been something that feels like I am pushing a snowball up a mountain all alone.

I am looking for some help from colleagues, and I have got Senator Cantwell and Senator King willing to do that as well. You have to have the focus in the budget as well.

The Department of Energy is listed as the lead agency within the Administration's implementation plan for the national strategy for the Arctic region. You are also designated as a supporting agency for some other projects. So I will ask you, as I will ask others, what is your Department doing to further the budget request for the integration of Arctic issues?

I know the DOE has actually been singled out as one of the few departments that has actually started to implement some of these initiatives, but I would ask you, very briefly, what DOE is doing to advance our Arctic issues through the lens of the budget?

Secretary MONIZ. Thank you. We are very committed to trying to advance the Arctic programs. I think I can say, even though it's not finished, in the QER, for example, one of the issues will be to emphasize collaborations with Canada as well in terms of looking at Arctic issues.

We are preparing a ten year plan for renewables, for example. We are committed to getting at least five megawatts of solar deployed soon.

I might go back and mention ARPA–E. Yesterday at the exhibit we saw many, many technologies that are appropriate for distributed generation in isolated communities to lower the extreme energy costs there. So on the technology front, we are pursuing that.

Another thing is last year I charged the National Petroleum Council to deliver a report by the end of March that will look at what are the R and D needs that we should be addressing for the

Arctic region, specifically around the hydrocarbon production possibilities there. In particular, looking at the environmental impacts, environmental stewardship, with production.

We are also doing a lot of work in modeling. Clearly, global warming, as you know very well, is impacting Alaska. There are permafrost issues we have looked at together. So, I think, we have some specific programs going on in technology. And we have around both isolated villages and around the hydrocarbon future and we are deeply into several planning processes that will define the next program.

The CHAIRMAN. I look forward to visiting with you on these items.

The National Security Strategy that was released last week provides we must promote diversification of energy, fuels, sources and routes as well as encourage indigenous sources of energy supply. Greater energy security and independence within the Americas is central to these efforts.

We have been talking a lot about energy independence, North American energy independence, and what that means with our friends to the south in Mexico and our friends to the north in Canada. Yet we see announcements, like we saw a couple weeks ago, where within our own borders we are putting off energy supply. Taking 22 million acres of great prospects for energy resource development completely offline, offshore and onshore, and done in the course of three days.

I am going to be looking forward to really pushing this Administration when we're talking about how we work to provide for the national security aims, as set out in this Administration's own policy, when we're saying no to Keystone. We're shutting off Alaska. I want to make sure that this is meaningful and not just words on paper, so I want to focus a little bit more.

My time is expired, and I want to give the courtesy to my colleagues here, but as we look to our oil exports to Canada, we have got about 455,000 barrels per day of exports to Canada. I am hoping that is part of that energy security and independence, and that the same would be afforded to Mexico. But that also, when it comes to our own resources within this country, we are not shutting them off as well. I am not giving you the opportunity to reply to that.

Secretary MONIZ. Alright.

The CHAIRMAN. But know that this is a priority of mine.

Secretary MONIZ. Thank you. I'm happy to engage in the whole energy security discussion.

The CHAIRMAN. I think we——

Secretary MONIZ. Which we are doing in the G7 context.

The CHAIRMAN. We have had those conversations, and I want to continue them. I will turn to Senator Cantwell.

Senator CANTWELL. Thank you, Madam Chairman.

Mr. Secretary, you know we have had multiple conversations about the recurring events at Hanford. We have addressed this issue prior to your time, in 2004, and when we had incidents in 2008 and 2010. So 2014 is the newest round of these incidents. Every few years we have concerns about worker safety and concerns that as the contractors roll over that we are starting again on making sure that we have implemented these kinds of reforms.

I certainly appreciate your engagement on this, but I want to make sure that you continue to take control of the situation and that whatever is done under your leadership is actually institutionalized so that we don't have the same issues happening again. These incidents of exposure really are something we don't want to see again in the future.

Specifically what is DOE doing to implement these new procedures and change things from business as usual to a regime that will last no matter who the contractor is?

Secretary MONIZ. Thank you. Well, first of all, as you know very well, with the latest round of incidents we put together, I think, a very, very high quality technical team which, I think, has brought some new insights. Now we have an implementation plan. We are already implementing much of it.

We have directed the contractor to implement all of the 40 plus recommendations. That will be in two phases. All of those that we can implement now, we will. There are some that will take, we estimate, about a two year period to get more information before we execute.

In terms of the resource commitments to manage the vapors problem, we estimate at about $20 to $25 million in FY'15 and likely doubling, roughly, in FY'16.

When it comes to institutionalization, my answer to that on any issue is perform. If one demonstrates high performance that's the best way to institutionalize something. So that's our goal.

Senator CANTWELL. What about fines or something of that nature?

Secretary MONIZ. Well, that may be part of a high performance culture. We want to perform. We are happy to be judged on how we perform in terms of implementing the recommendations that have now come forward for implementation. And again, I think if we succeed that will be the best way of institutionalizing the path forward.

Senator CANTWELL. Can I ask you about the Richland Operations Office? It was not funded as well as some of the other offices in the DOE complex, and it obviously has hit its milestones. The problem, obviously, with the Hanford budget overall is everybody always looks at it and thinks we can do with less. In reality, as you pointed out in your testimony, the complexity of the problem at Hanford is so great.

The Richland Office is currently cleaning up two of the most radioactive parts of the Hanford site, buildings 324 and 618, and ten burial grounds. What can you tell me about the timeline for the cleanup of these two specific sites, and what is going to be accomplished on these two projects in 2015?

Secretary MONIZ. Senator Cantwell, so first of all, as you said, and I'll just repeat that, of course, the overall site budget is increased in the request by roughly $100 million. The Richland part of that, certainly there have been a number of accomplishments. And so, we think the budget as requested will allow a strong program going forward.

I'll have to get back to you on the specific timeline of that specific project. But I want to emphasize that with this budget we will get the plutonium finishing plant which has been judged to be, at one

point it was the highest risk project, down to slab this year. We will be continuing to remediate ground water. So there's going to be a lot of—oh, we will continue the tremendous progress that's been made in opening up the river corridor. So we believe that FY'16 there will be very, very strong progress. We'll get back to you on that specific timeline.

Senator CANTWELL. Okay, and put in there, when will DOE meet the 2018 deadline for cleaning up the 618–10 and 618–11 burial sites.

We are obviously concerned about this reduction. And again, the priorities are so mammoth. We just want to make sure we are making progress.

When I get to my next round I am definitely going to ask you about separating defense waste.

The CHAIRMAN. Senator Cassidy.

Senator CASSIDY. Mr. Moniz, good morning.

Secretary MONIZ. Good morning.

Senator CASSIDY. You mentioned carbon capture sequestration. The Mississippi plant, in Kemper, Mississippi, I think that's 30 percent over cost. And so, I think, part of the issue is who should pay for that? Should that be the ratepayers or should that be the ARPA–E or someone else? It seems to be one of the questions behind carbon capture sequestration. What are your thoughts on that?

Secretary MONIZ. Well, the Kemper plant, of course, is a very, very ambitious plant which goes well beyond as a simple carbon capture plant. It is, first of all, capturing. Well, with its gasification approach it will be capturing roughly two-thirds of the carbon dioxide. But it is also a multi-product plant, so it is producing CO_2 for enhancing oil recovery.

Senator CASSIDY. I totally get that, but who should pay for that because right now, frankly, it sounds more experimental. Does that make sense?

Secretary MONIZ. I wouldn't say experimental. Fundamentally the Department of Energy made a grant, early on, to help it get along. It's understood that that is capped in terms of the Federal contribution, and my understanding is that the cost overrun is being shared between ratepayers and Southern Company.

Senator CASSIDY. Okay. Now ARPA–E is funding Tesla, right? Did I see that was one of the projects that ARPA–E is funding? Tesla?

Secretary MONIZ. No, sir. Tesla was given a loan of roughly $500 million a few years ago which they have fully paid back many, many years ahead of schedule.

Senator CASSIDY. Okay. Still it seems like we are subsidizing. I presume that it is somewhat of a subsidized loan?

Secretary MONIZ. Well, all of our loan programs——

Senator CASSIDY. The fact that it is guaranteed they borrow at a lower rate, I presume.

Secretary MONIZ. Yes, the terms are generally good, at or slight increase to Treasury's. We certainly don't——

Senator CASSIDY. Well, I just said it to point that out. I never read about a movie star buying $100,000 Tesla and wondering why we are, you know, you seem like they are profitable on their own.

I just make that point because the taxpayer who is in Louisiana, going to work in his pickup truck is effectively subsidizing the production of a $100,000 vehicle.

Secretary MONIZ. Well, sir, first of all, getting this kind of an electric vehicle with a long range into the market is part of our job of pushing the technology envelope.

Again, frankly, we made money on the loan to them. Indeed, and not a broadly known fact, is that in the 30 plus billion dollar loan portfolio the fees collected by the government already exceed the losses in the small number of loans that did not perform. So the portfolio has worked very well. We project there will be a $5 billion positive, in the black from the program.

Senator CASSIDY. Can I pause you just for a second? I don't mean to be rude, it's just I only have two minutes left or a minute thirty.

I think I spoke about this with you when I was in the House last year, but you had given a lecture at MIT speaking about the future of the energy supply of the United States. I think you predicted that gas would fall off around 2060 as an energy supply, coal at some point, perhaps prior to that and then nuclear or other low CO_2 generation would take over after that. Do you still see that as the likely scenario?

Secretary MONIZ. I should clarify, in the scenario, of course, which was constrained by a substantial CO_2 reduction in that picture, not surprisingly, first coal and then gas without carbon capture would, of course, go down to meet the low carbon targets. That does not exclude any of the low carbon technologies including coal and gas with capture playing a role along with nuclear and renewables and demand side management.

Senator CASSIDY. So——

Secretary MONIZ. So, it's really, it's almost a tautology in the sense of if you—if the model requires a low carbon future you have to go to low carbon sources.

Senator CASSIDY. So in the President's Clean Energy plan, I think I've read that my state will cost $5.7 billion to comply with. Now I look at that $5.7 billion as basically forcing manufacturers overseas for anything that is energy intensive. Important, of course, because energy intensive industry is what creates jobs for blue collar workers.

Do you see a problem with that? Do you see where I'm going with that?

Secretary MONIZ. Well, today the facts are that there's enormous construction in the Gulf. In fact the problem——

Senator CASSIDY. Well, absolutely, but somewhat in danger, potentially, by the rule that would require 40 percent reduction in CO_2 production from coal-fired plants.

Secretary MONIZ. We don't see, I mean, we don't see really the low carbon future as in any way being negatively impactful to the overall economy. We see continuing low prices, especially in the natural gas arena. And as you know that has been a major driver of what is happening in the Gulf region and elsewhere in terms of increased economic activity.

Senator CASSIDY. I am out of time, but I will finish by saying it does seem if you raise the cost of that energy production by these measures ultimately you increase the input and change the model

so companies are more likely to move overseas. But I'm over time, so I must yield back.

Secretary MONIZ. I'd be happy to discuss that privately, but I would just add one thing, of course, that the other side of the equation is work on the demand side and higher energy efficiency including in our industrial processes. There's a lot of continued progress there as well.

Senator CASSIDY. Thank you.

The CHAIRMAN. Let's go to Senator Manchin, and he will be followed by Senator Portman.

Senator MANCHIN. Thank you, Madam Chairman. Mr. Secretary, thank you for being here again. We have had some great discussions. Dr. Cassidy brought up some things I am very much concerned with.

I just want to get to the facts that we are dealing with. I have always said we are all entitled to our opinion, just not our own facts. The fact that we have right now is the United States of America continues to rely on fossil fuels for about 68 percent, and it seems to be for the next 25 years that the EIA, your own division, estimates that to be factual.

Reliability is a big factor with me. The reliability in the grid system, of what we have right now, can we maintain it? We came extremely close to having serious problems last year in the PJM system, with the polar vortex. And we are going to rely, I think that makes us about 32 percent coal up through 2040 and 35 percent natural gas. I think these are your figures. Are you?

Secretary MONIZ. Yes. Just to clarify though, I believe is in what's called the business as usual scenario.

Senator MANCHIN. Okay.

Secretary MONIZ. Yeah.

Senator MANCHIN. And then it says in 2013 renewables provide about 13 percent. Renewables are providing about 13 percent.

Secretary MONIZ. Again, in business as usual.

Senator MANCHIN. And you're expecting that to go to 16 percent, I guess business as usual, by 2040?

Secretary MONIZ. Yeah. Although again, with greater carbon constraints there's a good chance that will be higher, and certainly solar is going up very, very fast.

Senator MANCHIN. Here is the thing that I have a question about in your budget request. It is before us right now. I think it has a request for $2.7 billion for energy efficiency and renewable energy, of that amount?

Secretary MONIZ. And sustainable transportation. So it's really three different programs.

Senator MANCHIN. Okay, but only $560 million for fossil energy in research and development? The only thing I am saying is about a five to one ratio of what you are spending on the different forms of energy and actually what you are expecting those different energies to produce. Basically you want fossil or you expect fossil to give you five times more the energy to make the system run in America, to make the economy run in America, to keep the system in the grid alive. But you are putting all your eggs, it looks like, in a basket. I am not asking for a reversal, but I am asking for a level playing field.

If you want us to do the job, help us find that technology that we are able to continue to produce the energy depended upon.

As we know right now there are only two base loads, correct? Is that what we have? Gas is not quite a base load yet, but it will be, I think. It is getting there.

Secretary MONIZ. Yeah.

Senator MANCHIN. Nukes and coal, 24/7, rain or shine, that is what you have got.

With that being said, don't you think it is awfully dicey for us not to be moving further is what Dr. Cassidy said, to find that technology and not put the burden on? Because we do not have a commercial plant other than the Kemper plant coming on. One proven commercial plant as far as carbon capture sequestration.

Secretary MONIZ. Well, if I may comment. First of all, again, I think on the EERE budget it's a little bit artificial to compare that whole budget to the fossil number. Again, it's really practically three distinct programs.

Senator MANCHIN. But it's not balanced.

Secretary MONIZ. Yeah, so it's not balanced, but so the renewables budget is about $600 million, I believe, something like that. Transportation around 800 and efficiency around a billion, roughly speaking, I think. That's the first point.

Secondly, there's no question that, I mean, our job is to prepare for the future, as you said.

Senator MANCHIN. Sure.

Secretary MONIZ. And that future is going to depend upon clean energy and lower carbon emissions. So therefore, we are doing all the above for that world. For coal, in particular, we have other parts of the agenda, but for coal the number one focus is around carbon capture utilization sequestration. The budget for that, as I have already indicated, has many features beyond that R and D budget.

Secondly, there is also the ARPA–E budget which contributes to this.

Third, there is the loan guarantee program.

Fourth, there is the new tax incentive program proposed for Treasury, et cetera.

So it's a—and the loan program is $8 billion for fossil technologies.

Senator MANCHIN. It hasn't been—my time is running short. I just will say this. The facts of what we are dealing with right now. There is not another coal-fired plant being built or even in the planning stage of being built in America that I know of. You might have one or two somewhere, I don't know, but there is going to be 1200 being built around the world, 450 in India, 350 in China, and it goes on and on and on. And the bottom line, what I am saying is we should be the leader in technology. That is all I have said.

Secretary MONIZ. I think we will be, in particular, for lower carbon emission coal. And for example, I would note if one takes, I mean, you know, let's put it on the table.

If you take the proposed EPA rule for new plants requiring sequestration. The demonstration plants that we are putting forward are really pushing the edge and they're 90 percent capture, et cetera.

Senator MANCHIN. But they are not cost effective, not cost efficient.

Secretary MONIZ. If you—yes, but on the other hand, in the proposed EPA rule if you build an ultra super critical coal plant which is available.

Senator MANCHIN. Sure.

Secretary MONIZ. It's only 30 percent capture required to meet that. So it's a whole different level of challenge to that coal plant. So I think this is a discussion we need to——

Senator MANCHIN. We will continue. I know we have had it before. We will continue. I just think that it is unbalanced the way our Administration and country is approaching an inevitable. We are going to use it. We need it. We depend on it. Do you follow me?

Secretary MONIZ. Yeah.

Senator MANCHIN. Why not be the leader in technology since the rest of the world is using it?

Secretary MONIZ. I agree with that.

The CHAIRMAN. Senator Portman.

Senator PORTMAN. Thank you.

I appreciate that dialogue and the one point that maybe is obvious to everyone is we have more coal in the ground than all those other countries that are continuing to develop coal-fired plants at a time when we've got the ability to take the leadership role in the technology. So I agree with my colleague from West Virginia. We ought to be taking advantage of that.

Three questions quickly.

First on energy efficiency. You were very helpful in the legislation that we worked on in the last few years together, pretty good at providing technical advice. We hope that you will continue to do that.

Secretary MONIZ. Absolutely.

Senator PORTMAN. Senator Shaheen and I are reintroducing a bill that has gone through this Committee twice, as you know, with a large vote within the next few weeks, and we are talking to your folks. But if you could, again, make a personal commitment to this, we would appreciate it.

Secretary MONIZ. We will support that efficiency bill in any way we can.

Senator PORTMAN. Excellent. As you know we happen to have a few little amendments on the Keystone bill. Though I am sure that will influence your thinking on that and convince the President to sign it.

That's not a question. [Laughter.]

Senator HOEVEN. But an outstanding remark. [Laughter.]

Senator PORTMAN. Hoeven liked it. ACP, the American Centrifuge Project.

You all had a report issued last year and I understand part of it was classified so I won't ask you to talk about that, but it was about alternatives. My understanding is it said that the centrifuge project going on now, in other words, developing these new centrifuge technologies is the right way to go and that we need them.

Centrifuge technology, to be able to enrich uranium in this country. We only have one place we do it and that under our international treaties, as you have said in your previous testimony, we

have to have a U.S. source for this. Can you talk a little about, to the extent you can, that report where we are on ACP?

I noticed in the budget that you have $100 million dedicated to it for FY'2016. I also noticed that with regard to the international nonproliferation efforts that you continue to say that this is an important element to our strategy, to be able to tell other countries, look if you don't go down this route of enriching uranium, we can provide you enriched uranium for your peaceful purposes. Could you comment on that?

Secretary MONIZ. Yes. There are two different aspects I would emphasize.

First of all the United States really has the strongest standards in terms of nonproliferation issues globally for the nuclear fuels cycle. And so, we do feel that having the United States companies engaged in that fuel cycle is very important for our nonproliferation aims. So that's one aspect.

The second aspect is specifically for national security. We have two needs in particular. The nearest term one being tritium for our nuclear stockpile and then eventually AGU, for example, for our nuclear Navy.

To do that, as you have said, we need to have American origin technology to produce the LEU from American origin uranium placed into an American reactor. So from that point of view the ACP, Advanced Centrifuge Project, is the technology at hand. So the $100 million is to maintain that as we are finishing up, over these next months, a very intensive, multi-agency study on the exact needs, including schedule needs, to meet those national security obligations.

Senator PORTMAN. I appreciate that very much, and the report on tritium, I understand, is due out in April. I believe that will confirm what you are saying which is that we need to have this low grade, enriched uranium for tritium which is critical to our nuclear arsenal. We appreciate your continued support of ACP. I know taxpayers have already spent about $6 billion toward this effort. I appreciate the fact that we are going to follow through on this and have this domestic source.

Clean up. The Piketon plant used to use this gaseous diffusion model, and you all made a commitment to clean it up and do it in an accelerated way. Once again I am disappointed the budget does not keep that promise. If I look at the budget, I think it is $49 million below even what we did in Fiscal Year 2015. This is a commitment the President made way back in 2008.

I look at these sites in a very simple way. As you know, I was very involved in one of the sites, the Fernald site outside Cincinnati. But also look at what's happened at Rocky Flats and so on. To the extent you can continue this accelerated clean up.

One, it is safer for the community, obviously.

Second, you save the taxpayers billions of dollars. We believe we saved somewhere between $3 and $7 billion at Fernald alone in a bipartisan way supporting that, so I again have to express my concern about the fact that we are not getting the commitment here from the Administration.

Again, I would like to reissue my invitation to you to come out to the site and see it. Extraordinary. Thanks for sending two of

your senior officials out last year, but we have got to have this ability to clean up this site. As you know, we saved 700 people from losing their jobs just before Christmas by——

Secretary MONIZ. Right.

Senator PORTMAN. At the last minute, again, figuring out some ways to move some funds around here on the hill through our appropriators. I appreciate them doing that, but a much better solution is to set a schedule and keep to it.

Secretary MONIZ. By the way, I might add that General Klotz was there, I think, last week in fact for a visit.

Senator PORTMAN. Thank you for sending him.

Secretary MONIZ. The request this year is roughly what the request was last year. And then, as you say, the Congress was able to add about $50 million to that. I would just add that the unresolved issue as well is the question of the uranium.

Senator PORTMAN. Fail.

Secretary MONIZ. And as you know we are, yes, and we are involved in some litigation right now. And we are in the middle of doing a new secretarial determination in terms of how much uranium we can barter to help support the clean up. So——

Senator PORTMAN. We would like that support, but we really, really need the support in the budget.

Secretary MONIZ. Yup.

Senator PORTMAN. Thank you, Mr. Secretary.

Secretary MONIZ. Thank you.

The CHAIRMAN. We will now go to Senator Manchin. Just for clarification, there has been some discussion back here about the early bird rule.

The early bird rule, as has been the norm or the practice here on the Energy Committee, has been based on who gets here first. As my list is right now, Senator Heinrich is next, followed by Senators Capito, Warren, Gardner, King, Daines, Stabenow, Barrasso, Hirono, Hoeven, Franken, Flake, and Sanders.

So just to give members a heads up, that is how we are operating today. Given the lengthy list, I am going to encourage members to try to stick to their five minutes. Senator Heinrich.

Senator HEINRICH. Thank you very much. Mr. Secretary, I want to thank you again for coming out to the WIPP facility last August. That meant an enormous amount to the community and especially to the workers.

You mentioned early in your testimony the goal of getting that facility working in terms of interim operations in about a year. I wanted to ask you a little more specifically what you think the Department's current best estimate is of when normal operations might resume at WIPP?

Secretary MONIZ. We are targeting 2018, but I have to admit that it remains a little bit uncertain. The key project is the new ventilation system.

Senator HEINRICH. Right.

Secretary MONIZ. And that is still undergoing engineering analysis. To give you an idea of the uncertainty, until the engineering analysis is completed, is going to be a less than $100 million project or a $300 million project, and we do not want to set numbers until we have confidence. We are moving towards the engi-

neering design completion, and that will give us both a budget and a schedule of certainty. Our target is two years after, two plus years after.

Senator HEINRICH. I would just ask if you would please keep me posted in terms of as soon as we have some certainty.

Secretary MONIZ. Absolutely.

Senator HEINRICH. Of how we are going to move forward in terms of the ventilation, what that means after the subsequent schedule and if those schedules should slip at all if you can let me know as well that would be much appreciated.

Secretary MONIZ. Absolutely.

Senator HEINRICH. And thank you again for coming out for that. It was very important for that community.

We have talked a little bit about base loads and the change in the utility and grid systems in this country. I want to ask you a little bit about grid tied energy storage.

One, if you could talk a little bit about what some of the places in the budget that focuses on that, the priorities of the Department.

Two, I wanted to ask you more of a policy question of what you see as the greatest impediments to more widespread and sooner deployment of some of those technologies, if you see that just as a cost curve issue or if there are some particular regulatory rate making or other policy issues that we can address that would move adoption along at a faster rate.

Secretary MONIZ. Interesting, yes. So on the storage, as you know, Senator Wyden a couple of years ago asked us to do a storage report which we did which we now are trying to implement.

In the budget this year, first of all, in the Office of Electricity we have a 75 percent increase in our request. It's not a huge number. It's $21 million but very important both for technology, but also for system integration. How would you actually integrate it into the system?

The—we also, of course, not for stationary applications so much, but in the EERE budget there's also about $100 million for battery development there. And there, of course, again in cost reduction has been very dramatic. So cost is certainly an issue, the cost performance curve is certainly an issue.

I might also add ARPA–E has quite a bit of work in terms of batteries and new chemistries and of course, we have our hub which is based out of Argonne which, I think, is doing some terrific work, again, on advanced chemistries for lowering costs, higher energy density, et cetera.

The other question you asked is very interesting, I think, about the regulatory side. It's not obviously an authority that we have.

Senator HEINRICH. Right.

Secretary MONIZ. It would be FERC and state commissions, but I think there's a theme about storage and other aspects in which we still don't have regulatory structures that value auxiliary services, if you like.

Senator HEINRICH. Right.

Secretary MONIZ. To the grid.

Senator HEINRICH. Conservation storage.

Secretary MONIZ. Capacity.

Senator HEINRICH. Yes.

Secretary MONIZ. Markets, et cetera. Storage is certainly one of them. So I think regulatory design, going forward, is going to be very, very important. And that would be something between FERC and the states.

Senator HEINRICH. Alright.

Secretary MONIZ. And NARUC is in town next week. You should talk with them.

Senator HEINRICH. We will follow up. Thank you very much, Secretary.

Secretary MONIZ. Thank you.

The CHAIRMAN. Senator Capito.

Senator CAPITO. Thank you, Madam Chairman, and thank you, Mr. Secretary, for being here with us today.

Mr. Secretary, I know you understand the importance of the NATL to West Virginians and Pennsylvanians because of the unique role that they fill with the technology and also, it is the one facility, I think, that the Federal Government actually runs as opposed to being run by contractors. I was pleased yesterday that, I know you were asked about this in the House, and you mentioned because there have been rumors of consolidation which always is of great concern to those of us who represent the state.

Secretary MONIZ. The rumors are unchanged for years. [Laughter.]

Senator CAPITO. Pardon?

Secretary MONIZ. The rumors are unchanged for years.

Senator CAPITO. Unchanged for years. I am just double-checking that it is just a rumor, so I appreciate that. I guess I am asking you, again, to repeat what you said yesterday in terms of, as far as you know, consolidation is not a——

Secretary MONIZ. Correct. In particular, as you implied, our laboratories are generally management and operating contracts. NATL is unique in being a Federal facility.

Senator CAPITO. Right.

Secretary MONIZ. And that reflects two points. One is that it does do, let's call it, laboratory-based research.

Senator CAPITO. Right.

Secretary MONIZ. But it also plays a major role in managing all the contracting for our fossil energy office and others. We have no intention of changing that arrangement.

Senator CAPITO. Thank you. It is a major contributor to our economy too.

Secretary MONIZ. Right.

Senator CAPITO. In the northern part of the state.

Secretary MONIZ. Also, you may know we are upgrading right now.

Senator CAPITO. Yes.

Secretary MONIZ. The computational capacity at NATL.

Senator CAPITO. Great. Great. Yesterday in the EPW hearing we had Janet McCabe from the EPA testifying on the carbon rules in the Administration, and the NSPS will mandate any new coal plants that have CCS technology. We have talked a little bit about this, and we all know that the technology is not yet perfected or commercially available.

My question is are the various agencies, DOE, FERC and EPA, are you working through your budgets to make sure that you're coordinating this and putting great emphasis because for those of us more deeply affected there's a reliability of the grid issue, but also the continuation of the use of coal which is important to a lot of states in this country.

Secretary MONIZ. Yeah. If I may differ on one issue?

Senator CAPITO. Yes.

Secretary MONIZ. And that is that the, actually, the capture technology, the standard capture technology which came out of the petrochemical industry, is commercially available and you can get a warranty on it. As with all of these technologies, carbon capture or renewables, my view is the goal of innovation, what we support in innovation, is in fact cost reduction across the board. That applies here as well. So——

Senator CAPITO. But would you say the sequestration portion of CCS is commercially viable? I mean, I think that is where the rub is more, isn't it?

Secretary MONIZ. So yeah, carbon capture for sure.

Senator CAPITO. Yes.

Secretary MONIZ. That technology is available. In terms of the sequestration side, of course, we are storing about 60 megatons per year in enhanced oil recovery.

Senator CAPITO. Right.

Secretary MONIZ. Most of that is natural CO_2 as opposed to captured CO_2, but that is being done.

The regulatory structures around commercial scale, saline aquifer sequestration are still in development.

Senator CAPITO. Right, because we had the plant in the mountaineer plant in Mason County in West Virginia that they, the DOE, was very involved with, but basically walked away from it.

Secretary MONIZ. Right.

Senator CAPITO. Because the sequestration issue was.

Secretary MONIZ. But that's where I believe the—see, most of our current demos and I believe in the EPA proposed rule the enhanced oil recovery can be used as the storage direction. And that's quite commonly done.

Senator CAPITO. So, I guess my question——

Secretary MONIZ. In fact——

Senator CAPITO. My base question is are you working in a coordinated way to make sure that the dollars that are put towards this are moving in the same direction?

Secretary MONIZ. Yes. Clearly we have the technology development part of that, but also for example, our people, you know, we're in the discussions to shape the Treasury proposal on the tax credits for carbon capture and sequestration.

Senator CAPITO. Okay.

Secretary MONIZ. Yeah.

Senator CAPITO. Quick question on the budget. It appears as though you're requesting a larger budget for coal CCS and power than has been in the past, but this increase, it appears to come at the expense of coal and moving more towards moving CCS toward natural gas. Is that a correct assessment of the direction that you're going?

Secretary MONIZ. Again, because in the coal plants, and in, I might say, also in other industrial facilities, refineries and cement plants and ethanol plants, we have a substantial portfolio of both pretty basic research for breakthrough technologies and for large demonstrations. In this budget we propose a pretty modest amount of money to start the planning towards a gas CCS pilot demonstration.

Senator CAPITO. And that's a new direction?

Secretary MONIZ. That would be a new direction, right.

Senator CAPITO. Okay. Thank you.

Secretary MONIZ. Yeah.

The CHAIRMAN. Senator Warren.

Senator WARREN. Thank you, Madam Chairman.

Mr. Secretary, we talk a lot about energy, and most people think of oil and gas and coal and solar and wind. But a huge part of our energy structure is the electric grid, the system we use to transmit electricity to our homes and businesses.

Now our electrical grid has been so reliable that for the most part no one even thinks about it, but the grid is aging. The basic design elements of the grid date back to Thomas Edison, and major parts of today's grid were built right after World War II. One report indicates that utilities will need to spend between $1.5 and $2 trillion by 2030 just to maintain reliable electric service.

Now, Mr. Secretary, your budget request includes what you call cross-cutting initiatives to improve the reliability and the resiliency of the grid. Could you walk us through these new initiatives and talk, just a little bit, about the Department's plans for improving the grid?

Secretary MONIZ. Yes, thank you, and of course not surprisingly this will be one of the major focus areas for the Quadrennial Energy Review that we hope to be discussing with you soon.

So in the budget we propose $356 million for the grid and modernization initiative. It's a substantial increase because of the importance that we attach to it, as do you. The program, it's cross-cutting in the sense, in two senses, or maybe three senses.

One is that within DOE there are multiple program offices that contribute in different ways to the project, the Office of Electricity and Reliability, of course, but also the Renewable Energy Office because of the integration issues, our Policy Office, et cetera.

So the program will span everything from very fundamental technology development, like new wide band gap semiconductors for power electronics to system analyses. How do you integrate over large geographical areas?

Senator WARREN. So, let me ask just a little bit.

Secretary MONIZ. Yeah.

Senator WARREN. Let me push down on one part of that.

Secretary MONIZ. Sure.

Senator WARREN. One threat to the reliability of the grid is extreme weather.

Secretary MONIZ. Yes.

Senator WARREN. You know, heat waves make electric generation, transmission, distribution more difficult. They create potentials for brown outs and black outs. A recent report from the GAO focused on the risks that severe weather posed for our power grid,

and the report goes on to say that two broad ways that we can reduce the impact of extreme weather on energy infrastructure is to invest in hardening and resiliency so we can harden the infrastructure by making physical changes so it stands up better to extreme weather, and we can make it more resilient by making changes so that it recovers more quickly when some components are damaged and damage to the external systems.

Now a new study from the World Bank also suggests that when there's more diversity of energy sources, including more renewable energy connected to the grid, it will improve the resiliency of our electricity sector even in the face of weather extremes. And a Commonwealth of Massachusetts climate change adaptation report from 2011 also recommended diversifying energy supplies as a potential strategy to make our system less prone to failures.

Can you explain a little bit to us about why that is and what DOE is doing here?

Secretary MONIZ. Yes. So, again, two different issues.

One is the issue in terms of the high voltage transmission grid. And there, for example, using Recovery Act money we worked with the utilities to deploy at some scale a new technology called synchrophasors.

Senator WARREN. Sounds cool.

Secretary MONIZ. Yeah. So the idea—it is cool and it really gives you a lot of information about the status of the grid. The idea is we have to still work to get those data to become a decision making tool, real time, to prevent issues. But then if you go to the distribution end that's where, for example, distributed generation, that would include, for example, solar is a good example. Distributed generation and microgrids are themselves a resiliency tool.

Senator WARREN. Yes.

Secretary MONIZ. Okay? I'll give you one example where we actually did something concrete. Following Hurricane Sandy and of course, we have a lot of energy infrastructure that is coastal and susceptible to storm surges, et cetera. So in Hurricane Sandy, in the recovery, rather than trying to recover what we had, we spent a very small amount of money, cost-shared with New Jersey, to design a very substantial, so-called microgrid, not so micro. But a microgrid that would provide a resilience for a key, electrified transportation corridor so that even if the big grid was going out you might be able to isolate this. And of course, having a transportation corridor available is really important for public safety.

Senator WARREN. Good. Thank you, Mr. Secretary.

The impact of extreme weather on the grid reliability is a problem for everybody who uses electricity, and we're facing more extreme weather events. As of this morning we are at more than 77 inches of snow in Boston.

Senator KING. I knew she was going to get to that.

Senator WARREN. You knew I was going to get to this, and that it's due to start snowing again this afternoon.

These extreme weather events threaten our electricity infrastructure and make it even more important that we invest in upgrading and protecting the grid.

Thank you, Madam Chairman.

Secretary MONIZ. I'll have a firsthand view of that snow this weekend.

Senator WARREN. I know you will.

Secretary MONIZ. And actually I just said that one of the contributing things here is the extraordinarily high temperature right now of the water around Boston is contributing a lot of the moisture.

The CHAIRMAN. Let's go to Senator Gardner and then Senator King.

Senator GARDNER. Thank you, Madam Chairman. And thank you, Mr. Secretary, for being here today and the opportunity to discuss this.

I, first of all, wanted to say thank you and talk about something that I've been working and will continue to work and pursue on this Committee and that's the matter of energy savings performance contracts. Looking at some of the work the Department of Energy has done over the years on energy savings performance contracts, I'll just point out one example from the National Renewable Energy Laboratories in Golden, Colorado where for $3.3 million worth of ESPC investment, the total savings to the Department of Energy to the federal taxpayer will be $12.6 million.

Again, I think that highlights the work that we can do on energy savings performance contracts investing into energy efficiency and measures that reduce the amount of energy we consume and saving the taxpayer dollars. Now the problem, of course, with the Congressional Budget Office, in their wisdom, is only in Washington, DC. Can savings equal mandatory spending? I hope that you will work with me and others interested in this issue of the Army, whoever has been very diligent in pursuing billions of dollars worth of savings to the taxpayers will help me get the Congressional Budget Office to recognize savings when they see it. So, thank you for the work that you do, Secretary.

Secretary MONIZ. We'd be happy to support you on that. We are, I think, past to the $2 billion mark in terms of ESPCs and there's billions more to get.

Senator GARDNER. There is. Thank you very much for that.

Speaking of the National Renewable Energy Laboratory in Golden, I just wanted to ask a few questions.

As you know water is the lifeblood of the West. In Colorado it's an incredibly important resource. Energy production and water are closely linked.

What do you see as the Department of Energy's role with respect to energy and water challenges and what priorities does the Department have in this area? Would you talk about ways that we can work together, perhaps, with NREL to highlight this?

Secretary MONIZ. So NREL has, in fact, been part of our laboratory team that has designed an energy/water nexus cross-cutting initiative. We are proposing that in this budget for, I believe, it's $38 million. And of course, other agencies have lots of work in terms of the water arena, well, EPA and Interior and others.

But we really have a special kind of focus on the energy for water issues, and that goes everywhere from advanced desalination technologies to system design, big modeling programs for integrating the energy and water systems. That's an area, actually, where NREL has been very, very helpful.

We do have a substantial report that we published last year on this. And we'd be happy to supply that and discuss it with you, if you'd like.

Senator GARDNER. Very good.

And maintaining the conversation, gearing it toward NREL. High performance computing data center, NREL, helped the lab earn a 2013 DOE sustainability award. How is the HPC data system being used today on grid infrastructure to get more natural gas and renewables on to the system?

Secretary MONIZ. First of all, the Peregrine, I believe it's called, computer at NREL—it's over at PetaFLOP and is by far, the largest computational engine for the kind of portfolio that NREL has. I don't know if you know, it's also had a very, very novel design for its energy usage which has been really, really, path breaking.

Then in terms of your question. The model—first of all NREL has been very critical already, for example, something called the ReEDS Model came out of NREL. It is a standard tool used in the policy world, including our policy world, for looking at grid issues. So the issue is really to keep expanding that and looking at the interdependencies of infrastructures, gas and electricity being one of them, the IT system being another, with computational models that ultimately will allow us to integrate the new kinds of large databases we can get from sensors. Ultimately you'd like to be able to go to, kind of, distributed decision making capability so you can do real time addressing of any reliability issues, for example.

Senator GARDNER. Yeah, I would love to continue that conversation as well. Just a couple of quick questions before I run out of time here.

Last week, I believe, or it was a few weeks ago, Christopher Smith, your Assistant Secretary for Fossil Energy at DOE testified on Senator Barrasso's bill, S. 33, the LNG Permitting Certainty and Transparency Act. He talked about how he believed that the Department would be able to comply with the 45 day timeline for approval under that bill.

From your perspective and from a budget perspective have you included sufficient funding in this budget to ensure the 45 day review of these LNG applications for final approval would be achieved under the bill, S. 33?

Secretary MONIZ. Oh, yes. First of all, I do want to—the prologue, of course, is that I think we're doing quite well already. But certainly with that bill, as Chris said, we believe we can work with those deadlines. And we think we have the resources to do that, yes.

Senator GARDNER. Thank you, Mr. Secretary.

The CHAIRMAN. Thank you. I appreciate that confirmation, Mr. Secretary.

Secretary MONIZ. Okay.

The CHAIRMAN. Senator King.

Senator KING. Thank you.

First, Madam Chairman, I would like to say this is the first hearing I have been to since I have been here that I have heard sequestration spoken of positively. [Laughter.] So I appreciate that.

Secretary MONIZ. I'd be happy to speak about it negatively in the other sense.

Senator KING. That's the other—let's keep it on the positive.

Secretary MONIZ. Right.

Senator KING. Mr. Secretary, I have to complement you. I once heard an official in Washington characterized as being at the highest level where they still know anything. [Laughter.]

You are above that level, but I don't think I've ever seen a witness with a better grasp of policy, but also the detail of the budget that you have exhibited here today. I really want to thank you, for what I am sure was significant preparation and work to grasp what is going on. That is the essence of leadership and I want to thank you for that.

The second thing I want to say is I don't think your budget is big enough. I did some calculations. Your research and development, the sort of energy and science part, is about $10 billion. That's one percent of our total discretionary budget. It's two-tenths of one percent of the total Federal spending.

Just to give an example, the Federal support for the development of the fracking technology has produced benefits that are just immeasurable in terms of our society. Lower energy prices are enormously important. 21 percent of the average family budget goes to energy. A one dollar drop in the price of gasoline saves American taxpayers $138 billion a year. It's like a gigantic tax cut. It is over $1 billion a year in my state of Maine.

So, I don't think we are spending enough on research and development, and all we've got to do is point to the experience of the support for fracking over 30 years which has brought us to this energy boom that we're enjoying today. The work you are doing with Tesla, for example, on batteries. The work you are doing on carbon sequestration. The work you are doing on base load research, storage, all of those are enormously important, way beyond the rather small level of Federal support.

So put me down as saying let's keep going with the research and development. I think it is an essential Federal function that this Department has done well over the years.

I am going to submit a series of questions for the record on things like offshore energy which I think is very important, wind and tidal.

One thing I do want to touch on is nuclear waste storage. As you know we have been through a long period, 50, 60, 70 years, of not figuring out what to do with nuclear waste. I understand there is a company based in Dallas, Waste Control Specialists, that is looking toward at least an intermediate level storage. That would be a big improvement.

We have now got what amounts to 100 plus, high level, nuclear storage sites all over the country. One of which is in Maine, and we would like to get rid of that stuff. So I argue, is this a priority to work toward a high level waste storage facility?

Secretary MONIZ. Absolutely, it is a priority to work towards a whole nuclear waste disposal system. I might add, both, from the commercial nuclear power plants and from our own defense waste from the weapons program.

The Chairman, Senator Murkowski, knows, in fact last year we worked together with this and the Appropriations Committee leadership to try to advance a particularly, an initial pilot storage facil-

ity. We remain convinced, actually, that moving in this direction of getting a storage facility out there, functioning, move fuel away from reactors, would be a very, very good first step. Even as we in parallel, work to develop the geological isolation capability that we will, that we absolutely need for the long term. So the answer is yes. [Laughter.]

Senator KING. Well, the other piece, don't forget about transportation and getting it there.

Secretary MONIZ. Oh, yes. Well——

Senator KING. Find a site, but we also have to figure out how to get it there and there is a lot of planning involved in that.

Secretary MONIZ. Right. And in fact, I was on the National Academy Committee, probably now ten years ago that did the study on the whole transportation system for nuclear waste. Another advantage, in my view, of getting that kind of storage facility going, whether it's a federal one which is what we had in mind or potentially this private sector approach, consent based process, number one.

Number two, it will also exercise the transportation system which would be another major step forward.

Senator KING. I am out of time, but I have to ask one question that I think can get a one word answer. And that is, can you assure me that in your determination of the national interest when approving LNG exports that effect on consumer prices is a major factor?

Secretary MONIZ. Oh, yes.

Senator KING. Thank you and thank you, Madam Chairman.

The CHAIRMAN. That was two words——

Secretary MONIZ. Sorry?

The CHAIRMAN. That was two words, oh and yes.

Secretary MONIZ. Oh. [Laughter.]

The CHAIRMAN. Senator Daines and then Senator Stabenow.

Senator DAINES. Thank you, Madam Chair, and thank you, Secretary Moniz, for being here this morning.

I come from Montana, and when you think of Montana you probably might envision fly fishing and our——

Secretary MONIZ. I do.

Senator DAINES. Great national parks. The Yellowstone Park is about an hour from where I went to kindergarten through college. Glacier National Park, some of the great outdoors. In fact, I was fly fishing before Brad Pitt discovered it for the rest of the world in the famous movie, A River Runs Through It, which was filmed at the river I grew up, literally, fishing on.

Montana is also known for coal. We have more recoverable coal than any state in the Union. It is very important for our economic future.

I need to remind, I think, all of us that coal remains the single largest source of electricity supply in America. As a father of four children I sometimes wonder if we ought to give them their smart phones with a little sticker which says, "this device likely powered by coal" on it, just as a reminder of the important role that coal does play in our energy supply?

Tesla was mentioned earlier. Similarly, I wonder if we ought to have stickers on the back of Tesla automobiles that say, "this elec-

tric automobile likely powered by coal" just as a reminder of how important it is to our supply?

I was out on the Crow Reservation recently. That reservation, they mine coal there. The unemployment rate on that reservation is 50 percent as we look at the poverty they are dealing with. It would be 90 percent without the coal mining jobs. They see a direct threat right now on their futures and livelihood as it relates to these regulations we are seeing, not coming from the DOE, but more so from the EPA. $120 million of tax revenues come from our coal industry in Montana that fund our teachers and our infrastructure. Again, it is really a significant foundation for our tax base in our state.

In fact, Detroit Edison receives their electricity from coal from Montana. So our manufacturing base, in fact, a good friend, Senator Peters, newly elected from Michigan, explained the importance of low cost electricity to keep our manufacturing base of automobile industry there in Michigan.

So that is the background, and I would like to talk a little bit about the clean coal technology portions we see there and what you are supporting in your budget. How much money does the DOE have in proposing and investing in the clean coal technologies? We look forward here now to ensuring we protect coal, but also continue to improve, produce, the clean production of coal.

Secretary MONIZ. Well, again, the fossil energy R and D budget is in the $500 million scale, a bit more than that. The vast majority of that is in coal research. As I've said the other investments like ARPA–E, a $30 million program, I believe if they ran on carbon capture technologies, advanced technologies.

But again, as I've said before, we have an $8 billion active loan guarantee solicitation for fossil fuel technologies that lower emissions. And once again in this budget request, not ours, but in the Administration budget request out of Treasury, a $2 billion investment tax credit for anything related to carbon capture sequestration, including it could be for the infrastructure like CO_2 pipelines, et cetera, and an additional tax credit for sequestered carbon dioxide. So it's a pretty big program.

Senator DAINES. Yeah. I am going down the path here on the coal-fired plants, and I am aware that investment is going to be made in the R and D. How much of those dollars would be targeted towards helping, maybe, U.S. coal-fired operations verses assisting other countries, perhaps, like China and India?

Secretary MONIZ. Well it is all aimed at the United States. Now we do collaborate with China, for example.

So, for example, we have a clean energy research center which has several dimensions. One of which is around coal. But so we, the United States, we spend $10 million a year on that program. That's spent in the United States.

China matches that, and then both of those are matched by industry. So it's actually our $10 million is part of a $40 million program, but we are supporting the American researchers in collaborative projects.

Everything we're doing is—now we hope, of course, that ultimately there will be technologies that we may be able to put into

an export market to create more jobs here. But we're focusing on the United States.

Senator DAINES. Alright.

Secretary MONIZ. If in terms of the carbon issue we all recognize that China is using three, three and a half times as much coal right now as we are.

Senator DAINES. And lastly, Madam Chairman, I am out of time, but in terms of the IP creator in this research. Who is going to control and own that IP?

Secretary MONIZ. We will—in that program, that collaborative program, we have a very, very, active IP program to make sure that we keep all of our fair share, certainly, of the IP. A lot of it is not IP rich, like sequestration stuff, but some is technology stuff. And then we have a very active program to control IP.

Senator DAINES. Alright.

Thanks, Madam Chairman.

The CHAIRMAN. Senator Stabenow.

Senator STABENOW. Thank you, Madam Chairman, and welcome, Secretary Moniz.

Secretary MONIZ. Thank you.

Senator STABENOW. First, a big thank you for your support of the funding levels for the nuclear physics programs. I know you mentioned Michigan State University and the Facility for Rare Isotope Beams, and that's a very important basic science project, as you know.

Secretary MONIZ. Yes, it is.

Senator STABENOW. We are very proud of the effort that is going on there, and not only the science and the ability to compete globally that that will relate to, but also the jobs that are involved in that.

Secretary MONIZ. And great state support with that.

Senator STABENOW. Yes, absolutely. It's been a wonderful partnership, public and private partnership, as are the other parts of the DOE budget as it relates to science.

I just want to underscore the importance of that research innovation that you do in every area, including helping to bring things from a pilot to commercial stage which is where it is also so important that partnerships around loan guarantees and so on.

A couple of questions because other colleagues, earlier, talked about making sure that we keep costs down for energy intensive manufacturers. Certainly in Michigan, I certainly agree with that. And one of the big things we're hearing about is to make sure that we move forward in a thoughtful way as it relates to natural gas.

So, a boon thrust in America and I appreciate those that are in states with a lot of natural gas that they want to export. They want to get the best price that they can get. China will pay a whole lot more than the price right now in America, but if we look at American jobs and the fact that studies have shown that they're eight times more jobs created by keeping prices reasonable and keeping the jobs here, our energy intensive manufacturers that we need to thoughtful.

I appreciate the fact that you have a balancing act to do. You are certainly moving forward on exports, but I also know that you have undertaken it to update the study in the Department regarding the

impacts of increased or wide open LNG exports with no regard to the American economy.

It is important that we make sure that American consumers and American manufacturers are benefitting from this great natural resource, and that we get the edge that we need in order to creating manufacturing jobs in America.

I wonder if you might talk about the update of the study that you are undertaking and how it is going to evaluate the impact on costs for American consumers and American businesses.

Secretary MONIZ. Certainly. As I mentioned in response to Senator King's question, clearly, impact on domestic markets is very explicitly one of the criteria for the public interest determination. The—and so where we are, as we said last year when we put out our modified procedure.

Senator STABENOW. Right.

Secretary MONIZ. Which I think has provided more clarity for the situation that we feel we have the analytical base for up to 12 billion cubic feet per day of exports. I might say that most of the independent economic analyses predict that we are unlikely to export more than around ten would be the standard, the most, the average at least projection. So we did commission studies which are due later on this year in terms of if we were to get beyond that kind of number what would be the economic impact to make sure we understand.

The EIA does predict, certainly in the current range, very, very, very small impacts in terms of price and partly because when exports start and of course, we have no exports yet.

Senator STABENOW. Right.

Secretary MONIZ. When they start the expectation is that for every unit exported the elasticity is that there would be about two-thirds of a unit additional production, so that would also keep a lid on any price increase.

So anyway, we will just keep looking at this all the time. We're currently up to 5.7 authorized for export to non-FTA countries.

Senator STABENOW. You would agree, though, that other countries are paying more than we are for natural gas? Last year China was paying $16.

Secretary MONIZ. Ah, yes. Although that has changed dramatically with the oil price drop because in general——

Senator STABENOW. Sure.

Secretary MONIZ. These contracts are indexed to oil, and frankly that's another issue. We have seen, formally and informally, some withdrawals of consideration because right now the price structure is not adequate.

Senator STABENOW. Right. A colleague of mine mentioned Detroit DTE Energy and their reliance on coal. I just also want to put a plug in that they are very aggressively moving toward wind. They have a wind farm in what we call the thumb of Michigan, and I encourage you to continue to focus on clean energy. There are 8000 parts in one of those big wind turbines, and those have to be manufactured by somebody. That is a lot of jobs, and we think we can manufacture one of those in Michigan but they can be manufactured across the country.

In fact, a few years ago when I was in Alaska I went to a spot where there is wind, and they told me the wind turbine came from Michigan. So there are a lot of jobs there. So I would encourage you——

Secretary MONIZ. Great.

Senator STABENOW. To continue to be focused. Thank you.

Secretary MONIZ. Also I'll just add on about manufacturing focus on composites, for example.

Senator STABENOW. Absolutely.

Secretary MONIZ. Could lead to even larger blades and much more efficient turbines.

Senator STABENOW. And we are glad to be involved in that as well.

Secretary MONIZ. Great.

Senator STABENOW. Thanks.

The CHAIRMAN. Let's go to Senator Barrasso and then Senator Hirono.

Senator BARRASSO. Thank you, Madam Chairman. Mr. Secretary, welcome back. Good to see you again.

Secretary MONIZ. Thank you.

Senator BARRASSO. Before I begin with a question I do want to thank you and your staff for working with me on the Barrasso/Heinrich, bipartisan LNG export bill. I was very encouraged by Assistant Secretary Smith's responses to our questions. As of yesterday we had six Democrat co-sponsors, six Republican co-sponsors, so I look forward to working again with you on this bipartisan bill.

I would like to discuss crude oil, the crude oil market.

Over the last several months OPEC has decided not to cut oil production. Many have speculated about the motives for this. Some say that Saudi Arabia and other OPEC members are trying to rein in Iran's nuclear ambitions. Others have stated OPEC is trying to encourage Vladimir Putin to abandon his support for Syria's President Assad. I am sure you have heard all the different theories behind this. Others say OPEC is trying to undermine America's crude oil production. Regardless of their motives, OPEC's decision has forced American oil producers to cut some investment and then lay off workers in states such as my state of Wyoming.

Currently American producers are not allowed to export crude oil from the United States, so we have American producers who are not allowed to sell to Asia, to Europe, to Latin America, so American producers run out of customers. To me this is, obviously, hardships for folks in my state, but in other states as well. So in light of what is happening worldwide, isn't now as good time as any to lift this ban of exporting crude oil from the United States?

Secretary MONIZ. Well, Senator, as you know, that's, of course, in the Department of Commerce's jurisdiction. We do provide, kind of, technical support when requested.

But a few points I will make without judging the answer to that question is one, first of all we are an enormous oil product exporter. We must be, I don't know, three and a half to four million barrels a day, something like that. Probably, I think we're net two and a half million barrels a day exporters now of product.

That's an enormous change. It's almost a reversal of sign from a few years ago. So we are exporting, effectively, through products.

We are also exporting things like natural gas liquids, you know, propane, et cetera.

In terms of crude oil, the other perspective is that we are seven million barrel per day importers still of crude oil. So I think this question of exports also is to be taken on the context that we are actually enormous importers. I understand the next level of argument about matching refineries and this kind of issue.

Senator BARRASSO. The mismatch of refineries.

Secretary MONIZ. But those are the kinds of analyses that will be forthcoming.

I will just mention one that the EIA did and published are around impacts on gasoline prices, and their conclusion was probably none to possibly minor decreases in domestic prices, largely because the gasoline price is indexed more to the Brent benchmark.

Senator BARRASSO. Have you been in touch with the Secretary of Commerce on this issue? As you said, it's in that jurisdiction.

Secretary MONIZ. Yes. So we have supplied a number of technical briefings in terms of processing. For example, I mean, of course as you know, the Secretary of Commerce did or the Department of Commerce did issue a clarification in terms of what lightly processed condensate was for export which I think provided some additional clarity to the companies.

Senator BARRASSO. In terms of communication I do want to switch to Keystone XL now. I know that your Department has been involved with issues related to the President and his making his decision that's been six and a half years for a 1.2 mile segment of pipe, essentially, crossing the border.

Last Monday was the deadline for the Federal agencies to submit comments to the State Department on the Keystone XL pipeline, and I understand your agency did submit comments to the State Department. So would you publicly disclose what the Department's comments were to the State Department?

Secretary MONIZ. We did submit comments, Senator, but regrettably we just don't comment in terms of active decisional processes going on so I think the State Department would have to address that.

Senator BARRASSO. So the public is not entitled to the agency's comments? I want to know how this is consistent with the President's claim that this is the most transparent Administration in history.

Secretary MONIZ. Well again, I think it's quite conventional in active decisional processes where things can change. But again, the Department of State, I think, would have to be the one to do that.

I mean, I can say that what we submitted certainly provided, I would say, up to date information of relevance to the decision.

Senator BARRASSO. But the Department is still going to withhold sharing with the public what that information may be? I mean, that's——

Secretary MONIZ. Yeah, that's our intent that we believe the State Department should control the information with regard to an active decision making process.

Senator BARRASSO. Thank you, Madam Chairman. Thank you, Mr. Secretary.

Secretary MONIZ. Thank you.

The CHAIRMAN. Senator Hirono.

Senator HIRONO. Thank you, Madam Chair.

Mr. Secretary, I want to thank your Department for your support for various projects in Hawaii. In fact while I was sitting here I was informed that there was a collaboration with your renewable energy lab and our electric utility, HECO.

Secretary MONIZ. Yes.

Senator HIRONO. And solar city basically that will result in our electric company being able to accept a lot more solar energy into the grid.

Secretary MONIZ. Yes.

Senator HIRONO. A big deal for Hawaii as we move toward our clean energy goals.

I wanted to ask you a question about commercialization of new technology to get us to a clean energy economy. As you know there is an issue of as we support R and D and the technology to really get us to a clean energy future, the technology transfer aspects of it is a huge hurdle. And then you've heard of the valley of death where there's a lack of funding support to get from the research to the commercial scale of the research.

So yesterday you announced a new Office of Technology Transfer with, albeit, modest funding of about $20 million, I believe. Can you explain how that new office will complement or enhance existing efforts in support of technology transfer and whether this office will be focused solely on national lab technology or will it also pay attention to initiatives that are in the private sector or that come out of universities?

Secretary MONIZ. Thank you. By the way, first of all, let me say that I was very pleased to sign the MOU to extend our collaboration with Hawaii.

Senator HIRONO. Thank you.

Secretary MONIZ. Just over a year ago. And Exxon might say Hawaii, it may not always be comfortable, but Hawaii as an island, set of islands, of course, provides a very, very good place also to look at the development of new technology integration.

Senator HIRONO. Very much so.

Secretary MONIZ. Yeah. On technology transfer, so yesterday we announced the Office of—actually we call it the Office of Technology Transitions. And the head of which will also be the statutorily required technology transfer coordinator for the Department. Over the last six months or so that role has been played by Dr. Ellen Williams, who this Committee moved to confirmation as ARPA–E Director last December. So we now have an acting director and are searching for a permanent director.

In terms of the program, the Energy Policy Act of 2005 called for establishment of a technology commercialization fund at 0.9 percent of the applied energy R and D programs. Up until now the Department has interpreted the cost shared CRADA agreements at our national laboratories as satisfying that requirement. What we are doing now is we are, of course, continuing that CRADA approach, Cooperative Research and Development Agreement, approach as a tech transfer approach. But we are, in fact, adding to it now the technology commercialization fund as I think it was asked for by the Congress.

As you said that would be about $20 million. It will be used in a cost sharing way, a minimum of—well, the program design is still a bit of a work in progress, but at least 50 percent cost sharing, focused on technologies that the Department, the development of which, the Department has funded. This will be a competitive program for getting grants out of that $20 million matching fund pot.

Senator HIRONO. So in other words at universities, for example, that have gotten some grants, they will be able to access this technology transfer?

Secretary MONIZ. I think we still need to get the design, but I hear your suggestion, and I think it's one that we will definitely look at.

Senator HIRONO. I appreciate it.

Secretary MONIZ. I have to admit, just thinking mainly of the laboratories, but it could be potentially DOE-sponsored work at universities.

Senator HIRONO. Yes. So they said there is a lot of work in this area.

Secretary MONIZ. Yup.

Senator HIRONO. Being done at universities.

Secretary MONIZ. It's a good suggestion.

Senator HIRONO. My time is running out, but I do want to focus on your new proposal for state energy reliability and assurance grants. I just wanted to know whether the intention of this new grant program which appears to be totaling about $60 million, again, a modest amount, whether the term reliable delivery of newer types of energy would also include intermittent renewables?

Secretary MONIZ. Oh, yes, for sure. I might just clarify that the $63 million is actually the sum of the two grant programs.

Senator HIRONO. Yes, I added it up.

Secretary MONIZ. Energy assurance and reliability. Yeah. Yeah.

Senator HIRONO. Alright. I think my time is up. Thank you.

Secretary MONIZ. Thank you.

The CHAIRMAN. Thank you. Senator Flake.

Senator FLAKE. Thank you, Madam Chairman.

In the last couple of days we've seen a lot of attention about the President's upcoming cyber security conference at Stanford University. There are going to be a number of Federal agencies and tech companies involved. Noticeably absent has been the Department of Energy, although obviously, in the utility sector. This is an extremely important area with regards to cyber security. Was that an oversight? Will you be participating? Can you tell us about that?

Secretary MONIZ. Oh, yes. The Deputy Secretary, Sherwood-Randall, is part of the program and she will be there tomorrow, in fact. And the Deputy Secretary, starting with Mr. Poneman, when he was Deputy Secretary, now Liz Sherwood-Randall, the Deputy Secretary chairs the ongoing group of utility executives that meets with us, I think, quarterly, to discuss cyber security. So it's a very strong program.

All the feedback has been very, very positive from the industry, and indeed we have even taken the step of providing security clearances for a select number so that we can share some of the more sensitive information with them. The Deputy Secretary runs that and will be in the program tomorrow.

Senator FLAKE. Alright. Good to hear.

Earlier this week a rooftop solar company in Arizona called Stealth Solar admitted to illegally marketing services related to installation and leasing of rooftop solar systems. This issue appears to be gaining attention. I can tell you in Arizona a lot of these units there, as people now go to sell their homes, after entering into these long term agreements a lot are in for a surprise. Some have already received that surprise when they realize they have to pay off or have a lien put on their house.

What role, if any, can or does DOE plan to play in ensuring that these companies, who access federal tax credits, in particular, and these incentives for rooftop solar systems aren't misrepresenting what they're doing for their customers?

Secretary MONIZ. Senator Flake, thank you for telling me about that. I was not aware of this. I don't know what certainly authorities we would have. I can't think that we would, but I think we should look into this and discuss with others in the government if there is a role for us to play or whether it's a purely state issue. We have been engaged, just in a convening sense, on issues like rooftop solar and some of the discussions about net metering, et cetera, but I wasn't aware of this issue.

Senator FLAKE. Well, it is a big issue and a growing issue in Arizona. It is pretty competitive out there and the attractiveness in large measure is due to the Federal incentives that go along with these units, so I just wonder what role DOE plans to play. A lot of these programs——

Secretary MONIZ. At a minimum we'll try to understand the issue and be happy to get back to you with a discussion.

Senator FLAKE. I greatly appreciate that.

Secretary MONIZ. Okay.

Senator FLAKE. With regard to green building programs, some of those programs are run by DOE. GAO has done a study showing that we need to eliminate waste of taxpayer dollars in this regard. What is DOE doing in that regard concerning the green building programs that you administer?

Secretary MONIZ. Well we have a variety of those. Some of them, of course, are technology based in terms of new technologies. We also do convening programs which do not involve appreciable budget, like the Better Buildings Challenge. I don't know if they were referring to that or not.

But in the Better Buildings Challenge there are, in particular, it's more businesses make commitments in terms of energy intensity reduction, typically 20 percent by 2020. What we do is we use our convening power, a certain branding, for the companies meeting these goals while they share best practices with others. But that's not a major budgetary issue so I'd have to look into that in more detail.

Senator FLAKE. Specifically in 2011, GAO recommended that DOE, HUD and EPA lead an effort to collaborate with other agencies assessing the results of green building initiatives for the non-Federal sector. I think there are 17 such programs under your purview and there are 94 programs across 11 Federal agencies.

So this is a problem. There has been a lot of waste identified by GAO, but it does not seem that the agencies are very excited about moving on the recommendations that have been made by GAO.

Secretary MONIZ. Okay, again, I'm not familiar with that 2011 report, and we will look at it and get back to you.

Senator FLAKE. Alright. I appreciate that.

Secretary MONIZ. The same answer.

Senator FLAKE. Thank you much.

Secretary MONIZ. Thank you.

The CHAIRMAN. Thank you.

We will go to Senator Franken and then Senator Sanders.

Senator FRANKEN. Thank you, Madam Chair.

I would like to talk a little bit about nuclear weapons and cost.

According to the CBO the Administration's plans to operate, maintain and modernize U.S. nuclear forces will cost about $350 billion over the next ten years. Credible studies have concluded that the Administration's plans for our nuclear arsenal will cost over $1 trillion over the next 30 years.

What is worse is that CBO goes on to say that in its recent report that it's estimated the cost of the nuclear arsenal could grow if these programs see cost overruns, and that brings me to the part of the nuclear weapons budget for which your Department is responsible, the nuclear complex.

One example of over spending is the B61 bomb modernization program. As I understand it the life extension program was supposed to cost $4 billion, and it's now looking to exceed $10.5 billion. This is only one example of a systemic problem of egregious cost overruns at NNSA.

In fact for more than a decade and in numerous reports the GAO has consistently found that many of the National Nuclear Security Administration's major projects have experienced significant cost and schedule overruns. According to one of GAO's reports NNSA and NSA does not have and I quote, "a sound basis for making decisions on how to most effectively manage this portfolio of projects and other programs and lacks information that could help justify future budget requests or target cost savings opportunities."

Secretary Moniz, as I indicated we're on a path to spend $1 trillion over the next 30 years on our nuclear arsenal. I don't believe that we should be doing that nor do I believe that we will spend that much money and at some point we'll make a course correction and have wasted a lot of money. And these cost overruns are only making problems worse.

What are you doing to address these cost overruns and these skyrocketing costs?

Secretary MONIZ. Obviously I'm not going to get into nor do I have responsibility for the bigger policy issue as opposed to our responsibility for maintaining the deterrent that we have, even has its trinks.

Senator FRANKEN. But there have been a lot of cost overruns and——

Secretary MONIZ. Right. So now on the projects, let me first just note a fact that the, including for NNSA, the GAO has taken us off of the high risk list for projects below $750 million. Frankly, in the Department as a whole, especially in NNSA and environmental

management, there's about a half of dozen projects that are in the multibillion dollar stage where there have been issues, shall we say.

Now part of that is that the cost overruns are measured against baseline numbers that were put out long before they should have been, long before real engineering design was available. These are all unique projects. There's no baseline of experience to compare with. And one of the issues is there has to be better discipline in not putting out numbers that just have no grounding in reality.

Now, what have we done? We have just made a major change after over a year of work by a very senior team in terms of changing our project management approach across the entire Department including the NNSA. There are many features of it.

One is we took the successful principles that have been applied in the Office of Science which has built many multibillion dollar projects, generally very successfully. We have taken those principles. It starts with things that sound simple, a clear project owner, who has his or her budget at risk in a non-performing world. And there are a few others. So we've put those in place across the board.

Secondly, above the Under Secretaries we have had something called the Energy Systems Acquisition Advisory Board, ESAAB. It has been a completely episodic event where this group gets together whenever there's a decision to be made on some project, but no continuing situational awareness of what's going on. That's changed.

The Deputy Secretary will chair that. It will meet a minimum of quarterly for projects above $100 million. It has another group now established under it, a project risk management committee that will be meeting every two weeks which contains senior project people from across the Department, including my own, kind of, senior advisor on finance, et cetera, et cetera.

So they have started operating. It's a new system. We will insist upon discipline in terms of base lining costs so that if it's an overrun, it's going to be an overrun or an under run against a real baseline number and not some number that was put out there with no, frankly, almost no basis.

Senator FRANKEN. I'm way over my time, and that's because you gave an answer.

The CHAIRMAN. Senator Franken, we are going to have to move on.

Senator FRANKEN. Yeah, I just want to say that I will submit—I was acknowledging that. I want to submit——

The CHAIRMAN. You have been very patient, and I appreciate that.

Senator FRANKEN. Haven't I?

The CHAIRMAN. Yes, you have.

Senator FRANKEN. So I just want to say I am going to submit for the record some questions on the MOX plant in South Carolina. This is an issue which really—we are talking about spending a ridiculous amount of money, as far as I am concerned, on upgrading our nuclear arsenal. I know that the Secretary is not responsible for the overarching program.

Thank you.

The CHAIRMAN. Thank you.

Secretary MONIZ. We did note the problem.

The CHAIRMAN. I know that was an issue Senator Scott was really focused on when he was on the Committee as well, so thank you.

I promised Senator Sanders he would go next, followed by Senator Risch.

Senator SANDERS. Good. Thank you, Madam Chairman.

Mr. Secretary, thank you very much for the excellent job that you are doing. And Vermont is very proud——

Secretary MONIZ. Thank you.

Senator SANDERS. Of having a wonderful working relationship with you and Secretary Chu before you. And we appreciate the work you're doing covering enormously important areas for our country and for the world.

Mr. Secretary, I happen to be one of those who believes in science. I know it's a radical idea, but what the heck. I happen to think that the scientific community is right in telling us that climate change is real.

It is caused by human activity. It is already causing devastating problems in our country and around the world, and we need to transform our energy system away from fossil fuel. I know that view is not unanimously agreed to by members of the Committee. That is my view.

Secretary MONIZ. I agree with you.

Senator SANDERS. Okay, I appreciate that.

Very briefly, tell us what you and I know the President agrees with that. Tell us what your agency is doing, in fact, in trying to have the United States lead the world in terms of reversing the devastating problems we face through climate change?

Secretary MONIZ. Well, fundamentally it's following the President's Climate Action Plan and its three pillars.

So one is the mitigation through decreased greenhouse gas emissions and there, without going into all the details, clearly, our clean technology development programs and our efficiency programs are the heart of, what I think, is going to be the solution.

Senator SANDERS. I agree. Now in terms of energy efficiency and weatherization I represent the state which has a whole lot of older homes and older buildings. We have already received very helpful grants from the DOE in which we have cut emissions by 30, 40, 50 percent and cut people's fuel bills by 30, 40, 50 percent.

Would you agree with me that it is eminently sensible to make a massive investment in weatherization so people can save money on their fuel bills and we cut carbon? And that in a few years time people can repay the loans or the cost of the program? Does that make sense?

Secretary MONIZ. Absolutely, and enhance comfort at the same time.

Senator SANDERS. Exactly.

Secretary MONIZ. Yeah.

Senator SANDERS. I understand you have financial constraints, but one of the issues that I have always believed in is making sure that people who don't have a lot of money are able to receive loans or grants and they can repay it on the bill financing concept. Does that make sense to you?

Secretary MONIZ. Absolutely. I think there's an enormous return, again, and certainly helping the less well off is important in so many dimensions.

Senator SANDERS. I know there are financial limitations to what you and every other agency can spend, but are we investing enough, frankly, in weatherization in this country?

Secretary MONIZ. Well we did request in this budget, I don't remember the numbers exactly, but I think we asked for an increase of $40 or $50 million. Maybe one of my——

Senator SANDERS. $40 or $50 million?

Secretary MONIZ. Increase, an increase up to 230 something I seem to remember?

Senator SANDERS. Whatever.

Secretary MONIZ. Somebody?

Senator SANDERS. Between you and me——

Secretary MONIZ. But anyway, but there's an enormous need, of course, and——

Senator SANDERS. It would seem to me that we should be investing a heck of a lot more because this is going to pay for itself.

Secretary MONIZ. Yeah.

Senator SANDERS. It's going to create jobs. It's going to lower fuel bills, cut carbon emissions. It is a win/win/win situation. Do you agree?

Secretary MONIZ. Yes, and again and help families and their——

Senator SANDERS. Exactly. Exactly.

Secretary MONIZ. Right.

Senator SANDERS. Let me ask you this. Some of my friends have noted this or that problem in terms of sustainable energy projects or concerns about loans to Tesla, et cetera. Is it my understanding that in fact we provide in this country today, over a ten year period, about $100 billion in subsidies to the fossil fuel industry? Does that sound right to you?

Secretary MONIZ. I really could not give a sound answer to that.

Senator SANDERS. Alright. Let me ask you this one.

Secretary MONIZ. Yeah.

Senator SANDERS. My friends, often some of my colleagues, talk about nuclear energy as being something that we should radically advance or move forward on. Is it true that without the Price-Anderson program, which basically says to the nuclear industry that God forbid there's ever a nuclear disaster in this country that taxpayers, depending on the nature of the disaster, would pick up a substantial part of the liability? That without that program the nuclear industry would not be able to function?

Secretary MONIZ. Well, I think it's a little bit more complicated in a sense that the industry, the individual utilities are required——

Senator SANDERS. To pay a certain amount.

Secretary MONIZ. To have a few hundred million dollars of insurance.

Senator SANDERS. But why aren't they going to Wall Street? Why aren't my friends who are—well, believe in the private sector? Why don't——

Secretary MONIZ. And then what is unique as well in Price Anderson is that then all the nuclear operators must self insure up to roughly $10 billion.

Senator SANDERS. Right.

Secretary MONIZ. And the total judgments for public impact of nuclear power over its history, the last I knew, it was about $200 million over all those years.

Senator SANDERS. The truth is if God forbid——

Secretary MONIZ. Yeah.

Senator SANDERS. If there were ever a disaster, Fukushima, in this country, the taxpayers would have to pick up, depending on the nature of the disaster, a substantial part of that cost.

Secretary MONIZ. Well,——

Senator SANDERS. That is true.

Secretary MONIZ. If it were above $10 billion——

Senator SANDERS. Yeah.

Secretary MONIZ. For one event, correct.

Senator SANDERS. That's right. That's right.

Secretary MONIZ. Right.

Senator SANDERS. And so my only concern is that I say to my friends who always want to get the Government out of this or that. Do you want to support getting the Government out of Price Anderson in the nuclear industry?

Let's work together on it. I don't think I am going to have too many takers on that. Point being, the Government does play a role in various forms of technology and energy.

Thanks.

The CHAIRMAN. Let's go to Senator Risch then Senator Hoeven.

Senator RISCH. Thank you very much.

Mr. Secretary, as you might guess I come at this a little different, from a different perspective, than Senator Sanders. You were so good to visit the nation's lead nuclear energy laboratory in Idaho Falls. People are still talking about that. We certainly appreciate your visit, and we look forward to continuing to do great things there.

One of the issues, of course, is the clean up there. We know that it was really unfortunate that WIPP had the problem that it had, a view of outline here for us here today, a timeline for getting WIPP up and running. I think we should all be pulling a wagon in the same direction on that.

One of the questions I have for you is once that gets up and running there is going to be, I think, a bottleneck of trying to get things in there. For instance, in Idaho we continue to process and the workers do a great job of doing that. They have got 473 packages ready to go.

This probably drove them a little deeper than where you are so you may want to take this for the record, but what can we anticipate as far as shipments? How are they going to prioritize shipments that go into WIPP once it opens back up? Because we do have these backed up and there's obviously going to be more by the time we get there.

Secretary MONIZ. Yes, Senator Risch, I really don't have a detailed answer to that right now because one doesn't exist, to be

honest. We're going to have to work through our prioritization. Work with our stakeholders to see how we'll do this.

There is one other possibility to help, of course, as you know, we had started to use a commercial site in Texas as, kind of, a relief valve. That's also been stopped for the moment, but maybe that will also revive, to help that. But we'll have to work that through I think when we have a clearer idea of when we can actually start shipments.

Senator RISCH. I appreciate that, and I appreciate that this is on your radar screen. It is important to all of us, and I think everybody is working in good faith to try to get this done so we can move forward.

Again, we sincerely appreciate that. Those people do a great job out there with the contractors with what they are doing for all of us, for Idaho, for the DOE, for America.

Secretary MONIZ. Yes.

Senator RISCH. I want to talk just a minute about the electric grid. It was raised here in the hearing by Senator Warren. I come at it from just a little different aspect. She was concerned about weather and the fiscal security.

As you and I know there are other threats to the grid. Some of it is classified so we can't talk about it here, but some of it we can.

As you know Idaho has been, really, on the cutting edge of that. I hope you will keep that in mind as we move forward because clearly there has been identified by Senator Warren, by virtually everyone, that the grid is a real vulnerability of America, particularly in the cyber aspects of it.

You had the opportunity to look at that in Idaho. You know what we're doing there. And again, those people out there are really on the cutting edge and doing great things.

Let me just close with this.

Secretary MONIZ. May I say, including the DHS facility, yeah. Yeah.

Senator RISCH. Right, exactly.

Let me close with this. I appreciated your answer to Senator Franken about the issues regarding our nuclear inventory. Those are absolutely critical to America. No one wants to spend money on it, but because of the world the way it is today, we have to.

I will look forward to hearing from you in a classified setting a little more detail in how you are going about what you generally described here because that is really critical for America and for America's security. So thank you for what you are doing there.

Thank you for recognizing the issues and the dollars and cents are huge when you are dealing with that, and thank you for generating what we hope will be a real pragmatic approach to this and how we are going to get this done and do it as effectively and reasonably cost effective as possible.

Secretary MONIZ. We can certainly arrange that classified briefing for you and maybe other colleagues, if they'd like, if they're interested in the broader——

Senator RISCH. Yeah. There are many other colleagues, my colleagues——

Secretary MONIZ. Nuclear security issues.

Senator RISCH. Right. There are many of my colleagues who are interested in that, some of whom are on this Committee, but some are also on other Committees that I sit on. My time is up and I thank you.

Secretary MONIZ. Great, thank you.

The CHAIRMAN. Senator Hoeven.

Senator HOEVEN. Thanks, Madam Chairman.

Secretary Moniz, thanks for being here. Thanks for your good work.

I want to echo Senator Risch's comments. Your visit to our state was much appreciated, and I think was very good, very valuable. Thank you for that.

Secretary MONIZ. I was pleased actually to visit all of the states of the members here.

Senator HOEVEN. Well it is important, and we appreciate how you have approached that.

First question, and this may have come up with Senator Barrasso, but he is a primary sponsor in the LNG Permitting Certainty and Transparency Act. I am also a sponsor on that bill. It would require approval or it would require a decision by the DOE within 45 days from approval of the environmental impact statement on an application for LNG export.

As you know, you and I have had negotiations of this issue which I appreciate. Do you feel we have got that in a format that is workable?

Secretary MONIZ. Yeah, as we've described, I mean, I think we're doing a good job but with the parameters put forward. We can work with those dates.

Senator HOEVEN. Thank you.

The second question I have is about the Advanced Fossil Energy Loan Guarantee Program. You have got some outstanding applications to do some exciting things with utilizing natural gas. Of course, we are flaring off a lot of natural gas.

Secretary MONIZ. I'm surprised you used the plural. [Laughter.]

Senator HOEVEN. Well, I want to be fair.

I am just wondering how that is progressing and do you feel you are getting close to another round of approvals? And if so, when?

Secretary MONIZ. Well, yes.

First of all, we do feel we have, for the $8 billion fossil program, in particular, although as well as the other programs, we feel we have a very good proposal stream. We cannot discuss any, of course, individual proposal. I would just say that, of course, as you well know, one of them that you may have in mind has certainly gone to the financial part of the discussion, to part two. Yeah. And so we're moving along a whole bunch of our proposals.

Senator HOEVEN. I think that is a program where we are doing some exciting things in terms of, as you said, your core mission of technology development. I appreciate that, and I appreciate working with you on it.

The last point I want to go to is are you aware——

Secretary MONIZ. May I just—I'm sorry, Senator, just interrupt you to say that for any of our projects, once they have gone to part two it means they have passed the threshold test on the technology side.

Senator HOEVEN. Good, yeah, thank you.

Are you aware of the Shell Company's Quest project in the oil sands and the Exxon's Kearl project in the oil sands? Both of them are projects that are investing billions to reduce greenhouse gas emissions associated with producing oil from the oil sands. Are you familiar with those?

Secretary MONIZ. No, I am not actually.

Senator HOEVEN. In both cases I see they are making huge investments in carbon capture and storage technology. In fact in the case of Quest, by the end of this year they will be storing a million tons a year of CO_2 which they will pipe further north and store in rock formations.

Isn't that exactly the kind of investment in technology that is going to help us get carbon capture and storage or sequestration to a commercially viable point? Both Senator Manchin and Senator Capito pressed you on this issue. The key is yes, we can do CCS on a technologically feasible basis, but we have got to get it to a commercially viable basis.

You said driving down the cost is your number one parameter. Here are projects that are investing hundreds of millions and billions along with the Province of Alberta and the Canadian Federal Government with huge private investments in CCS. Isn't that the kind of thing that can help us drive this technology forward?

Secretary MONIZ. Sure. Again, I don't know these particular projects, but absolutely. We're CCS across the board, we think, is really, really important. And I might add there is a little facility in North Dakota, I think it is, that has sent 20 megatons of CO_2 into Canada for enhanced recovery.

Senator Hoeven: Exactly. The Dakota Gasification Company and DOE was an integral part of developing that.

Secretary MONIZ. Correct.

Senator HOEVEN. I would like to get to your people the Quest and the Kearl which are Shell and Exxon's projects so you——

Secretary MONIZ. Please do.

Senator HOEVEN. So you can see how important it is in terms of developing CCS.

Secretary MONIZ. Yes.

Senator HOEVEN. Which is what you want to do.

Secretary MONIZ. Terrific. In fact the person in our office, Julio Friedmann, is the expert in this area. I'll bet he knows about them, but——

Senator HOEVEN. Well, I would really like to take——

Secretary MONIZ. Yup.

Senator HOEVEN. Like you to take a look because I understand from your earlier comments to Senator Barrasso that you were not going to comment on Keystone internal deliberations, which I understand. You and I have talked about that issue many times. But I think it would be good for you to take a look at this project.

Secretary MONIZ. I would be happy to.

Senator HOEVEN. I think you will be impressed.

Secretary MONIZ. Okay. Alright.

Senator HOEVEN. Thanks, Mr. Secretary.

Secretary MONIZ. Yup, you bet, yup.

Senator HOEVEN. Great.

The CHAIRMAN. Mr. Secretary, thank you. You have been very generous with your time. It has been almost two and a half hours you have been sitting here.

I want to echo the comments, I believe it was of Senator King. Clearly this is not something where you studied up quickly to come before the Committee to speak to the President's priorities within your budget. You know the details in and out of what is happening within DOE. I think that this is reflected in your responses to our questions, and I would like to express my appreciation for how prepared you have come to this hearing.

Secretary MONIZ. Thank you.

The CHAIRMAN. I will be submitting some additional questions for the record, but I do think that given the fact that we had pretty robust participation here at the Committee, we have gotten to hear some responses in a host of different areas. I will ask one more question while we still have you here, and that relates to the critical minerals strategy.

Back in 2010 and in 2011, DOE released a report on the critical minerals strategy within the country. We talked a lot about our dependence on foreign sources for oil. I think we recognize that when it comes to our critical minerals we have that same dependency, and with many of these important minerals it is clearly a dependence that leads to a vulnerability.

I was listening to the comments from the Senator from Montana saying the Tesla needs to have a little bumper sticker that says "this may be powered by coal" and your kid's iPhone should have the same sticker that says "this may be powered by coal." I think it is very clear that all of it is powered by some form of critical mineral and the priority that we place on that, again, accessing these within our own country where we do have resources is important.

So, the question to you is whether or not DOE is looking at updating any of the analysis that you have done, now three years back? Is that something that is on the books for consideration?

Secretary MONIZ. Not that I know of, but I can look at that.

The CHAIRMAN. Can you look at that?

Secretary MONIZ. And we could consider it, of course.

The CHAIRMAN. Thank you.

Secretary MONIZ. The issue of critical minerals also goes into the things like rare earths.

The CHAIRMAN. Right.

Secretary MONIZ. That go into so many technologies, et cetera. On that one we did form the Hub out in Iowa which I think is doing extremely well. I think that perspective is both to produce the minerals, but it's also when can you, if they're very critical, when can you replace them by something else?

The CHAIRMAN. Yes.

Secretary MONIZ. Can you recycle them more, et cetera. So those are all interesting.

The CHAIRMAN. Yes.

Secretary MONIZ. We could look at that and see.

The CHAIRMAN. Good.

Secretary MONIZ. And if that's something you're interested in we could have a refresh.

The CHAIRMAN. I would like to do that.

Secretary MONIZ. Okay.

The CHAIRMAN. We are going to do that.

I will also be submitting a question to you about methane hydrates. This has been an area where we have seen the interest from DOE's perspective surge and then wane over the years. I think this is an area that has enormous potential for us. Better understanding our methane hydrates is something that I would like to do.

Secretary MONIZ. I'd be happy to discuss that.

The CHAIRMAN. I did have a question on the long term mercury storage facility. We had posed a series of questions to you, Senator Heller and I, last year. As I was going through my homework last night I actually came across a letter from you that speaks just exactly to this and where we are with the storage facility. So I will look forward to following up——

Secretary MONIZ. Good.

The CHAIRMAN. A little bit more with you on that.

Secretary MONIZ. Excellent.

The CHAIRMAN. There are some other questions you will be seeing from me.

Secretary MONIZ. Okay.

The CHAIRMAN. I will turn to our Ranking Member, and we will conclude the hearing.

Senator CANTWELL. Thank you, Madam Chairman.

Again, I want to add my thanks for your appearance here today and details for the budget itself. I think it is a forward looking perspective to our energy needs, and I thank you for that.

As some of my colleagues have mentioned they might do more, it reminds me of a few years ago when some of the leaders of industry, Bill Gates and the CEO of Cummings, came to all of us and said that we should increase ARPA–E even more. I think it is a valid point that we could be discussing this in this budget overall.

I am going to submit a question for the record as it relates to the WIPP, the Vit plant and the natural gas pipeline. I think there have been some issues there about postponing the EIS.

Secretary MONIZ. Oh.

Senator CANTWELL. So I am going to submit something for the record, and if you could respond to that, about the timing of that, that would be quite helpful.

You mentioned visits to people's states. We very much appreciate that and want to offer, if you want, to come out and look at the various science, no, human science studies that are being done in the Northwest, various activities. We would appreciate that.

I wanted to get a sense of the DOE role. You had a major role in the Human Genome Project. What are you thinking about the brain and precision medicine efforts and what DOE might contribute to that? That is why we welcome you to visit the Northwest on the life sciences issues there.

Secretary MONIZ. Yes. Well, I am certainly aware of the major push, University of Washington, Seattle, et cetera, and building up, I think Microsoft was involved in building up tremendous programs there.

Thank you, I mean, for again observing that the Department has made and is making tremendous contributions in life science which are often not recognized. They are actually derivative of the original programs around radiation damage, and that then grew into genomics, et cetera.

On the brain—and also a factoid that might be interesting is in our four large light sources, it's now up to about 40 percent of the use is actually life and medical science connected. So it's a really big deal.

In terms of the brain, we have now, for about a year, been having discussions with Francis Collins. He actually initiated them. He is eager for the Department of Energy and our laboratories to play a role.

That's based upon two major areas, the expertise around sensors and very sensitive measurement devices but also around the large scale computation capacity that we have. Of course, in the budget the pushing to the next frontier of exascale, high performance computing is one of our also highlighted areas. One of the many applications can be in terms of a brain initiative.

I'd love to have that discussion because, frankly, we're always concerned about mission and making sure that's understood that is an appropriate place for us to work. NIH is very eager for us to join that.

Senator CANTWELL. Thank you.

One last thing, last December we were able to pass the Manhattan Project National Historic Park in Washington, New Mexico and Tennessee. Part of that law requires the Department of Energy to enter into an agreement with the Department of the Interior within a year to specify roles in how that will be administered.

Can you tell me whether the Department has begun that discussion with Interior? And when do you expect to have it finalized? By the end of this year?

Secretary MONIZ. The goal is for the end of this year. In fact, I was just told this morning in my morning staff meeting that there will be a meeting with the Park Service today to discuss that.

Senator CANTWELL. So you would expect that that would be completed by the end of this year?

Secretary MONIZ. Until I get a report I'm a little reluctant to say I expect, but I know that that's the target and we will try to meet that target.

Senator CANTWELL. Well, within one year you are supposed to specify.

Secretary MONIZ. Yeah.

Senator CANTWELL. So that is a requirement, and you will do it.

Secretary MONIZ. That's right.

Senator CANTWELL. And we very much appreciate getting this off the ground between the various agencies.

Secretary MONIZ. Yes.

Of course in the meantime the visiting at Hanford and at Oak Ridge of Manhattan sites will continue in the normal way, the B reactor, for example.

Senator CANTWELL. Yes, but every time somebody puts out a proposal like here are the visiting hours, it is taken up in seconds. That is the demand. People are chomping at the bit.

Secretary MONIZ. I see, yeah.

Senator CANTWELL. So, it is not as if some people are visiting. That is not the question.

Secretary MONIZ. Right.

Senator CANTWELL. The question is there is so much public demand that people view this as probably one of the most positive developments and from the perspective of hearing the science story behind this——

Secretary MONIZ. Right.

Senator CANTWELL. It is pretty incredible.

Secretary MONIZ. Good. We are pursuing it.

Senator CANTWELL. Thank you so much, and thank you, Madam Chairman.

The CHAIRMAN. Thank you. With that we stand adjourned.

[Whereupon, at 12:25 p.m. the hearing was adjourned.]

Department of Energy
Washington, DC 20585

June 9, 2015

The Honorable Lisa Murkowski
Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

Dear Madam Chairman:

On February 12, 2015, Secretary Ernest Moniz testified regarding the Department of Energy's budget request for Fiscal Year 2016.

Enclosed are answers to the questions that were submitted by Ranking Member Maria Cantwell, Senators John Barrasso, Steve Daines, Jeff Flake, Al Franken, Martin Heinrich, Mazie Hirono, Angus King, Mike Lee, Joe Manchin, Rob Portman, and you to complete the hearing record.

If we can be of further assistance, please have your staff contact our Congressional Hearing Coordinator, Fahiye Yusuf, at (202) 586-2764.

Sincerely,

Brad Crowell
Assistant Secretary
Congressional and Intergovernmental Affairs

Enclosures

cc: The Honorable Maria Cantwell, Ranking Member

Printed with soy ink on recycled paper

QUESTIONS FROM CHAIRMAN MURKOWSKI

Q1. Before making decisions that will prevent (or continue to prevent) oil and gas development on millions of acres of federal lands and waters in Alaska, did President Obama, or anyone else from the Administration, consult with you about the impact that those actions could have on our nation's energy security?

A1. While I am in frequent contact with Secretary Jewell on a range of issues, this was a Department of Interior decision, and we were not consulted. I do not expect to be consulted on all issues managed by other agencies.

Q2. DOE appears to have $15 million in its current budget to finally follow up on its work on methane hydrates from 2012, but also appears to be seeking no research dollars to further methane hydrate production research in FY 2016. Given the huge potential for hydrates to be the dominant source of global energy, I cannot understand why the Department is not willing to provide stable research funding to make America the global leader in tapping this future resource.

Q2a. Can you explain this Administration's plans for further study and development of methane hydrates? As part of your answer, please identify how much funding you currently have for methane hydrates research, how much funding you have requested for FY 2016, and funding that you anticipate DOE will need for methane hydrates research in future fiscal years.

A2a. The Department requested and received $15 million for gas hydrate research in its FY 2015 appropriation. This funding will be used through FY 2016 to complete ongoing research projects and continue resource characterization in the Gulf of Mexico and Alaska. No additional funding is being requested for FY 2016 as work will continue with the previously appropriated funds. Any future funding needs will be evaluated through future budget processes.

Q2b. Do you agree or disagree with the recommendations of your advisory committee, the Methane Hydrate Advisory Committee, which last year proposed a focused 10-year investment and highlighted the need for long-term production tests in the Arctic, in OCS areas, and from a sea platform?

A2b. The Methane Hydrate Advisory Committee has recommended an extremely ambitious research program. The Department considered those recommendations in its FY 2016 Budget Request.

Q3. The National Security Strategy released last week states: "We must promote diversification of energy fuels, sources, and routes, as well as encourage indigenous sources of energy supply. Greater energy security and independence within the Americas is central to these efforts." Are our 455,000 barrels per day of oil exports to Canada part of that energy security and independence? Might we consider extending the same consideration to Mexico?

A3. Oil exports are subject to Section 754.2 of the Export Administration Regulations (EAR) (15 C.F.R. Parts 730-774). These provisions are derived from a number of statutory provisions, such as the Energy Policy and Conservation Act of 1975 (EPCA). Per the EAR, with very few exceptions, a license is required to export crude oil to all destinations. Section 754.2(b)(1) provides for approval of licenses in a number of instances including exports of oil to Canada for consumption or use therein and exports consistent with Presidential findings. In June 1985, President Reagan issued a finding that exports to Canada would be in the national interest. The finding instructed the Secretary of Commerce "to take all other necessary and proper action to expeditiously implement this decision." No provisions exist for comparable treatment of exports to Mexico. Energy security is one of several considerations that have gone into determining the existing body of legislation and regulations. For further clarification on existing export policy, I would refer you to the Department of Commerce.

Q4. Your Department released critical materials strategy reports in both 2010 and 2011, and during the hearing you committed to considering an update to them. From the perspective of mineral security, do you believe the United States is better off than we were in 2010 and 2011? Have we made progress in lessening our dependence on foreign minerals over the last three years?

A4. The Department's 2010 and 2011 Critical Materials Strategy reports identified three pillars to address critical materials challenges: (1) diversifying supply of critical materials, (2) developing alternatives to critical materials, and (3) driving recycling and reuse of critical materials. As you suggest, diversified global supply chains are essential: multiple sources of materials are required to manage supply risk. This means taking steps to facilitate the environmentally sound extraction, processing, and manufacturing of critical materials here in the United States, as well as encouraging other nations to expedite alternative supplies. However, the other two pillars— substitutes and recycling processes—are also important for mitigating risk. In 2013, DOE funded the Critical Materials Institute, led by Ames National Laboratory in Ames, Iowa. The Institute has brought together leading experts to pursue scientific and engineering research to address material criticality over the long term. The Institute has focused its efforts around the three pillars of the Critical Materials Strategy.

The circumstances that led to high prices and tight supplies of rare earth commodities in 2011 have eased somewhat. Manufacturers are using rare earths more efficiently and making substitutes that reduce their use, such as replacing fluorescent lighting with light emitting diodes and replacing permanent magnet motors with induction motors. Meanwhile, while rare earth production by China has declined since 2011, production by the U.S. and other countries has increased. While the situation surrounding rare earths has eased, we are continuing to monitor emerging mineral security and material criticality. Issues related to critical materials and minerals touch on the missions of many federal agencies, and the full interagency perspective can help us proactively address critical materials issues. Along with DOI, DOE co-chairs the National Science and

Technology Council (NSTC) Committee on Environment, Natural Resources, and Sustainability (CENRS) Subcommittee on Critical and Strategic Mineral Supply Chains, which was established in December 2010. This Subcommittee facilitates a strong, coordinated effort across federal agencies to identify and address important policy implications arising from strategic minerals supply issues, including identifying emerging critical materials, improving depth of information, and identifying R&D priorities.

Q5: Approximately how many active applications is DOE considering for the Title 17 loan guarantee program right now? How many loan guarantees does the Department anticipate completing this year?

A5: Currently, the DOE has approximately 20 active applications under the Title XVII loan guarantee program. These applications have been received under the Advanced Fossil Energy Projects and Renewable Energy and Efficient Energy Projects solicitations, which were issued in December 2013 and July 2014, respectively. Application deadlines under both solicitations extend through 2016.

Q6. Senator Heller and I recently wrote to you about the Department of Energy's unfulfilled legal obligations under the Mercury Export Ban Act of 2008. I appreciated your recent response, in which you confirmed that DOE issued its Environmental Impact Statement in January 2011, published a supplement to that EIS in September 2013, and that the "next step" is to issue a Record of Decision (ROD) with regard to the location of a long-term storage facility. You also noted that the process of building the facility is "contingent on funding."

Q6a. What has the Department actually done, since issuing the Supplemental EIS in September 2013, to move this project forward?

A6a. The Department and representatives from Nevada Governor Sandoval's office recently met with representatives of the gold mining industry, the primary generator of elemental mercury, to discuss a path forward.

Q6b. When does the Department expect to issue a ROD with a final decision on the location of the storage facility?

A6b. The timing for issuance of the ROD remains uncertain.

Q6c. Who or what is holding up the issuance of the ROD?

A6c. The Department's planning and engagement with stakeholders to make a final selection for the location of the elemental mercury storage facility.

Q6d. Your letter stated that construction of the mercury storage facility is "contingent on funding." What is the expected cost of its construction?

A6d. The preliminary cost estimate for construction of a new facility is $20 to $40 million.

Q6e. Does the President's FY 2016 budget – which includes an additional $2.5 billion for DOE – request funding for a mercury storage facility? If not, why not?

A6e. No funding has been requested in FY 2016 for the construction of an elemental mercury storage facility due to other budget priorities. The FY 2016 Budget Request reflects careful consideration of these priorities.

Q6f. When does DOE plan to meet its legal obligation to build the mercury storage facility?

A6f. The Department does not currently have an estimate for when an elemental mercury storage facility could be available.

Q7. DOE has now canceled the FutureGen "clean" coal project for the second time in about seven years. It was again canceled last week even though the project's purpose was to demonstrate that carbon capture and storage (CCS) technology can be used to preserve coal as an element of our nation's fuel mix in the future.

Q7a. Please explain in detail why DOE again canceled FutureGen.

A7a. The Department of Energy has worked diligently over the last six years to make this project a success. The Department believes strongly in the importance of oxycombustion

technology and, accordingly, has worked closely with Congress and a number of non-federal partners to advance this priority project despite setbacks.

However, in light of a number of challenges to the project, including the lack of private financing and other hurdles, the Department no longer felt that the FutureGen Alliance had the ability to spend the funds appropriated by the American Recovery and Reinvestment Act (ARRA) before the statutory deadline of September 30, 2015. Absent an extension of this deadline by Congress, and in order to best protect those taxpayer funds, the Department has notified the FutureGen Alliance that Federal support is no longer available for construction activities at this time. Accordingly, we have initiated a structured closeout of Federal support for the project that will help maximize the value of investments to date while minimizing ongoing risks and further costs.

Q7b. Approximately how many taxpayer dollars have been allocated to this project over the years?

A7b. $1.049 billion has been obligated to the FutureGen 2.0 project. Of those funds, approximately $793 million are expected to be returned to Treasury.

Q7c. With respect to the President's Climate Action Plan, the proposed New Source Performance Standards (NSPS) require that new coal-fired power plants utilize CCS technology. Based on a briefing my staff received last summer from DOE's Office of Fossil Energy, this would appear to leave the Kemper County, Mississippi plant as the most likely candidate to show that this technology can be adequately demonstrated. What are you doing to make sure that the Kemper County facility succeeds in light of the FutureGen announcement? What impact will the cancellation of the FutureGen project have on the Kemper plant?

A7c. The cancellation of the FutureGen project is not expected to have any negative affect on the Kemper project. Construction of the Kemper project is more than 98% complete and the plant is expected to begin commercial operations in 2016.

Q7d. The Clean Air Act states that a technology must be "adequately demonstrated" before EPA can promulgate a standard requiring its use. In light of FutureGen's failure, and the status of other projects in the U.S., do you view carbon capture and sequestration as having been "adequately demonstrated"? If yes, please explain how this can be if it rested significantly on a now-failed project?

A7d. The decision to determine if a technology is "adequately demonstrated" is a regulatory function of the EPA, and considers, among other things, the availability of commercial systems, system components, and technical readiness. The carbon capture goals of the FutureGen project are significantly different from the carbon capture requirements set forth in the draft rule. The FutureGen project was attempting a capture rate of 90%, while the draft rule proposed for a new super critical coal plant, for instance, would require only a 30% capture. There is no question that such technologies have been demonstrated. While we think that the failure of the FutureGen project is unfortunate because we believe it to be an important next-generation technology, it reflects an entirely different level of ambition than that called for in the draft rule.

Q7e. Since the budget request was completed prior to the announcement that the FutureGen project has been cancelled, what funding changes do you anticipate as a result?

A7e. Funds from the American Recovery and Reinvestment Act (ARRA) provided the bulk of the Government's support for FutureGen. No funding was requested for FutureGen in the President's FY16 budget.

Q8. The Administration's FY 2016 budget requests $43.1 million for the Federal Energy Management Program, an increase of almost 60 percent over last year's funding level. The supporting documents note that the request supports "major Administration initiatives to better assist all agencies in meeting aggressive energy, water, greenhouse gas and other sustainability goals..."

Q8a. Please define these "goals" and note if they are statutory or executive.

A8a. The Federal Government is pursuing a number of challenging energy and sustainability goals established through Executive Order (EO) and statute. Statutory federal energy and sustainability statutory goals were set forth by the National Energy Conservation Policy Act (NECPA), Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007, among others.

A full list of the statutory and executive requirements for federal energy use and sustainability can be accessed here: https://www4.eere.energy.gov/femp/requirements/ The Federal Energy Management Program (FEMP) collects data from Federal agencies on their progress toward reaching the following key goals:

- EO 13693: Reduce agency building energy intensity (in BTUs per square foot) by 2.5% annually through the end of FY 2025, amounting to at least a 25% reduction from a FY 2015 baseline.
- EO 13693: Use clean energy (renewable or alternative) equivalent to at least 25% of total electricity use in FY 2025.
- EO13693: Use renewable electric energy equivalent to at least 30% of total electricity use in FY 2025
- EO 13639: Reduce water consumption (gals/sq. ft) by 36% in FY 2025, through 2% annual reduction from a FY 2007 baseline.
- EO 13639: Reduce vehicle fleet GHG emissions per mile by 30% in 2025 from a FY 2014 baseline.
- EISA 2007: Reduce energy intensity (Btu/GSF) by 24% compared to 2003; 30% reduction required by FY 2015.

- EPACT 2005: Use renewable electric energy equivalent to a least 7.5% of total Federal electricity consumption in FY 2014; at least half of which must come from new renewable sources developed after January 1, 1999.

Q8b. The FEMP request further states that "major funding changes are a result of a $15 million investment to assist agencies to invest in priority projects for efficiency and renewables with the greatest impact." Please specify the "priority projects" at issue and how that priority was established (statutorily, executive action, or other).

A8b. The FEEF (Federal Energy Efficiency Fund), now called AFFECT (Assisting Federal Facilities with Energy Conservation Technologies) program, focuses on providing direct funding to support the best available agency projects, enable implementation of projects, and leverage cost sharing at other Federal agencies for capital improvement projects and other initiatives to increase energy efficiency, conserve water, and increase renewable energy investments at Federal facilities in support of Federal agencies' energy and sustainability goals as outlined in part (a).

AFFECT grants are awarded after a competitive assessment of the technical merits and economic effectiveness of each agency proposal, which considers a number of factors including: a cost benefit analysis; the life-cycle cost-effectiveness of the project; the amount of energy and cost savings anticipated; the amount of funding committed to the project by the proposing agency; and the extent that a proposal leverages financing from other non-Federal sources. The FY 2014 AFFECT program generated $114 million of investment from agencies with $5 million of FEMP funds resulting in an average $24/$1 leveraging factor.

Q9. The Administration requests $52 million for DOE's cyber-related activities in FY 2016, an increase of 13 percent from last year's funding level. Just this week, President Obama announced that he was creating a new agency to combat cyber threats. This newly

established "Cyber Threat Intelligence Integration Center" is reportedly to be housed in the Office of the Director of National Intelligence.

Q9a. Please specify DOE's cyber-related activities and describe the proposed new digital forensic analysis initiative.

A9a. The FY 2016 request reflects the critical need to accelerate and expand efforts to strengthen the energy infrastructure against cyber threats. The $52 million requested is specifically for activities to bolster cybersecurity in the energy sector, which includes both the electric sector and the oil and natural gas sector. These grid-related activities, funded in the Office of Electricity Delivery and Energy Reliability (OE), are performed in close collaboration with our energy sector and government partners.

The energy sector is a prime target for malicious cybersecurity attacks, and the ability to detect and mitigate the malicious activity is critical. In FY 2016, OE's Cybersecurity for Energy Delivery Systems (CEDS) will conduct a competitive solicitation to establish a Virtual Energy Sector Advanced Digital Forensics Analysis Platform for conducting real-time advanced digital forensics analysis for the energy sector. The development of a virtual environment for forensic analysis will enable analysts to safely inspect malware, zero-day vulnerabilities, and advanced threats across multiple stages and different vectors, as well as to test mitigations. This environment will be used to analyze untested and untrusted code, programs, and websites without allowing the software to harm the host device. The $10 million requested for this initiative supports implementation over a two-year timeframe followed by transition to the private sector, where it will become self-sustaining.

The CEDS request also supports the Cybersecurity Risk Information Sharing Program (CRISP), which transitioned in FY 2014 from a small DOE-funded electricity sector pilot to a private-sector program primarily funded and managed by the North American Electric Reliability Corporation (NERC) and the electricity subsector companies that participate in the program. NERC manages unclassified elements of CRISP, and DOE performs critical classified elements. In FY 2016, DOE continues its classified analysis and reporting and will issue a competitive solicitation to identify and fund commercially available technologies and services that can be incorporated into CRISP via operational pilots designed to enhance all aspects of the program. As the energy sector-specific agency, DOE will also work with the oil and natural gas sector to bring it into CRISP.

In FY 2016, CEDS is expanding online access to the Cybersecurity Capability Maturity Model (C2M2) and Risk Management Process (RMP) guidelines and conducting benchmarking and data analytics of C2M2 evaluation tool results. These guidelines, developed with industry and Federal partners, help utilities improve their organizational and process level cybersecurity posture.

CEDS will issue an FY 2016 competitive solicitation for energy sector-led R&D to advance cybersecurity for energy delivery systems to transition mid-term R&D projects into real-world cybersecurity capabilities that address the changing threat landscape. In addition, CEDS will continue to support applied research and strengthen the core capabilities at the national laboratories.

CEDS also leads the Energy Sector-Cybersecurity Incident Management Capability effort to build effective, timely, and coordinated cyber incident management capabilities for

operations, information exchange, and technology in the energy sector. In collaboration with the Department of Homeland Security (DHS), the Federal Energy Regulatory Commission (FERC), the Electricity Sector Information Sharing and Analysis Center, and industry, DOE leverages governmental and non-governmental resources to create a suite of deliverables that develop the workforce, improve processes, and enhance technologies for cybersecurity for energy delivery systems. In FY 2016, CEDS will enhance situational awareness with relevant local and Federal agencies through increased information sharing and collaborative regional exercises.

The budget request for the Department also includes $254 million for cybersecurity activities aimed at protecting the DOE enterprise, including at DOE's national laboratories. The activities for protecting the DOE enterprise are funded across several programs, including NNSA, the Chief Information Officer, Science, Nuclear Energy, and Environmental Management, as well as through the Working Capital Fund and, funded by ratepayers, the Power Marketing Administrations. Additional information on DOE's cybersecurity activities are described in the budget request's cyber crosscut.

Q9b. Why was the creation of yet another agency to deal with cyber issues deemed advisable? How do you expect the Department's cyber efforts and the NERC/FERC stakeholder process to interface with this new cyber office? What does this mean for the Electricity Sub-sector Coordinating Council which currently provides a forum for communications between public and private sector partners? What is the impact to the Electricity Sector Information Sharing and Analysis Center (ES-ISAC) that handles information sharing?

A9b. The President directed the Director of National Intelligence to establish the Cyber Threat Intelligence Integration Center (CTIIC). The Center, which is not a new agency, will provide an integrated all-source analysis of intelligence related to foreign cyber threats and cyber incidents affecting U.S. national interests; support the U.S. Government

centers responsible for cybersecurity and network defense; and facilitate and support efforts by the Government to counter foreign cyber threats. Once established, the CTIIC will join the National Cybersecurity and Communications Integration Center (NCCIC), the National Cyber Investigative Joint Task Force (NCIJTF), and U.S. Cyber Command as integral parts of the U.S. Government's ability to protect the Nation from cyber threats.

The Department expects the CTIIC will add value to our activities with the Electricity Sector Information Sharing and Analysis Center (ES-ISAC), the Oil and Natural Gas Information Sharing and Analysis Center (ONG-ISAC) and the Federal Energy Regulatory Commission, as well as our partnerships with the Electricity Subsector Coordinating Council, the Oil and Natural Gas Subsector Coordinating Council and the entities they represent. Through the ES-ISAC and ONG-ISAC, the information provided by the CTIIC can assist in enhanced situational awareness and incident management as these centers are the primary hubs for coordination and communications within the energy sector. Planned working groups will offer further opportunities for coordination with the CTIIC. Concise, relevant, and timely cyber threat information sharing with and among entities within the energy sector will always be one of the valuable tools in cyber defense.

Q10. The $7.5 million request for the National Electricity Delivery program notes that it "authorizes the import and export of electricity, issues permits for cross-border transmission lines, and coordinates Federal transmission permitting on Federal lands."

Q10a. How many cross-border transmission lines are currently in existence? How many applications for cross-border transmission line permits are pending? What is the average processing time for the Department to consider these cross-border permits?

A10a. To date, Presidential Permits have been issued for 100 cross-border electric transmission lines at the U.S.-Canada border and 31 cross-border electric transmission lines at the U.S.-Mexico border. There are four Presidential Permit applications pending: Northern Pass (New Hampshire-Quebec), Great Northern Transmission Line (Minnesota-Manitoba), New England Clean Power Link (Vermont-Quebec), and Soule River Hydro (Alaska-British Columbia).

Before issuing a Presidential Permit, the Department must review its action pursuant to the National Environmental Policy Act (NEPA). Transmission projects are unique, involving many stakeholders who participate in the permitting process. Depending on the complexity of the project, the processing time generally ranges from 18 months to 3 years. Upon completion of the NEPA process, the Department typically issues a Presidential Permit within two weeks, if the project is determined to be in the public interest. It is also important to note that decisions by state regulators or project owners can significantly change project schedules and in some cases, result in project delays or cancellation.

Q10b. Please specify the transmission projects for which the National Electricity Delivery program has coordinated federal transmission permitting on federal lands during this Administration. How many of those projects have been completed and what was the average time for such completion? How many are pending and how long have those projects been under development?

A10b. As part of the Rapid Response Team for Transmission (RRTT), DOE tracks and coordinates schedule information with the Federal agencies designated as "lead" under NEPA. Shortly after its creation in 2009, the RRTT selected eight pilot projects to identify challenges and efficiencies in inter-agency coordination that could improve early information sharing and review efforts for transmission projects requiring multiple

Federal authorizations. Environmental review and permitting efforts for each of the seven RRTT pilot projects is coordinated by the Federal NEPA lead agency.

One project was withdrawn by the sponsor, and four of the seven remaining projects have completed the NEPA process. Of these, two are under construction: the Susquehanna to Roseland project is anticipated to be in-service by June 2015 and the CapX2020 Hampton-Lacrosse project is targeted for service in 2016. The Sunzia Southwest Transmission Project concluded the NEPA review and is in the process of obtaining state permits. NEPA review for Segments one through seven and ten of the Gateway West project was completed in 2013. On a separate track, NEPA is being conducted on the remaining segments eight and nine.

Three projects are at various stages of the NEPA process, having experienced project sponsor delays and permitting difficulties.

Q11. The FY 2016 budget requests $63 million for a new initiative to provide State Energy Reliability and Assurance Grants.

Q11a. Is the Administration seeking Congressional authorization for this new program?

A11a. The proposed Grants for Electricity Transmission, Storage, and Distribution Reliability program continues and expands upon the Office of Electricity Delivery and Energy Reliability's (OE) history of success working with states and leveraging previous technical support to states for planning processes in accordance with EPACT 2005, the American Recovery Act, and the DOE Organizational Act of 1977. States, local, regional, and tribal entities would be encouraged to compete for funding to develop state reliability planning that would include evaluation of transmission, storage, and distribution infrastructure.

The proposed Grants for Energy Assurance program expands upon OE activities that are aimed at improving the capacity of states, localities, and tribes to identify the potential for energy disruptions, quantify the impacts of those disruptions, and develop comprehensive plans responding to those disruptions and mitigating the threat of future disruptions. The goal of the Grants for Energy Assurance program is to expand state, local, and tribal energy assurance planning, in partnership with the energy sector, to better protect citizens and energy assets so that communities and their local energy infrastructure can become more resilient. Traditionally, Congress has provided specific authority for formula grants. Although the Department of Energy has general programmatic and financial assistance authorities that would enable it to administer the proposed Grants for Energy Assurance program, the Department stands ready to work with Congress to ensure that implementation of the program meets Congressional expectations.

Q11b. The supporting documents merely note that the grants are to be "in support of electricity transmission, storage, and distribution reliability and energy assurance." Please provide more details on this new program, including whether the program is a competitive solicitation and whether it will have a matching funding requirement for the state, local, or tribal recipient.

A11b. States are seeking a more proactive and comprehensive approach to state energy market and policy designs to address the challenges and opportunities which are transforming energy infrastructure. The Grants for Electricity Transmission, Storage, and Distribution Reliability program is proposed to promote and integrate electricity reliability, efficiency, renewable energy, environmental protection, and climate resiliency planning and action by state, local, regional, and tribal entities. State electricity reliability planning initiatives eligible for the grants would include evaluation of transmission, storage, and distribution infrastructure necessary for managing new or retiring generation, planning for the

increasing interdependencies of natural gas and electricity systems, and accounting for climate change and extreme weather risks in infrastructure investments. These grants would be offered to all 50 states and to regional, local, tribal and territorial entities. Grants would also be available to associations that organize their member states, local, tribal and territorial governments on a regional or national level. While matching funds would not necessarily be required from an applicant, we would regard an offer of matching funds as an indicator that the applicant is strongly committed to the proposed work. Grant proposals for electricity transmission, storage, and distribution reliability would be rewarded competitively.

In particular, DOE would provide grants to be used for several activities germane to long-term electricity system reliability planning, including:

- Integrating planning and action for transmission, storage, and distribution reliability, climate resiliency, and environmental compliance;
- Planning for the increasing interdependencies of electricity, natural gas, and water systems;
- Identifying and implementing regulatory reforms to enable transmission, storage, and distribution investments that address challenges and take advantages of opportunities, including reforms to enable distributed generation and energy efficiency;
- Developing climate resiliency metrics;
- Identifying and planning upgrades of infrastructure to make it more resilient to climate change and extreme weather;

- Developing incentives and enabling cost recovery for reliability and climate resiliency investments;
- Collecting and sharing data on transmission, storage and distribution cost, environmental impacts, resiliency, reliability, and flexibility;
- Valuing the availability of resources; and
- Fostering multi-state cooperation.

In FY 2016, the Grants for Energy Assurance program is proposed to finance state, local, and tribal governments to enhance resilience and national security through energy assurance planning and the testing of, training to, and exercising of those plans. Grants would be offered to all 50 states and to regional, local, tribal, and territorial entities. State and local activities relevant to short- and long-term energy assurance preparedness and planning, could include:

- Creating and sustaining in-house expertise at the state and local levels on energy assurance planning and resiliency focused on smart grids, critical infrastructure, interdependencies, cybersecurity, energy supply systems, energy data analysis, long-term risk and hazard identification and mitigation, and communications;
- Designating energy emergency assurance personnel;
- Developing new or refining existing Energy Assurance Plans to incorporate response actions to new energy portfolios, including smart grid technologies, infrastructure hardening, transportation fuel diversification, energy efficiency, distributed energy technologies, and other risk mitigation measures;
- Establishing energy emergency procedures that address multiple interdependencies across lifeline sectors (e.g., food, housing, and shelter);

- Revising appropriate policies, procedures, and practices to reflect the Energy Assurance Plans;
- Developing or refining a process or mechanism for tracking the duration, response, restoration and recovery time of energy supply disruption events, to include, for example, contingency plans to ameliorate shortages of delivered fuels (e.g., propane, heating fuel, wind, natural gas) and to accommodate interdependencies with associated sectors (e.g., telecommunications, health, and transportation);
- Training appropriate personnel on energy infrastructure and supply systems and the content and execution of energy assurance plans;
- Conducting energy emergency exercises (intra- and inter-state) to evaluate the effectiveness of the Energy Assurance Plans and to demonstrate coordination and communication strategies across government and industry and energy and interdependent sectors;
- Incorporating physical and cybersecurity measures and related guidance for critical energy and interdependent sectors;
- Updating state, local and industry contacts lists to ensure necessary coordination before, during, and after a disruption; and
- Leveraging other efforts such as regional planning and information-sharing groups to share information between state and Federal governments and the private sector to reduce risk.

Q11c. Does this new program intend to help states comply with the Environmental Protection Agency's Clean Power Plan or other regulations? Why or why not?

A11c. The Grants for Electricity Transmission, Storage, and Distribution Reliability Grants program is proposed to support electricity reliability planning and action by state, local,

regional, and tribal entities to promote and integrate electricity reliability, efficiency, renewable energy, environmental protection, and climate resiliency. DOE will provide grants to be used for several activities germane to long-term electricity system reliability planning, including integrating planning and action for transmission, storage, and distribution reliability, climate resiliency, and environmental compliance, which also could include compliance with EPA's power sector regulations, if needed.

Q11d. Is this new program related in any way to the Department's QER on transmission, distribution, and storage? Please explain.

A11d. The QER is not finalized yet. The request is aligned with the Departmental Grid Modernization Crosscut Initiative and is closely associated with and supportive of the Office of Electricity Delivery and Energy Reliability's National Electricity Delivery and Infrastructure Security and Energy Restoration program activities and missions.

Q12. The FY 2016 budget request of $40 million for Clean Energy Transmission and Reliability includes a "competitive solicitation to improve operation reliability and security of the grid."

Q12a. How much funding does the Department propose for this "competitive solicitation" and what entities may apply?

A12a. The Department plans to allocate $4.4 million to projects selected under a competitive solicitation process. The objective is to integrate mathematical and computational advances into operational software tools, with a focus on providing utilities and system operators with enhanced model-based, decision-support capabilities to improve the reliability and security of the grid.

The solicitation would be targeted to industry. DOE's Power Marketing Administrations, as transmission operators, would be eligible to apply.

Q12b. How does this new grants program differ from the new State Energy Reliability and Assurance Grants program also sought in this budget request?

A12b. The competitive solicitation is an extension of existing technical research activities within the Advanced Modeling Grid Research (AMGR) activities in Clean Energy Transmission and Reliability (CETR). The AMGR focus is on enhancing the performance and capabilities of the software tools used by system operators and planners; it does not provide funding for the operations or planning processes themselves. The State Energy Reliability and Assurance Grants program, on the other hand, provides funding to states, localities, regions, and tribal entities for long-term reliability planning, and grants to states, localities, and tribes for energy assurance planning and exercises.

Q12c. Is the intent of this new competitive solicitation to assist with EPA compliance?

A12c. The competitive solicitation does not directly assist EPA with compliance. However, the software tools being developed under AMGR could help operators and planners manage the changing supply and demand mix, as well as address emerging threats to reliability.

Q12d. Is this related to the Department's QER work?

A12d. The QER relates to the entire the Office of Electricity Delivery and Energy Reliability's mission and includes enhancing U.S. infrastructure resilience as an area of focus.

Q13. The Department requests $318.5 million in FY 2016 for its Weatherization and Intergovernmental Program, a 31 percent increase over the previous year. The request "establishes a new local program that will provide competitive grants and technical assistance to local governments, creating partnerships to catalyze investments in the advancement of the U.S. clean energy economy."

Q13a. Please specify the grants programs and other funding opportunities already available under the Department's Weatherization and Intergovernmental Program.

A13a. The mission of the Weatherization and Intergovernmental Program (WIP) is to partner with state and local organizations to significantly accelerate the deployment of clean energy (e.g., energy efficiency and renewable energy) technologies and practices by a wide range of government, community, and business stakeholders. WIP's subprograms include the Weatherization Assistance Program (WAP) and the State Energy Program (SEP).

- The Weatherization Assistance Program provides formula funding to assist in weatherizing low-income homes across America, as well as support for Training and Technical Assistance (T&TA) activities to improve program effectiveness, service delivery, resource accountability, and operational efficiency. The FY 2016 Budget requests $213 million for Weatherization Assistance Program formula funding and T&TA activities, and an additional $15 million is requested for competitive awards to develop and test out a number of financing models to support energy-efficiency retrofits in the underserved multi-family sector.
- The State Energy Program provides formula funding to assist states in establishing and implementing clean energy (e.g., energy efficiency and renewable energy) plans, policies, and programs to reduce energy costs, increase competitiveness, enhance economic competitiveness, improve emergency planning, and improve the environment. SEP provides states with capacity building resources, technical assistance, and best practice sharing networks to facilitate the adoption of plans, policies, and programs that are appropriate based on state and regional circumstances. The FY 2016 Budget requests $70.1 million for the State Energy Program. Of the $70.1 million request, $45 million is for

standard formula grants that allows states, Washington, D.C., and U.S. territories to advance their energy priorities through the design and implementation of energy efficiency and renewable energy programs. $15 million is for competitive awards to individual state projects as well as multi-jurisdictional approaches where state energy offices partner with other states and/or local government energy or economic development agencies to develop and implement initiatives aimed at creating and/or transforming markets to enable scaled-up adoption of energy efficiency and clean energy technologies. The State Energy Program requested funds also provide $10.1 million for technical assistance to state energy offices and related stakeholders, in support of WIP Program activities. Technical assistance is an interdependent component to the financial assistance activities making technology deployment more efficient and effective and enhancing the likelihood of program success. Technical assistance resources are integral to (1) tools development, decisional information, and other technical assistance to grantees and sub-recipients; (2) national energy initiatives and strategic partnerships focused on deployment and best practices; (3) improvement of web-based reporting and monitoring systems; and (4) metrics and evaluation of state planning, analysis, and evaluation activities.

In addition, the FY 2016 Budget requests $20 million to establish the Local Energy Program in FY 2016. Municipal and county governments are in a unique position to implement clean energy solutions that reduce energy use, save money in local communities, and create jobs. Through the technical assistance and competitive awards, DOE will assist local governments with strategic energy and economic planning, policy

and program design and implementation, energy data management and evaluation, and development of financing solutions. More specifically, DOE will work with local entities to demonstrate successful models for cost-effectively reducing energy use and will provide local entities with best practice models utilized in jurisdictions of similar size and situation and assist them in developing and implementing strategies to achieve their clean energy technology goals. This new program will allow DOE to expand partnerships with local governments to catalyze investments to advance the U.S. clean energy economy.

Q13b. Is the Administration seeking Congressional authorization for this new grants program?

A13b. Yes. In support of the Weatherization and Intergovernmental Programs budget request, the Department included language to authorize funding for the new Local Technical Assistance Program to support local governments through competitive grants and technical assistance. The Department would be pleased to work with the Committee to provide technical assistance should the Committee consider additional authorization legislation.

Q13c. Please provide the criteria for this proposed new grants program, including whether a local funding match will be required.

A13c. The objective of the Local Energy Program is to leverage the unique policy levers that local decision-makers have as a catalyst for developing creative and effective energy efficiency and clean energy solutions in local communities. The program is envisioned to fund 20 or more competitive projects and provide technical assistance to these and other communities in a broad spectrum of policy areas, such as improving local energy code implementation; leveraging private resources to expand energy upgrades in commercial buildings and residential buildings, including in public facilities; and developing

sustainable funding and financing resources, among others. DOE will work with stakeholders in crafting the criteria for the awards proposed under the new Local Energy Program and will consider match requirements as criteria are developed for awards.

Q14. What, if anything, does DOE plan to do to reduce permitting costs and help marine hydrokinetic (MHK) projects move along more quickly?

A14. The Department of Energy's Water Power Technologies Office focuses on minimizing key risks to deployment and reducing the cost and time associated with permitting and deploying marine and hydrokinetic (MHK) projects. In FY 2016, the MHK subprogram's market acceleration and deployment work will focus on addressing many different barriers to the development, deployment, and evaluation of these systems. This includes undertaking research and developing new instruments to more quickly and cost-effectively identify, mitigate, and prioritize environmental risks; providing new and unbiased data to both developers and regulators to help accelerate permitting timeframes; and engaging in ocean planning processes to ensure that MHK is considered in the nation's marine spatial plans.

In FY 2016, the MHK subprogram will also continue to support environmental research and data collection; the development and testing of new environmental monitoring instrumentation; and the aggregation, analysis, and dissemination of environmental research data. This work will be rooted in existing, proven interagency and international collaborations. The MHK subprogram leverages work occurring internationally and ensures that information provided through these collaborations meets the needs of MHK policy and permitting decision makers. For example, the National Oceanographic and Atmospheric Administration and the Bureau of Ocean Energy Management are partners

in the U.S. DOE-led international environmental data gathering initiative (through the International Energy Agency Ocean Energy Systems Agreement), and also participate in the DOE-led Federal Renewable Ocean Energy Working Group. These efforts are expected to help reduce the time and cost associated with siting and permitting MHK projects, currently a critical barrier in the technology development cycle.

In addition, the FY 2016 Budget includes $5 million to complete front end engineering and design of an open water test facility. The results of this completed engineering and design phase are expected to be used to support a programmatic go/no-go decision on further facility construction funding. Full-scale open water grid connected test facilities have been proven to reduce time to market while reducing the development and permitting costs of MHK technologies.

Q15. You FY 2016 budget calls for a $6 million increase, to $67 million, for all types of water power research. What portion, if any, would go to demonstrating MHK technologies to help prove t heir commercial viability?

A15. The Department's FY 2016 Budget request provides the funding stability necessary to continue making progress in marine and hydrokinetic (MHK) technology demonstrations. The request includes $14 million to support open water demonstrations of MHK technologies. This amount is on par with FY 2015 enacted funding designated for demonstrating MHK technologies.

The $6 million increase in Water Power funding in the FY 2016 Budget request over the FY 2015 enacted level predominantly supports a related area of MHK R&D—the design of an open water test facility that will enable cost-effective demonstrations of MHK technologies that have the potential to achieve commercial viability. Fully-energetic open

water test berths are important for demonstrating and testing wave energy converter components and systems at full-scale under all operating conditions. Specifically, the FY 2016 Budget Request includes $5 million to complete conceptual planning and the design of such a facility.

Q16. Your budget for water power suggests support for MHK activities, but seems to push funding toward "front end engineering and design of a grid connected open water test facility." Given that DOE has provided grant funding for several of these test centers already, why build a new federal test center from scratch? Aren't we just wasting all the taxpayer funding provided to the Oregon, Hawaii, and Florida test centers between 2008 and 2013?

A16. In FY 2016, the MHK subprogram intends to competitively select a project and fully fund the first phase of a multi-berth, full-scale, grid-connected open water wave test facility capable of testing and demonstrating wave energy converter components and systems year-round under operating and survival conditions. If constructed, this test facility would be unique from other U.S. test facilities. Subsequent phases will be subject to a programmatic go/no-go decision to pursue facility construction. If constructed, this project is expected to leverage the results from the MHK subprogram's FY 2013 awards to the Northwest NMREC and the Cal Poly Corporation California Wave Energy Test Center, which are evaluating site locations and delivering preliminary designs and cost estimates. Results from these site location evaluations are forthcoming in FY 2015.

The open water test facility effort is supported by FY 2015 appropriations Conference Agreement report language, which directs DOE to continue "wave testing infrastructure development work, including preliminary development of an open water, fully energetic wave energy test facility."

Since their inception, National Marine Renewable Energy Centers (NMRECs) have established capabilities in MHK energy and have demonstrated their value to the sector. For example, the Northwest NMREC's Pacific Marine Energy Center has established wave and tidal test capabilities through investments made from 2008 to 2013 at various scales and durations. Developers seeking early opportunities for scaled demonstrations continue to leverage its expertise. Wave energy developers utilizing the U.S. Navy's Wave Energy Test Site to test grid-connected technology also leverage the capabilities of the Hawaii NMREC. In addition, once operational, the Southeast NMREC's infrastructure and permits for ocean current testing will fill a unique capability that no other test center in the United States provides. Prior DOE investments in NMRECs' capabilities have positioned them to continue to play a role in future MHK technology advancements.

In general, university- or consortium-relevant MHK R&D funding opportunities are expected to be made available using a competitive solicitation mechanism (i.e. Funding Opportunity Announcements open to U.S. universities). U.S. universities have shown interest in this model, and have been successfully funded under competitive solicitations.

Q17. Your water power budget includes funding to launch HydroNEXT. Exactly how do you plan to spend the funding DOE has requested to encourage incremental conventional hydroelectric generation?

A17. Under the HydroNEXT Initiative, the Department is focusing on developing hydropower technologies that will be low-cost, challenge the design of more "traditional" hydropower technologies, and ensure hydropower development occurs in an environmentally sustainable manner. While the FY 2015 phase of the Department's HydroNEXT Initiative focused primarily on low-impact development of undeveloped stream reaches,

the FY 2016 effort is expected to expand HydroNEXT to include all three hydropower resource classes: Existing Water Infrastructure (new FY 2016 focus); Undeveloped Streams (existing FY 2015 focus); and Pumped-Storage Hydropower (existing FY 2015 activities, increased FY 2016 focus).

The Existing Water Infrastructure resource class includes existing hydropower and non-powered dams (NPDs), with a technical resource potential of 4 to 8 gigawatts, and 12 gigawatts, respectively. It may be economically feasible to incrementally add a portion of this resource potential to the U.S. electrical grid through the development of NPDs. These NPDs can be developed, maximized, and sustained with technology advancements that reduce environmental footprints, lower hydropower replacement and production costs, and enable more robust management of increasingly complex and competing water uses.

To address these issues, the Department intends to focus on investments in R&D that advance standardized low-cost add-on modular powertrain technologies and site engineering designs and approaches. The first part of this effort is expected to invest in innovative technology solutions that lead to well-defined, standardized, and cost-reducing safety and environmental requirements with a goal of reducing costs such that hydropower can be more cost-competitive with other generation resources. The second part of this effort is anticipated to target the creation of project designs that reduce or eliminate the risks of unforeseen safety, environmental, or regulatory design changes for NPD development. While the Department's efforts in this area focus primarily on NPDs,

some new technologies identified under this effort could also be used to implement incremental increases in generation at existing hydropower projects.

In addition, Undeveloped Streams – those segments of natural waterways outside the physical footprint of Existing Water Infrastructure – represent over 60 GW of technical hydropower resource potential. To leverage this untapped hydropower resource, the Department will invest in developing low environmental impact, and low cost powertrain and component technologies. On March 18, 2015, the Department posted a Notice of Intent to Issue a Funding Opportunity Announcement to support research and development of low environmental impact civil structures, alternative construction methods and materials, and innovative mechanical and electrical powertrain components. The Department anticipates that these technologies will help to reduce installation, operational, and maintenance costs, while addressing the environmental and social concerns of new hydropower development.

Finally, the third resource class, Pumped-Storage Hydropower (PSH), represents an opportunity for hydropower to enable the integration of variable renewable generation, such as wind and solar power, into the U.S. electrical grid. The Department intends to initiate PSH research and development by investing in innovation in two areas: (1) scalable PSH facility designs using commercial off-the-shelf pumps, turbines, piping, tanks, and valves to achieve reductions in PSH deployment costs, and (2) hybrid PSH technology designs combining water storage with other forms of energy storage within energy and water delivery and collection systems.

Cross-cutting work to reduce barriers to hydropower deployment and to increase the sustainability and environmental performance of hydropower systems can also benefit all types of hydropower. For example, developing and refining tools to evaluate and improve the biological performance of new hydropower turbines can ultimately benefit any new type of hydropower system, whether a replacement or upgrade at an existing hydropower plant, new generating capacity at a previously NPD, or a completely new low-impact development.

Finally, the Department proposes continued funding of the national laboratories to investigate ways to incrementally increase hydropower generation by developing advanced flow measurement systems and models that optimize hydropower project operations and improve water-use efficiency.

Q18. When you visited Fairbanks last summer you visited the University of Alaska's Center for Energy and Power and heard its desires to make America a world leader in the development and engineering of microgrids. What are your views about the Department's role in helping to advance microgrid development? Do you believe microgrids are more deserving of limited research dollars than more advanced and mature resources such as wind power?

A18. As part of our commitment to the President's all-of-the-above strategy, we support the advancement of numerous innovative technologies, including microgrids, which we consider one of the key building blocks for the grid of the future. The Department has a broad portfolio of activities focused on the development and implementation of microgrids to improve the reliability and resiliency of the grid and help communities become more resilient.

Microgrids can serve well as a platform for the integration of renewable energy resources such as wind, solar, and geothermal energy. In Alaska, significant wind energy resources

can be integrated into the grid more effectively and efficiently with advanced microgrid systems. In FY 2015, DOE is focusing on the development of microgrids for targeted applications in remote areas of the country, such as Alaska. In FY 2016, DOE will continue to advance its development from single microgrids toward an integrated network of multiple microgrids for an even smarter grid of the future.

The Department is making investments commensurate with the needs for component-technology development (such as wind power) and system-technology development (under microgrid R&D), both of which are required to advance microgrid development and implementation.

Q19. I am interested in learning more about your request for $11 million for a loan guarantee program that may help fund up to $2 billion in loans for energy projects in tribal/rural America. I know that the Alaska Federation of Natives has been asking you to promote rural energy development in Alaska and throughout tribal areas in the Lower 48. How will your budget meet the needs of rural America and specifically Alaska Natives for more affordable power?

A19. The DOE budget for FY16 proposes to help support rural America and specifically Alaska Natives to obtain more affordable power in three ways:

- Providing staff (one) support for the Office of Indian Energy's Alaska Program Manager in Anchorage, while co-locating these positions with our NREL and NETL offices.
- Increasing availability of technical assistance for Alaska Native stakeholders—specifically increased capacity for on-demand technical assistance as well as an expansion of the Strategic Technical Assistance Response Team (START) program in Alaska.

- Increasing availability of financial assistance (deployment grants) nationwide, but also specifically for Alaska Native stakeholders.

In regard to loan guarantee programs, it is well documented that Indian tribes have considerable challenges accessing capital to support infrastructure development. Indian lands have an estimated 7,000,000 MW of renewable energy potential; however, only 125-130MW has been installed due to lack of capital. Although other credit programs exist, the eligibility criteria for these programs preclude most tribes from participating. For example, the maximum financing amount available under many loan programs is insufficient to develop clean energy projects. While the USDA Rural Utilities Service allows for higher maximum guaranteed loan amounts, it is focused on transmission and distribution, not on generation projects, and requires participants in the program to be an organization or business structure similar to that of a utility.

Section 2602(c) of the Energy Policy Act of 2005 authorizes the Director of the Office of Indian Energy Policy and Programs (IE) within DOE to establish a Tribal Indian energy loan guarantee program to provide, or expand the provision of, electricity on Indian land. Per statute, the aggregate outstanding amount guaranteed by DOE at any time shall not exceed $2 billion.

In FY 2016, the Department proposes $2 million in administrative Budget Authority and $9 million in credit subsidy for the Tribal Indian Energy Loan Guarantee Program (TIELGP). The administrative budget would be used to issue the necessary rulemaking and solicitations to allow the program to begin accepting loan applications; the credit subsidy would be used to support the first set of loan guarantees, with the expectation that

it would support at least one project in the 1MW-10MW installed capacity range. This program will be directed by the DOE Loan Programs Office (LPO) in collaboration with the Office of Indian Energy, with the LPO providing the loan review and underwriting services for the TIELGP program. The loan guarantees will support the development or expansion of generation projects which employ commercially proven and available clean energy technologies.

The TIELGP will provide much-needed capital to support energy security and economic development on Indian lands.

Q20. I am disappointed that your budget request would zero out of any federal funds for petroleum oil technology and research. Research to improve techniques to recover unconventional oil economically – like the heavy oil in Alaska – would add tremendously to our nation's reserves and help keep the Trans-Alaska Pipeline System operating in the future. How does this reflect an "all of the above" energy policy? Doesn't it make more sense to consistently research to tap our own resources so that we don't see oil prices rise back to levels that hurt American families and businesses?

A20. America's abundant unconventional oil and natural gas resources are critical components of our Nation's energy portfolio. While their development enhances our energy security and fuels our Nation's economy, it must be done in a prudent, safe, and environmentally responsible manner.

Our current research and development efforts are focused on developing technologies for mitigating the safety and environmental impacts of developing these resources through the Multi-Agency Collaboration on Unconventional Oil and Gas Research.

Q21. Your budget proposes a nearly 75 percent increase in funding for geothermal energy up to $96 million. How much of this funding would go to improving heat maps of geothermal resources nationwide – your "play fairway" analyses – and how much would go to improving drilling techniques through your FORGE initiative? What is the Department's plan for ground-source geothermal heat pump research?

A21. Hydrothermal: The FY 16 Budget Rrequest will advance the Department's geothermal Play Fairway Analysis (PFA) initiative, which assesses exploration risk and the probability of finding new resources on a regional scale, through the analysis and integration of diverse geologic datasets. The objective is to generate maps and risk assessments that quantitatively identify the most prospective areas for new geothermal exploration and development. The PFA mapping leverages and modifies practices from traditional oil and gas analysis, and is a first-of-its-kind endeavor for geothermal mapping in both the U.S. and internationally. The resulting maps and assessments are expected to reduce overall exploration costs and increase geothermal development by providing more targeted exploration and drilling opportunities, leading to a more accurate assessment of exploration risk in a region and reducing finding-and development costs. The FY 2016 Budget is expected to advance the PFA initiative through field validation, and the drilling of select and specifically-located slim-hole and/or temperature gradient wells in high-potential "blind" geothermal resources areas.

The FY 2016 Budget Request supports PFA at $8 million.

Enhanced Geothermal Systems: The increased subprogram funding reflects the commencement of Phase 3 of the Geothermal Technologies Program's highest priority, the Frontier Observatory for Research in Geothermal Energy (FORGE) initiative—a dedicated enhanced geothermal systems (EGS) field laboratory where novel technologies and techniques will be tested, with a primary focus on EGS optimization and validation. Phase 3 activities include further subsurface characterization, drilling of wells, reservoir stimulation, flow testing, and technology testing of complementary EGS R&D.

The FY 2016 Budget Request supports EGS at $45M, of which $35M is for FORGE.

Ground-source Heat Pumps: The Building Technologies Office (BTO) continues to support ground-source heat pump (GSHP) development through an industry cost-shared demonstration project. BTO is also in the process of closing out a large number of GSHP demonstration projects that were funded through the American Recovery and Reinvestment Act, and is sponsoring an analysis of these results to determine the energy savings and "lessons learned" from these projects.

Subsurface Technology Engineering (SubTER) Crosscut: The Department is also seeking to implement the Subsurface Technology Engineering crosscut (SubTER) in coordination with the Office of Fossil Energy, Office of Nuclear Energy, and the Office of Energy Efficiency and Renewable Energy. The SubTER crosscut will address identified challenges in the subsurface through highly focused and coordinated research in Wellbore Integrity, Stress State and Induced Seismicity, Permeability Manipulation, and New Subsurface Signals to ensure enhanced energy security, material impact on climate change via CO2 sequestration, and significantly mitigated environmental impacts from energy-related activities and operations. The Department's FY 2016 Budget Request includes $244.0 million across DOE offices for SubTER. The EERE request includes $71 million—within the Geothermal Technologies program—in support of this crosscutting initiative.

Q22. The Administration has requested a 34 percent increase for the budget of the Office of Congressional and Intergovernmental Affairs. Please explain in detail how the additional $1.6 million would be utilized, if appropriated.

A22. Congress provided $6.3 million in FY 2015 for the Office of Congressional and Intergovernmental Affairs (CI) in part funded through the use of prior year balances (see Joint Explanatory Statement, Departmental Administration Table). In FY 2016, funding is a continuation of these activities at the same level. CI provides strategic advice and counsel to the Secretary, Deputy Secretary, and other Departmental leaders on engagement with Congress, governors, local elected officials, Tribal governments, and other key stakeholders. CI also engages with these stakeholders to ensure their views are considered in the Department's decision making process and to coordinate accurate and timely communications regarding Departmental activities. FY 2015 funding is consistent with operational needs to continue to provide accurate and timely communications of Administration and Departmental activities to Congress, state, local and Tribal governments and external organizations and to support an expanded intergovernmental outreach effort.

Q23. The Administration has requested an 81.5 percent funding increase for DOE's International Affairs account. Please explain in detail how the additional $10.6 million would be utilized, if appropriated.

A23. The Office of International Affairs (IA) applies its knowledge of international energy technologies, markets, and policies to advance U.S. objectives in energy security, clean energy deployment, and national security. IA is also responsible for leading the Department and Administration's response to critical energy security commitments across all major regional sectors and relevant energy technology-focused initiatives through multilateral and bilateral efforts.

The evolving global energy landscape has increased the demand for IA's expertise and resources. IA leads in critical areas, including addressing a proliferation of energy crises

across multiple regions to capitalizing on growing opportunities for bilateral technology cooperation. Moreover, the FY 2015 enacted funding level represented a significant decrease from IA's FY 2014 operating level and FY 2015 Budget Request. The President's Budget therefore requests an increase in FY 2016 to resource IA to meet the Administration's international mission requirements while sustaining key IA capabilities.

The FY 2016 request for additional funding will support a number of critical international energy objectives by securing the necessary technical expertise increasingly needed to achieve the mission. The funding will also cover growing operational demands on IA and support its staff with the necessary tools to succeed within international engagements. Below are only a few illustrative examples of ongoing mission-critical work that the FY 2016 request would directly support:

- Ukraine: The situation in Ukraine requires increased energy planning assistance, including sustained technical expertise within IA and increased coordination with our counterparts in Ukraine and travel to that country. IA has already led several delegations of energy systems experts to Ukraine to assist in energy planning efforts, including reducing Ukraine's reliance on Russian fuels. Moreover, in response to the Ukraine crisis and following the President's G7 Leaders Summit in June 2014, IA has been asked to lead U.S. efforts to develop our collective energy security agenda among G7 partners as well as our friends and allies in Europe. This role has substantially increased demands on IA resources to meet the need for technical assistance and energy sector planning. In FY 2016, we anticipate ongoing efforts that will also address the medium- and long-term energy security objectives beyond the current crisis.

- Israel: Additional funding will also sustain and increase U.S.-Israel cooperation through established annual meetings that address critical energy infrastructure protection, natural gas technical workshops, and Israel's growing interest in collaborating on energy storage and energy-water desalination issues. IA and other Departmental experts are uniquely positioned to meet this increased request for technical cooperation. Much of this work was recently directed by the United States-Israel Strategic Partnership Act of 2014.

- Caribbean: In FY 2016, IA plans to develop several technical analyses for countries' power sectors and policy impacts on regional energy security. This will build upon the work of the Administration's increased engagement with Caribbean nations such as the Vice President's Energy Security Summit and DOE's Energy Technology Symposium. The rapidly shifting energy geopolitics in the region has raised critical questions regarding the Caribbean's energy usage and supply diversification. The U.S. can lead on these efforts by demonstrating technical and policy solutions on these issues.

- Energy-Water Nexus: In addition to meeting a growing portfolio of critical energy security initiatives and strategic bilateral technology partnerships, IA will also expand its collaborations with key countries on the energy-water nexus. Many countries are eager to work with the Department to address the technical and policy implications of their interconnected energy and water systems. The United States stands to benefit greatly from such increased international cooperation.

Q24. At her recent confirmation hearing, your Deputy Secretary, Elizabeth Sherwood-Randall, answered a question about funding for the Mixed Oxide (MOX) Fuel Fabrication

Facility. That program enjoyed bipartisan support in the Senate and the House, including $345 million for the project in FY 2015. The President's FY 2016 budget continues funding of the MOX Facility at the FY 2015 level.

She answered, "The technical viability of the MOX approach is not in question. The only reason that questions have been raised about how to proceed is because of challenges to the funding stream. The Secretary asked us to examine whether there is another way to do it more economically. If Congress provides funding for this project that is sustainable over time, this [MOX] is our preferred solution. We cannot renege on our agreements with Russia. This is defense by other means for us. We want to ensure that that plutonium is disposed of so that it can never be used against us."

What is the status of DOE's commitment to this program?

A24. The Administration remains firmly committed to disposing of surplus weapon-grade plutonium. Construction of the MOX Fuel Fabrication Facility is continuing in FY 2015 while the Department completes a report to Congress on the plutonium disposition program. The Department's preliminary analysis in 2014 of potential plutonium disposition options indicated that the current MOX approach is significantly more expensive than anticipated. The Department has requested that Aerospace Corporation, a federally funded research and development center, independently assess and validate the Department's preliminary analysis. The Department plans to submit the Aerospace Corporation assessment and other information to Congress, consistent with the requests in the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 and the Explanatory Statement accompanying the Consolidated and Further Continuing Appropriations Act, 2015. The Department remains committed to the Plutonium Management and Disposition Agreement (PMDA), titled *Agreement Between the Government of the United States of America and the Government of the Russian Federation Concerning the Management and Disposition of Plutonium Designated As No Longer Required for Defense Purposes and Related Cooperation,* which calls for the

United States and the Russian Federation to each dispose of at least 34 metric tons of excess weapon-grade plutonium withdrawn from nuclear weapons.

Q25. In your written testimony, you noted that "... the FY 2016 Budget includes funding to conduct initial R&D towards demonstration of carbon capture and storage for natural gas plants. While natural gas is an important bridge fuel, natural gas, as well as coal, will need carbon capture and sequestration to compete in a future clean energy economy."

Q25a. How much funding has DOE requested for CCS-related activities for natural gas in FY 2016?

A25a. DOE's FY2016 funding request of $104.6M for post-combustion capture will leverage the portfolio and funding of existing second generation and transformational coal-related, carbon capture technologies to conduct additional tests on these R&D units using flue gas from a natural gas power system. This will ensure activities are aligned with second generation capture targets and efficient use of funding.

Q25b. How does the level of funding requested within DOE's FY 2016 budget for CCS-related activities for natural gas compare to funding requested for efforts to increase the domestic supply of natural gas?

A25b. DOE's FY 2016 post-combustion capture funding request of $104.6 million will fund activities that focus on coal technologies but address technical issues common to both coal and natural gas, such as capital cost and energy penalty. Certain questions specific to natural gas capture such as the higher oxygen content and lower concentration of carbon dioxide in the flue gas will also be pursued. Separately, under the office of Oil and Gas, DOE's FY 2016 funding request of $44 million for natural gas supports environmentally prudent development, emissions mitigation from midstream infrastructure, and emissions quantification from natural gas infrastructure. While these all play a role in the safe, environmentally prudent development of domestic natural gas resources, none of that effort is focused on CO_2 capture from natural gas systems.

Q25c. How does the level of funding requested within DOE's FY 2016 budget for CCS-related activities for natural gas compare to funding requested for development of methane hydrates?

A25c. No additional funds for methane hydrates are included in the FY 2016 request, however, several projects selected under prior year funding will continue.

Q25d. Please describe the scope of the activities that DOE intends to fund for natural gas CCS.

A25d. The FY 2016 budget request allows the Carbon Capture Program to continue coal-related R&D activities while leveraging a subset of these efforts to conduct tests that will address specific natural gas-related carbon capture issues such as higher oxygen (O_2) content and lower carbon dioxide (CO_2) concentration in flue gas, and higher flow rates of flue gas. Where possible, CO_2 capture technologies that are tested on coal-fired power systems would also be tested on natural gas flue streams. Most R&D will address shared challenges for both coal and natural gas such as energy penalty, capital and operation cost, and plant integration.

Q25e. Do you believe it is appropriate for any agency within the federal government to mandate CCS for natural gas, or to impose a regulation that would require its use?

A25e. The role of the Carbon Capture program is to develop technologies that are not currently available so that appropriate policies can later be put into place. At this time, CCS is not required for natural gas power systems; however we believe that natural gas will continue to play an important role in energy generation for some time to come, so it is a prudent — and in fact, critical — role for the Department to develop and assess technology options for natural gas that can be advanced long into the future.

Q25f. Please describe the criteria that DOE believes will form the basis for "competition" among energy resources "in a future clean energy economy."

A25f. The term "clean energy economy" refers to the suite of technologies available with low or near-zero carbon emissions, which includes renewable sources such as wind and solar, and thermal sources such as nuclear and fossil units with CCS. To be competitive, technologies should be available at a similar cost point, varying with regional differences. This may be achieved through policies which support an "all of the above" strategy. This allows for different technologies with low or near zero emission to be deployed where they are best suited.

Q26. How many full-time employees did DOE hire, on a net basis, in FY 2014? How many full-time employees has DOE hired so far, on a net basis, during FY 2015?

A26. DOE has a negative net hires for each year (more losses than gains). The numbers are made up of Full Time employees, including Recent Graduates and Presidential Management Fellows.

	Total Hires	Total Separations	Total "Net" Hires
2014 Full Time Employees	671	1085	(-)414
2015 Full Time Employees	238	471	(-)233

Q27. In his 2011 State of the Union Address, President Obama established a goal of one million electric vehicles on the road in the United States "by 2015." How many electric vehicles are now on the road in the United States?

A27. The goal of being the first country in the world to have one million electric vehicles on the road by 2015 is an ambitious milestone in transforming our national vehicle fleet, a transformation that will reduce petroleum dependence and protect the American people from oil price volatility, improve environmental stewardship and transportation sustainability, and create jobs and stimulate economic growth.

While the Department is working hard to support the overall goal of one million electric vehicles through investments in cutting-edge vehicle technologies, it is also critical to maintain the growth trend of the plug-in electric vehicle (PEV) market, which includes battery electric vehicles and plug-in hybrid electric vehicles (PHEV).

- To date, more than 286,000 PEVs have been sold since their first introduction to the market in December 2010.
- In 2014 alone, more than 118,000 PEVs were sold in the United States, a more than 20% increase in PEV sales compared to 2013.
- Nearly 9,000 public plug-in electric vehicle charging stations and more than 1,700 private, non-residential charging stations are currently installed in the United States.
- More than 190 companies from a variety of sectors have signed the Department's Workplace Charging Challenge Pledge. These partners have reported that their employees have saved more than 370,000 gallons of gasoline and 2.5 million pounds of carbon pollution.

It will take many millions of vehicles to truly transform our transportation sector and significantly reduce our dependence on petroleum. As such, we need to continue to pursue the research and development needed to further reduce cost and improve performance – key aspects of the EV Everywhere Grand Challenge.

EV Everywhere is a bold, DOE-wide initiative that seeks to enable the U.S. to produce a wide array of PEVs, which includes battery electric vehicles and plug-in hybrid electric vehicles,that are as affordable and convenient as gasoline powered vehicles by 2022. Performance and cost targets guide the Department's investments focused on reducing the

combined battery and electric drive system costs of a PEV by up to 50 percent. Specific technical targets include:

- Cutting battery costs from $289/kWh in 2014 to $125/kWh by 2022.
- Reducing the cost of electric drive systems from $15/kW in 2014 to $8/kW by 2022.
- Eliminating almost 30 percent of vehicle weight through light weighting by 2022, compared to a 2002 baseline.

After its initial three years, EV Everywhere is on track toward meeting its ten-year goal. Specific examples of recent successes include the following:

- In 2014, Vehicle Technologies Office (VTO) R&D reduced the modeled, high-volume production cost of electric drive vehicle batteries to less than $300/kwh, a more than 40% reduction from the EV Everywhere baseline cost established in 2012.
- VTO R&D has reduced the modeled, high-volume cost of an electric drive system from $30/kW to less than $15/kW (2014). Through a VTO project, General Motors is the first U.S.-based OEM manufacturing electric motors in the U.S., and the Chevy Spark EV is already using those electric motors.
- VTO, Ford, and Magna partnered to reduce the weight of a 2013 Ford Fusion by nearly 25% – improving fuel economy while maintaining safety and performance. The reduction brings the Fusion family sedan to the weight of the subcompact Ford Fiesta. The team integrated multiple lightweight materials into a variety of vehicle components, including carbon fiber in the seats, lightweight glazings in the rear window, aluminum in the 3-cylinder engine, and advanced high strength steel in the body.

Q28. According to a DOE fact sheet released in July 2010, "in 2008, the United States had only two factories manufacturing advanced vehicle batteries and produces less than two percent of the world's advanced vehicle batteries. By 2012, thanks in part to the Recovery Act, 30 factories will be online and the U.S. will have the capacity to produce 20 percent of the world's advanced vehicle batteries. By 2015, this share will be 40 percent." Now that it is 2015, what is the United States' actual share of global advanced vehicle battery manufacturing?

A28. Under the Recovery Act, Vehicle Technologies awarded $2 billion for advanced battery and advanced electric-drive component manufacturing projects, growing the number of U.S. facilities from two to more than thirty as of December 30, 2014. These investments supported the build-out of domestic capacity for manufacturing advanced technology vehicles and components – not only creating jobs but also helping to ensure that the United States remains a leader in a competitive global automotive market (in which other governments are investing heavily).

The total battery manufacturing capacity of the 6 cell production plants that have been established by the ARRA grants can support more than 350,000 vehicles per year, based on a plug-in hybrid electric vehicle with a 10-kWh battery (about a 20-mile electric range). In addition, the Advanced Technology Vehicles Manufacturing (ATVM) Loan Program established a battery manufacturing capacity of 100,000 EV batteries (24 kWh each) per year. In addition to the cell manufacturing facilities, the ARRA grants established a major pack assembly facility, 9 battery materials (cathode, anode, electrolyte, separator, and cell hardware) production plants, 1 battery recycling plant, and 10 electric drive component (drive motor, power electronics, capacitor, and transaxle) production plants.

A recent supply chain analysis by the National Renewable Energy Laboratory indicates that the United States has the capacity to manufacture 20% of world lithium ion batteries.

The 40% forecast noted above did not account for the significant growth of lithium ion battery manufacturing capacity in other countries since 2009 that were established to accommodate the growth in demand from all markets (automotive, stationary, consumer/other) from 25 GWh in 2011 to a projected 50+ GWh in 2015.

Q29. Please list the total funding requested in DOE's FY 2016 budget request for each of the following vehicle technologies:

Q29a. Electric vehicles;

A29a. Funding for electric vehicles in the Vehicle Technologies' FY 2016 Budget request supports technologies enabling plug-in electric vehicles, including full battery electric vehicles and plug-in hybrid vehicles. The FY 2016 Budget request for electric vehicles is $190.65 million, including funds requested for Batteries and Electric Drive R&D, as well as a portion of the Vehicle Systems subprogram specific to electric-drive technologies.

Q29b. Fuel cell vehicles;

A29b. The FY 2016 Budget request for Hydrogen and Fuel Cell Technologies includes $36 million directly for Fuel Cell R&D and the remainder ($56.7 million) for fuel cell vehicle enabling technologies such as hydrogen production, delivery, and storage R&D and efforts to reduce commercialization barriers, e.g., safety, and market transformation.

Q29c. Natural gas vehicles; and

A29c. The FY 2016 Budget request for Vehicle Technologies includes $10 million in the Fuel and Lubricant Technologies subprogram for development of on-board natural gas storage technologies for light- and heavy-duty natural gas vehicles.

Q29d. Other vehicle technologies.

A29d. The FY 2016 Budget request provides $194.35 million in other vehicle technologies. This includes funding for advanced combustion engine technologies, lightweight and propulsion materials technologies, fuel and lubricant technologies, and other advanced vehicle technologies to enable fuel efficiency, such as high efficiency heating and cooling systems, better aerodynamics, and low rolling resistance technologies. Advances in lightweight materials and other vehicle technologies can improve the efficiency of multiple different vehicles -- light- and heavy-duty, regardless of propulsion system.

Q30. DOE last issued a loan under the Advanced Technology Vehicles Manufacturing (ATVM) program in March 2011.

a. How many applications are currently pending for the ATVM program?

b. How many of those applications are under active review?

c. What is the average length of time (in days) that it has taken DOE to review each application for ATVM?

d. How many loans does the Department anticipate completing under ATVM before the end of FY 2015?

e. How many loans does the Department anticipate completing under ATVM before the end of FY 2016?

f. Please provide a detailed explanation of the spending of taxpayer dollars appropriated to the ATVM program in FY 2014 and FY 2015.

g. Please provide a detailed justification for the $6 million requested for this program for FY 2016, including the perceived need to increase this appropriation by $2 million (50 percent).

A30. The ATVM program currently has four complete applications for $945 million in loan requests. All of these applications are under active review. The program also has received stated intentions to submit loan applications from a number of companies that have begun developing online applications to the ATVM program.

The ATVM program has committed to respond to each application on its completeness within 60 days. Once an application is substantially complete, the timeline for completing due diligence and underwriting is different for each borrower due to the unique circumstances of the project and credit.

In FY 2015, the program anticipates issuing multiple loans under the ATVM program. This includes the recent conditional commitment DOE issued to Alcoa, Inc. in March 2015 for a $259 million loan to support the manufacture of automotive aluminum in Tennessee. When issued, this loan and others will be the first new ATVM loans issued since 2011. In FY 2016, the Department anticipates that it could have sufficient applications to issue additional loans under the ATVM program, pending appropriated administrative budget levels.

Secretary Moniz announced a number of ATVM program improvements to clarify eligibility and improve customer service for applicants in April 2014. These improvements included clarified eligibility for component suppliers, improved responsiveness to applicants, and revisions to the ATVM application process. Since then, DOE has received, and anticipates receiving additional, a number of quality applications. As a result, DOE anticipates processing additional ATVM applications in FY 2015 and 2016.

In FY 2016, DOE has requested $6 million in administrative expenses for the ATVM program, which is an increase of $2 million over the FY 2015 administrative appropriation. This increase is needed to process and underwrite an increasing volume of loan applications and to compensate for a reduced budget request of $4 million in FY

2015, down from $6 million in FY 2014. This appropriation will cover ATVM's administrative expenses, including salaries for its full time employees as well as the cost of outside advisors for financial, legal, engineering, credit, and market analysis. ATVM's appropriation must cover the costs for originating new loans as well as monitoring existing loans.

In FY 2014 and FY 2015, the ATVM program's appropriated administrative budget was used to monitor and manage the existing $8 billion ATVM loan portfolio, cover the costs of processing applications, underwriting new loans (including the costs associated with support services), and pay salaries, benefits, and overhead.

Q31. Please provide a detailed list of the Department of Energy's unobligated balances, by account.

A31. The Department's unobligated balances routinely fluctuate, and as such, I have asked my staff to work with your staff to provide this information in an updated and timely manner.

Q32. According to DOE's Notice of Proposed Rulemaking (NPR) on residential furnaces, the Energy Policy and Conservation Act of 1975 requires "any new or amended energy conservation standard must be designed to achieve the maximum improvement in efficiency that is technologically feasible and economically justified. (42 U.S.C. 6295(o)(2)(A)) Furthermore, the new or amended standard must result in a significant conservation of energy. (42 U.S.C. 6295(o)(3)(B))"

The proposed rulemaking claims average life cycle cost savings to consumers from the non-weatherized gas furnaces required by this change of $305 dollars over an assumed furnace lifetime of 22 years for the annual fuel utilization efficiency change and $13 dollars over the same period for improved standby and off mode upgrades. Both of these result in a payback period for the energy efficiency upgrades of approximately seven years for the consumer.

Q32a. Is it 'economically justified' to require manufacturers to retool, at serious expense, to provide energy efficiency upgrades that save a consumer $13 over 22 years?

A32a. The Energy Policy and Conservation Act of 1975 (EPCA) requires that any new or amended energy conservation standard must be designed to achieve the maximum improvement in

energy efficiency that is technologically feasible and economically justified. Furthermore, the new or amended standard must result in a significant conservation of energy. To determine whether economic justification exists, EPCA directs the Department to determine whether the benefits of the proposed standard exceed its burdens by, to the greatest extent practicable, weighing the following seven criteria:

1. The economic impact of the standard on the manufacturers and on the consumers of the products subject to such standard;
2. The savings in operating costs throughout the estimated average life of the covered product in the type (or class) compared to any increase in the price of, or in the initial charges for, or maintenance expenses of, the covered products which are likely to result from the imposition of the standard;
3. The total projected amount of energy savings likely to result directly from the imposition of the standard;
4. Any lessening of the utility or the performance of the covered products likely to result from the imposition of the standard;
5. The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the imposition of the standard;
6. The need for national energy conservation; and
7. Other factors the Secretary considers relevant.

To assess the benefits and burdens of standby and off mode furnace standards, the Department conducted a life-cycle cost (LCC) analysis to calculate, at the customer level, the financial impacts over the life of the product and a national impact analysis to assess

the aggregate impacts at the national level the net present value of total consumer LCC. DOE also conducted a manufacturer impact analysis to estimate the financial impact of both active and standby/off mode standards on manufacturers of furnaces. In the manufacturer impact analysis the Department developed estimates of manufacturer capital conversion costs (one-time investments in property, plant, and equipment) and product conversion costs (one-time investments in research, product development, testing, and marketing).

The Department tentatively concluded that the standard levels proposed in the notice of proposed rulemaking (NOPR) were technologically feasible and economically justified for both active mode, as measured by annual fuel utilization efficiency (AFUE), and standby/off mode power, as measured in watts of electrical power consumption. The Department also tentatively concluded that the proposed standards would save a significant amount of energy. At the proposed level, the Department estimates that manufacturers will need to invest $38.5 million in capital conversion costs and another $16.5 million in product conversion to comply with the new AFUE requirements. For standby/off mode, the Department concluded that the standard levels could be achieved through component change-outs of the electrical system. These electrical components are generally purchased from third party vendors, and thus only product conversion costs are required at a total estimated cost of $1.35 million for the industry.

Even with these costs included, the proposed AFUE standards yield a cumulative net present value of total consumer costs and savings that ranges from $3.1 billion to $16.1 billion (discounted at 7 percent and 3 percent, respectively) and the standby/off mode standards have an estimated cumulative net present value of total consumer costs and

savings that ranges from $1.0 to $3.3 billion (discounted at 7 percent and 3 percent, respectively) over the DOE analysis period that goes from 2021 through 2050. This net present value calculation includes compliance costs to industry, which is a range from an increase of $9.22 million to a decrease of $82.14 million.

Q32b. How is DOE defining a 'significant conservation of energy?' $13 of electricity does not seem to meet the 'significant conservation of energy' requirement (and the proposed rule for improvements in the standby mode and off mode for mobile home gas furnaces results in a savings of only $1).

A32b. To adopt more stringent standards for a covered product, DOE must determine that such action would result in "significant" energy savings. Although the term "significant" is not defined in the Act, the U.S. Court of Appeals for the District of Columbia Circuit, in Natural Resources Defense Council v. Herrington, 768 F.3d 1355, 1373 (1985), opined that Congress intended "significant" energy savings, in the context of EPCA, to be savings that were not "genuinely trivial." For the proposed standby mode and off mode standards, the lifetime energy savings for non-weatherized gas furnaces and mobile home gas furnaces purchased in the years 2021 to 2050 amount to 0.28 quads, or approximately 5 percent of the natural gas used for space heating in households. This is a savings of 15.9 percent relative to the standby energy use of these products in the base case without amended standards, and a savings of 3 percent relative to the active mode energy use of these products in the base case without amended standards. These energy savings are nontrivial, and, therefore, DOE considers them "significant" within the meaning of section 325 of EPCA.

Q32c. Is it appropriate to force these costs on consumers when the savings in carbon dioxide emissions between the implementation of the rule and 2030 is only 0.2 percent relative to the base case without amended standards?

A32c. There is no parallel to "significant conservation of energy" that applies to emissions reductions within EPCA. Because new or amended standards also are likely to result in changes to emissions associated with energy production, DOE conducts an emissions analysis to estimate how standards may affect these emissions and estimates the economic value of emissions reductions[1].

The referenced value of CO2 reduction for the year 2030 is correct, but it is not representative of the CO2 savings over the life of the equipment impacted by this rule. As noted, the cumulative reduction in CO2 emissions through the year 2030 represent a savings of 0.2 percent relative to the base case. This amounts to a reduction of 4.2 million metric tons. However, as we are dealing with a product having an average lifetime of 21.5 years, the stock of furnaces will not be fully replaced for over 30 years after the effective date of the standard. Thus the reference year 2030 only captures a very small fraction of the proposed rule's potential impact on CO2 emissions. The emission reductions consistent with the consumer costs captured in the Department's analysis are the cumulative emission reductions for furnaces purchased in the 30 year period that begins in the first full year of compliance with amended standards – i.e., the period 2021 to 2050. The emission reductions over this period would total 137 million metric tons of CO2.

Q32d. Manufacturers claim that the differences in the production costs to make the new furnaces are much higher than DOE has estimated due to the changes in processes required to jump a technology gap between 80 and 90 percent efficiency. The new furnaces require more expensive components to avoid corrosion and other issues associated with the higher

[1] Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Carbon, United States Government (May 2013; revised November 2013) (Available at: https://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf).

efficiency processes, so they will be more expensive to consumers. Has DOE considered these costs in its analysis?

A32d. The Department considered these costs in its estimates. To arrive at its cost estimates, DOE performed a teardown and cost modeling analysis that involved physical disassembly and examination of both baseline non-condensing furnaces (i.e., 80% efficient) and condensing furnaces (i.e., 90% and higher efficiency). The relevant metric is annual fuel utilization efficiency (AFUE). During this analysis, furnaces were completely disassembled, and each part was measured, weighed, and cataloged in a bill of materials in order to identify the components, materials, and manufacturing processes used to manufacture both types of furnaces. The primary difference between baseline 80% efficient furnaces and high efficiency 90%+ efficient furnaces is the inclusion of a secondary, condensing heat exchanger. The secondary heat exchanger is constructed from a corrosion-resistant type of stainless steel known as AL 29-4C, and DOE fully accounted for this cost. Public comment was sought on costs, including at the public meeting regarding the proposed rulemaking (see 80 FR 13119).

DOE also accounted for all ancillary changes, such as mounting brackets and transition plates for the secondary heat exchanger, upgrades to the inducer fan assembly, and condensate management and disposal systems. Based on its analysis, DOE estimates that the change in the required efficiency level from 80% AFUE to 92% AFUE (the proposed level) would increase manufacturer production cost by $91 for non-weatherized gas furnaces and $97 for mobile home gas furnaces, an increase of approximately 25 percent. The costs from the engineering analysis are then used as an input to the downstream projection of purchase price increases to consumers that are ultimately used in the cost-benefit analysis.

Q32e. Did DOE considered the impact to lower and middle income families who cannot afford to wait seven years to recoup the upfront costs associated with the more expensive furnaces?

A32e. In analyzing the potential impacts of amended annual fuel utilization efficiency (AFUE) standards for non-weatherized residential gas furnaces and mobile home furnaces on consumers, DOE evaluated the impacts on low-income consumers that may be disproportionately affected by the proposed standard compared to the average consumer. The Department estimates that the payback period for low-income households is 8.3 years compared to 7.2 years for all consumers, which is still below the average furnace lifetime of 21.5 years. Life-cycle cost savings for low-income households is estimated at $247 compared to $305 for an average household.

QUESTIONS FROM RANKING MEMBER CANTWELL

Q1. DOE Role in BRAIN and Precision Medicine Initiatives:

Last year, the President launched the BRAIN initiative, an ambitious, multi-agency undertaking that will greatly advance our understanding of brain function in coming years. In the 2016 Budget Request, the White House has also now proposed a new Precision Medicine investment of $215 million to transform our ability to treat diseases and improve health using advanced medical technologies.

Since DOE has had a major historical role in previous "grand challenge" biology projects like the Human Genome Project, what roles do you expect DOE and the national laboratories to play in the BRAIN and Precision Medicine initiatives?

A1. The Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative is part of a new Presidential focus aimed at revolutionizing our understanding of the human brain. By accelerating the development and application of innovative technologies, researchers hope to produce a revolutionary new dynamic picture of the brain that, for the first time, will show how individual cells and complex neural circuits interact in both time and space. This picture is expected to fill major gaps in our current knowledge and to provide unprecedented opportunities for exploring exactly how the brain enables the human body to record, process, utilize, store, and retrieve vast quantities of information, all at the speed of thought.

DOE does not have a mission assignment in human health and is not formally a participating agency in either the BRAIN or Precision Medicine initiatives. However, the DOE National Laboratories possess tremendous capabilities, expertise, and resources — ranging from large-scale instrumentation and user facilities such as light sources, genome sequencing, and nanoscience centers, to high-performance computing to analyze large, complex datasets. DOE partnering with the BRAIN agencies (National Institutes of

Health (NIH), National Science Foundation (NSF), DARPA, and the Department of Veterans Affairs could accelerate progress in this area. The Consolidated and Further Continuing Appropriations Act of Fiscal Year (FY) 2015 (Public Law No. 113-235) directs NSF to establish a National Brain Observatory working group to determine how to use the data infrastructure of the NSF, DOE's National Laboratory network, and other applicable agencies to help neuroscientists collect, standardize, manage, and analyze the large amounts of data that will result from research attempting to understand how the brain functions. Similarly, progress could be accelerated by partnering with the NIH in the area of Precision Medicine by exploiting DOE capabilities in biomolecular chemistry and genomics, coupled with our supercomputing capabilities.

Q2. Natural Gas Pipeline spur for the Waste Treatment Plant:

Hanford's vitrification plant will consume a lot of energy. It could be cleaner and more cost-effective to power the plant with natural gas, rather than diesel fuel, as is currently planned. I understand that DOE is working on an Environmental Impact Statement on a proposal to bring natural gas up to Hanford, in a pipeline spur off the main natural gas pipeline into the TriCities. What is the timeline for the completion of this Environmental Impact Statement? Does the Department generally agree that natural gas is a cleaner fuel source than diesel?

A2. Presently, the Department is focused on beginning operations of the Low Activity Waste (LAW) Facility and supporting facilities as soon as practicable, and completing the design and construction of the Pretreatment and High-Level Waste Facilities. Operation of the LAW Facility will provide valuable information and experience the Department can use to assess the need for program improvements. The Department is committed to completing analyses at the appropriate time to ensure Waste Treatment Plant operations meet cleanup goals, as well as maximize environmental sustainability and minimize greenhouse gas emissions in a cost-effective manner.

Q3. Timeline on clean up at Building 324 and 618-10 Burial Ground:
When will DOE complete clean up work on the 324 Building and the 618-10 Burial Ground? Will DOE meets its legal commitment, through the Tri-Party Agreement, to have the 618-10 Burial Ground cleaned up by 2018?

A3. Completing cleanup at the Richland Operations Office is a priority for the Department. There has been tremendous progress at Richland, and our FY 2016 budget request focuses on continuing to make progress. Between now and the end of FY 2016, we plan to complete the design and mockup to ensure we know how to safely clean up the 324 building, and complete trench work at the 618-10 burial ground. We share a similar goal of sustaining the complex; focusing on high-risk cleanup projects, such as the Plutonium Finishing Plant; and addressing the sludge in the K Basin, while moving forward on other cleanup work as well. I look forward to working with you on these important issues.

QUESTION FROM SENATOR WYDEN

Q1. Mr. Secretary, my question has to do with funding for this year, not for FY16. To follow up on previous discussions I have had with you, and Assistant Secretary Danielson, on marine renewable energy: I fear we are missing the opportunity to lead the global race to commercialize these new clean energy technologies and capture a significant portion of the jobs that will come from that effort.

For instance, DOE estimates twenty percent of the electricity requirements of my home state of Oregon, along with California and Washington, could come from marine renewable energy resources. That number rises to 100 percent for Hawaii and Alaska. I consider those possibilities a significant potential commercial market and a material resource worthy of substantial DOE investments.

During the last appropriations cycle, congressional appropriators provided more money for marine renewables activities for FY15 than you had requested.

Is it your intent to use those additional funds to support existing award recipients, like Oregon State University, for example, to support projects with ongoing permitting processes along with the continued development of technology?

I would appreciate your Water Power team meeting with my staff to brief us on your plans.

A1. The Department plans to obligate FY 2015 appropriations to complement existing marine and hydrokinetic (MHK) research, development, and deployment efforts, and to support additional competitive award solicitations, to which previous award recipients are eligible to apply. Competitive solicitations in FY 2015 thus far include $8 million in awards under the Marine and Hydrokinetic Systems Performance Advancement II: Component Metric Validation Funding Opportunity Announcement; and, while still in the planning phase, a similar amount in awards for laboratory-scale and open water testing of MHK systems.

Additionally, the Department has made University- and Consortium-specific MHK R&D funding opportunities available using competitive solicitation mechanisms. U.S. universities have shown interest in and have been successfully funded under this model. For example, Oregon State University and the University of Washington are partners in the Northwest

National Marine Renewable Energy Center, and are working with the University of Alaska to conduct field-focused R&D activities under the FY 2014 MHK R&D University Consortium Funding Opportunity Announcement.

The Department has briefed your staff to discuss FY 2015 plans and looks forward to continuing to work with you and your office on this important issue.

QUESTION FROM SENATOR BARRASSO

Q1. For years, DOE has used its excess uranium to barter for environmental clean-up services. In the process, DOE has contributed to a sharp drop in the spot price of uranium. This has significantly hurt America's uranium producers and has led to job losses in Wyoming and other states.

In December 2014, DOE solicited public input on a proposal to transfer even more uranium. I'm glad that DOE has requested public input. But DOE should do more.

For example, DOE should agree to: (1) subject to peer review any analysis which it relies upon for future transfers; (2) transfer uranium through long-term contracts (not short-term contracts or the spot market); and (3) transfer uranium only after issuing a rulemaking in accordance with section 553 of the Administrative Procedure Act.

These steps are all reasonable and would help reduce the impact of DOE's transfers on America's uranium producers.

Would you be willing to take these additional steps? If not, why not?

A1. The Department shares your commitment to helping to maintain viable domestic uranium, conversion and enrichment industries. As you know, the Department plans to issue a new Secretarial Determination covering transfer of uranium for cleanup services at the Portsmouth Gaseous Diffusion Plant and for down-blending of highly-enriched uranium. As a first step, DOE sought comment through a December 2014 Request for Information about the effects of continued uranium transfers on the domestic uranium industries and recommendations about factors to be considered in assessing the possible impacts of DOE transfers. DOE appreciates the substantive comments received in response. DOE also commissioned an updated analysis from Energy Resources International on the effects of the proposed transfers.

DOE also sought additional public comment on the agency's uranium transfers, including review and comment on comments received in response to the December 2014 Request for Information, the economic analysis prepared for DOE by Energy Resources

International, and a list of factors DOE has identified for analysis of the impacts of DOE transfers on the uranium mining, conversion, and enrichment industries. We believe that these steps demonstrate our commitment to transparency and to a strong domestic uranium industry.

QUESTION FROM SENATOR DAINES

Q1. You said the Department of Energy proposed an investment of $500 million in Fossil Energy Research and Development, "with vast majority of it in coal research," In FY15, the House explicitly directed DOE to "use funds within the coal program only for coal research and development" and to request funding for natural gas R&D activities in the "Natural Gas R&D Program." Unfortunately the President's FY 16 budget seems to heavily request funding – out of the Coal CCS & Power Systems program – for activities to support development of technologies applicable to natural gas generation. These activities are more appropriately funded through the natural gas R&D program – can you explain why the Department is diverting funding critical for coal to natural gas projects?

A1. The FY 2016 Budget Request funds natural gas carbon capture activities under the Carbon Capture budget line rather than the Natural Gas Technologies line in order to leverage the significant, existing expertise on carbon capture technologies that exists within the Carbon Capture program. Carbon capture from coal and natural gas generation share many of the same challenges, including energy penalty, capital and operation cost, and plant integration and the vast majority of capture technologies are applicable to both fuels. Therefore, it would be inefficient to create two separate programs that would conduct much of the same research in parallel and lose the opportunity for shared learning within one work stream. Other examples of these research and development (R&D) spillover benefits already exist within the coal portfolio, for example the R&D conducted in both the Advanced Turbines and Solid Oxide Fuel Cells programs benefit both coal-fired and natural gas-fired power generation. In contrast, the focus of the Natural Gas Technologies program continues to be on the safe, environmentally prudent development of domestic natural gas resources; none of that effort is focused on natural gas power generation.

More specifically, DOE's FY 2016 post-combustion capture funding request of $104.6 million allows the Carbon Capture Program to leverage existing coal-related R&D

activities at the laboratory-, bench-, and pilot-scale. This is aimed at preparing for future pilots and demonstrations on CO_2 capture at both coal natural gas power plants. The FY 2016 request will continue to fund activities that focus on coal technologies while also leveraging a subset of these efforts to conduct tests that will address specific natural gas-related carbon capture issues such as higher oxygen (O_2) content and lower carbon dioxide (CO_2) concentration in flue gas, and higher flow rates of flue gas. Where possible, CO_2 capture technologies that are tested on coal-fired power systems would also be tested on natural gas flue streams. Most R&D will address shared challenges for both coal and natural gas such as energy penalty, capital and operation cost, and plant integration.

Q2. The proposed EPA 111(b) and (d) rules assume coal CCS technology is feasible, but the technology is still too expensive and there are no large-scale coal fired electricity generation projects operating with CCS anywhere in the world. Aren't resources best directed towards making necessary advances in CCS for coal based systems versus natural gas systems, which are not required to apply CCS under the EPA's proposed 111(b) rule?

A2. The FY 2016 request of $116.631 million for Carbon Capture continues the program's long term focus on further lowering the costs of carbon capture from coal-fired power generation. In addition to the ongoing, large-scale coal CCS demonstration projects being pursued by DOE, a large-scale (110 MW) coal-fired power plant integrated with CCS – Sask Power's Boundary Dam Project – started operation in October 2014.

While it is true that 111(b) and 111(d) do not require CCS on natural gas based systems today, many studies — including IEA's recent Energy Technology Perspectives report — have suggested that CCS on natural gas power systems will be needed to achieve deep carbon reductions in the power sector. We believe that natural gas will continue to play

an important role in energy generation for some time to come, so it is a prudent — and in fact critical — role for the Department to develop and assess technology options for natural gas that can be advanced long into the future. Furthermore, many of the technology advances that have been developed — advanced solvents and sorbents, compression methods, and sub-surface research and development — are likely to be applicable to both coal and natural gas systems, and thus the advances in both areas are mutually beneficial.

Q3. Pertaining to coal research dollars, you stated funds are spent "all in the United States," but the Department does "collaborate with China, for example there is a clean energy research center including coal research." When I asked who would own the Intellectual Property associated with that research, you said that the Department of Energy is working to make sure the United States keeps its "fair share" of intellectual property. Can you expand on how that "fair share" is determined?

A3. The Protocol that established the U.S.-China Clean Energy Research Center (CERC) makes clear that, before any collaborative research with Chinese entities can begin, there must be put in place a "technology management plan" that is mutually agreed by the collaborating parties and endorsed by both Protocol signatory parties. Such a plan specifies how intellectual property (IP) will be allocated, if IP arises from a joint project. Under such plans, participating parties of both countries agree to principles that are compliant with U.S. law, Chinese law, and international conventions.

According to the Intellectual Property Annex to the CERC Protocol, and any associated "technology management plan," IP created or invented by the U.S. side is owned by the U.S. side. IP created or invented jointly is jointly owned. In either case, if a project is jointly funded by both sides, the other side's project participants have a right to access the intellectual property developed under that project for that project, and a right to a non-

exclusive license for commercial purposes, on favorable terms. Third parties that are not project participants may be able to obtain a non-exclusive license, on fairly negotiated arm's length commercial terms. In this way, the United States is guaranteed a "fair share" of the IP, as is China.

Q4. Is the Department of Energy investing in clean coal technologies in China? If so, how much money?

A4. 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 Carbon Sequestration Leadership Forum, and the Asia Pacific Economic Cooperation Forum. Large carbon capture and storage (CCS) and CCUS projects provide foundational information for decision-making in clean fossil energy and underpin CCS and CCUS investment, operation, regulation, and planning decisions.

In addition to the programs noted above, the Department of Energy (DOE) is also working with Chinese counterparts to prioritize two important CCS/CCUS projects announced by President Obama and President Xi in November 2014 – a large scale international CCS project in China and a joint collaboration to demonstrate carbon dioxide utilization in enhanced water recovery.

It is important to note that DOE funds are spent strictly on U.S. entities. No funds are going to Chinese entities in government or industry. Rather, the approach has been parallel investments – U.S. money to U.S. groups, and Chinese funds to Chinese groups.

For example, the Office of Fossil Energy provides $2.5 million per year in funding for the CERC Advanced Coal Technology Consortium, which is matched by U.S. companies, and paired with parallel investments by Chinese government and companies.

Q5. Can you explain why Department of Energy pulled its investment from FutureGen project despite significant investment from the State of Illinois and industry?

A5. The Department of Energy has worked diligently over the last six years to make this project a success. The Department believes strongly in the importance of oxycombustion technology and, accordingly, has worked closely with Congress and a number of non-federal partners to advance this priority despite setbacks.

However, in light of a number of challenges to the project, including the lack of private financing and other hurdles, the Department no longer felt that the FutureGen Alliance had the ability to spend the funds appropriated by the American Recovery and Reinvestment Act before the statutory deadline of September 30, 2015. Absent an extension of that deadline by Congress, and in order to best protect those taxpayer funds, the Department has notified the FutureGen Alliance that Federal support is no longer available for construction activities at this time. Accordingly, we have initiated a structured closeout of Federal support for the project that will help maximize the value of investments to date while minimizing ongoing risks and further costs.

QUESTION FROM SENATOR FLAKE

Q1. In light of the recent decision to scrap the FutureGen 2.0 project and past investment failures such as Solyndra, what is the agency doing to eliminate waste of taxpayer funds?

A1. The Department takes seriously its responsibility to be a steward of taxpayer investments. Any project that receives funding from the Department of Energy goes through extensive due diligence and ongoing monitoring to ensure good stewardship of the investment. Developing any first-of-a-kind technologies inherently involves some amount of risk. The Department is committed to mitigating those risks while supporting efforts to advance promising and innovative technologies.

Q2. Earlier this week a rooftop solar company in Arizona, Stealth Solar, admitted to illegally marketing services related to the installation and leasing of rooftop solar systems. This issue appears to be gaining increased attention. What role, if any, can or does DOE play in ensuring that companies who access federal tax incentives for rooftop solar systems do not exploit those incentives at the expense of solar customers?

A2. The Department of Energy administers grant and loan programs for renewable energy projects, including for solar projects, but does not manage tax incentives. If the issue you raised includes federal criminal allegations, the Department of Justice would be best positioned to respond.

Q3. In 2011, GAO recommended "that DOE, HUD, and EPA lead an effort to collaborate with other agencies on assessing the results of federal green building initiatives for the nonfederal sector." I believe there are seventeen such programs within DOE's purview, with a total of ninety-four across eleven federal agencies. What has DOE done to assess the green building programs?

A3: The Department of Energy (DOE) closely coordinates activities across its offices and programs that advance energy efficiency in the nonfederal buildings sector to ensure that program activities are complementary, and not duplicative. Each of DOE's programs address different aspects of building energy use, providing a portfolio approach to

advance building energy efficiency in the United States. For example, DOE's Building Technologies Office supports: high-impact technology research and development for new energy efficiency products and solutions; technology-to-market activities to verify and improve performance and cost for these new technology products and solutions; and efforts to lock in savings where a government role is appropriate, such as through appliance standards. DOE's Office of Weatherization and Intergovernmental Programs (WIP) partners with its national network of state and local organizations to significantly accelerate the deployment of energy efficiency and renewable energy technologies and practices by a wide range of government, community, and business stakeholders, through formula grants to states for retrofitting residential buildings for low-income households or to establish and implement energy efficiency and renewable energy plans, policies and programs at the state level.

DOE also recognizes the need for continued interagency collaboration to ensure agency efforts are effective, efficient and avoid duplication. Specific to green buildings, DOE also works directly with other agencies to continue to meet its energy goals for the non-federal sector. For example, in 2009 DOE and EPA signed a Memorandum of Understanding to enhance and expand federal programs, including the ENERGY STAR and the National Building Rating Program, to advance energy efficiency which is critical to addressing climate change, economic, and energy security issues. The MOU will help avoid duplication, ensure effective communication with other Agencies and stakeholders, maximize the use of resources, and build upon Agency and stakeholder efforts to date.

DOE remains committed to continuing to work with Congress and other federal agencies to meet its energy goals while being a strong steward of taxpayer dollars.

Q4. Yesterday, GAO issued its 2015 updated list of federal programs at high risk for fraud, waste, abuse and mismanagement. Among the programs listed, is DOE's Contract Management for the National Nuclear Security Administration and Office of Environmental Management. Taken together, DOE's budget request for these two programs is approximately $18.4 billion or 61% of the total request. Notably, GAO acknowledged that DOE met one of the five criteria it uses to evaluate the susceptibility of such programs to waste and abuse--a strong commitment and top leadership to make improvements. Likewise, you highlighted that commitment in your testimony. However, GAO noted that DOE failed to meet three other criteria, including monitoring and independent validation of the effectiveness of corrective measures and a demonstration of progress toward implementing those measures. What more does DOE plan to do to address this troubling issue?

A4. The Department is committed to real, measurable, and sustainable performance improvement in contract and project management. The Department has made significant progress over the last five years and this progress was acknowledged by GAO in the High Risk update in 2013 when the GAO narrowed its focus to projects valued at more than $750 million in the Department's Office of Environmental Management and National Nuclear Security Administration.

Building on this progress, I have been instituting changes to improve the Department's performance on major projects across the DOE enterprise on several tracks. One of the first actions I took was to reorganize the Department at the Under Secretary level to create an Under Secretary for Management and Performance focused specifically on improving project management and performance and bringing the Office of Environmental Management, the Office of Legacy Management and the Office of Management under the purview of this new Under Secretary. In addition, in August 2013 I established a Contract and Project Management Working Group and its findings were issued in the December 2014 report titled *Improving Project Management*, which led to the implementation of several additional efforts to improve project management. These included strengthening the Energy Systems Acquisition Advisory Board (ESAAB),

establishing a Project Management Risk Committee comprised of the most senior project management officials from each Under Secretary's office to advise the ESAAB, and improving the lines of responsibility and the peer review process.

Q5. In 2012, GAO recommended that DOE determine whether any incentive payments for the Waste Treatment and Immobilization Plant (WTP) at the Hanford site, which was over budget and behind schedule, were made erroneously. If so, GAO recommended taking action to recover the erroneous incentive payments. By November 2014, DOE was in the process of reviewing the incentive payments to the WTP contractor. What were the findings of that review? If there were any erroneous payments, has DOE recovered them?

A5. DOE implemented a review of all 18 milestone and incentive payments made between January 2009 and March 2013. DOE determined that all payments made to the contractor were proper and appropriate in accordance with the criteria set forth in Section J, Attachment P of the contract.

Q6. Last year, GAO identified additional cost increases and schedule delays for the Mixed Oxide Fuel Fabrication Facility or MOX Facility. Among its recommendations, GAO suggested that "DOE conduct a root cause analysis of the program's cost increases and ensure that future estimates of the program's life-cycle cost and cost and schedule for the program's construction projects meet all best practices for reliable estimates." Has DOE conducted such a review? How does the review fit into DOE's plans to look at alternatives to the MOX Facility?

A6. The Department conducted this analysis and delivered it to the House Armed Services Committee, the Senate Armed Services Committee, the House Energy and Water Development Subcommittee, the Senate Energy and Water Development Subcommittee, and the South Carolina congressional delegation staff in January 2015. The report details many contributing factors to the cost increases for the MOX project, highlighting incomplete project and procurement planning from project inception, proceeding with a nuclear construction project having insufficient design maturity, and poor cost estimating.

These factors are among those we are now addressing with project management improvements. The NNSA has established an organization staffed with people dedicated to aligning project and contract management. NNSA has prioritized work to ensure that the tools and experience required to succeed in the execution of large nuclear construction projects are in place. Establishing and staffing this organization were among the recommendations that NNSA has already begun to implement to address the root causes identified. This organization has supported the congressionally requested assessment and analysis being conducted by Aerospace Corporation, a federally funded research and development center, to independently assess and validate the Department's preliminary plutonium disposition options analysis for disposing of 34 metric tons of weapon-grade plutonium. The Department plans to submit the Aerospace Corporation assessment and other information to Congress, consistent with the requests in the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 and the Explanatory Statement accompanying the Consolidated and Further Continuing Appropriations Act, 2015.

The Department intends to work with Congress and other key stakeholders to determine the path forward for the plutonium disposition program.

Q7. Three months ago, DOE's Contract and Project Management Working Group put together a draft copy of a report that included twenty-one recommendations for how DOE can improve its contracting capabilities. The Department has committed to implement four of those recommendations immediately. What about the other seventeen?

A7. As you mentioned, the Department has begun implementing four recommendations from the Improving Project Management report. The newly established Project Management Risk Committee has been meeting on a weekly basis to analyze project issues and

evaluate the other seventeen project management recommendations in the report and will report back to me with a specific recommended action for each one. In addition, the restructured ESAAB met for the first time in early April 2015. Finally, each Under Secretary is already underway in establishing a project management assessment office if it does not already exist.

Q8. It appears that many of the projects under the auspices of the NNSA and Environmental Management are over budget and significantly delayed. These inaccurate estimates and delays often lead to federal financial commitments to projects, which grow exponentially after the projects are being developed or are under construction. Why are there so many errors in the estimates for these projects and how those estimates are presented to decision makers at the Department and in Congress?

A8. Factors such as baselines with immature designs, poorly defined project risks, and unfavorable contract structures have led to project overruns, and/or missed completion dates. While EM does have several projects that are over budget and significantly delayed, it has been making steady progress at improving the establishment of project baselines. Since *the Root Cause Analysis of Contract and Project Management* conducted in April 2008 EM has implemented several strategies that are yielding positive results.

Among the current improvements are: baselining at higher levels of design maturity, baselining smaller projects, use of fixed prices for portions of contracts and/or use of cost caps, ensuring adequate risk analysis is conducted prior to baselining projects, and conducting frequent project peer reviews. These improvements, when combined with the EM practice of starting construction only after facilities are at 90 percent design help drive out risk.

With these improvements in place, better project baselines and project management have resulted in much more successful performance. The recent initiative to improve project management will continue to emphasize project ownership, upfront planning, and risk analysis across the entire Department.

To address long-standing and significant project management challenges identified by the Government Accountability Office (GAO) and Congress, the NNSA established the Office of Acquisition and Project Management (APM) in February 2011. Consistent with the recommendations of the National Research Council, NNSA's APM organization is responsible for providing project management support to the program offices, thus relieving the Deputy Administrators from maintaining their own project management capabilities and allowing them to focus on their central mission responsibilities.

NNSA's improvements since 2011 have been aligned with the Secretary's recently released Improving the Department's Management of Projects policy and Improving Project Management report, and focus on addressing long-standing project management challenges identified by internal and external stakeholders. In particular NNSA has as goals and has been attempting to ensure the following: that all applicable federal and departmental policies and regulations are implemented, including DOE Order 413.3B and Federal Acquisition Regulations; appropriate front-end planning – including achieving 90% design completion on complex nuclear work – and requirements definition is conducted before establishing a project baseline; project staff are appropriately sized, skilled, trained, experienced, and certified; high quality cost estimates are established utilizing NNSA's Cost Estimating Business Operating Procedure, which implements GAO's 12 Steps for a High Quality Cost Estimate; acquisition strategies are executable

within funding; project peer reviews are conducted regularly and are independent reporting to the Principal Deputy Administrator; program and project owners are identified, and roles and responsibilities are clearly defined; contract vehicles and incentives align with taxpayer interests; and contractors are held responsible and accountable for delivering capital asset projects in accordance with the terms and conditions of the contract.

Since NNSA's Office of Acquisition and Project Management's inception, NNSA has delivered its project portfolio 7% under budget for projects less than $750 million dollars. As an example of recent success, in June 2013 the NNSA delivered the CMRR/REI project $1.9M under budget and two weeks ahead of schedule. This is the first time the NNSA has completed a nuclear facility capital asset project valued at over $100M ahead of schedule and under budget.

Q9. In September 2014, GAO recommended that DOE reexamine the size of the Strategic Petroleum Reserve (SPR) due to changing market conditions. According to GAO, without this reexamination, "DOE cannot be assured that the SPR is holding an appropriate amount of crude oil in the SPR, and its ability to make appropriate decisions regarding maintenance of the SPR could be compromised." In his response letter to GAO, Principal Deputy Assistant Secretary for Fossil Energy, Christopher Smith, indicated that DOE "has initiated the process" to conduct such a review. What is the status of DOE's review of the size of the SPR?

A9. A draft scope of the proposed strategic review is currently being reviewed within DOE to determine future action.

Q10. On November 4th, 2014, the EPA proposed rate-based emissions guidelines for fossil fuel-fired power generating plants on tribal lands. Four of the affected plants, Four Corners, Navajo, and South Point Energy Center are located within Arizona. The proposed guidelines have the potential to burden the tribes with significant compliance costs. In DOE's FY16 budget request there "are no significant changes from FY2015

activities" in the Tribal Energy Program. Considering that the DOE Office of Indian Energy Policy and Programs "performs its functions consistent with the federal government's trust responsibility, Tribal self-determination policy, and government-to-government relationship with the Indian Tribes," what role did the office have in the consultative process between the EPA and the tribes regarding the EPA proposed rule? Additionally, what actions, if any, does DOE plan to take in the Tribal Energy Program to address tribal needs regarding the proposed EPA guidelines?

A10. DOE's engagement with tribes in Arizona continues support consistent with the federal government's trust responsibility, tribal self-determination policy, and government-to-government relationship with the Indian Tribes. Most recently, we have provided direct financial assistance to the Navajo Nation (2012), Gila River Indian Community (2012), Pasqua Yaqui Tribe (2012) San Carlos Apache Tribe (2011-2012), and the Tonto Apache Tribe (2014).

Regarding the consultative process between the EPA and the tribes, DOE has not been directly involved in that process, but we are aware of the proposed rule's provisions. Regarding "what actions, if any, does DOE plan to take in the Tribal Energy Program to address tribal needs regarding the proposed EPA guidelines"? The Department does not plan to take any action directly related to the proposed EPA rule, which allows affected tribes to work with appropriate state and federal regulators.

QUESTIONS FROM SENATOR FRANKEN

Q1. Mr. Secretary, what is the current life-cycle cost estimate for the South Carolina Mixed Oxide (MOX) Fuel Fabrication Facility at the Savannah River Site? How does this new cost estimate compare to the original cost estimate, and what are the reasons for the difference between the two?

A1. The lifecycle cost for irradiation of MOX fuel in light water reactors (LWR) includes the construction and operation of the MOX project facilities and the Waste Solidification Building (WSB), reactor modifications and fuel qualification to irradiate MOX fuel , MOX feedstock production, also referred to as plutonium oxide production (i.e., disassembly of pits and conversion of plutonium to oxide), transportation, and other related activities. As discussed in the Department's preliminary Analysis of Surplus Weapon-Grade Plutonium Disposition Options Report (Options Report) issued in April 2014, the projected, normalized life cycle is estimated at more than $30 billion.

Consistent with the requests in the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 and the Explanatory Statement accompanying the Consolidated and Further Continuing Appropriations Act, 2015, the Department has requested that Aerospace Corporation, a federally funded research and development center, independently assess and validate the Department's preliminary analysis of options for disposing of 34 metric tons of weapon-grade plutonium.

A2. Does the new cost estimate include the enduring costs for upgrading and maintaining security at civilian nuclear reactors to ensure the plutonium in MOX fuel cannot be stolen?

A2. The costs for initial security upgrades that are required to obtain the Nuclear Regulatory Commission (NRC) license to operate reactors using MOX fuel would be paid by the Department. The recurring security costs needed to maintain security at the facility will

be paid by the utility irradiating MOX fuel in order to continue to meet NRC licensing requirements. The savings for using MOX are expected to offset any additional security costs at civilian nuclear reactors

Q3. How many companies have agreed to use MOX fuel in their reactors?

A3. The Department does not yet have nor would it expect to have any firm commitments from utilities to use MOX fuel so far in advance of a possible first MOX fuel delivery. The "firm commitment" would come at the end of a negotiation process that would take place closer to the time the MOX fuel would be available, with the execution of a supply contract followed by purchase orders for specific quantities with delivery timelines.

Q4. Is it your position that the US should still pursue MOX because of the agreement with Russia, or do the cost increases suggest it is time to choose a different disposition method for plutonium? Is your Department considering any alternative, more cost-effective strategies for achieving our plutonium disposition mission?

A4. The United States remains committed to the Plutonium Management and Disposition Agreement (PMDA). The Department's analysis and consideration of cost effective alternatives does not affect that commitment because the PMDA provides, inter alia, for disposition by irradiation or any other method as may be agreed by the Parties. Consistent with the requests in the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 and the Explanatory Statement accompanying the Consolidated and Further Continuing Appropriations Act, 2015, the Department has requested that Aerospace Corporation, a federally funded research and development center, independently assess and validate the Department's preliminary analysis of options for disposing of 34 metric tons of weapon-grade plutonium.

Q5. I appreciate everything you and your Department are doing to promote renewable energy. As you know, Minnesotans strongly support renewables as well, and our state has a lot of wind resources in particular. But there is a segment of the wind power market that has not received the attention it deserves from your agency or many others here in Washington, and that is distributed wind power. Distributed wind is typically behind the meter, and can be deployed in many settings; farms, ranches, suburban locations, or anywhere with some land and good wind across rural America. Along with several of my colleagues from both sides of the aisle, I sent you a letter in December of last year expressing my strong support for distributed wind, and I was disappointed by the relatively meager increase in the budget for distributed wind in your FY16 budget request. Can you please tell me why the Administration's budget proposal was so low for this important segment of the wind power market?

A5. In order to reduce the cost of wind energy, accelerate the deployment of wind power, and contribute to the nation's role as a leader in renewable energy technology, DOE remains committed to developing and deploying a diverse portfolio of wind technologies. The Department's FY 2016 request provides increased support for wind research over FY 2015 enacted levels. DOE's investments in innovative wind technology development and mitigation of market barriers are benefiting all types of wind energy applications, including both customer- and utility-side technologies.

DOE is committed to addressing technology and deployment challenges facing distributed wind. For FY 2016, the Wind Program request includes $4.4 million for R&D focused on the distributed wind sector under its Technology Research, Development, and Testing and Resource Characterization subprogram. Within this subprogram, the Department's anticipated investments specific to distributed wind include technology development, advanced manufacturing, turbine certification testing, deployment modeling, and market analysis. The Wind Program also intends to continue distributed wind projects started in FY 2015 related to wind resource and site assessment, turbine design tools, and soft cost research. The Department is using data gathered from a September 2014 request for Information titled "Acceleration of Distributed Generation

from Wind Energy Systems" to aid in prioritizing the Wind Program's distributed wind project portfolio going forward.

While the above efforts are directly related to distributed wind, the Department also supports technology- and deployment-agnostic efforts that apply to all wind energy technologies, including distributed wind. For example, under the Mitigate Market Barriers subprogram, the Wind Program's Wind Exchange and its six Wind Energy Regional Resource Centers help communities understand the impacts and benefits of wind energy and make wind development decisions, which often involve distributed wind systems. In addition, the greater DOE Grid Modernization effort includes distributed wind energy integration into building energy management systems and micro grids.

Q6. Fusion has the potential to offer a nearly inexhaustible source of energy with no environmental impact, and therefore could be a viable source of clean energy in the future. But while your budget proposal asks for a 5% increase in funding for the Office of Science, it cuts funding for the Fusion Energy Sciences (FES) program by 10%. Does this cut in FES funding indicate that your Department does not view fusion research as a priority, relative to other research programs? What do you see as the future of fusion research is in the United States?

A6. The FY 2016 budget request for the Fusion Energy Sciences (FES) program is $420 million, which represents a small increase over the FY 2015 budget request of $416 million. The Department remains committed to investing in fusion energy long term. The FY 2016 budget request will support this highly impactful program, including world-class large-scale magnetic fusion facilities, leading research in fusion high-performance computing and materials science, vigorous international partnerships that provide U.S. scientists with new research opportunities, and a wide range of innovative university programs in the fusion and plasma sciences that serve the research needs of over 250 students nationwide.

Q7. Your budget request includes funding for only 5 weeks of operations at the Alcator C-Mod facility at the Massachusetts Institute of Technology, after which the facility will be closed. I understand that the closure of this facility has been planned over the past few years, but could you please explain your reasons for shutting down this cutting-edge research program?

A7. The Administration's decision is based on the need to prioritize under constrained budgets so that the U.S. fusion program takes advantage of opportunities with the greatest potential scientific impact. The decision to close the Alcator C-Mod (C-MOD) facility took into consideration the need to preserve scientific breadth in the program, the significant size of the C-Mod budget, and the ability of the U.S. to mitigate the impact of this closure through other existing research facilities such as DIII-D at General Atomics in California and NSTX-U at the Princeton Plasma Physics Laboratory, and partnerships overseas. Like C-Mod, DIII-D and NSTX-U are both magnetic fusion experiments of the tokamak type, the most successful fusion configuration to date. By virtue of key complementary characteristics and recent upgrades, DIII-D and NSTX-U represent a unique, scientifically powerful pair of research platforms for scientists and students from around the globe.

QUESTIONS FROM SENATOR HEINRICH

Q1. Concentrating Solar Power (CSP) systems have the advantage of using thermal storage to supply power on demand. One element in DOE's CSP program is the National Solar Thermal Test Facility (NSTTF), which provides testing and support for the design and operation of unique components and systems in proposed solar thermal electrical plants for large-scale power generation. The NSTTF is the only test facility of its type in the United States. Do you believe CSP should continue to be a key element in DOE's solar program and do you see a continuing role for a facility like NSTTF in the CSP program?

A1. The Department recognizes that the National Solar Thermal Test Facility (NSTTF) at Sandia National Laboratory plays a unique role in the U.S. CSP industry, and the Department continues to support NSTTF's mission, which is aligned with the technical targets and goals of the DOE SunShot Initiative. The FY 2016 Budget Request will continue to support the NSTTF. To ensure that both government and private sector sponsored research costs adequately reflect facility usage, the direct funding supports approximately 50% of the direct operations and maintenance (O&M) costs of the NSTTF, with the balance supplied from loading on Sandia's research that is performed at the facility or fees that outside entities pay to perform research at the facility. This has been the standard Solar Energy Technologies Program practice for supporting the NSTTF since FY 2012.

Q2. I understand a number of the nation's leading scientists, historians and others recently wrote to request that you use your authority as secretary to vacate the AEC's 1954 decision to deny the renewal of Dr. J. Robert Oppenheimer's security clearance. Senator Bingaman made a similar request to then-Secretary Chu in a letter in 2011, which you have. History has shown that the decision to deny Dr. Oppenheimer a clearance did a great injustice to an outstanding scientist and loyal public servant. Will you consider using your discretion in this case to issue a declaratory order vacating the decision?

A2. I appreciate that you have shared with me the resolution passed by the Los Alamos County Council, and supporting letters from members of the J. Robert Oppenheimer Memorial Committee, including prominent scientists and authors, all testament to the

continuing interest in the 1954 AEC decision both within the U.S. scientific community and beyond.

I am keenly aware of Dr. Oppenheimer's unquestionable scientific contribution to U.S. national security. His wartime contribution continues to shape the contours of our defense complex to this day.

I am pleased that the Department of Energy was able in October 2014 to declassify all of the remaining portions of the AEC hearing transcript not previously disclosed. As you know, the AEC never found Dr. Oppenheimer to have breached his obligation to protect classified information entrusted to him. Moreover, the 1954 decision included a declaratory statement that Dr. Oppenheimer was a loyal American.

Q3. The Waste Isolation Pilot Plant in Carlsbad, NM, is the nation's only mined geologic repository for the permanent disposal of defense-generated transuranic waste. Looking forward, what is DOE's current best estimate of how many years WIPP will need to remain in operation to dispose of the currently anticipated inventory of TRU Waste? Is the expected life-cycle completion date now 2055, and is that date reflected in the cost-benefit analyses related to recovery operations?

A3. The life-cycle planning schedule for the Waste Isolation Pilot Plant (WIPP) is currently being updated to reflect fiscal year 2050 as the completion of operations.

Q4. The NNSA's Global Threat Reduction Initiative has established a goal of accelerating commercial domestic production of critical medical radioisotopes, such as Mo-99, without the use of highly enriched uranium. What is the status of NNSA's efforts to support the reliable domestic production of medical radioisotopes? What is the program's current timeline for assuring a reliable domestic supply of medical radioisotopes?

A4. To accelerate the establishment of reliable supplies of Mo-99 produced without highly enriched uranium (HEU), DOE/NNSA is currently focusing on developing three diverse

production pathways with two commercial entities[2]. The two companies are: (1) NorthStar Medical Radioisotopes (neutron capture technology and accelerator technology), and (2) SHINE Medical Technologies (accelerator with Low Enriched Uranium (LEU) fission technology). Each of the cooperative agreements are implemented under a 50 percent - 50 percent cost-share arrangement, consistent with Section 3173(a)(1)(C) of the American Medical Isotopes Production Act of 2012, part of the National Defense Authorization Act for FY 2013, and are currently limited to a total of $25 million of Government funding each. Beyond the Government funding provided under the cooperative agreements, all costs incurred to develop the project are the responsibility of the commercial entity.

The NorthStar neutron capture project is currently scheduled to begin production in October 2016, pending approval of the RadioGenix™ Tc-99m generator by the U.S. Food and Drug Administration.

The NorthStar accelerator project is currently scheduled to begin production in October 2017, assuming the project receives full commercial funding.

SHINE's baseline schedule indicated that an accelerator-driven aqueous LEU-based system could be developed, built, and licensed to begin commercial production in 2016. This schedule was based on a number of underlying assumptions which have since changed, including the ease of SHINE securing matching funding, thereby impacting the

[2] DOE/NNSA previously entered into cooperative agreements with Babcock & Wilcox to develop Low Enriched Uranium solution reactor technology and General Electric-Hitachi to develop neutron capture technology. Both companies have made the business decision to halt progress on the projects due to economic conditions of the Mo-99 marketplace; these projects are currently inactive.

baseline. The current schedule to production is June 2018, assuming the project receives full commercial funding.

While DOE's commercial partners have made technical progress to develop non-HEU-based Mo-99 production technologies, considerable economic challenges remain due to continuing market practices that will need to be overcome before these companies will be able to produce substantial quantities of Mo-99 to meet U.S. needs. In order to achieve a long-term, reliable supply of this crucial medical isotope in the future—one that also includes the production of Mo-99 in the United States—the current Mo-99 industry must continue its transition to a full-cost-recovery, non-HEU-based model.

QUESTIONS FROM SENATOR HIRONO

Q1. Your testimony highlights the partnership on biofuels DOE is engaged in with the Departments of Defense and Agriculture, as well as outlining your priorities for research and development in six crosscutting Departmental initiatives.

Our nation's energy challenges require as much collaboration as possible. I'm curious what other non-nuclear areas you are partnering with the Department of Defense on, in particular on issues like grid modernization, the energy-water nexus, research and development, and others that have critical national security impacts?

A1. The Department of Energy (DOE) coordinates with the Department of Defense (DOD) on many energy-related issues. In July 2010, the DOE and DOD signed a memorandum of understanding (MOU) concerning cooperation in a strategic partnership to enhance energy security. The MOU was implemented to identify a framework for cooperation and partnership to strengthen coordination of efforts to enhance national energy security, and demonstrate Federal Government leadership in transitioning America to a clean energy economy. In March 2015, representatives from DOE and every branch of the armed forces met to discuss activities and ongoing progress regarding the MOU. Examples of on-going coordination and activity with DOE and DOD include, but are not limited to:

- **Microgrids R&D:** DOE, DOD, Department of Homeland Security (DHS), and the private sector are designing and deploying three microgrid demonstrations as part of the *Smart Power Infrastructure Demonstration for Energy Reliability and Security (SPIDERS)* program. SPIDERS demonstrates secure microgrid architecture with the ability to maintain operational surety through trusted, reliable, and resilient electric power generation and distribution. The Preliminary Design of Phase III at Camp Smith, HI—the most complex of the SPIDERS microgrids—is complete.

- **Grid-Level Energy Storage System (ESS):** DOE is collaborating with the Army to conduct an ESS demonstration to support the Base Camp Integration Lab (BCIL), an Army forward operating base (FOB) test bed facility at Fort Devens, MA. This ESS demonstration has been developed to drive an increase in the reliability of the base camp microgrid while decreasing the fuel consumption of the system. The energy storage systems selected will first be tested and demonstrated at Sandia's Distributed Energy Technology Laboratory (DETL) and then performance tested at BCIL.
- **DOD/DOE Parallel Development for Energy Storage:** DOD and ARPA-E leadership attended a combined system demonstration on November 20, 2014, for DOD's Hybrid Energy Storage Module and ARPA-E's Advanced Management and Protection of Energy Storage Devices programs. In this collaboration model, the $26M DOD development program will be leveraging the most promising advanced battery management system technologies coming out of the $30M ARPA-E program.
- **Vehicle R&D:** The Army's Tank Automotive Research, Development and Engineering Center (TARDEC) and DOE's Vehicle Technologies Office (VTO) have a long-standing relationship that was formalized and strengthened through the Advanced Vehicle Power Technology Alliance (AVPTA) in July 2011. The goals of the Alliance are to encourage greater coordination and information exchange and to undertake joint projects that would provide more value than could be achieved separately.

- **Manufacturing Institutes:** Currently, DOE and DOD have funded the development of five manufacturing centers as part of the administration's National Network for Manufacturing Institutes (NNMI). They are (1) the co-sponsored pilot, National Additive Manufacturing Innovation Institute (NAMII), (2) the DOE-sponsored Power Electronics/Wide Band-Gap, (3) the DOD-sponsored Digital Design and Design Innovation Institute, (4) the DOD-sponsored Lightweight and Modern Metals Manufacturing Innovation Institute, and 5) the DOE-sponsored Institute for Advanced Composites manufacturing Innovation
- **Interagency Collaboration on Energy-Water Research**: DOE and DOD are currently exploring potential collaborations in the energy-water nexus in areas such as energy-efficient desalination, water-efficient cooling, and integrated energy and water systems design. There is interest in pursuing collaboration that includes technology demonstration and evaluation on bases and/or ships.
- **Biofuels Commercialization:** In July 2011, DOE signed an MOU with the Navy and the U.S. Department of Agriculture that outlines a plan to leverage Title III of the Defense Production Act (DPA) and the Commodity Credit Corporation to support several geographically diverse U.S.-based biorefineries capable of producing advanced drop-in biofuels, including renewable diesel and jet fuel for commercial and military applications.
- **Wave Energy Demonstration:** DOE is funding a one-year demonstration of the Northwest Energy Innovations wave energy converter at the Navy Wave Energy Test Site in Hawaii (operated by Naval Facilities Command). The device will be towed to the 30 meter test berth and deployed when ocean conditions permit,

sometime in spring 2015. DOE also recently competitively selected two new technology development and demonstration wave energy converter projects, each receiving $5M in DOE funds. The projects will be deployed at the Navy Wave Energy Test Site's 60-meter and 80-meter test berths in the FY16 and FY17 time frame. Frequent communication between DOE and NAVFAC has allowed the two agencies to coordinate investments and schedules, and to share information related to MHK deployment and performance.

- **Solar Veterans Training Program:** SunShot, with the support of EERE Strategic Programs, conducted a pilot solar training course at Marine Corps Base Camp Pendleton, California that included 17 Marines and 3 Sailors preparing to transition to veterans status. The 20 service-members participated in a four week solar training course sponsored by SunShot. Participants took the NABCEP certification exam at the end of the course as well as an interview day with private solar companies, with graduation on February 13, 2015. Additional pilots are planned for Ft. Carson, CO (Army) in April as well as Naval Station Norfolk (Navy) in June, 2015. DOE intends to expand the pilot program to ten bases by the end of 2015.
- **Federal Energy Management Program (FEMP) Support to DoD on Renewable Energy Development**: FEMP completed an initial renewable energy screening for the Air Force, which includes 31 of their most energy consumptive bases. As part of the White House-announced Capital Solar Challenge, FEMP and NREL are supporting the Navy's analysis of its facilities in the National Capital Region.

Q2. There is a lot of very exciting work underway in Hawaii and throughout the country on the use of various types of biomass to produce energy, as well as other valuable products such as animal feed, bio-fertilizers, plastic, and ingredients for human nutrition.

In particular, algae can be used as a way of reducing greenhouse gas emissions from power plants and other industrial sources because of its ability to convert large quantities of captured CO2 into fuels and other products. Investing in carbon utilization technologies – particularly sustainable, bio-based technologies – represent important investments that can enhance our energy security and address climate change.

DOE's budget request recognizes that investing in algae is a priority, one which I support. But the Department's proposed investment in these technologies is just a tiny fraction of the portfolio proposed in the Bioenergy Technologies Office budget, and is lower than the level provided by Congress in the last Fiscal Year.

While the increase provided under the BTO's budget for algae is encouraging, and while the Budget discusses the use of algae under the Carbon Use and reuse Program, this funding is zeroed out in this year's request. Can you explain how, and whether, the Department plans to continue integrating algae into the Fossil Energy Office's Carbon Storage Program?

A2. The Office of Fossil Energy's Carbon Storage Program is utilizing FY 2015 appropriated funds to study the integration of biological carbon dioxide (CO_2) conversion technologies, such as algae, with fossil energy systems. The FY 2016 funding request for Carbon Storage maintains priority on addressing the critical issues associated with geologic storage of CO_2 while the Bioenergy Technology Office continues to address the key issues surrounding algae fuel and feedstock development which will have applicability to all CO_2 point sources, including fossil fuel systems.

QUESTIONS FROM SENATOR KING

Q1. What role should DOE play in developing offshore wind? You have not requested funding for additional offshore wind demonstration projects. If one of the downselected projects fails to meet its metrics, how will you handle selecting another project?

A1. DOE is focused on meeting two critical objectives with respect to offshore wind: reducing the cost of energy through technology development and demonstration, and reducing deployment timelines and uncertainties. These are the objectives of the DOE and Department of the Interior (DOI) National Offshore Wind Strategy. DOE's Offshore Wind Advanced Technology Demonstration Projects support advanced, first-of-a-kind technologies that have the potential to reduce the costs of offshore wind and reduce barriers in the U.S. market for offshore wind technology. These projects are intended to give the offshore wind industry the opportunity to evaluate technology solutions aimed at reducing costs and addressing challenges unique to U.S. conditions, i.e. deep water and hurricanes. For example, bottom-fixed foundations, which are being demonstrated off Virginia Beach and the Atlantic Coast, are easier to construct and install than traditional offshore wind foundations, which reduce costs. These bottom-fixed foundations also include hurricane ride-through systems suitable for the hurricane regions of the East Coast.

DOE's offshore investments are expected to help reduce market barriers by facilitating regulatory pathways for offshore wind and providing lessons learned for future projects. For example, in collaboration with DOI, DOE's offshore demonstration projects are generating efficient permitting processes so that these projects may be completed in just five years, from initial development to generating power to the grid. This is more than

three years shorter than the timelines that other non-DOE supported offshore wind projects have experienced. Reducing timelines represents a large savings in development costs for offshore wind projects and reduces uncertainties for investors and developers. DOE investments will also grow the domestic supply chain, encourage domestic manufacturing, and help develop a specialized maritime labor force.

We believe the current amount of requested funding for three demonstration projects provides the appropriate balance of offshore wind-specific and demonstration funding with respect to technology development and market barrier funding. As the current demonstration projects progress further, analysis of the lessons learned and gaps that still exist will allow the Wind Program to responsibly develop supplementary activities to support the development of a cost-effective U.S. offshore wind industry that meets U.S. energy goals as needed.

DOE will review the progress of the three demonstration projects with respect to their current budget period's go/no-go milestones in the summer of 2015. If, after review, one or more of the projects is given a "no-go" decision, DOE will evaluate the status of the two alternates for potential funding, subject to appropriated funds.

Q2. I see that your request for the Water Power office, which funds the Marine & Hydrokinetic Program, is lower than last year's enacted level. Why? I believe that tidal projects show enormous potential, as Maine is home to the first grid-connected project in the country and that company has now successfully deployed in Alaska as well.

A2. The FY 2016 request supports marine and hydrokinetic (MHK) and hydropower R&D at levels similar to those enacted in FY 2015—$61 million in total in FY 2015, versus the FY 2016 request of $67 million.

The Department's request provides the funding stability necessary to continue making progress in both hydropower and MHK technologies. The request includes adequate resources to support advancement of component technologies and risk reduction of MHK systems to ready them for successful open water demonstration. In parallel, the request includes adequate resources to support MHK systems that are ready for the demonstration stage of development. Regarding tidal potential, the Department is supporting key component innovation through a competitive solicitation. These components are able to support tidal, current, and wave energy system deployment.

QUESTIONS FROM SENATOR LEE

Q1. The stated purpose of DOE's loan program is to provide loans to projects that have not been able to access capital in the private market. However, the top 10 recipients of loans under the 1705 loan program, which provided a combined $12.2 billion in loan guarantees, are companies which do not appear to have issues accessing capital: NextEra Energy Resources, LLC is a Fortune 200 company; Abengoa Solar Inc. is a Spanish multinational company; Prologis is a global real-estate investment trust; Cogentrix is a wholly owned subsidiary of the Goldman Sachs Group, Inc.

Please outline the formula or criteria DOE uses to determine that these projects are a) being overlooked by the private market and b) not at high risk of default under favorable government terms.

A1. LPO works with the private markets to help deploy innovative clean energy technology in the United States. Every transaction supported by LPO is a public-private undertaking. While DOE issues loans and loan guarantees to provide the necessary debt financing for these projects, the project sponsor must provide significant project-level equity investments.

In many cases, including those referenced in your question, DOE issues loans and loan guarantees to project companies, which include ownership and equity investments from creditworthy companies. Note that project companies are standard financial structures used in the U.S. energy industry. However, since these project companies deploy innovative technology, they present a higher risk profile than the parent owner(s) and equity investors to commercial-sector capital providers.

Commercial banks and bondholders are often unwilling to finance the first few commercial-scale projects that use a new technology since there is not yet a history of credit performance or operation – even if the equity investors or project developers have strong credit ratings and robust balance sheets and normally do not have challenges accessing capital for conventional projects. As a result, the initial commercial

deployment of new energy technology is often limited by a project developer's inability to secure sufficient long-term debt financing to build the project.

LPO was established to fill this critical role in the marketplace by financing the first deployments of a new technology to bridge the gap for commercial lenders. Once the technology is proven at commercial scale through the first few projects, the Department of Energy (DOE) stops providing financing and lets the private market take over.

The Department takes its mission and responsibility to taxpayers seriously. This includes significant protections to ensure that all loan underwriting, issuance, and monitoring is executed in a manner necessary to maximize recoveries and achieve the program's mandate of accelerating the deployment of innovative energy technology in the U.S.

As noted in previous Government Accountability Office (GAO) reports, LPO's due diligence and underwriting is as stringent, if not more stringent, than that performed in the private sector. This approach has resulted in total estimated losses to the portfolio of approximately 2 percent, while supporting projects that represent more than $50 billion in total project investment.

Q2. In considering applicants for the 1705 loan program, did DOE consider whether or not applicants are already receiving financial assistance from elsewhere within DOE or any other federal entities, specifically assistance from the Department of Treasury 1603 grants, or loan guarantees from the Export-Import Bank? Does DOE currently consider this for its ongoing loan guarantee programs?

A2. Yes. The Department evaluates all sources of revenue for applications received under the Title XVII program. Further, the Department ensures that all applicable Title XVII loan guarantees, including those issued under the Section 1705 program, adhere to the

statutory requirements preventing Federally Supported Projects contained in the FY 2009 and FY 2011 Appropriations Acts. These provisions prohibit the Department from issuing loan guarantees to borrowers receiving other federal funds, with some exceptions, including tax credits.

Q3. In March 2012, the Government Accountability Office made several recommendations to the DOE to improve its loan guarantee program.[3] What is the implementation status of each of the GAO's recommendations? If DOE has not implemented GAO's recommendations, why not?

A3. The GAO issued a more recent report, DOE Loan Programs: DOE Should Fully Develop Its Loan Monitoring Function and Evaluate Its Effectiveness (GAO-14-367) in May 2014. The report noted that the LPO has made significant improvements to its loan monitoring and other functions since 2011 but did include four recommendations to further improve the program. Since the release of the GAO report, the LPO has been implementing actions to address these recommendations including, staffing key positions, updating management and reporting software, updating policies and procedures, and performing internal evaluations of LPO's loan monitoring functions. LPO has already implemented many of the GAO recommendations and will fully implement all of the report's recommendation by June 2015 – approximately one year following the report's release.

In addition to its specific actions it has taken in response to the GAO recommendations, the LPO continues to make ongoing improvements to its management, policies, and

[3] "Further Actions Are Needed to Improve Tracking and Review of Applications," Government Accountability Office, March 2012, GAO-12-157, http://www.gao.gov/assets/590/589210.pdf

procedures to ensure compliance with OMB Circulars A-11 and A-129, as well as adherence to government and industry best practices where appropriate.

Q4. In May, 2014, the DOE Inspector General released an Audit Report, the "Implementation of Recommendations from the January 2012 Independent Consultant's Review of the Department of Energy Loan and Loan Guarantee Portfolio." The IG found that the Department had completed actions to address 4 of the report's 12 recommendations, and that action was not yet completed on the remaining 8 recommendations. What is the status of the remaining 8 recommendations?

A4. The Department's Loan Programs Office (LPO) has taken actions to address each of the twelve recommendations contained in the Independent Consultant's report. Specifically, the OIG report states that the LPO has completed actions to address four of the Independent Consultant's report's twelve recommendations and has initiated actions in response to the remaining eight recommendations.

The OIG found that in cases where the Department had not implemented a specific recommendation from the Independent Consultant's report, it considered the recommendations and addressed the issue with a different approach. Further, the Department provided strong rationales for pursuing the alternative actions and the OIG did not object.

Since the OIG report was published, the LPO has continued to implement actions to address the recommendations of the Independent Consultant's report. This includes updated management and reporting software, updated loan monitoring policies and procedures, independent credit reviews of the entire portfolio, and additional internal controls.

In addition to its specific actions in response to the OIG recommendations, the LPO continues to make ongoing improvements to its management, policies, and procedures to

ensure compliance with OMB Circulars A-11 and A-129, as well as adherence to government and industry best practices where appropriate.

Overall, LPO employs a robust portfolio monitoring process that mitigates risk and protects taxpayers' interests. The effectiveness of LPO's portfolio monitoring and risk management is illustrated by the overall health of its portfolio with losses to date of approximately 2 percent of loans, loan guarantees, and conditional commitments.

Q5. In an April, 2014 audit report on the loan to Abound Solar, the DOE Inspector General noted that DOE ignored the advice of its own advisors with regard to the loan to Abound: "Further, we found that the internal solar expert had previously expressed concerns to the Program regarding deficiencies in Abound's quality control."[4]

The report further finds that DOE suspended payments when Abound later ran into trouble, but restarted the payments two months later in spite of warnings from the same solar industry experts whose opinions differed with an engineer tasked with assessing the project's financial health. According to the IG, no effort was made to reconcile this discrepancy in opinions.[5]

Finally, the report found that DOE's portfolio manager "had no prior loan management experience and had limited background in project finance and financial statement analysis, yet he was assigned to manage a number of loans totaling over $2 billion." The report notes that the program officer said he had not completed reports on the creditworthiness of DOE loan recipients "because he found it to be 'a very difficult exercise.'"[6]

What has DOE done specifically to address each of these issues? Please address each of the above issues separately.

A5. The Department generally agreed with many of the recommendations in the IG report and it highlights many of the procedural improvements the Department's Loan Programs Office (LPO) has made to protect taxpayer interests since Abound originally filed for bankruptcy more than two years ago. These include an updated portfolio management

[4] "The Department of Energy's Loan Guarantee to Abound Solar Manufacturing, LLC," US Department of Energy, Office of Inspector General, Office of Audits and Inspections, April 2014, DOE/IG-0907, p 3,
[5] Ibid., 4
[6] Ibid., 9

software system, updated policies and procedures to standardize documentation, and updated hiring plans for its loan monitoring functions.

For all of its transactions, the LPO completes a thorough and well-documented loan underwriting process for all of its transactions, including Abound. Before approving the loan guarantee to Abound, the Department completed financial modeling and market analysis. This included advice from its independent marketing consultant regarding the sharply deceasing photovoltaic solar panel prices.

The LPO regularly works with outside consultants, including independent engineers, to benefit from outside expertise as we manage our portfolio. In this case, the issues raised by our internal solar engineer were addressed through the independent engineer's report, which directly responded to nine of the eleven issues and addressed the other two issues at a higher level. Following this process, management made a decision with the intent of maximizing the best possible result for taxpayers based upon the technical, financial, legal and other information available at the time.

Q6. Can you provide a line item from your budget justification for the Zero Net Energy Commercial Buildings Initiative? Approximately how much money has the program received since authorization? Please provide a fiscal breakdown of the account.

A6. The Buildings Technologies Office does not have a specific line item in its budget for Zero Net Energy Commercial Buildings.

Q7. How many programs or regulations currently exist at DOE to promote energy efficient housing at both the residential and commercial level?

A7. The Department of Energy's Building Technologies Office supports energy efficiency housing at both the residential and commercial level.

We would also direct you to the Regulatory Agenda to the spring 2015 which includes a list of rules that DOE is currently pursuing through the Building Technologies Office. It is accessible at the Office of Information and Regulatory Affairs website: http://www.reginfo.gov/public/do/eAgendaMain;jsessionid=07FE2E8326BB5A9BC7DFE26420B88E85?operation=OPERATION_GET_AGENCY_RULE_LIST&currentPub=true&agencyCode=&showStage=active&agencyCd=1900&Image58.x=25&Image58.y=10&Image58=Submit.

QUESTIONS FROM SENATOR MANCHIN

Q1. Your agency's Energy Information Administration predicts that the United States will continue to rely on fossil fuels to produce as much as 68% of the nation's electricity for the next 25 years. In that case, we will rely on coal for 32% of the country's electricity, while natural gas will produce 35% in 2040.

The EIA reported that in 2013 renewables provided 13% of our total electricity generation and they expect this number to potentially grow to 16% in 2040 – only a 3% increase over 25 years. Is that right?

In contrast, this budget includes $2.7 billion for Energy Efficiency and Renewable Energy and only $560 million for Fossil Energy Research and Development. Your EERE budget is nearly five times that of the fossil budget, despite fossil energy providing more than five times the amount of electricity that renewables provide. Can you explain that distinction to me?

A1. As illustrated in DOE's Quadrennial Technology Review, an important component of the motivation for Federal investment in energy technology is to maintain and support US technological leadership in key areas, especially where there is a large "R&D potential:" the difference between the physical limits of the technology and the current state of the art. That R&D potential tends to be greatest where the technologies have not been tested in the marketplace for decades but are emerging from lab benches to demonstrations and production lines.

It is also important to recall that in revamping the DOE account structure Congress dictated that the EERE budget encompass a wider variety of technologies and programs than Fossil Energy: it covers renewable generation of electricity from five energy sources: solar, wind, water (conventional hydro and marine), geothermal and biomass. For comparison, of the $2.7 billion requested for EERE, $645 million is for research, development, and demonstration of these renewable electricity generation technologies.

EERE also funds a technology program that encompasses energy end use (including fossil energy) that covers dozens and likely hundreds of technologies for buildings (windows, lights, controls); for transportation (engines, fuels, materials) and couples both these programs with advanced manufacturing to maintain US international leadership in these markets and create domestic jobs.

Moreover, EERE also funds Weatherization and State Energy Grant programs, whose beneficiaries could be working with any fuel. Thus a simple comparison of top lines of the accounts may not provide all the information needed to understand the portfolio that the Department has put forward as a balanced approach to maintaining US leadership in energy technology and manufacturing.

Thus, fossil energy is but one critical component of our all-of-the-above energy strategy, and our FY 2016 budget request reflects a commitment to those areas, in addition to renewable, efficiency, and advanced transportation technologies. The FY 2016 request funds fossil energy R&D at roughly the same level as it was funded by the Congress in FY 2015. In fact, the FY 2016 request is $85 million (+18 percent) above the FY 2015 budget request for fossil energy R&D. And while the request for Fossil Energy R&D is roughly even with the FY 2015 enacted level, the budget includes some significant increases in key technology areas like carbon capture, carbon storage, methane emissions mitigation, natural gas, and supercritical CO2 technologies. In addition to the funding in our FY 2016 request, we are also now receiving applications for our $8 billion advanced fossil energy loan guarantee solicitation for projects that are innovative and reduce air pollutants or greenhouse gas emissions.

Q2. Ensuring reliable electricity is top priority for me. I assume it is for DOE as well. Last winter, during the polar vortex, the PJM system – the system that provides the electricity for West Virginia and the electricity we are using right now – was running at full capacity and saw a record number of plant outages when they were most needed. With the new EPA rules, we are facing more pressure on our baseload coal. Further threats to our reliability could result in rolling blackouts, which put the lives of the most vulnerable – the elderly, the sick, the poor –at risk. Put simply, the reliability of our grid is a life and death matter. Is the DOE worried about the reliability of our grid, especially in light of new EPA regulations? How are DOE and EPA working together to ensure that the new regulations do not jeopardize energy security and reliability?

A2. DOE is committed to working with the EPA and other stakeholders to successfully implement EPA's power sector regulations and maintain grid reliability. DOE believes that, generally speaking, the EPA regulations will not create widespread reliability issues and that any localized concerns can and are being addressed through resource planning efforts (e.g., generation and transmission projects). With EPA's recent release of its proposed Carbon Pollution Standard for Existing Power Plants under Section 111(d) of the Clean Air Act, states have an important role to play in shaping how they will comply with the standard. DOE can provide technical assistance throughout this process if requested. Further, DOE recognizes the role that regional reliability coordinators, independent system operators (ISOs), regional transmission organizations (RTOs), state public utility commissions, and other stakeholders can have to help inform states' development of their 111(d) compliance plans. As with EPA's other power sector regulations, this new regulation, when final, is not expected to create widespread reliability issues, and any local reliability challenges that may arise should be manageable with timely cooperation and coordination among all the stakeholders, including utilities, regulators, balancing authorities, reliability coordinators, ISOs, and RTOs.

DOE provides a host of technical assistance resources to state, local and tribal governments on energy issues. DOE's technical assistance takes an "all-of-the-above" approach, including but not limited to energy efficiency, generation efficiency, renewable energy, natural gas, carbon capture and storage, and nuclear energy. Specific technical assistance resource opportunities vary across DOE and may include: funding opportunity announcements, reports, peer-to-peer exchange, access to DOE and national lab technical experts, workshops, and webinars. Existing DOE technical assistance resources for state, local and tribal governments on topics relevant to EPA's proposed Clean Power Plan are available. DOE offices will continue to provide technical assistance as they are able depending on each office's resources; technical assistance will vary between offices and requests.

Q3. As you know, Mr. Secretary, we have two baseload sources of electricity: coal and nuclear. EPA's Clean Power Plan would require new coal-fired power plants to use CCS, despite the fact that this technology is not commercially available. This will effectively prevent the construction of new coal-fired power plants. In addition, the rules for existing coal-fired power plants are going to lead to some of those plants being retired. Now, some of those are outdated and should be retired. However, when they cannot be replaced by new plants, we could lose a significant portion of our baseload power generation. That's when you get reliability issues.

In fact, FERC Commissioner Philip Moeller recently expressed concerns about the impact of these new rules on the reliability of electricity in the United States.

If this EPA rule goes forward, we are going to need serious investment in fossil energy more than ever. How does this DOE budget put us on the path to commercially available CCS?

A3. The Office of Fossil Energy's budget request provides a substantial amount of funding for research and development (R&D) activities that seek to lower the cost of both current and second generation CCS technology. FE's funding allocates money for R&D on all parts of the CCS process including advanced energy systems, capture technologies, storage site

characterization, and the monitoring, verification, and accounting technologies needed to ensure long-term storage of the CO_2. Lowering the cost of the individual technology components and focusing on system integration will accelerate CCS deployment to market and make it economically competitive as a CO_2 reduction technology. In addition to funding new CCS component technologies, the budget request allocates funding for pilot projects. Beyond the CCS systems being deployed today, a broad portfolio of second generation technologies are being funded to be ready for demonstration and deployment beginning in 2025.

Q4. The recent National Coal Council report you requested on the state of DOE's Carbon Sequestration Program found that "funding for DOE programs is inconsistent with DOE goals," and that "DOE programs have been inadequately funded at levels that are insufficient to achieve the aggressive goals of the program."

They also found that "there is a policy mismatch between CCS technology funding and other DOE energy programs. Policy disparity is inhibiting the advancement of CCS technology deployment."

What is the DOE's response to these findings?

A4. The President's Clean Energy Plan adopts an "all of the above" strategy, of which coal and CCS is a part of the solution. In addition to the DOE budget, a variety of mechanisms beyond R&D cost sharing are being used to accelerate the development of CCS technology and support the goals of the program. The existing and newly proposed sequestration tax credits and paired investment tax credit aims to use Treasury authority to incentivize new CCS projects. Funding from the American Reinvestment and Recovery Act provided demonstration funds for early technologies, which will continue to pay dividends as the projects come online and system integration issues are evaluated. In addition, EPA's proposed regulation for new coal power units requires the installation of CCS, which would

provide certainty for new power projects, and a regulatory push for new technologies emerging in the power sector.

Beyond the investments in the United States, DOE also maintains the secretariat of the Carbon Sequestration Leadership Forum, aimed at advancing the state of CCS technology internationally.

Q5. We've got Boundary Dam, Kemper, Petra Nova. We're in the middle of that first wave of large-scale CCS deployments. This budget has some good things for advanced coal and fossil projects.

In your opinion, do the provisions in the budget – the CCUS Investment Tax Credit and sequestration tax credit, another loan guarantee solicitation - do these get us over the finish line into a place where we have commercially available CCS? What else is needed?

A5. CCS technology is available today and demonstration plants are being constructed and operated. However, lowering the cost of carbon capture and addressing key questions related to carbon storage warrant ongoing research and development; funding for both of these activities is included in the FY 2016 Budget. The budget request also proposes two new refundable tax credits, an investment tax credit and a CO_2 sequestration tax credit, that would help finance CCUS projects. Together, these activities may accelerate the commercial deployment of CCUS technologies.

Q6. Can you tell me how many coal-fired power plants would be eligible for the CCUS Investment Tax Credit? And how many would be eligible for the sequestration tax credit?

A6. The proposed CCUS tax credit program offers two credits which apply to new and retrofitted electric generating units (EGUs) that deploy carbon capture technologies: Investment Tax Credits (ITCs) for eligible carbon capture property and Sequestration Tax Credits (STCs) for investments resulting in the permanent storage of carbon dioxide. While there is no minimum megawatt (MW) size for new EGU's, the ITC limits applicability to

only those retrofit units with a capacity greater than 250 MW. Although the ITCs and STCs are not directly linked, projects that are eligible for the ITCs can also apply for the STCs. There are 269 GW of coal capacity operating in the U.S. today at units that are larger than 250 MW. This is approximately 82% of the total coal fleet in the U.S. The sequestration tax credit is open to all coal-fired power plants, as well as other emissions sources, under the stipulation that 70% of the credits go toward investments that utilize more than 75% coal.

Q7. As you know, a recently created commission is currently working to examine missions and effectiveness of the DOE National Laboratories, including the National Energy Technology Laboratory (NETL) in West Virginia. As Secretary of Energy, do you pledge to work with my office and this committee to ensure that the NETL mission and the NETL employees are fully supported and to keep us informed about any changes suggested by the Commission or DOE that would impact NETL programs and employees?

A7. The Commission to Review the Effectiveness of the National Energy Laboratories has conducted six open public meetings as of February 24, 2015. Current plans include monthly meetings continuing through July 2015. In addition, Commission members have visited a number of the National Energy Laboratories, including the National Energy Technology Laboratory (NETL).

The Commission issued its Interim Report on February 27, 2015. The Interim Report contains the preliminary observations and recommendations gleaned from Phase 1 of the study, which consisted of a literature review; visits to five of the National Laboratories; semi-structured interviews with staff from across the National Laboratories, DOE, other Federal agencies, companies, other non-governmental organizations, and additional interested parties; and presentations at monthly public Commission meetings.

As Secretary of Energy, I will continue to ensure that this Commission process is fully transparent and that each of the National Laboratories, including NETL, is fully represented and supported. My office will continue to maintain an open line of communication with your office.

QUESTIONS FROM SENATOR PORTMAN

Q1. Based on the Administration's budget submission, it is clear that you continue to support development and deployment of U.S. uranium enrichment technology, and specifically the American Centrifuge technology. Can you provide your views on the importance of maintaining this current domestic centrifuge capability and your perspective on the attributes necessary to justify further development and deployment of an American uranium enrichment technology?

A1. The Department is responsible for a number of national security missions that require a reliable supply of enriched uranium in varying assays and forms. This includes low-enriched uranium for commercial light water reactors involved in tritium production, and highly enriched uranium for naval propulsion. The Department needs an enrichment capacity using U.S.-origin technology because enrichment facilities using foreign technology, even if they are located in the U.S., produce uranium that carries peaceful use assurances that render the material unavailable to be used for such defense purposes. The Department has taken interim measures to maintain the current centrifuge capability at the American Centrifuge Plant in Piketon, Ohio in warm standby while the detailed analysis requested by the Congress is performed.

Q2. Can you explain how this technology can help meet national security needs, support U.S. energy security, and maintain help maintain U.S. leadership in nonproliferation.

A2. An enrichment capability based on U.S. technology would meet national security missions that require unobligated low-enriched uranium for commercial light water reactors involved in tritium production, and eventually highly enriched uranium for naval propulsion. Development of an enrichment capability based on U.S. technology and its associated knowledge base and supply chain would allow the U.S. to better detect, deter, and assess potential proliferation of new uranium enrichment programs around the world

and to maintain global leadership in the effort to minimize the spread of enrichment technology.

Q3. Can you confirm it is your understanding that the United States will need additional enriched uranium in the future and that American domestic enrichment technology is required for future U.S. national security purposes?

A3. Yes, the U.S. will need an enrichment capability based on U.S. technology to provide enriched uranium for several national security purposes including unobligated low-enriched uranium for commercial light water reactors involved in tritium production, and eventually highly enriched uranium for naval propulsion.

Q4. What is the status of DOE's report on tritum requirements? Is it still on track to be completed in April and Will you provide my office a copy of the report once completed?

A4. The Department is required to produce a report that includes an accounting of the current and future availability of low-enriched uranium, highly-enriched uranium, and tritium to meet defense needs as well as a cost-benefit analysis of uranium enrichment technology options available to supply enriched uranium for defense purposes, including a preliminary cost and schedule estimate to build a national security train. The Department intends to complete the reports in the requested time frame and will provide a copy to your office.

Q5. Besides preserving the American Centrifuge Project, what other opportunities for improving the front-end of the fuel cycle are being pursued and funded in the FY2016 budget request?

A5. In FY 2016, the Office of Nuclear Energy (NE) will continue to support long-term, "game-changing" R&D activities as part of the Fuel Cycle R&D Program. Specifically, NE supports technology development to enable recovery of uranium from seawater. The

main objective is to explore alternative uranium resources as extracted from seawater, which essentially holds unlimited supply of uranium. Success of the project will ultimately set a potential price cap of the uranium resource and minimize its price volatility. In addition to uranium from seawater in the Fuel Cycle R&D program, the Department has included front-end nuclear fuel cycle technologies in the definition of advanced nuclear facilities in the recent solicitation for $12.6 billion in loan guarantees available for advanced nuclear energy projects. Of the $12.6 billion, $2 billion is available exclusively for front-end projects. This could include uranium conversion or enrichment, as well as nuclear fuel fabrication.

Q6. What is your estimate of the future costs to complete the clean-up of the cold-war legacy at all DOE sites, and what is your error band on the cost and schedule to complete the job?

A6. The Department has been pleased to provide your staff members with this information. We will continue to keep you informed of any new developments on this issue.

Q7. What factors contribute to cost and schedule uncertainty, and what can Congress do to decrease this uncertainty?

A7. The Department has been pleased to discuss this issue with your staff members. We will continue to keep you informed of any new developments on this issue.

Q8. During his 2008 Presidential campaign, candidate Barack Obama committed to working: "with Congress to provide adequate funding to commence decontamination and decommissioning activities of those facilities [at DOE's Portsmouth Gaseous Diffusion Plant] which are no longer needed, and to maximize the employment of site workers to achieve this end"

In 2009, Secretary Chu made a high-profile announcement that DOE would accelerate work at the site and complete the clean-up by 2024. Last summer, DOE unexpectedly announced that a funding gap of $110 million dollars would force lay-offs of up to 700 workers before Christmas. Subsequently, Congress augmented project funding to

stabilize and continue the clean-up through the end of this fiscal year.

The President's FY 2016 budget request for the Portsmouth cleanup is nearly $49 million below the FY 2015 appropriation; will you confirm the Administration's commitment to complete the clean-up of the Portsmouth GDP site by 2024?

A8. The goal of 2024 is not achievable. The Department's schedule range for completing cleanup of the site is 2044-2052 reflecting 50 percent and 80 percent confidence levels, respectively.

Q9. Will this budget request without augmentation facilitate completing the clean-up of the Portsmouth GDP site by 2024?

A9. The goal of completing cleanup of the site by 2024 is not achievable. The Department's schedule range for completing cleanup of the site is 2044-2052 reflecting 50 percent and 80 percent confidence levels, respectively.

Q10. Given the enormity of the remaining Environmental Management task and the cost being passed on to future generations, I am struck by the fact that the President's budget request for the environmental management program is $42 million below that enacted by the Congress for FY 2015. This is particularly troubling, given that DOE - as an agency - is requesting $2,500 million more that it received in FY2015.

And, EM's budget request is $151 million less than last year at the former government gaseous diffusions plants being deactivated and decommissioned in Oak Ridge, TN, Paducah, KY, and Portsmouth, OH. Despite many years of effort and much that has been remediated, a huge amount of work remains undone at each of those sites.

At the Oak Ridge East Tennessee Technology Park they are just beginning the demolition of the enormous K-27 and K-31 buildings, they have yet to begin D&D of half century old facilities at Y-12, much work remains to be done to finally resolve U233 disposition at ORNL's building 3019, and construction of the sludge processing facility will begin when technology maturation and design is completed. Yet the clean-up budget request is 15.2% less than FY 15.

At Paducah, KY, the government recently re-assumed responsibility for all the facilities formerly leased, operated and maintained by the former-USEC Corporation and EM is beginning preparations for site remediation. But despite the expanded government role and responsibility, the clean-up budget request is 14% less than FY15.

And at Portsmouth, in addition to continuing the on-going D&D work, design and construction of an on-site landfill must be funded. It appears obvious that under the proposed budget, work scope must be reduced if the 17.6% decrease is enacted.

Deactivation of the former government uranium enrichment plants began in Oak Ridge in 1987, in Portsmouth a decade ago, and just recently in Paducah. An opportunity to complete the D&D of one site at a time has been missed. Instead, the government finds itself responsible for all the overhead of the three combined sites and unable to divest itself of these fixed costs in the near term.

In September of 2013, I requested the plan for waste disposal and building demolition at the Portsmouth GDP that we had been told was completed in 2012. We were subsequently told that the plan would be finalized in September, 2014. We have not yet seen the plan.

Environmental clean-up and restoration work is critically important to Southern Ohio, and merits your attention to ensure financial stability, fulfill the federal obligation to the community, and sustain productivity at the Portsmouth GDP site.

Will you commit to providing me with a comprehensive management plan for completing D&D at the Portsmouth site by 2024?

A10. The goal of completing cleanup of the site by 2024 is not achievable. The Department's schedule range for completing cleanup of the site is 2044-2052 reflecting 50 percent and 80 percent confidence levels, respectively.

Q11. Will you commit to providing this Committee with an integrated plan for completing D&D at all three DOE GDP sites?

A11. Although the three sites are similar, they are also unique in many ways. Funding is not shared among the sites and cleanup is performed under separate regulatory requirements. For these reasons, an integrated technical plan for D&D completion at the three sites does not make operational or financial sense. Integrated financial information for the three gaseous diffusion plants is provided in DOE's Tri-Annual D&D Fund Report and through the annual budget request process. The Department will continue to integrate lessons

learned among the sites, particularly as work at the Oak Ridge site is completed, followed by the Portsmouth site, and the Paducah site, respectively.

Q12. As you know the costs of cleaning-up the site of the former Portsmouth Gaseous Diffusion Plant in Ohio's Pike County have been significant and the bartering of uranium from the DOE stockpile has been critical to keep that project alive. DOE's uranium barter program enables us to ensure that there's adequate funding for demolition and waste disposal, which will save the taxpayers money over time. We also, I think, need to be clear that this directly offsets an equal amount of tax payer funds that would otherwise be used. I want to clarify in the record that the barter agreement, which I support, is critical to our clean-up efforts in Pike, Ohio at the Portsmouth Gaseous Diffusion Plant.

Do you intend to continue the uranium barter program to subsidize the Portsmouth GDP clean-up funding, understanding that the stockpiles are limited?

A12. Yes.

Q13. How much uranium is left in the stockpile?

A13. The Department has been pleased to provide your staff members with this information.

We will continue to keep you informed of any new developments on this issue.

Q14. The Ohio delegation has previously requested that DOE open an office in Piketon charged with managing the site clean-up effort. Management is currently done from the Portsmouth – Paducah Project Office (PPPO) in Lexington, Kentucky Office, which is located mid-way between the Kentucky and Ohio facilities. Much has changed since the PPPO was opened in January 2004. The majority of the DOE site was returned from USEC management to DOE control, the DUF6 plant was built and began operations, and DOE has taken over management of the Gas Centrifuge Project & Facilities. Achieving the management goal of accelerating the site cleanup at Portsmouth, eliminating potential environmental threats, reducing life-cycle costs, and facilitating re-industrialization requires close oversight of the contractors and frequent and routine interactions with the community.

Will DOE strengthen its presence in the community and at the Portsmouth site by opening a Piketon Office?

A14. The Department does not plan to open a Piketon Office. DOE has a well-staffed office located on the Portsmouth site.

Q15. The DOE-recognized Community Reuse Organization, SODI (Southern Ohio Diversification Initiative) has an existing agreement with DOE to reuse or recycle assets from the Portsmouth site. As a result, DOE has received millions of dollars from the proceeds and has awarded $600,000 in grants for economic development projects. In 2009 DOE included Community Investment Provisions in the PORTS D&D Request for Proposals (RFP) and the resulting contract.

Will Community Investment Provisions equivalent to those in the 2009 PORTS D&D RFP, be included in future RFPs and contracts for Infrastructure & Site Services, DUF6 Operations, and extensions for the D&D contract at Portsmouth? Please explain your response.

A15. The Department has been pleased to provide your staff members with this information.

We will continue to keep you informed of any new developments on this issue.

Q16. Will the selection criteria for future contracts credit the use of local contractors and venders, and preference for local businesses? Please explain your response.

A16. Current and future procurements use selection criteria consistent with the Federal Acquisition Regulations. It is important that the selection criteria limiting competition to local contractors and vendors or preference for local businesses not violate the Competition in Contracting Act of 1984 that requires full and open competition for prime contract awards.

Q17. Will DOE include award fee incentives for contractor execution of Re-industrialization and Asset Recovery programs in future Requests for Proposals, contract awards and contract extensions at PORTS? Please explain your response.

A17. It is DOE's intent to continue to work with its community reuse organizations, including SODI, in the future as cleanup work makes more assets available. DOE's expectations regarding recycling/reuse of DOE assets under its contracts are put in procurement requests with language that evolves over time. Any future procurement request will include language developed by DOE, consistent with DOE policy and the federal and

Department of Energy Acquisition Regulation for all procurements at the time and as appropriate for the services being provided under the contract. DOE procurements are routinely sent out in draft for comment and we will welcome any community input at that time.

Q18. Will a portion of the proceeds from reuse and recycle of Portsmouth assets be reinvested in SODI to continue the Re-industrialization and Asset Recovery Program? Please explain your response.

A18. Yes, it is DOE's intent to continue to work with its community reuse organizations, including SODI, as cleanup work makes more assets available. Per the existing DOE/SODI Asset Transition Agreement, DOE provides excess property to SODI that is eligible for transfer and economically viable to recycle or reuse. A portion of the proceeds from the sale of the property is retained by SODI for community reinvestment. To date, DOE has transferred property to SODI with a value of approximately $4.5 million, with SODI retaining approximately $2.2 million.

Q19. Southern Ohio and Pike County in particular, represents a low-income population that leads the State of Ohio in unemployment, and that carries the federal Appalachian Regional Commission designation of "distressed county." In 2008, DOE's Office of Environmental Management organized the Portsmouth Site Specific Advisory Board (SSAB). The SSAB has made a number of recommendations regarding employment continuity, regional purchasing, community support, and education outreach. With only 14% of Pike County residents pursuing higher degrees, mostly due to financial concerns, education investments related to, or as part of the on-going work at the Portsmouth site could, for example, provide a stimulus for future economic development.

How have the recommendations made by the Portsmouth SSAB been incorporated into DOE's planning and work scope?

A19. Recommendations from the Portsmouth SSAB have been routinely helpful in DOE's decision making at the site. Perhaps the most significant example is reflected in the SSAB and DOE lengthy and detailed discussions on the waste management Remedial

Investigation and Feasibility Study (RI/FS) that is expected to result in a Record of Decision later this year. SSAB comments provided input that was used to augment the final language that was developed by the site.

In addition, in January 2009, the Portsmouth SSAB passed Recommendation 09-01, which requested community investment provisions in the Portsmouth D&D contract. The Board specifically outlined employment continuity, a regional purchasing program, community support and educational outreach. Since 2011, DOE prime contractors have procured more than $250 million in local goods and services and distributed more than $3 million to local economic development projects and charitable organizations. Site contractors have also awarded more than 50 scholarships to local high school students and more than 100 internships to assist local college students.

DOE also has an educational outreach program, including the Science Alliance – a three-day, interactive science fair in Piketon, Ohio that brings about 1,200 students and educators on-site for STEM-related demonstrations. In 2013, DOE also established a regional Science Bowl at Portsmouth, which is part of the nationwide academic competition, with the winning team traveling to Washington DC. The SSAB participated in both the Science Alliance and Science Bowl. In addition, DOE partners with Ohio University on a program that has local high school students summarize the site's Annual Site Environmental Report (ASER). Site representatives routinely visit local high schools for various presentations related to site history, current activities and potential careers.

Q20. Since 1998, when the government's uranium enrichment enterprise was privatized, the law has authorized DOE to accept for disposal the depleted uranium by-product, (a.k.a. tails) and low-level radioactive waste from any NRC licensed uranium enrichment facility. Under the current law, if the service is requested, the NRC licensee shall reimburse the Secretary "in an amount equal to the Secretary's costs, including a pro rata share of any capital costs."

Prior to DOE constructing the Portsmouth and Paducah conversion facilities, tails were stored at the three government enrichment sites. This resulted in the accumulation of approximately 750,000 metric tons of tails. That government inventory is currently being processed for disposal at the two DOE conversion plants, and will take about twenty years to complete. After disposing of the government inventory, the facilities will be decommissioned and the workers will have to find other employment.

At NRC commercial licensed sites, licensees may elect to store the depleted uranium by-product on their sites, but are required by regulation to set aside adequate funds for its eventual disposal. There are no commercial disposal facilities in the United States that compete for this work; however, there is one facility under construction in Europe to manage the European tails inventory.

As USEC ceased commercial enrichment operations, the Department accepted the transfer of accumulated USEC tails as provided by law. Currently, the only uranium enrichment plant operating commercially in the United States is the Urenco USA Plant in Eunice, NM. Its NRC licensed, like that of the paused American Centrifuge Project, and any future license applicants, requires the set aside of funds to dispose of tails. That is to say, that the disposal of commercial tails has already been paid for by the consumer, even though it has not yet taken place.

Other than the transfer from USEC, have any other NRC licensees elected to enter into an agreement with DOE for tails disposal services?

A20. No commercial enrichment entity, including USEC, has as yet requested DOE to take its depleted uranium tails as low-level waste under the applicable provision of the USEC Privatization Act.

Q21. If all NRC licensed U.S. commercial uranium enrichment plants sent their depleted uranium tails to be processed at DOE facilities, how much would the annual cost to the government of operating those DOE facilities be reduced?

A21. Additional material from commercial enrichment facilities would extend the operational period of conversion at the Depleted Uranium Hexafluoride (DUF6) facilities, but not reduce the facilities' annual operating cost.

Q22. Given that the government has the only disposal facilities, does it make sense to allow the accumulation of tails inventories on site at commercial facilities?

A22. Use of DOE's uranium conversion facilities for disposal of depleted uranium tails that have been declared low-level waste is an option for commercial enrichment entities, to be exercised at their discretion. DOE is not the only avenue for Depleted Uranium Hexafluoride (DUF6) converted product (oxide) disposal. There is one commercial waste disposal facility licensed for disposal of this waste, and another commercial facility is in the license amendment phase. Hence, accumulation and storage of tails at commercial facilities is a decision to be made by commercial enrichment entities on a case-by-case basis, considering site-specific packaging, transportation, storage, disposal and other costs and considerations.

Q23. What is the current balance in the government's Uranium Enrichment Decontamination and Decommissioning Fund; and what is the projected deficit in the obligation to complete the environmental restoration at each of the three former federal gaseous diffusion plant sites?

A23. The Department has been pleased to provide your staff members with this information. We will continue to keep you informed of any new developments on this issue.

Q24. The House recently passed HR 35, the *Low Dose Radiation Research Act* of 2015. In his remarks to the House, Congressman Smith of Texas said

"The Department of Energy's Low Dose Radiation Research Program within the Office of Science focuses on the health effects of ionizing radiation and helps to resolve the uncertainties in this area that currently exist. Unfortunately, this program has not been a priority at DOE over recent years and has seen systematic de-emphasis."

That proposal directs DOE to determine where uncertainty exists, and if appropriate, recommend the extent of future research necessary so that radiation exposure standards accurately reflect the health hazard.

Why has DOE de-emphasized low-dose radiation research, and what is DOE's plan for future Low Dose Radiation Research?

A24. Over the past 17 years, the DOE low dose radiation research program has produced new knowledge on how cells respond to radiation. For example, the program has been instrumental in discovering DNA repair mechanisms as part of an adaptive response of cells to radiation exposure and bystander effects on neighboring cells exposed to radiation. Some of these molecular-level observations support the idea of a threshold level for radiation dose and all of the information from this research has been made available to the scientific community and the Federal and state regulatory agencies that have direct responsibility for assessing the human health effects of radiation exposure. However, these observations, while scientifically significant, have not extrapolated to effects on cancer risks in humans and therefore have not had any impact on radiation protection standards thus far.

As such, the Office of Science is prioritizing its efforts toward the basic science challenges needed to advance the Administration's emphasis on sustainable bioenergy development.

The National Academies are in the preliminary planning stages for their Biologic Effects of Ionizing Radiation (BEIR) VIII study. DOE looks forward to participating with the Academies on its study, and hopes that DOE's research to date on this topic is factored in as the Academies outline the state of the science, make recommendations for additional

research, and identify potential updates to the regulatory framework for human radiation protection standards.

Q25. The FY 2016 budget eliminates the university nuclear education program. Please explain the rationale for withdrawing federal support to university nuclear education programs?

A25. Since 2009, federal investments totaling $24 million have provided 278 annual undergraduate scholarships and 147 multi-year graduate fellowships to students engaged in nuclear energy-related fields of study. These investments, combined with other factors, have led to an approximate 200% increase in the enrollment of nuclear engineering students since 2001. While the Administration remains committed to continued federal investment in this area based on data that indicate approximately 38% of the nuclear energy workforce will be eligible to retire in the next five years, we believe there are other existing and more broadly applied programs that provide a means to advance the Administration's Science, Technology, Engineering, and Math (STEM) objectives. Also, as the nuclear industry expands, the Administration is confident that it will create the incentives necessary for students to enter nuclear-related programs.

Q26. What impact do you think this will have on a university's ability to recruit nuclear experts?

A26. We believe there will be no negative impact on the Nation's university nuclear engineering programs.

Q27. Are you concerned that defunding this program will cause harm to the nation's nuclear energy research and our nuclear energy workforce?

A27. As discussed in the Department's July 2014 Report to Congress, "Integrated University Program: Fiscal Year 2014 Nuclear Workforce Survey," the number of students pursuing degrees and certificates in nuclear energy-related disciplines at U.S. universities,

community colleges, and trade schools continues to increase and is currently at its highest level in decades. While concern remains, it appears that the nuclear energy workforce is more stable than it has been in several decades, and sufficient scientists, engineers, and technicians will continue to enter the nuclear energy workforce. This is due in part to existing efforts in both the civilian and government sectors to establish effective programs and incentives, as well as market forces that drive interest in the field.

Q28. In July, 2000, the Secretary of Energy imposed an agency-wide suspension on the unrestricted release for recycling of scrap metal originating from DOE radiological areas. In 2001, DOE estimated that the inventory of surplus metals was expected to total more than a million tons over the next 35 years, of which a significant fraction would have no residual radioactivity and as much as 50% could be recycled economically.

More than half the forecast DOE scrap metal, including almost all of the scrap nickel, would result from the D&D of the Gaseous Diffusion Plants in Ohio, Kentucky and Tennessee. Between 2001 and 2015 the average annual generation rates were predicted to be 50,000 tons per year of carbon steel, 4,000 tons per year of stainless steel, and 3,000 tons per year of nickel.

In 2011, the Department issued a draft Programmatic Environmental Assessment (PEA) to consider disposition alternatives. Contaminated nickel and other materials were not included in the PEA. The PEA's "proposed action" was to modify the suspension policy to allow for the recycle of uncontaminated scrap metal originating in DOE radiological areas, but only if cleared by the relevant Under Secretary.

What action has been taken by DOE since issuing the 2011 PEA on Recycle of DOE Scrap Metals?

A28. The Programmatic Environmental Assessment has not been finalized and the suspension remains in effect.

Q29. How much scrap metal subject to the original agency-wide suspension is currently being stored by the Department?

A29. At present the total is less than 10,000 tons from routine activities, e.g., operation and maintenance, etc. The quantity is down from what was reported in the 2011

Programmatic Environmental Assessment due to disposal of some of the backlog by the sites as waste.

Q30. To what extent is the agency-wide suspension that began in 2000 still in effect?

A30. The agency-wide suspension on the release of scrap metals from radiological areas remains in full effect.

Q31. What is the Department's Plan for the volumetrically contaminated nickel and the surface contaminated scrap at Oak Ridge, Portsmouth and Paducah?

A31. The Department's January 12, 2000 Moratorium on the release of volumetrically-contaminated DOE nickel remains in effect. DOE continues to evaluate the feasibility of the technologies to decontaminate the nickel as well as the commercial demand for nickel. Recently, the Portsmouth site successfully completed a bench-scale test to evaluate the use of carbonyl technology to decontaminate the nickel. The Department will continue to investigate appropriate markets and environmentally safe technologies for this material. Any path forward will be in accordance with all necessary environmental and regulatory requirements.

Q32. Last Fall, the New Mexico Environment Department issued compliance orders penalizing the U.S. Department of Energy over $50 million related to 37 violations in the handling of radioactive waste at the Waste Isolation Pilot Plant and the Los Alamos National Laboratory.

In Jan, DOE agreed to pay the Environmental Protection Agency $44,722 for alleged violations of radioactive and hazardous chemical waste storage requirements at Hanford. The penalty follows $136,000 DOE agreed to pay in 2013, also related to storing radioactive and hazardous chemical waste at Hanford.

And recently, the state of Idaho announced plans to fine the federal government $3,600 a day, increasing to $6,000/day by July 1, 2015. The Idaho Department of Environmental Quality said it rejected a request for another extension from the U.S. Department of

Energy to go past the Dec. 31 deadline to remove the radioactive waste at the Idaho National Laboratory.

DOE has entered into a number of Court approved "consent agreements" with the states and with EPA, setting milestones for environmental clean-up at DOE sites. They generally include significant legal and equitable remedies and the consent agreements generally state that they are "subject to the availability of appropriations provided in advance for this purpose."

A32. N/A

Q33. How has the Department accounted for these potential fines and penalties in the FY 2016 budget request?

A33. Under Section 301(d) of DOE's current appropriation, amounts paid to regulators would be paid out of the appropriate sub-line, which is the legal control for purpose availability.

Q34. What is the potential total annual liability related to the legal and equitable remedies to which the Department has agreed in federal facility agreements and consent orders under the Hazardous Waste Management Act?

A34. Since the potential amount of annual liability is dependent on the precise violation, the state law pursuant to which the fine or penalty is imposed, and the individual state penalty policies, the Department cannot provide a reliable answer to this question.

Q35. Using clean-up program appropriations to pay fines and penalties is counter-productive to the intended objectives, so what are the alternative sources for funds to pay fines and penalties when the Department defaults on its agreements?

A35. The only source of funding available to the Office of Environmental Management is the money appropriated from Congress for cleanup work.

Q36. During your confirmation hearing I expressed my concern with the perception that DOE's Advanced Manufacturing Office was drifting away from its traditional focus of energy efficiency and technology deployment. You said at the time, that it was important that the department support innovation and cost reductions in manufacturing processes, and it should with energy intense industries to understand the roadmaps for improving efficiency, saving money, and helping them to become more competitive as a result.

Do you still believe that the Department has an important role in developing manufacturing process innovation and is the Office of Advanced Manufacturing properly focused on that objective?

A36. Yes, the Department of Energy's Advanced Manufacturing Office (AMO) plays an important role in developing and demonstrating new, energy-efficient processing and materials technologies at a scale adequate to prove their value to manufacturers and spur private investment. AMO partners with industry, small business, universities, and other stakeholders to advance high-impact technologies for energy efficiency in the manufacturing sector, as well as develop foundational, cross-cutting manufacturing technologies, including the manufacturing of materials, that are critical to efficient and competitive domestic manufacturing of clean energy products. AMO addresses these clean energy manufacturing objectives using three primary modalities of support: research and development of early stage manufacturing technologies through the support of individual R&D projects, pre-commercial technology development through facilities and manufacturing consortia, and technology assistance through manufacturing partnership participation, assessment and evaluation tools.

Q37. Mr. Secretary, last week your department made the decision to suspend the FutureGen 2.0 project, slated to be built in central Illinois. FutureGen 2.0 was an advanced coal technology project that received substantial support not only from the federal government, but also from the state of Illinois and companies with a vested interest in the next generation of clean coal power plants.

How do you reconcile ending this project just one day after President Obama requested millions of dollars for carbon capture and storage projects in his FY 2016 budget?

A37. The Department of Energy has worked diligently over the last six years to make this project a success. The Department believes strongly in the importance of oxycombustion technology and, accordingly, has worked closely with Congress and a number of non-federal partners to advance this priority despite setbacks.

However, in light of a number of challenges to the project, including the lack of private financing and other hurdles, the Department no longer felt that the FutureGen Alliance had the ability to spend the funds appropriated by the American Recovery and Reinvestment Act before the statutory deadline of September 30, 2015. Absent an extension of that deadline by Congress, and in order to best protect those taxpayer funds, the Department has notified the FutureGen Alliance that Federal support is no longer available for construction activities at this time. Accordingly, we have initiated a structured closeout of Federal support for the project that will help maximize the value of investments to date while minimizing ongoing risks and further costs.

The unfortunate outcome on this project does not detract from the continued importance of developing and demonstrating carbon capture and storage (CCS) technologies. The Administration has made unprecedented investments in clean coal technologies, and the Department remains committed to advancing widespread deployment of CCS.

Q38. The Administration had initially committed $1 billion in Stimulus funding for the project. How much of those funds were actually expended?

A38. $1.049 billion has been obligated to the FutureGen 2.0 project. Of those funds, approximately $793 million are expected to be returned to Treasury.

Q39. What did the American tax payer get out of the FutureGen 2.0 investment?

A39. The Department acquired valuable information from the work accomplished to date. These include the first ever draft Federal permit for long-term, large-scale CO2 injection, completion of test and monitoring wells, advanced modeling, extensive geologic characterization of a major saline aquifer reservoir, and engineering and integration

designs for large-scale deployment of advanced oxy-combustion carbon capture technologies. This progress will continue to benefit our broad clean coal portfolio, helping to further the deployment of carbon capture and storage projects and the development of next-generation technologies.

Q40. To your knowledge, how many coal plants are there in the United States currently under construction in the planning stage?

A40. There are only a small handful of coal fired plants currently either under construction or in the serious planning phase, i.e., those plants that have filed for an air permit.

Q41. How long do you think it will take to develop commercially viable CCS technology that can be installed on a new domestic coal plant?

A41. CCS technology is available today and demonstration plants are being constructed and operated. However, lowering the cost of carbon capture and addressing key questions related to carbon storage warrant ongoing research and development; funding for both of these activities is included in the FY 2016 Budget. The budget request also proposes two new refundable tax credits, an investment tax credit and a CO_2 sequestration tax credit, which would help finance carbon capture, utilization and sequestration (CCUS) projects. Together, these activities may accelerate the commercial deployment of CCUS technologies.

Q42. How long do you think it will take to develop commercially viable CCS technology that can be retrofitted onto an existing domestic coal plant?

A42. As with new plants, CCS technology for retrofits are available today and demonstration plants are being constructed and operated. Examples of such retrofits include the Boundary Dam project in Canada which is operational, and the Petra Nova WA Parish project in Texas that is under construction.

However, lowering the cost of carbon capture and addressing key questions related to carbon storage warrant ongoing research and development; funding for both of these activities is included in the FY 2016 Budget. The budget request also proposes two new refundable tax credits, an investment tax credit and a CO_2 sequestration tax credit that would help finance carbon capture, utilization and sequestration CCUS projects. Together, these activities may accelerate the commercial deployment of CCUS technologies and projects.

Q43. The Energy Policy Act of 2005 granted the Department of Energy the authority to issue up to $8 billion in loan guarantees for advanced fossil energy technologies including Carbon Capture and Sequestration. To date, the Department has not issued a single guarantee. Why?

A43. In September 2008, the Department of Energy issued a loan guarantee solicitation for coal-based power generation and industrial gasification facilities that incorporate carbon capture and sequestration and advanced coal gasification facilities (Solicitation Number: DE-FOA-0000008). The first date for Part I Applications under this solicitation was December 22, 2008. The Department also received applications for similar fossil energy projects under a prior loan guarantee solicitation issued in August 2006 (Solicitation Number: DE-PS01-06LG00001).

Overall, the Department of Energy's Loan Programs Office (LPO) received eleven applications for fossil energy projects through these two solicitations. Two projects are currently in due diligence, one is on hold at the request of the applicant, and the remainder either withdrew or were rejected for failing to meet the criteria of the Title XVII program. Many of these projects withdrew or chose not to proceed due to the

changing market economics associated with the dramatic reduction in natural gas prices over this time period.

In December 2013, the Department issued a solicitation for Advanced Fossil Energy Projects making up to $8 billion in loan guarantees available. The LPO is currently accepting and processing applications under this solicitation.

Q44. As part of the American Medical Isotopes Production Act of 2012, the Department of Energy was to develop a program to assist in the establishment of domestic production capabilities for medically-vital isotopes like molybdenum-99 (Mo-99). Mo-99 is used in nuclear medicine to perform life-saving procedures related to both heart disease and staging of cancer – two of the biggest killers in our country. One of the motivations behind this law was to address the fact that foreign production facilities that are scheduled to cease producing in 2016. With respect to that program:
Does the Department concur with NRC that "multiple global shortages of medical isotopes have underscored the need for prompt action to ensure a reliable domestic supply"?

A44. Yes. Beginning in 2009, the Department of Energy's National Nuclear Security Administration entered into cooperative agreements with domestic commercial entities to accelerate the development of a diverse set of technical pathways to produce molybdenum-99 (Mo-99) in the United States without the use of highly enriched uranium (HEU). These partnerships were initiated when the supply of Mo-99 was in a period of shortage due to extended, unexpected outages of two of the world's largest Mo-99 producers. These global shortages highlighted the need to develop new, replacement production capacity in the United States from sources that do not use HEU.

Q45. The predominant U.S. supplier of Mo-99 has announced it will cease isotope production in 2016. What is DOE doing to prevent a domestic shortage?

A45. The world's largest producer, located in Canada, is expected to cease regular production of molybdenum-99 (Mo-99) in October 2016. The Department of Energy/National

Nuclear Security Administration has been working since 2009 to encourage reliable supplies of this important medical isotope by (1) partnering with domestic commercial entities to accelerate the establishment of reliable supplies of Mo-99 produced without highly enriched uranium before the Canadian producer ceases production in 2016, (2) working with the Organization for Economic Cooperation and Development's Nuclear Energy Agency's (OECD-NEA) High-Level Group on the Security of Supply of Medical Radioisotopes to develop policy guidelines designed to encourage reliable, commercial supplies of Mo-99 for the long-term, and (3) regularly engaging with government, industry, and medical community stakeholders to foster critical information-sharing about the current and long-term supply expectations. According to supply projections published by the OECD-NEA in 2014, global demand for Mo-99 can be met by the other global producers after the Canadian supply ceases in 2016. However, if any unexpected outages of the other facilities occur after 2016 and before sufficient replacement capacity is established, shortages may result. For this reason, it remains crucial that new replacement Mo-99 production capabilities are realized in the shortest timeframe possible. One of NNSA's commercial partners, NorthStar Medical Radioisotopes, is currently scheduled to begin production of Mo-99 by October 2016, pending regulatory approval from the U.S. Food and Drug Administration. NNSA's other commercial partner, SHINE Medical Technologies, is continuing to develop new production in the shortest timeframe technically and economically possible. In addition, other commercial entities in the United States and around the world are also working to develop new and expanded Mo-99 production capacity.

On February 6, 2015, the Government of Canada issued an announcement confirming that the National Research Universal (NRU) reactor will cease regular Mo-99 production in October 2016, and will seek regulatory approval to keep the NRU operational until March 31, 2018 for its other scientific missions, and to produce Mo-99 in emergency conditions where shortages cannot be mitigated by any other means. While Canada maintains that new, replacement capacity is necessary to ensure long-term reliability of supply, emergency production from Canada is expected to be a last-resort option to ensure patient needs can be met and the global medical community will not suffer shortages of this important medical isotope.

Q46. In December of last year, the Department of Energy released its solicitation for the Advanced Nuclear Energy Loan Guarantee program. That program was authorized by Title XVII of the Energy Policy Act of 2005. Would medical isotope production facilities be eligible to apply for a loan guarantee through this program?

A46. The Advanced Nuclear Energy Projects Loan Guarantee solicitation makes up to $12.5 billion in loan guarantees available to support eligible projects. DOE's authority to issue this amount of loan guarantees was provided by the Omnibus Appropriations Act, 2009, P.L. 111-8, as amended by Section 408 of the Supplemental Appropriations Act, 2009, P.L. No. 111-32. This authority provides $2,000,000,000 in loan guarantee authority available exclusively for advanced nuclear facilities for the "front-end" of the nuclear fuel cycle and the remaining $10,500,000,000 is available for nuclear power facilities. Given this statutory authority, medical isotope production facilities are not eligible to receive a loan guarantee since they are neither nuclear power facilities nor front-end facilities producing nuclear fuel.

Q47. With the growing reserves of natural gas, and the move to natural gas as a fuel for electric power generation, how is natural gas utilization being addressed to ensure lowest cost and highest efficiency electric power generation?

A47. Natural gas utilization is addressed in three different ways. First, in traditional regulated states, there is state regulatory oversight to assure that the utilities charge only "just and reasonable" rates, and this generally involves review of procurement decisions and generation costs. In these states, other factors, such as fuel supply diversity and gas market diversity for fuel procurement, may also be taken into account by the utilities and regulators. In such instances, utilities would be taking non-monetary direction from regulators seeking to lower risks through fuel diversity and to enhance marketplace access for diverse business suppliers. Second, in the organized markets (i.e., RTO/ISOs), the market system selects bids based on prices offered and works to minimize costs. Gas-fired generation wins when the marginal costs are low enough to underbid competing generation facilities. Third, in both systems, merchant power generators may participate. They are driven by efforts to minimize costs, within the constraints of the generation facilities that they own. Gas utilization is thus a function of fleets and prices.

The Department of Energy does not have a role in this domain, as natural gas utilization is not managed at the federal level.

Q48. One of the strategic focus areas of the administration is natural gas, what consideration has been given to accelerate the application of technology developed in the Solid State Energy Conversion Alliance (SECA) program for highly efficient electric power generation directly from natural gas?

A48. The purpose of the Department of Energy's Office of Fossil Energy (FE) Solid Oxide Fuel Cell program is to develop low-cost, high-performance, reliable and robust fuel cell technology suitable for coal and natural gas-fueled central station power generation

applications.

The program fully believes that natural gas is an important fuel for developing this technology and will provide both economic and environmental benefits as a natural gas fueled system. In fact, this year FE is seeking through a Funding Opportunity Announcement (FOA) the installation of two greater than 400kW Prototype Systems that operate on natural gas. This pilot demonstration will lead to greater acceptance of solid oxide fuel cell technology in the marketplace for central power generation.

Q49. Does DOE see a relationship between near-term natural gas application of SECA technology for distributed generation and the long-term goal of central power generation with gasified coal?

A49. Yes, The Office of Fossil Energy believes that an attractive pathway to deployment of stationary fuel cells fueled by gasified coal is through the near-term market opportunities in distributed generation but the program's long-term focus is on coal or natural gas fueled central generation that can be integrated with carbon capture and storage.

Q50. Please provide a list of all of the workforce development programs operated by the Department. I consider a workforce development program to be a program or grant, the primary function of which is to do one of the following: trains or supports undergraduates, graduate students, and postdoctoral research; helps the private sector gain access to skilled workers; assists in worker retraining; and, improves the quality of our nation's workforce. Please reference any authorities that DOE utilizes to carry out each of the programs listed, and provide an account of how much DOE spent on each program for the last five fiscal years.

A50. The Department is in the process of capturing and reporting education and workforce training activities contained in its FY 2016 congressional budget justification documents, as well as the activities funded in the requested prior fiscal years. The Department will transmit the full list to the Committee as soon as possible.

Q51. I recently introduced bipartisan legislation that seeks to streamline the process of federal permitting through establishing a Federal Chief Permitting Officer to oversee permitting processes, designation of a lead agency to coordinate and ensure timely and concurrent reviews, and implementation of an online dashboard by which the public can hold agencies accountable for meeting deadlines, among other provisions.

What permitting reforms do you believe are most necessary in the energy arena, especially relating to CCS and LNG, to ensure that contemplated projects receive thorough review but are not needlessly delayed due to bureaucratic red tape?

A51. DOE supports the broad permitting reforms that the Administration launched in a 2011 Presidential Memorandum focused on improving the efficiency and transparency of federal permitting and review processes for infrastructure projects. Following the 2011 Presidential Memorandum, on March 22, 2012, the President issued Executive Order 13604 on "Improving the Performance of Federal Permitting and Review of Infrastructure Projects," including pipelines, renewable energy, and electric transmission lines. The President then issued a related Presidential Memorandum on May 17, 2013, directing an Interagency Steering Committee, of which DOE is a member, to develop an implementation plan for modernizing infrastructure permitting regulations and institutionalizing best practices. Finally, the President issued a June 2013 Presidential Memorandum on "Improving Permitting and Review of Electric Transmission Projects" (Transmission Memorandum). The implementation plan for the May 2013 Presidential Memorandum (called "Implementation Plan for the Presidential Memorandum on Modernizing Infrastructure Permitting") was released in May 2014. The plan calls for permitting reforms applicable to energy projects that focus on streamlining federal permitting and review while protecting the environment. DOE supports the reforms called for in the implementation plan, in particular:

- establishing an interagency center to implement the reforms;

- developing a policy for coordinated project review, which would designate a lead agency to coordinate and ensure timely and concurrent review, to enforce agreed-upon schedules, and to resolve disputes; and
- making available cost recovery authority so agencies can coordinate with applicants/agencies early on, before a completed application is received.

DOE is developing an Integrated Interagency Pre-Application (IIP) Process, in accordance with the 2013 Transmission Memorandum, to institutionalize the strategies of interagency coordination, synchronize federal and state review processes, develop agreed-upon schedules for transmission projects requiring multiple authorizations, and determine best practices for early engagement and information exchange between transmission developers and permitting authorities, in order to avoid unnecessary delay. DOE has sought comment on the proposed IIP Process. In response to the feedback it received, DOE is currently revising the pending IIP Process and a proposed rule that would implement the IIP Process under 16 U.S.C. § 824p(h), in which Congress granted DOE authority to coordinate applicable federal authorizations and related environmental reviews for electric transmission projects. In addition, DOE is currently piloting the principles of early coordination, combined federal and state review, early outreach with tribes, early stakeholder engagement, and agreed-upon schedules that underlie the IIP Process with the proposed Great Northern Transmission Line. See: http://www.whitehouse.gov/the-press-office/2014/05/14/fact-sheet-building-21st-century-infrastructure-modernizing-infrastructu (accessed January 21, 2015).

With regard to liquefied natural gas (LNG) permitting, since receiving the first long-term application in 2010 to export LNG to non-free trade agreement (FTA) countries from the lower-48 states, DOE has been — and remains — committed to conducting a public interest determination process that is expeditious, judicious, and fair, as required by the Natural Gas Act. Throughout this time, the Department has consistently made clear that a close monitoring of market developments plays a critical role in the Department's decision-making process.

On August 15, 2014, DOE announced its final revised procedures for LNG export decisions. Since then, DOE has acted and will act on applications as they become ready for final agency action. An application is ready for final action when DOE: (1) has completed the pertinent NEPA review process, and (2) has sufficient information on which to base a public interest determination. By acting only on applications that are ready for final action, DOE has avoided devoting resources to applications that have little prospect of proceeding. These saved resources are being redirected to provide timely action on applications that are furthest along in the regulatory review process.

As of January 21, 2015, DOE has granted five final long-term authorizations to export lower-48 LNG to non-FTA countries in a total amount equivalent to 5.74 billion standard cubic feet per day of natural gas from four proposed liquefaction facilities. DOE has established a pattern of issuing final LNG decisions promptly after completion of the FERC regulatory process, when FERC has issued its order addressing (to date, denying) rehearing requests. Four of these long-term authorizations have been granted under the revised procedures over the past 4.5 months.

With respect to carbon capture and storage (CCS) permitting, a framework is now in place. Initially permits were delayed for a first-of-a-kind project due to lack of prior experience, inexperienced staff and specific implementation guidance to manage the reporting requirements. Assuming sufficient staff availability, future CCS permitting should proceed more expeditiously. DOE and EPA coordinate at the staff level regarding permit issues with the understanding that EPA has regulatory authority. The CCS Task Force Report of 2010 stated that there are no insurmountable legal or regulatory barriers to deployment, and recent regulations provide additional clarity for these projects.

Q52. The Department is requesting new funding in FY 2016 for a Transformer Resilience and Advanced Components (TRAC) program aimed at studying the physical stressors on transformers and other grid components. Can you please discuss how this program and funding fit into the Department's current resiliency efforts when it comes to large power transformers?

A52. As with other DOE activities such as Office of Electricity Delivery and Energy Reliability's (OE) microgrid and energy storage programs, the TRAC program and funding are aligned with the Department's current efforts to increase the resilience of the Nation's electric grid. TRAC efforts support a key element: innovation in key electrical equipment to improve the grid. OE is working with Power Marketing Administration partners and DOE's Office of Environment, Health, Safety, and Security to ensure adequate infrastructure protection, spare component capacity, and systems to manage risks. OE plans to conduct R&D into the next generation of electrical system components that are higher-performing and pose fewer risks.

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