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MONIZ NOMINATION

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

TO

CONSIDER THE NOMINATION OF DR. ERNEST MONIZ TO BE THE SECRETARY OF ENERGY

APRIL 9, 2013

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MONIZ NOMINATION

TUESDAY, APRIL 9, 2013

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

The committee met, pursuant to notice, at 10:12 a.m. in room SD–366, Dirksen Senate Office Building, Hon. Ron Wyden, chairman, presiding.

OPENING STATEMENT OF HON. RON WYDEN, U.S. SENATOR FROM OREGON

The CHAIRMAN. The committee will come to order.

The committee meets this morning to consider the nomination of Dr. Ernest Moniz, to serve as Secretary of the Department of Energy. This job will put Dr. Moniz at the center of some of the most pressing issues facing the U.S. economy and environment, how to manage newly accessible reserves of natural gas, combating climate change, making our economy more efficient and supporting new energy technologies.

I believe our country needs energy that transitions America to a lower carbon economy and is built on 3 pillars: strong economic growth, reductions in greenhouse gas emissions, and energy innovation. It's no accident that the early focus of this committee's agenda centers squarely on those matters.

Our first hearing focused on natural gas.

Technological advances in recent years have allowed our country to tap into reserves of natural gas that were previously uneconomic. Now this resource has the potential to provide our country with a lasting economic advantage both for manufacturers, like steel companies, as well as families and businesses that can save on their power bills. These savings can make a real difference in today's tight budget climate.

Last week I visited Pilot Butte Middle School in Central Oregon which cut its energy bill by more than 35 percent in the past year due to lower natural gas prices. As the Washington Post reported just last week, European industry flocks to our country to take advantage of cheaper gas. That's just the latest in the wave of good news stories about natural gas.

At present the Energy Department faces crucial decisions about how much of that gas to export abroad. I intend and I know the committee will inquire into Dr. Moniz's views on his thoughts about how to preserve that advantage for American consumers and our businesses.

Just as important as economic benefits, natural gas also has the potential to bolster America's standing on the issue of climate. In fact the Energy Information Administration reported just last Friday that U.S. carbon emissions last year dropped to the lowest level since 1994, thanks largely to the rise of natural gas.

Now there's certainly questions about the climate impacts of methane leaks and flaring, among others, yet our policymakers can address these environmental issues responsibly. Natural gas can provide clean burning, base load power that emits 50 percent fewer greenhouse gases than traditional fossil fuels. Agreement among stakeholders on practical environmental protections can give certainty to natural gas producers and maximize the benefits of domestic shale gas.

That's the short term.

To make a larger impact in climate change our country needs more renewable power. Natural gas plants can serve as an ideal partner to intermittent renewables like solar and wind because they can come online and power down quickly. Our country needs to reduce our carbon footprint.

The draft U.S. National Climate Assessment, issued earlier this year, starkly lays out the impact the country can expect from a changing climate. In my part of the world, for example, the Pacific Ocean along the Oregon coast is projected to rise by two feet by 2100. But addressing climate is not just an issue of avoiding natural disasters. It's also critical to maintaining our Nation's competitive advantage in a tough global economy.

Today low-cost natural gas provides our Nation's economy with a competitive advantage. However, new technological breakthroughs could put our competitive advantage at risk in the foreseeable future. Congress, in writing the 2007 energy bill, did not anticipate the natural gas revolution. A lot of major industry figures didn't either.

The challenge now is to find policies that can spark a similar revolution in renewable energy. As a technological insurance policy it makes sense to pursue policies to transition to a lower carbon economy to ensure that we don't lose our competitiveness in the world. Only the Congress has the tools to address the global nature of this issue and pursue a solution that actually reduces domestic emissions while keeping our economy competitive. Renewables have to be part of that solution.

This month the committee is going to take up bills that encourage hydropower and geothermal which we would call the forgotten renewables. Every electron of renewable power on the grid represents points on the board against climate change. So our country does have the potential to maximize a variety of types of clean energy. We will also look at the implications of tax reform which can encourage renewables as well.

When it comes to clean energy, one big challenge Dr. Moniz will face as Secretary of Energy is dealing with the Department's loan programs. The bottom line is the taxpayers need more protections when it comes to Federal financing. It is also clear that there's a big difference between investing in a wind farm that has a customer and power purchase agreement on day one compared with

investing in a manufacturing plant to make a commercially untested product.

In a very important hearing that was chaired by Chairman Bingaman, we asked Herb Allison, the former Wall Street executive and Bush Administration official, who critiqued the loan program, whether or not the DOE loan program ought to be carved into separate financing programs based on financial and technical risk. Mr. Allison thought that idea made sense. We'll certainly be looking into that matter with Dr. Moniz as well.

The committee also plans to take up an efficiency bill, a bipartisan bill, crafted by Senators Shaheen and Portman, which could result in major energy savings. Those kinds of advances are often the lowest cost answer to energy.

Finally, any serious effort to build a lower carbon economy has to address the matter of nuclear energy. The questions have arisen about how to dispose of nuclear waste. This has raised important matters with respect to how to proceed on the issue.

That's why Senator Murkowski, along with Senators Feinstein, Alexander, and I, have been working for months now on a long-term answer to what is a decades-old problem. I'm hopeful we'll have a proposal in the coming weeks that builds on the work, that fine work, done by the previous chairman, Jeff Bingaman, and the President's Blue Ribbon Commission.

Finally, as Congress works to address nuclear waste from civilian reactors it's just as important that the Department take responsibility for the legacy of contaminated waste sites like Hanford. As the Defense Nuclear Facilities Board wrote in a letter last week, despite billions of dollars that have been spent to clean up the radioactive waste there, there are a host of unresolved issues.

The first one on the list was hydrogen build up that could cause explosions in waste tanks. This is an issue that this committee talked about in this very room 16 years ago. Dr. Moniz and I have had a number of conversations about this issue in the past. I think we've agreed we're going to have a lot more in the future.

It's flatly unacceptable that the Department still has no viable plan for cleaning up hazardous waste on the bank of the Columbia River half a century after the contamination occurred and more than a decade since Dr. Moniz served as Under Secretary of Energy.

So we look forward to discussing all of these issues and more.

Let me now recognize my friend and colleague, Senator Murkowski.

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

Senator MURKOWSKI. Thank you, Mr. Chairman.

I think you've done a good job just in terms of outlining some of the things that we hope to work on as a committee from a very broad perspective. But I think that does, kind of, set the stage for what Dr. Moniz will be dealing with should he be confirmed as Secretary of Energy. So I appreciate the way that you've outlined it this morning.

I want to welcome to the committee Senator Bingaman, our former colleague and great chairman of this committee. It's good to see you again.

Of course, General Scowcroft, we appreciate your leadership on the Blue Ribbon Commission. It's nice to have you here ready to vouch for Dr. Moniz this morning.

Dr. Moniz, I do appreciate your willingness to serve this Administration as Secretary of Energy. I think it bodes well for you that you have Senator Bingaman and General Scowcroft with you here this morning. You may very well prove to be this rare nominee, I guess, that generates that bipartisan support, I would certainly hope.

So I enjoyed our discussions before the recess. I'm impressed both by your work and your knowledge here. I also appreciate your intellectual honesty.

You've spoken in favor of a free flowing, global gas trade. You have defended unconventional gas from spurious criticism. At the same time you have refrained from opportunistically changing your mind about nuclear power after Fukushima.

If confirmed I trust that you will continue to tell us what you really think, no matter what the issue may be. I think that that's important to all of us. That will be critical because, as you know, you are not signing up for the easiest job here.

If confirmed you will find yourself in charge of thousands of scientists, many of whom are engaged in exciting, cutting edge work. But you're also going to inherit a range of challenges and some problems. 35 years after the Department of Energy was created we are still in search of a broad, coherent and consistent policy in this arena. I think Senator Wyden has laid out some of those contours clearly.

But oftentimes we don't see that reflected in what comes out of the Department. Energy related programs and initiatives remain fragmented and scattered throughout the Federal Government. Not enough money is getting to the bench for research and development. Too often it appears that silos within the Department stand in the way of progress.

In recent years I've become concerned that DOE is not clearly and unambiguously working to keep energy abundant, affordable, diverse and secure. As I see it we need a stronger voice in the councils of the Administration for energy supply. As if that were not enough, of course we've seen the Department engaged in a series of bad or perhaps unnecessary bets.

We all recognize the situation with Solyndra. There's also A123. There's others that have left taxpayers on the hook for substantial losses. All of us would do well to remember that success is not necessarily measured through spending or good intentions but actual results that are achieved.

Chairman Wyden and I are working to increase the amount of oversight conducted by this committee. We believe that this will help improve the Department of Energy. I'm optimistic that our committee can also reform some of its programs and end those that aren't working as planned. But we will also need help from our Secretary of Energy. Policy and management are different animals. The person that we confirm to run DOE must clearly excel at both.

So, Dr. Moniz, I thank you again for accepting this nomination, going through this process. I look forward to hearing how your background has prepared you to operate an agency of this size and scope. I welcome you to the committee.

The CHAIRMAN. Dr. Moniz, welcome. Normally at this point I administer the oath. But you have the good fortune to show up with the energy equivalent of a couple of NBA all-stars.

[Laughter.]

The CHAIRMAN. I think what we'll do, since Chairman Bingaman and General Scowcroft are both with us, is we'll let both of them make their introductory statements on your behalf. Then we'll administer the oath and proceed with the program.

It is really hard to fathom Jeff Bingaman being there and all the rest of us being here. But it is great to see our friend and former Chair, Jeff Bingaman. Senator Bingaman, welcome. We look forward to your remarks.

STATEMENT OF HON. JEFF BINGAMAN, FORMER U.S. SENATOR FROM NEW MEXICO

Senator BINGAMAN. Thank you very much, Mr. Chairman. It's great to be back at the committee.

Senator Murkowski, thank you very much for your kind comments.

Members of the committee, it's an honor to be here with General Scowcroft to help introduce Dr. Moniz to the committee.

As this committee knows and as the chairman and ranking member just said, there are many challenges for the next Secretary of Energy. It's important that we have a person with substantial knowledge and many varied skills in order to succeed. In my view in order to succeed a person in that position has to have certain attributes.

I think all of us, if we were choosing a Secretary of Energy, would want to choose somebody with those attributes. I've listed 5 that I think are important. I'm sure that you can add to that list.

But let me just go through my list of five.

First we would want a person as Secretary of Energy who had a knowledge of science and engineering. Obviously in much of the country science and engineering work is funded through the Department of Energy. It's managed by the Department of Energy. I think that's an essential qualification.

Second, we would want a person with demonstrated managerial abilities. That's obviously essential because of the vast range of responsibilities that Congress has given to the Department of Energy.

Third, we'd want a person with an understanding of how that department works and also the workings of other departments of the Federal Government that share responsibility for science and engineering and national security. We'd need a person who is familiar with the committees of the Congress that have responsibility for oversight of the Department of Energy.

Fourth, we would want a person with a deep understanding of our Nation's energy challenges. I'll have a little more to say on that.

Finally we, since the Department has responsibility for the maintenance of our nuclear deterrent, we would obviously want a person who understood how to achieve that as well.

Mr. Chairman, as it turns out, in Ernie Moniz we have a nominee for Secretary of Energy with outstanding qualifications in each of these 5 areas.

First, his qualifications as a scientist and engineer are well known and universally respected.

Second, as Ernie has demonstrated his managerial ability both in the public sector and at one of our Nation's greatest universities. He was Under Secretary of Energy from 1997 to 2001 and had responsibility for the day to day operation of the Department. Most recently as Director of MIT's Energy Initiative, he's pulled together the resources and talent of that great institution to move our country forward in meeting its energy challenges.

Third, Dr. Moniz has an in depth knowledge of how the Department works, how the Department of Energy works, how it relates to other executive departments. He understands the rightful oversight responsibilities that Congress and its committees have with regard to the Department of Energy including this committee, of course.

Fourth, Dr. Moniz has a deep understanding of our Nation's energy challenges. All of us on this committee, who served on this committee in the last few Congresses, have heard Dr. Moniz testify on the excellent studies which he and others at MIT have prepared on major aspects of those energy challenges. Over the last 10 years those studies and reports covered nuclear power, geothermal power, renewable energy, coal, natural gas, the transportation sector and the electric grid. Those studies have made a major contribution to the understanding, both here in Washington and around the country, on how to secure our Nation's energy future. Of course, understanding our energy challenges includes understanding how well designed public policies can help to meet those challenges and help us to finance needed energy development and infrastructure.

Finally with regard to the Department of Energy's responsibility for maintaining the nuclear deterrent, Ernie Moniz unquestionably has the background and knowledge to perform that part of the Secretary of Energy's job as well.

So I believe the President has chosen well with this nomination of Dr. Moniz to be Secretary of Energy. We're fortunate to have a person with his outstanding qualifications wanting to take on this very challenging job. I hope there will be very strong bipartisan support for Dr. Moniz in this committee and in the full Senate as well.

Thank you.

The CHAIRMAN. Thank you, Senator Bingaman. When you're talking about good fortune, Dr. Moniz is fortunate to have you in his corner. So we thank you for an excellent statement.

General Scowcroft, welcome.

STATEMENT OF LIEUTENANT GENERAL BRENT SCOWCROFT, U.S. AIR FORCE, RETIRED

General SCOWCROFT. Thank you, Mr. Chairman.

Chairman Wyden, Ranking Member Murkowski and members of the committee, it's both a privilege and a pleasure to appear before you in support of the nomination of Dr. Ernie Moniz to be Secretary of Energy. It's an honor for me to join Senator Bingaman in support of this nomination.

I've been involved, in one way or another, for decades in national security issues related to energy and nuclear security. Dr. Moniz has been a key element in that involvement. I can honestly say I do not know anyone more suited to lead the Department of Energy at this difficult time than Dr. Moniz.

His dedication to the task, his comprehensive command of the issues involved, his acumen and judgment, all of which underpinned by enthusiasm and good humor, are, to me, simply unparalleled.

The latest of our many efforts together was the President's Blue Ribbon Commission on America's nuclear future familiar to members of this committee. The Commission benefited enormously from Dr. Moniz's expertise as well as from a series of earlier studies on nuclear energy at the MIT Energy Institute for which he is responsible.

I share with Dr. Moniz a strong interest in working to counter future threats of nuclear proliferation by developing international support for nuclear fuel leasing. Such arrangements could contribute to preventing the future spread of enrichment and reprocessing by newcomers to nuclear energy thereby providing incentive to prevent some of the difficulties that currently bedevil the international community in cases like Iran.

Dr. Moniz has published on this topic with two of my associates, now Deputy Secretary of Energy, Dan Poneman and the late Arnie Kanter. I also share Dr. Moniz's interest in the promise of small modular nuclear reactors which may have benefits for U.S. industry and leadership. Energy, security and environment can provide a safe and practical alternative for developing countries that choose to pursue nuclear energy.

This country faces a complicated series of issues in the area of energy and nuclear security. As I said at the outset, I simply cannot think of anyone more suited under these difficult circumstances to be at the helm of the Department of Energy.

Thank you, Mr. Chairman.

The CHAIRMAN. General, thank you for an excellent statement. I know at our last meeting when we talked about nuclear waste with Senator Murkowski and Senator Alexander, a big chunk of the meeting seemed to be devoted to praising you. So we look forward to calling on your counsel on these nuclear waste issues.

Dr. Moniz, the rules of the committee apply to all nominees. They require that they be sworn in connection with their testimony. If you would, please stand and raise your right hand.

Do you solemnly swear that the testimony you are about to give to the Senate Committee on Energy and Natural Resources shall be the truth, the whole truth and nothing but the truth, so help you God?

Mr. MONIZ. I do.

The CHAIRMAN. Now before you begin your statement it's the tradition of the committee to ask 3 questions with respect to your particular qualifications before the committee.

First, will you be available to appear before this committee and other congressional committees to represent departmental positions and respond to issues of concern to the Congress?

Mr. MONIZ. I will.

The CHAIRMAN. Are you aware of any personal holdings, any investments or interests that could constitute a conflict of interest or create the appearance of such a conflict should you be confirmed and assume the office to which you've been nominated by the President?

Mr. MONIZ. Chairman, my investments, personal holdings and other interests have been reviewed—oops, both by myself and the appropriate ethics counselors in the Federal Government. I've taken appropriate actions to avoid any conflicts of interests. There are no conflicts of interests or appearances thereof to my knowledge.

The CHAIRMAN. Are you involved or do you have any assets held in a blind trust?

Mr. MONIZ. No, I do not, Mr. Chairman.

The CHAIRMAN. Alright.

Thank you very much, Doctor. I know you've got family members here. We would just invite you to introduce them.

Mr. MONIZ. OK. I'll start with my wife of 39.83 years, Naomi.

[Laughter.]

The CHAIRMAN. I know you academics focus on numbers.

[Laughter.]

Mr. MONIZ. Yes. This may be one of the rare cases of both precision and accuracy.

[Laughter.]

The CHAIRMAN. Very, very good.

Why don't we now recognize you to make your opening statement? Then we'll have questions from members of the committee in order of their appearance.

TESTIMONY OF ERNEST MONIZ, NOMINEE TO BE SECRETARY OF THE DEPARTMENT OF ENERGY

Mr. MONIZ. Thank you, Mr. Chairman and Ranking Member Murkowski and distinguished members of the committee. It's a privilege to appear before you as President Obama's nominee for Secretary of Energy. If confirmed by the Senate I will work to the best of my abilities to advance the public interest across all the missions entrusted to the Department of Energy, energy, nuclear security, science and environmental remediation.

With the chairman's permission I'd like to start with some thanks.

First, reinforcing those to Senator Bingaman and General Scowcroft.

I agree with the NBA all star characterization. I cannot adequately express my gratitude for their appearance here. They have made major contributions to clean energy and to nuclear security, two of DOE's core missions and high priority areas for the President. It's been an honor to work with them and they are friends

and mentors. I hope they will continue to be mentors in the years ahead.

Second, I want to thank really, all the members of the committee for taking the time to meet with me and to share your perspectives on challenges facing DOE and the Nation.

Third, I thank Secretary Steve Chu. I think he's brought to the Department some new ideas and new ways of doing business.

Finally, I thank my family for their steadfast support and as I—in particular, my wife, Naomi, who we have already met.

I'd now like to take a moment to describe for the committee some of the experience, that if confirmed, I will apply to the various mission areas that fall under the responsibility of the Secretary of Energy.

Science.

I've served on the MIT faculty since 1973 as Associate Director in the Office of Science and Technology Policy and as DOE Under Secretary. These roles have given me a very deep appreciation of DOE's importance to American leadership in science. If confirmed I'll work with the scientific community and with Congress to assure that our researchers have continuing access to cutting edge research tools for scientific discovery and for training the next generation.

Energy technology and Policy.

Since 2001 when I returned to MIT from the Department of Energy my principle focus has been at the intersection of energy technology and policy, especially on research and education aimed at a future low carbon economy. DOE has a central role in advancing the science and technology foundations for the transition to a low carbon economy that will serve our Nation's economic, environment and security goals.

The President has advocated an all of the above energy strategy. If confirmed as Secretary, I will pursue this with the highest priority. As the President said when he announced my nomination, "We can produce more energy and grow our economy while still taking care of our air, water and climate." The need to mitigate climate change risks is empathetically supported by the science and by the engaged scientific community. DOE should continue to support a robust R and D portfolio of low carbon options and to advance a 21st century electricity delivery system.

The U.S. has also experienced a stunning increase in domestic natural gas oil production over the last few years. Yet, even as we produce more oil domestically, which is very important, reducing our oil dependence for transportation fuel also remains a national security objective.

In 2006 I was appointed the Founding Director of the MIT Energy Initiative, a research program that we've developed which reflects this same all of the above commitment. The initiative was intentionally built up with strong partnerships with a range of energy companies. If confirmed, I hope to be able to build on this experience so as to convene industry, environmental groups, academia, investors, policymakers and other stakeholders for constructive and consequential discussions about America's energy future.

I also have the pleasure of serving on President Obama's Council of Advisors on Science and Technology. PCAST has recommended

an Administration wide quadrennial energy review with DOE and the Executive Secretariat role. If confirmed, I plan to help develop this QER by gathering strong input from the Congress and private sector stakeholders and by enhancing the Department's analytical and policy planning capabilities.

Nuclear Security.

The President, starting with his Prague speech in 2009, has laid out a vision of nuclear security. Step by step reductions in nuclear weapons while ensuring the safety, security and effectiveness of our stockpile as long as we have nuclear weapons, strengthened efforts to prevent the threat of nuclear weapons and measures to prevent nuclear terrorism. DOE has significant responsibilities spanning much of this agenda.

The Department is entrusted with the responsibility to maintain a safe and reliable nuclear weapon stockpile in the absence of testing. When I served as DOE Under Secretary I led a review of the science based stockpile stewardship program. I also served as the Secretary's lead negotiator for enhancing the security of Russian nuclear weapons material. DOE expertise to a large extent drawing on the knowledge, skills and commitment of our national laboratory scientists and a technically versed intelligence group is critical to our national defense. If confirmed, I intend to make sure that these DOE assets continue to sustain the Nation's nuclear security.

Environmental Remediation.

Environmental remediation at many sites involved in decades of nuclear weapons production during the cold war remains a major mission area for the Department. This is a legal and moral imperative. If confirmed, I pledge to work with the committee and the affected communities and other stakeholders in the most transparent manner.

A discussion about environmental remediation inevitably triggers a broader discussion about management and performance throughout DOE. If confirmed, I hope to work again with the members of this committee and others in Congress and the Administration to elevate the focus on management and performance at DOE.

In summary, the Department of Energy has significant responsibilities that bear on America's economic, energy, environmental and security future. With your support, in addition to that of the President, I feel both prepared to address the challenges and optimistic about the outcomes. So thank you and I'll be pleased, of course, to respond to your questions.

[The prepared statement of Mr. Moniz follows:]

PREPARED STATEMENT OF ERNEST J. MONIZ, NOMINEE TO BE SECRETARY OF THE DEPARTMENT OF ENERGY

Chairman Wyden, Ranking Member Murkowski, and distinguished members of the Committee, it is a privilege to appear before you as President Obama's nominee for Secretary of Energy. I am deeply honored by the President's confidence in me, as expressed by this nomination. If confirmed by the Senate, I will work to the best of my abilities to advance the public interest across all the missions entrusted to the Department of Energy (DOE)—energy, nuclear security, science, and environmental remediation.

With the Chairman's permission, I would like to start with some thanks. First, I thank Senator Bingaman and General Scowcroft. I cannot adequately express my gratitude for their appearance here today. They have both served our country for decades, with integrity and collegiality across the political spectrum. They have

made major contributions to clean energy and to nuclear security, respectively—two of DOE's core missions and high priority areas for the President. It has been an honor to work with them and I will continue to learn from them in the years ahead.

Second, I thank the members of the Committee for taking the time to meet with me and to share your perspectives on challenges facing DOE and the nation. If confirmed, I hope these dialogues can continue in a collaborative search for solutions.

Third, I thank Secretary Steve Chu. He is now the longest-serving Secretary of Energy and has brought to the Department new ideas and new ways of doing business. A signature example was the startup of ARPA-E, with strong support from members of this Committee and other members of Congress.

Finally, I thank my family—starting with four grandparents who emigrated from the Azores Islands to a blue collar American town just over a hundred years ago. My parents, like so many other children of immigrants to America, had dreams for me based on a quality education with big American dreams for the next generation to be realized through an education—public schools, followed by college on a scholarship from my dad's labor union, followed by graduate school with government fellowship and research project support. Looking ahead, I thank my wife, our daughter and son-in-law, and two grandchildren for their steadfast support—I'm sure this will be essential should I be confirmed. Permit me to introduce Naomi, my wife of nearly 40 years.

I would now like to take a moment to describe for the committee some of the experience that, if confirmed, I will apply to the various mission areas that fall under the responsibility of the Secretary of Energy.

SCIENCE

I have served on the MIT faculty since 1973, including as Head of the Department of Physics (1991-1995, 1997) and as Director of the William H. Bates Linear Accelerator Center (1983-1991). The Bates lab was a DOE-funded, MIT-operated national user facility for nuclear physics research using intense electron beams. This gave me experience with DOE administrative and project management systems. I also served as Associate Director for Science of the Office of Science and Technology Policy in the Executive Office of the President (1995-1997) and as DOE Undersecretary (1997-2001).

Taken together, these roles have given me a deep appreciation of DOE's importance to American leadership in science. DOE is the lead funder of basic research in the physical sciences and provides the national research community with unique research opportunities at major facilities for nuclear and particle physics, energy science, materials research and discovery, large scale computation, and other disciplines. More than a hundred Nobel Prizes have resulted from DOE-associated research. DOE operates an unparalleled national laboratory system and partners with both universities and industry at the research frontier.

The Secretary of Energy has the responsibility for stewardship of a crucial part of the American basic research enterprise. If confirmed, I will work with the scientific community and with Congress to assure that our researchers have continuing access to cutting-edge research tools for scientific discovery and for training the next generation.

ENERGY TECHNOLOGY AND POLICY

Since 2001, when I returned to MIT from DOE, my principal focus has been at the intersection of energy technology and policy, especially on research and education aimed at a future low-carbon economy. Progress in energy science, technology, analyses and policy is a preeminent challenge for the 21st century. DOE has a central role in advancing the science and technology foundations for the transition to a low-carbon energy system that serves the nation's economic, environmental and security goals.

In 2006, I was appointed the founding Director of the MIT Energy Initiative (MITEI), a campus-wide effort that facilitates research, education, campus energy management, and outreach. About 25 percent of the entire MIT faculty is engaged in MITEI-sponsored research and education projects, along with many hundreds of students. The MITEI research program has helped generate novel approaches to how energy is produced, delivered, stored and used and is spinning out numerous startup companies from the campus labs into the clean energy economy. The MITEI education program is helping to fill the pipeline of trained scientists, engineers, and entrepreneurs, essential talent for ensuring American competitiveness by creating the products, indeed the industries, of the future. The campus energy management program is demonstrating the cost savings available from efficiency upgrades, materially improving the MIT operating budget. The MITEI outreach program is bring-

ing technically-grounded fact-based analysis to policymakers—including through testimony before this committee and others in Congress.

The President has advocated an "all of the above" energy strategy and, if confirmed as Secretary, I will pursue this with the highest priority. As the President said when he announced my nomination, "we can produce more energy and grow our economy while still taking care of our air, water, and climate." The need to mitigate climate change risks is emphatically supported by the science and by many military and religious leaders as well as the engaged scientific community. DOE should continue to support a robust R&D portfolio of low-carbon options: efficiency, renewables, nuclear, carbon capture and sequestration, energy storage. In addition, a 21st century electricity delivery system, including cybersecurity and a high degree of resilience to disruptions, is vital and deserves increased attention in the next years.

We have also experienced a stunning increase in domestic natural gas and oil production over the last four years. The natural gas "revolution" has led to market-led reductions in carbon dioxide emissions as well as a dramatic expansion of manufacturing and associated job opportunities. The increase in U.S. unconventional oil production, combined with increased vehicle efficiency, will continue to reduce American oil imports and our trade deficit. New technology development and deployment can and must further reduce the associated environmental footprint.

Even as we produce more oil domestically, reducing our oil dependence for transportation fuel remains a national security objective. This will also help shield families from the uncertain impacts of global oil prices. DOE, in line with the Quadrennial Technology Review completed in 2011, should continue to invest in technologies for still greater vehicle efficiency, alternative fuels, and vehicle electrification.

The research program that we have developed at the MIT Energy Initiative reflects this same "all of the above" commitment. It encompasses both innovation around today's energy systems—supply and demand—and transformational technologies for the future. The largest single area of emphasis is solar energy, with environmentally responsible hydrocarbon production and conversion second. The Initiative was intentionally built up with strong partnerships with a range of energy companies, bringing together key players in the energy innovation "supply chain"—from venture capitalists to multinationals. If confirmed, I hope to be able to build on this experience so as to convene industry, environmental groups, academia, investors, policy makers, and other stakeholders for constructive and consequential discussions about America's energy future.

I also have the pleasure of serving on President Obama's Council of Advisors on Science and Technology (PCAST). At the end of 2010, PCAST issued a report to the President on Accelerating the Pace of Change in Energy Technologies through an Integrated Federal Energy Policy. It specifically recommended an Administration-wide Quadrennial Energy Review (QER) with DOE in the executive secretariat role. The previously mentioned Quadrennial Technology Review was the first installment in the QER process. If confirmed, I plan to build on this foundation by working with colleagues across the Administration, garnering strong input from the Congress and private sector stakeholders, and enhancing the Department's analytical and policy planning capabilities.

NUCLEAR SECURITY

The President, starting with his Prague speech in 2009, has laid out a vision of nuclear security: step-by-step reductions in nuclear weapons, while ensuring the safety, security and effectiveness of our stockpile as long as we have nuclear weapons; strengthened efforts to prevent the spread of nuclear weapons; and measures to prevent nuclear terrorism. DOE has significant responsibilities spanning much of this agenda.

The Department is entrusted with the responsibility to maintain a safe and reliable nuclear weapons stockpile in the absence of underground testing. The responsibility for certifying this to the President rests with the Departments of Energy and Defense, with the DOE/NNSA lab directors at the center of the technical evaluation process. When I served as DOE Undersecretary, I led a review of the science-based stockpile stewardship program that emphasized the importance of strong DOE-DOD collaboration to integrate military requirements with stockpile stewardship activities. If confirmed, I intend to engage actively in this collaborative effort—an important piece of our national security posture and a core element of the President's nuclear security agenda.

The nuclear terrorism threat must be reduced further by continuing efforts to identify, control and eliminate nuclear explosive materials worldwide. As DOE Undersecretary, I served as the Secretary's lead negotiator for enhancing the security

of Russian nuclear weapons material. This included putting the very successful "Megatons to Megawatts" program, which has eliminated hundreds of tons of high enriched uranium from Russian weapons, back on track when it had fallen off the rails. I now serve on the Department of Defense Threat Reduction Advisory Committee and am sensitive to enhanced risks in the context of terrorist groups with global reach and ambitions. DOE expertise, to a large extent drawing on the knowledge, skills and commitment of our national laboratory scientists and a technically-versed intelligence group, is critical to our national defense. If confirmed, I intend to make sure that these DOE assets continue to sustain the nation's nuclear security.

ENVIRONMENTAL REMEDIATION, MANAGEMENT AND PERFORMANCE

Environmental remediation at the many sites involved in decades of nuclear weapons production during the Cold War remains a major mission area for the Department. This is a legal and moral imperative. DOE has made substantial progress in this regard but, as you know, the hardest challenges remain as long term, expensive, complex clean-up projects in several states. Each typically presents a one-of-a-kind engineering challenge with limited baseline data and significant health, safety and environmental implications. If confirmed, I pledge to work with the committee, with other members of Congress, and the affected communities and other stakeholders in the most transparent manner. New challenges will almost certainly arise over time, as they have throughout the history of the program, possibly exacerbated by budget constraints that seem likely across the board. Our shared goal will be to accelerate solutions consistent with safe operations and budgetary realities so that contaminated lands can be returned to beneficial and productive use.

A discussion about environmental remediation inevitably triggers a broader discussion about management and performance throughout the Department. If confirmed, I hope to work with members of this committee and others in Congress and the Administration to elevate the focus on management and performance at DOE. Major project execution and cost management, environmental, health and safety compliance, and physical and cyber security are examples of areas that call for continuous improvement. Of course, performance ultimately rests on the shoulders of the Federal and contractor workforce, so maintaining a skilled workforce with initiative, commitment and diversity is necessary for success.

CONCLUSION

In summary, the Department of Energy has significant responsibilities that bear on America's economic, energy, environmental and security future. I have appreciated the opportunity to collaborate with members of this Committee and with other members of Congress both during my previous tenure at DOE and in the years since. If confirmed, I look forward to working with you as a partner. With your support in addition to that of the President, I feel both prepared to address the challenges and optimistic about the outcomes.

Thank you. I will be pleased to respond to your questions.

The CHAIRMAN. Dr. Moniz, thank you and we'll begin with questions.

Just for the record, I want to make sure we're clear. You share my view that it has to be a priority to accelerate the transition to a lower carbon economy. Is that correct?

Mr. MONIZ. Certainly, Mr. Chairman. I do, very much. If I may add, we are, of course, in a historic trend toward low carbon. I agree completely with you, we should pick up the pace.

The CHAIRMAN. Now, those who disagree say that renewable energy, like hydro and geothermal, carbon capture, they make the argument that renewables aren't price competitive with traditional power sources. Now the Department of Energy runs various programs that finance clean energy research and development and innovation. What could you do as Energy Secretary to help bring down the cost of renewable energy and help our country be globally competitive?

Mr. MONIZ. Mr. Chairman, I think there are several directions. But I would emphasize, first and foremost, I believe it's the Depart-

ment's push on the research and development agenda to lower costs. In fact, to be honest some of my engineering friends don't like, sometimes, the characterization. But in the end the goal of innovation in this space is, in fact, to reduce the costs so that we can have the lowest energy costs across the board.

In the low carbon agenda, first I think in some cases we are seeing remarkable cost reductions already occurring. Certainly one area that we have emphasized strongly, solar energy has seen absolutely dramatic reductions. Wind is in many places competitive.

In other cases we have still our research jobs cut out for us. But I believe again in the all of the above strategy. That would include carbon capture and sequestration where cost reduction would be important. It will include small modular reactors and certainly the breadth of renewables, including your, as you label them, the sometimes forgotten renewables like small hydro and particularly engineered geothermal.

The CHAIRMAN. Very good.

Now let me turn to the area where we have an advantage. That's natural gas. We've got the lower prices. The world wants it. We want to make sure and the committee is already looking at this to see if maybe we can come up with a strategy where we can have it all, where we can have this manufacturing renaissance.

It may be possible to have some exports. We understand the implications for renewables. We're going to try to have it all, obviously easier said than done.

On the issue of prices, which we're going to focus on in this committee for businesses and consumers, I'm concerned that given our advantage the Department has used some data which is outdated, No. 1. and doesn't look at regional impacts the way you all have done at MIT. My question here is if confirmed, I certainly support you, will you revisit this issue to make sure that we get the most current data so that we can really think through on a bipartisan basis in this committee, the implications on this price issue for natural gas?

Mr. MONIZ. Mr. Chairman, I have emphasized very strongly and I think we're in the same place, that we need to have strong analysis grounded in the best data. So I think as we move forward in making any determinations including those which I understand we will have to tackle, if confirmed, in terms of the export license question, that we certainly want to make sure that we are using data that is relevant to the decision at hand.

The second point on regional issues, of course sometimes, the kind of, aggregate will be sufficient. But for many issues, certainly all the issues involving energy infrastructure, the regional questions are extremely important.

The CHAIRMAN. I appreciate that. The reason I asked it is at MIT you have focused on some of these regional impacts of gas pricing. That wasn't done in the Administration study. That's why I want to work on it with you.

One last question, if I might, and that deals with fracking on natural gas. Your predecessor charged a subcommittee on his Advisory Board to look into these various issues. They came forward with a number of policy recommendations. In particular, they were

concerned about the lack of confidence that the public has with respect to some of these fracking issues.

We had a very good dialog in this committee at our first hearing with Francis Beinecke, the Head of the Natural Resources Defense Council, and my colleague and friend, Senator Hoeven, who looked at a variety of approaches including a strong role for the states, a set of minimum Federal standards to protect the public and particularly, the most comprehensive disclosure program that has been seen in this area of the fracking chemicals and the like. What could you do as Secretary of Energy to make sure that fracking is done in a responsible manner and to help address the public's concerns?

Mr. MONIZ. Mr. Chairman, I think it's clearly very important to have public confidence in environmental stewardship as we produce this resource. Of course the Department of Energy is not charged with doing the regulation of this, but I believe the Department could contribute to it in many ways. For example, one approach could be in the issues of methane emissions where, going back to your earlier theme, we could use some new data on the emissions.

I think the Department of Energy would be well positioned to work with the EPA, for example, with the industry, convening groups and making sure we have the best and most reliable data on which to speak about and to make decisions.

The CHAIRMAN. Doctor, thank you.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

Dr. Moniz, let's stick with natural gas here for another question.

Clearly a great boom around the country as it relates to the shale gas that is being made available. In Alaska, as a result of this production boom in the lower 48, we've got about 35 trillion cubic feet of known gas and perhaps another 300 trillion cubic feet of both gas both onshore and offshore that is effectively stranded because there's no economic way to move it to the lower 48 and at least for right now or for perhaps going into the foreseeable future.

The State is looking to what they might be able to do to move the gas to Tidewater and then make it available for exports. Of course, the DOE study last year that came out at the end of last year showed that exports of Alaska gas would have no harmful impacts on the Nation's economy. In fact would be beneficial to the Nation.

Now, I'm not going to ask you to prejudge anything in terms of what might happen with an export application coming out of the State of Alaska. But if you could just provide for the committee your general philosophy and views on natural gas exports given what we know about the current reserves and the market conditions. Are these good or bad for the Nation? Can you speak to exports specifically?

Mr. MONIZ. Thank you, Senator Murkowski.

The first point, of course, I would just note the historical fact that Alaska has been exporting LNG for some time.

Senator MURKOWSKI. Forty years.

Mr. MONIZ. But of course it's now diminishing. Certainly the large reserve you talk about remains stranded today.

In terms of exports, while if confirmed, No. 1, I'll have to really be in the position then to delve into the current situation with regard to the license applications. There clearly has to be a public interest criterion applied. I believe a natural gas act suggests that one should move forward with licenses unless there is a clear public interest issue. I would also note that Secretary Chu, I think, did note at one point that things like cumulative impacts would be considered in the license queue.

But fundamentally I think all of these issues have to come together and make a transparent, analytically based evaluation application by application.

Senator MURKOWSKI. This one should be easy.

Yes or no? Is hydro power a renewable resource?

Mr. MONIZ. Yes.

Senator MURKOWSKI. Thank you.

[Laughter.]

The CHAIRMAN. Good answer.

Senator MURKOWSKI. Good answer. Good answer.

[Laughter.]

Senator MURKOWSKI. I love these short ones.

[Laughter.]

Senator MURKOWSKI. You've mentioned, we all talk about an all of the above approach to energy. The question that I would have of you is how expansive is your view of all when we're talking about all of the above? Does that also include coal?

Mr. MONIZ. Yes, it does. I think, in fact I think the President has said that and our studies have also said it. We see coal as being a continuing major part of the energy supply in the United States and certainly in the world. We do think that as we go to a low carbon economy we really have to push hard on completing the investments that have been made, nearly $6 billion on establishing CCS as a viable and cost competitive approach.

I think we have two major tasks.

We need to make sure through extended storage of large amounts of CO_2 in the various demonstration projects that we can provide public confidence into long term storage of large amounts of CO_2.

Second, I think we need to really focus on innovation that can really reduce the cost of carbon capture dramatically.

The combination of those two things, I think, would have coal very, very competitive.

Senator MURKOWSKI. Then one last question.

This is relating to the EMP potential attacks, the electromagnetic pulse attack or geomagnetic disturbances. We know that the discussion about all this is certainly not new. Do we have sufficient information to characterize and simulate the susceptibility of the power grid to either EMP or GMD attacks or do we need more study on this?

Mr. MONIZ. Senator Murkowski, I know I need more study on this. I think we do in general. I think this is part of a broader issue where we need to introduce robustness and resilience into our whole grid for many kinds of natural and unnatural threats.

So I think this is an important area to pick up the level of study.

Senator MURKOWSKI. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Murkowski.

Senator Heinrich is next. Senator Stabenow I believe has to go. Senator Heinrich, do you have 5 minutes that you can donate to Senator Stabenow and then you would be recognized next?

Senator HEINRICH. Absolutely. I'd be happy to lend 5 minutes to Senator Stabenow.

The CHAIRMAN. Ever collegial.

Senator Stabenow.

Senator STABENOW. Thank you very much, Mr. Chairman. I did enter the room early but my problem was I got here before you, so I have to get here after you. So that I'm recognized.

So Dr. Moniz, welcome.

Mr. MONIZ. Thank you.

Senator STABENOW. I want to join colleagues in indicating that I think we are very fortunate to have your willingness to come back into public service.

Mr. MONIZ. Thank you.

Senator STABENOW. From a Michigan perspective I did want to have the opportunity this morning to just reiterate what you and I have talked about on so many fronts that not only is your department and the responsibilities of your department important to our country in a global economy, for the economy, for the environment, issues around climate, energy independence, but Michigan is very, very engaged in the areas that you are involved in.

As you know my Alma Mater, Michigan State University, leading the facility for where isotope research, which as you know is critical to basic research for the future, all our efforts around advanced vehicle technology, alternative energy. I'm very pleased to say Michigan is now No. 1 in clean energy patents for the country. So a lot at stake as we go forward on jobs.

I do want to speak and ask you to talk just a little bit more about the issue of natural gas as—and I want to thank the chairman for raising the issues that he did and the ranking member. I know that there are various ways to look at the issue around exports. There's certainly other issues as well, safety issues, others.

But when we look at the fact that the world's largest manufacturing economy is in America, about 18.2 percent of global manufacturing done here and that for the first time in 13 years we're growing now as of 2010 and creating jobs and moving forward. So what we do around exports and pricing, I believe, is critical to that growth. The Boston consulting group concluded that affordable natural gas prices could lead to 5 million new manufacturing jobs.

My concern goes back to the issue of accurate data when looking at the proposals or the efforts that you have to decide upon as it relates to export proposals. We've had before the chairman of Dow chemical company coming before our committee based in Midland, Michigan. They've identified over 100 new projects that have been announced through their company alone at a value of over $95 billion and that was not including, those numbers, in the study that was done by the NERA for the Department. I'm concerned that other projects in terms of economic impact have not been included as well.

I'm not certainly an expert on the science of natural gas. But I do understand there may be a way to look at this, the components

of what gas being most significant and the most valuable to domestic manufacturing, dry gas having great value in exporting. So I wonder if you might speak about, first of all, what updated information that you would ask for in evaluating the export of natural gas, the applications coming before you.

Do you agree that we need clear criteria for evaluating the economic impact? How can we come to a way where we can address both the desire and the need and economic impact of export, but not lose what is clearly an advantage for us right now in the United States which is a growing manufacturing sector that's going to bring back middle class jobs to America?

Mr. MONIZ. Thank you, Senator Stabenow.

Again, building on questions both of the chairman and Senator Murkowski. First, it's clear that I have to, if confirmed, be able to look really hard at those studies and the data that we have. As you've said there are many factors.

For example, really understanding and observing what happens with, kind of, elasticity of production when and if there are exports. Are we producing more gas? Are we producing more wet gas which provides more natural gas liquids for our manufacturing industries?

So I think there are multiple components. I think the important thing, as you've said, is to first of all, note that in the overarching public interest criterion the status of the domestic natural gas market is clearly right up in that list of criteria. We will then move forward from, if I'm confirmed, to begin to make.

I think we have an obligation to make judgments, license by license application but using all those criteria including the one of cumulative impacts.

Senator STABENOW. Thank you very much.

I would just stress again price matters.

Mr. MONIZ. Yes.

Senator STABENOW. Getting this right is incredibly important I think for the American economy on multiple fronts. I look forward to working with you.

Mr. MONIZ. Thank you.

Senator STABENOW. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Stabenow.

Now with graciousness, Senator Heinrich. We'll go to Senator Heller for his 5 minutes and then to Senator Heinrich.

Senator Heller.

Senator HELLER. Thank you and good morning, Dr. Moniz.

Mr. MONIZ. Good morning, Senator Heller.

Senator HELLER. It's good to see you again. Thanks for taking time to have discussions in my office. I think they were very, very helpful.

As we mentioned the Department of Energy has quite a presence in Nevada whether those issues are renewable energy, the Nevada test site or perhaps Yucca Mountain, it's heavy in Nevada. Your comments and the discussions we've had have been very helpful.

I do appreciate your comments on nuclear security in your opening statement. The Nevada test site is an important tool for our Nation. We seem to combat nuclear proliferation and train our military in the prevention, protection response to terrorists who

would use radiological or nuclear material as a weapon of mass destruction.

But Doctor, by far the biggest question in the minds of Nevadans when it comes to Department of Energy is regarding the fate of the proposed nuclear waste repository at Yucca Mountain. Rather than objectively evaluating Yucca Mountain as one proposal among many, the Federal Government attempted to shove it down Nevada's throat by designating it as the only potential location to be evaluated. Yucca Mountain was plagued with problems including falsified science and design problems.

Given this, it's no wonder that Nevadans don't trust the assertions that Yucca Mountain is safe. The people of Nevada deserve to be safe in their own backyards. No amount of reassurance from the Federal Government will convince us that Nevada should be the Nation's nuclear waste dump.

But I do recognize the need to address the problem of nuclear fuel, spent fuel. But it must be solved through careful consideration of all alternatives based on credible scientific information rather than by politicians here in Washington, DC. So given your role the question is, given your role on the Blue Ribbon Commission your nomination to head the Department of Energy, do you believe that we should look past Yucca Mountain toward consent based sitings for long term spent nuclear storage?

Mr. MONIZ. Senator Heller, thank you. First let me say that the pleasure was mine to be able to speak with you and all the other members of the committee.

Senator HELLER. Thank you. Thank you.

Mr. MONIZ. It was very, very helpful.

There's no question that I will enter the role of Secretary, if confirmed, with the idea of advancing the Blue Ribbon Commission agenda. First and foremost consent based siting is, as you know, a part of that. Much of the work of the Commission will require working with the Congress. We've heard about the work going on with actually 3 members of this committee and Senator Feinstein in addition.

So I think moving the agenda of storage in parallel and aggressively moving the agenda of repositories, moving the agenda of deciding what would be the best, kind of, reorganization of the program. What are the best authorities to assign to that office? All of those agenda items, in my view, are linked in order to underpin the success of a consent based approach.

Senator HELLER. I appreciate those comments. Frankly I appreciate Administration also pushing back on this storage site. I hope that with your leadership and your understanding of the dangers of, I think, proposed to Nevadans on this particular issue that we can get past this issue and find reasonable use and reasonable work together on where to store this spent fuel.

You mentioned in your comments also about all of the above. I certainly do appreciate that also. Renewable energy is critically important to Nevada. We have fantastic solar, geothermal resources. We look to continue, continue, looking for ways to broaden that development.

So what role do you see renewable energy playing in our overall energy portfolio?

Mr. MONIZ. Senator Heller, I'm extremely bullish about this. In fact, if you take a step back it's a pretty remarkable story. Much of it's been already said.

Highest production of oil in 15 years.

Highest production of gas, ever.

Two x on renewables just in, I think, 4 years.

Lowered CO_2 emissions.

Greater manufacturing.

When we take a step back it's been a pretty remarkable run, I think, over these last years.

Now, the low carbon economy is absolutely critical. Of course, renewables, nuclear, CCS are the 3 major and well, renewables including biofuels, but renewables are absolutely central.

I think wind, of course, already has a significant performance in terms of economics and in many areas. There we do have work to do. For example it would be wonderful, not for Nevada perhaps, but it would be wonderful to really get offshore wind to become competitive in price. That will take some more R and D.

Solar is making tremendous advances. In Nevada I think you have both the photovoltaic and the concentrated solar options.

Senator HELLER. We do.

Mr. MONIZ. The former, we don't take enough, I think, of a look at this. We are down to the order of $1.00 per watt for a solar module. We can argue whether it's 90 cents or $1.10, but this is fantastic progress.

On solar thermal as now more and more technology for storing the energy for many hours, 4 to 6 hours, comes in then the solar becomes much more like a dispatchable resource into the grid.

So I think these are tremendous opportunities.

Senator HELLER. Dr. Moniz——

Mr. MONIZ. You mentioned geothermal, sorry. That's just another huge, huge.

Senator HELLER. Dr. Moniz, thank you very much for your time.

Mr. Chairman, thank you.

The CHAIRMAN. I thank my colleague.

Senator Heinrich.

Senator HEINRICH. Thank you, Mr. Chairman. I have to say I agree with you. It was very odd to be on this side of the dais and have Senator Bingaman introducing Dr. Moniz on that side of the dais. But I'll do my best to carry on New Mexico's legacy here.

I want to stick with one of the issues that Senator Heller brought up regarding spent nuclear fuel, a high level waste. As you know in January Secretary Chu announced or released a new strategy to manage spent nuclear fuel and high level radioactive waste. That strategy was very much in response to the recommendations of the Department's Blue Ribbon Commission that you were a part of.

DOE's strategy for the management and disposal of used nuclear fuel and high level radioactive waste includes plans now for both short term consolidated storage and the development of a permanent repository. On page 5 of the Department's strategy they outline it very clearly and I'm going to quote now. "The Administration also agrees with the BRC that a linkage between opening an interim storage facility and progress toward a repository is important so that states and communities that consent to hosting a con-

solidated interim storage facility do not face the prospect of a de facto, permanent facility without consent."

What are your thoughts on maintaining that strong linkage between the siting of interim storage and final disposal facilities so that a State can be sure that interim storage doesn't turn into permanent storage?

Mr. MONIZ. Senator Heinrich, I'm, as a member of the Commission, I support that fully. Storage is not disposal. It is what it says. It's storage on the way to disposal.

Although I should add, we emphasized as well that one of the benefits of a few decades of storage is the option that it could be direct disposal of spent fuel. It could possibly in the future mean doing some processing of the fuel. But it's the same thing as far as the repository. It's either spent fuel or high level waste and the linkage is clearly important.

Senator HEINRICH. Thank you.

I want to talk for a moment as well about technology transfer. I know that you spent some time in New Mexico and know our two labs at Sandia and Los Alamos well. With their sister DOE labs we have an incredible engine that can help promote economic development and provide quality jobs throughout this country. But I think we can do a better job of tapping into these resources.

Transferring technologies developed by DOE's labs could help foster new government/industry partnerships to spur technical innovation and boost job creation especially in the areas that you've outlined in clean tech and clean energy. I know you've had some experience with tech transfer at MIT's energy initiative. I wanted to ask you do you think that DOE and the labs are doing as much as they can to help facilitate that technology transfer? Do you think there are some better ways to leverage the laboratory's resources in partnership with both universities and the private sector?

Mr. MONIZ. Senator Heinrich, I think that's a very important question for the laboratories in their role of supporting clean tech and the economy. I mean, I think the Department could do more. We actually, in my last go round, we did engage in some successful technology transfer, but we also, I think, saw that there were other barriers that could be lowered.

So in this case what I think as an example is perhaps we could do more and I'd be interested in the feedback. But do more in working with the states, for example, because you mentioned universities, but it's not only universities. It's the investment climate. It's the so called innovation ecosystem. Perhaps working collaboratively to build that up it will provide, in a certain sense, more pull for the technology out of the laboratories.

Senator HEINRICH. Great. I look forward to working with you on that. I think one of the important issues is just setting a culture that reinforces the idea that this is an important part of what the labs do.

I'll leave you with one quick thought.

At Los Alamos, LANL has been making really good progress toward meeting the commitments to the State of New Mexico that they made regarding cleaning up legacy nuclear waste. One of the priorities is simply the removal of 3,700 cubic meters of trans-

uranic waste that is stored above ground. Unfortunately in the FY'13 CR we didn't get the additional 50 million that the Obama Administration had requested.

But I hope to be able to work with you to make sure that we continue to prioritize that. The work that they're doing there is working. They need to meet those commitments that they've made to the State.

I certainly would appreciate your thoughts, but look forward to getting together with you on that and making sure that we continue down that road.

Mr. MONIZ. If confirmed, I will be happy to look into that and work with you. I don't know the issue at the moment.

The CHAIRMAN. Thank you, Senator Heinrich.

Senator Barrasso.

Senator BARRASSO. Thank you, Mr. Chairman.

Congratulations again on your nomination.

Mr. MONIZ. Thank you.

Senator BARRASSO. Thank you for taking time to visit with me yesterday.

I wanted to ask about liquefied natural gas exports. In 2011 you co-authored a report entitled, "The Future of Natural Gas." In the report you wrote that, "American security interests can be strongly affected by the energy supply concerns of its allies." You went on to explain that the natural gas cutoff to Europe demonstrated Russia's market power in a situation where key allies have inadequate alternative supplies of gas.

I want to show a chart that shows really how vulnerable many of our NATO allies are to Russian gas. You'll see that, for example Russian gas makes up over 48 percent of the gas consumed in Germany, 71 percent of the gas consumed in Poland and Turkey, 100 percent in Latvia, Lithuania, Slovakia.

So in January of this year I introduced bipartisan legislation, Republicans and Democrats together co-sponsoring, which would expedite LNG exports to NATO allies and to Japan. I heard from many of our NATO allies and from Japan that they want to buy our gas. We talked a little bit yesterday about gas in the global market.

Do you believe that LNG exports from the United States to these countries would strengthen our national security interests?

Mr. MONIZ. Thank you, Senator Barrasso. That is a very interesting question. I think many dynamics in the gas market address this question of working with allies. I just wanted to start with that.

I mean, exports is clearly one. But I would just also note that if you look at the last few years just the fact that the United States had this gas revolution led to the, essentially, the diversion of a lot of LNG that was targeting the United States to Europe created a remarkable amount of spot market pricing and put pressure on the Russian imports. So I think there is many ways in which these dynamics come together.

One of the things that I've noted and in my opening statement as well that we'd like to pursue is the so called quadrennial energy review. Now that sounds like a process. But I mention it here because the point of it is that it would be a mechanism for getting

the many different threads of energy, let me call it policy, from multiple departments. This would include in this case, the State Department, the Department of Defense so that our national security interests are part and parcel of our energy decisions.

Senator BARRASSO. I want to switch to an issue of nuclear energy.

I'd like to ask you about the United States Enrichment Corporation, also known as USEC. I understand you were a member of their strategic advisory council from 2002 to 2004. You were one of 9 members of the council and you were a paid advisor for the work.

In March a spokesman for USEC, they applauded your nomination. The reason I'm asking this is because there have been extraordinary steps by the Department of Energy has been taking to bail out USEC, a company that Congress privatized in 1996. Many in Congress have concerns about the Department of Energy's agreement with USEC which was announced in May 2012.

Under that agreement the Department of Energy is in the process of giving uranium, publicly owned uranium, in an effort to prop up USEC. This agreement has contributed to a near 20 percent drop in the price of uranium and put new uranium mining projects at risk in other locations. It's threatened good paying jobs in Wyoming and other states.

Some have called for you to recuse yourself from decisions involving USEC. So the question is, if confirmed, what will be your position on using the public uranium for the benefit of USEC?

Mr. MONIZ. Thank you, Senator.

First of all on recusal issues in this and any other cases I will always be consulting very closely with counsel. I mean I have had no connection with the company for a decade basically.

I think there are several issues that come in here.

One is the issue of—which is not directly to your point. I'll come back to that in a second, that there is this issue of the requirement really to try to maintain an American origin enrichment technology for the purposes of national security and supportive allies.

Second however, directly to your point, I think that in my own history at the Department previously and I will certainly, if confirmed, say absolutely going forward always take into account in balancing issues with the health of our domestic industry. In my last go around, I mean, that was manifest in the way we managed the megatons to megawatts program which in fact, pretty much shielded the domestic industry. I think that that would be an important criterion in any decision that we make.

I think a system, an integrated uranium plan along these lines I think is what we need to go to to deliver.

Senator BARRASSO. Great.

Finally and briefly, on Friday Energy Daily reported that Senator Reid and his staff may be seeking to place the former chairman of the Nuclear Regulatory Commission, Gregory Yazgo, as a special advisor at the Department of Energy.

Do you know anything about that? Is there any truth to that report, do you know?

Mr. MONIZ. I read that. I have absolutely have nothing whatsoever, no communications whatsoever, in any form from anyone on that subject.

Senator BARRASSO. Thank you. Thanks very much.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Barrasso.

Senator Franken.

Senator FRANKEN. Thank you, Mr. Chairman.

Dr. Moniz, thank you for being with us. You said that you've been married 39.83 years. May I remind you you're under oath?

[Laughter.]

Senator FRANKEN. Is your anniversary June 10th?

Mr. MONIZ. June 9th. That's with the rounding error.

[Laughter.]

Senator FRANKEN. Alright. We'll have to consider.

[Laughter.]

Senator FRANKEN. That's my only question. No.

[Laughter.]

Senator FRANKEN. When this committee heard testimony from former Lockheed Martin CEO, Norman Augustine, on a report by the American Energy Innovation Council this group put together included a lot of other CEOs, former CEOs. We were told that the country has, this is a quote, "has yet to embark on a clean energy innovation program commensurate with the scale of the national priorities that are at stake."

In fact the council's report shows that in 2010 the Federal Government spent $80 billion on defense research, $30 billion on medical research, but only $5 billion on energy research. This is troubling given that energy is such an important part of our national security which the presence of General Scowcroft just underscored. In spite of this low funding level some of my colleagues on the other side of the aisle are critical of government support in the area of energy innovation. We tend to hear only the focus on the failures and disregard the successes.

For example, we have heard almost from every member on the committee talk about this natural gas boom. The roots of this technological revolution are in the eastern shales, eastern gas shales projects which was a Federal Government initiative to develop the commercial extraction of natural gas from shale. Micro-seismic imaging, which is instrumental for fracking was developed by Sandia National Laboratory, a Federal energy laboratory. It's not just me saying this, former Mitchell Energy Vice President, Dan Stewart said and I quote. "DOE started it and now the people took the ball and ran with it. You cannot diminish DOE's involvement."

My question is I fear that sequestration will further erode our efforts to promote energy innovation. How will you use your leadership role in the Department to make sure U.S. energy innovation remains strong and a priority?

Mr. MONIZ. Thank you, Senator Franken.

I think this is indeed a very serious issue. I certainly endorse what Norm Augustine said. Indeed, if you will allow a slight digression, very slight. I would just note that if one does very simple arithmetic as a guide to the level of investment that might be called for by taking the fraction of GDP and energy times 1 percent

of GDP for research you come out with the numbers that Norm and his colleagues had, roughly speaking another $9 or $10 billion would seem to be about the right level.

But I also recognize——

Senator FRANKEN. That's given our historical investment. In other words we are actually investing less.

Mr. MONIZ. We are under investing by a factor of three, roughly.

Senator FRANKEN. Yes. This is at a time when we know——

Mr. MONIZ. Yes.

Senator FRANKEN. Some must know that we have a climate change, some of us believe we have a climate change crisis approaching or with us we have—we've had a lot, a lot of—we're paying for that now.

So this is under investment at a time when we really are seeing a very serious threat to our national security, to the world.

Mr. MONIZ. I would agree. I would add that I think there is a lot of evidence that we have a lot more capacity to do the kind of work that you're talking about. For example, the very first solicitation by ARPA–E had a factor of 100 or more applications that could be supported.

Now having said that we recognize that we are in a period of tight budgets and so I guess the answer to your question is that we will try to leverage the funding, if I'm confirmed, as much as we can to try to move technologies to the point where the private sector can develop them into material contributors to a low carbon economy.

Senator FRANKEN. I mean, look at the return investment though. Look at what we're talking about in terms of natural gas. We're talking about natural gas, as the chairman said in his opening statement, that it has brought down the cost of generating electricity and it has brought down the carbon footprint in our country. That's because of DOE research and development.

I think that we're being penny wise and pound foolish by disinvesting, under investing, in energy research and development. I just want to underscore that.

There were a lot of other things I wanted to get to. Maybe I'll be able to but my time is up.

Thank you.

Mr. MONIZ. Mr. Chairman, may I just add one comment with your permission?

The CHAIRMAN. Of course.

Mr. MONIZ. Because I think it's important to add that the unconventional gas boom had some other elements as well. I think it's important to recognize all of them.

That is the DOE, absolutely right, was very important to kick this off. But then there came two other aspects.

One was an extended period public/private partnership with industry sharing and industry guidance for the demonstration and test drilling phase.

Simultaneously Congress had a time limited incentive for production from unconventional wells.

The 3 of those came together in a very efficient and effective way as we are seeing now as we see the benefit of that.

Senator FRANKEN. That sort of is my point is that there's a role for R and D. Then it becomes public/private partnerships and then, I mean, that's what the internet was. It was initially developed by the government, by the Defense Department and we've seen, I mean, and then and we've seen what it's become.

I'm just arguing for not disinvesting in energy research. Thank you.

The CHAIRMAN. Very good.

Senator Scott.

Senator SCOTT. Thank you very much.

Dr. Moniz, good to have you in our committee today. It was good chatting with you yesterday. Congratulations on your nomination.

Mr. MONIZ. Thank you.

Senator SCOTT. Two areas I want to chat about today a little bit. One is growing our economy. The second has to do with our national security.

The first, energy production and the distribution of affordable energy can be the cornerstone to building our economy, creating jobs and strengthening America's economic competitiveness. In just 6 short years since the oil boom in North Dakota we've seen their per capita income rank go from 38 to 6th in this country. They have the country's lowest unemployment rate.

So there's no question that our energy economy could be a major part of growing our GDP back to 4 or 5 percent range. They say we could create around two million jobs in the next few years and see trillions of dollars of economic activity in our country through our energy economy.

Second is an issue relating to national security. Our national security is an important ingredient in these types of energy conversations. One specific area for my concern and interest is the MOX facility in South Carolina.

There is a project, of course, in South Carolina that is critical to our Nation in honoring the U.S. Russian plutonium disposition agreement to dispose of 34 metric tons of excess U.S. weapons grade plutonium. The MOX facility is designed to dispose of excess weapons grade plutonium by converting it into fuel for commercial nuclear power reactors.

Dr. Moniz, when you were at DOE during the Clinton Administration did you ever participate in any discussions about the development of MOX agreement with the Russian government?

Mr. MONIZ. Senator Scott, yes, I did. In fact I spent quite a bit of time discussing that issue.

Senator SCOTT. Yes.

Mr. MONIZ. I mentioned in the opening statement that I was deemed the Secretary's lead negotiator for disposition of Russian weapon materials and this fell under that purview.

Specifically, in 1998 we, the Department of State and the Department of Energy together established a mutual disposition program for 34 tons—and we produced, I believe in the year 2000 then a signed plan. There at that time there were two pathways that were technically laid out. One was the MOX approach and the second was a vitrification approach. Then that's when the Administration ended and subsequently the projects went forward.

Senator SCOTT. So what is your view on the MOX approach? Do you support it?

Mr. MONIZ. Yes, sir. The MOX approach is certainly one way of taking, to clarify, what it will do is it will so called change the isotopics of the plutonium to make it less suitable for a nuclear weapon.

Senator SCOTT. Do you believe the Administration, the Obama Administration, has any intention of breaking or sending signals to break the U.S./Russia plutonium disposition agreement?

Mr. MONIZ. Sir, at this stage I have no information other than what's in the public sphere. So if I'm confirmed obviously I would be looking into this issue.

Senator SCOTT. Are you aware of the fact that we spend about $4 billion on that MOX facility and it's about half way done, maybe 60 percent done?

Mr. MONIZ. Yes, I think I read 60 percent. Yes, I agree with you, Senator.

Senator SCOTT. Do you believe that the U.S. should finish the project?

Mr. MONIZ. I have to wait for possible confirmation to be able to be in a position to understand where we are going with that.

Senator SCOTT. But do you have an opinion on whether or not we should be? There's two options so far, right? There's basically two options.

One is a MOX facility.

The question really is do you think we continue the work that we've invested $4 billion in, 60 percent completion for us to honor the agreement that we currently have?

Mr. MONIZ. I certainly think we need to honor our agreement with Russia in terms of mutual disposition of plutonium.

Senator SCOTT. So if we do not go forward with the MOX facility how will we honor the agreement?

Mr. MONIZ. That would have to be looked into if I were confirmed. Again, I have no indication of what the path forward is other than what I've seen in the public on the MOX plant.

Senator SCOTT. So would you say then that we should continue forward with the MOX facility?

Mr. MONIZ. I think we need to dispose of the 34 tons of plutonium.

Senator SCOTT. Right.

Mr. MONIZ. I mean right now what we have is the MOX plant.

I, you know, I think I need to await confirmation before I can——

Senator SCOTT. You haven't been there?

Mr. MONIZ. I haven't been there, no.

Senator SCOTT. Yes, but do you have an opinion?

I mean, during the Clinton Administration you were the lead negotiator.

Mr. MONIZ. Certainly.

Senator SCOTT. In the Obama Administration do we continue to work on it? There are basically two paths to go down.

One being that path that we've already—that's the $4 billion, 60 percent completion.

The other path that we haven't started on.

So my real question was should we continue down this path?

Mr. MONIZ. All I can say, sir, is that, you know, I would need to be confirmed, look at what we're doing, look at the path forward, look at what the Administration proposes. Then work with you and others to push through our commitment to dispose of 34 metric tons of plutonium.

Senator SCOTT. Do you have any idea what it would cost for us to backtrack and start again?

Mr. MONIZ. No, sir, I do not.

I don't know and again I'm not suggesting that that's the plan.

Senator SCOTT. Of course.

Mr. MONIZ. No, I mean——

Senator SCOTT. Are you aware of any of the penalties that the Federal Government would have to pay to the State of South Carolina if the facility is not finished on time?

Mr. MONIZ. I don't know exactly. But I believe there are some agreements with the State about moving plutonium out of the State by a certain date.

Senator SCOTT. I think it's 2016. I think it's a million dollars a day.

So the reason why if we're having a conversation——

Mr. MONIZ. Beside that.

Senator SCOTT. We consider how to relate how substantial even in the economy we have today. So my thought was if it's important if we only have two paths that we can consider. One path we're on currently which is 60 percent complete. We've invested $4 billion.

The other path we have no idea how much it would cost, when we would start and how we would get it finished.

So my question was should we continue down the path that we're on if we're 60 percent finished. We've already made the initial investment. We have no clue on the alternative.

Your answer was you're not sure exactly what we should do at this point?

Mr. MONIZ. No, sir, that's not exactly how I phrased it.

Senator SCOTT. No, sir, it was not.

Mr. MONIZ. I said, if I'm confirmed then I will certainly and certainly with your encouragement look into this with a high priority. I'll work with you and others involved closely.

Let me make no mistake about my commitment to advance the agreement to dispose of the plutonium.

Senator SCOTT. My questions, finally wrapping up. My questions really have to do with the fact that many of the rumors that we've heard around the MOX facility and the Obama budget has to do with the ability or the probability of a reduction in the funding of it. If the funding is reduced by 50, 60, 75 percent, the ability to finish on time would not occur, No. 1.

No. 2 the impact on that to the Federal Government would be hundreds of millions of dollars in penalties.

Third, maybe perhaps the most important it would be breaking the agreement that we have to dispose of the 34 metric tons that we signed with the Russian government.

The CHAIRMAN. Senator Scott, thank you.

Senator SCOTT. Thank you.

The CHAIRMAN. We have to move along to get everybody in before the vote.

Senator Schatz.

Senator SCHATZ. Thank you, Mr. Chairman.

Thank you, Dr. Moniz. I enjoyed our conversation several weeks ago. I'm especially appreciative of the partnership between the U.S. DOE and the State of Hawaii in the Hawaii Clean Energy Initiative.

As you know we've been able to triple clean energy production in less than 3 years. That's substantially because of the partnership that we've had. I'd like to ask you a series of questions that might be easier than the previous ones.

[Laughter.]

Senator SCHATZ. Specifically in the area of energy efficiency and conservation there's been a lot of discussion about electricity generation. But one of the areas that I think Senator Portman and Senator Shaheen have been working very hard on and where I consider to be low hanging fruit is efficiency and conservation.

I'd like you to just articulate the U.S. DOE's position on that and how do we advance efficiency and conservation because it is one of the few areas where we may be able to make some good progress on a bipartisan basis.

Mr. MONIZ. Thank you, Senator Schatz.

First, let me say just say that I totally agree with the inference that energy efficiency demand side activity is enormously important. Indeed if one looks at, kind of, a low carbon future with low greenhouse gas emissions, for example. It's very hard to see how that can happen without substantial efficiency gains. That's across the board. It's in transportation.

How do we move that? We have the CAFÉ standards that the Administration has put forward which is critical. But of course, now comes the technology development in terms of drive trains, light weighting, many, many ways of accomplishing that economically.

It's buildings. Buildings use about 70 percent of our electricity, our residential and commercial buildings. This is enormously important to address there. There, the low hanging fruit is, in fact, quite ripe actually. I would say to mix some metaphors.

In addition to some R and D their cooperation with the States and localities, I think, will be very, very critical like the race to the top. Concept is one example of something I think that we could advance there.

Finally, industry. I think, industry, of course, is probably among those 3 sectors already the leader because of, you know, bottom line, concerns. But even there I think there's more that we could do to help incentivize, for example, more combined heat and power which would be a big step.

Senator SCHATZ. Thank you.

You know in Hawaii we have our particular challenges given that each island is its own grid.

Mr. MONIZ. Right.

Senator SCHATZ. U.S. DOE has been very helpful in terms of integrating unprecedented percentages of intermittent energy into our grid. But can you talk just about the national grid system?

How U.S. DOE is helping both on the cyber side and on the energy efficiency and energy management side to kind of solve the problems that are emerging over the next several years?

Mr. MONIZ. Yes, thank you, Senator.

If I may go back a step and note that in 1998/1999 we initiated a cross cutting portfolio look at the Department's research. The first thing that popped out was there was no work on grids because it didn't fit into the stovepipes of fossil energy or renewables, etcetera. Now of course we have the Office of Electricity and Delivery Reliability. The office has really, I would say, upped the game certainly using some of the stimulus funding, getting smart metering as an enabler, supporting research on sensors, controls, is out there.

I think we need to still do more. I think we need to greatly increase our ability to do systems evaluation so that we get robustness and resilience of the system again, particularly in the face of either natural or unnatural acts against the grid.

Integration is very important. I forget, the chairman mentioned in fact, how also the integration of renewables and gas was critical to get the kind of back up in the system.

Senator SCHATZ. So one of the things that has been very productive in the State of Hawaii is the partnership between the DOE and the DOD. The Pacific command has articulated climate change and energy security as the strategic challenge in the Asia Pacific region. So can you talk about how U.S. DOE and DOD, I know they're working very well together in Hawaii, but what's happening on the national level in terms of that partnership?

Mr. MONIZ. Senator, I'll certainly need to learn more about it. But I know what is happening in some dimensions, two in particular I'll just mention.

One is the issue of lowering the energy footprint and the energy needs in fixed assets like bases and work around building efficiency, micro grids integration. I think is a, is moving forward and b, can be an important template for then spreading out into the more into the economy. Of course on a different side there's also the work on fuels and frankly an area that I think is very important, the war fighter.

How do we address the energy needs of the war fighter which is an enormous problem for that individual out there in the field?

Senator SCHATZ. Thank you.

Thanks, Chair.

The CHAIRMAN. Thank you very much.

Senator Lee.

Senator LEE. Thank you very much, Mr. Chairman.

Thank you, Dr. Moniz for joining me in my office a few weeks ago. I greatly enjoyed our visit.

In March of last year Secretary Chu issued a memorandum to Federal power marketing administrations. In that memorandum the Secretary proposed some rate structures that would incentivize energy efficiency programs, the integration of intermittent resources and preparation for electric vehicle deployment for these PMAs. There's been some significant concern expressed with regard to this memorandum suggesting that the policies contained therein

might increase the cost of electricity for small, municipal and cooperative power systems that purchase power from these PMAs.

How would you respond to those concerns? Do you agree with them? Do you think the concerns expressed have been legitimate? Do you share them?

Mr. MONIZ. First Senator Lee, let me say that I think the—we all recognize the core responsibility of the PMAs to deliver power as inexpensively as possible to the preference customers. That is a very important part of where the PMAs operate.

Senator LEE. Perhaps the most important point, correct?

Mr. MONIZ. The first priority I believe is there.

Now, of course, that does also require that the PMAs are making sure they're reliable. They are also growing with 21st century technology for delivery. My understanding then is that with WAPA, there was then a joint team put together to make recommendations as to what might be done recognizing the importance of maintaining the cost structures.

The last that I know of is that those recommendations are now in front of WAPA to determine what they want to do. Although I'll have to look at this more carefully if I'm confirmed. But I think again the first priority is clear in terms of the cost structure. I would say that it's also important to have the PMAs engaged as they wish to be with their customers in making sure that they are modernizing.

Senator LEE. Would you continue to support these policies if they would, in fact, significantly raise rates?

Mr. MONIZ. No, well, I think the PMAs and their customers would not. Therefore we would not.

Senator LEE. OK. OK.

Do you support carbon tax?

Mr. MONIZ. Sir, first of all it's important to say the Administration has not proposed a carbon tax and has no plan to do so. I think that's the first point.

The second point is Department of Energy is not the locust of discussions about such fiscal policies.

Our job is to, as I said earlier, our principle job is push the technology innovation to get the costs of the low carbon technologies as low as possible.

Senator LEE. Have you, in the past, advocated on this issue on one side or the other?

Mr. MONIZ. For example, in 2008 there was an, of course, an open letter to the next President, whoever it would be prior to the election. That was a time in which there were bipartisan discussions of cap and trade systems. I noted what the implications of that would be.

Senator LEE. OK.

There was a recent GAO report that identified some rather significant duplication among the over 80 initiatives that subsidize wind energy. These initiatives, as I understand the facts to be, incurred nearly $3 billion in obligations for the Federal Government. While some of these programs and initiatives fall under the Departments of the Interior, Agriculture, Commerce and Treasury, a significant number, of course, fell under the Department of Energy.

So leaving aside the separate question of whether the Federal were not to be involved in providing such subsidies at all, does it make any sense that the Federal Government should administer so many of these programs? Should there be so many of these recognizing the significant risk and reality of duplication?

Mr. MONIZ. Senator, I have to be honest, first of all that I'm simply not aware of this report and I'd be happy to look at it and get back subsequently.

Clearly on the one hand I'm very supportive, as we've said earlier, of providing the marketplace with low carbon options. On the other hand I don't think anyone would support duplication of programs if that is in fact the case.

Senator LEE. Right. So perhaps we ought to look at consolidating some of them and thereby reducing duplication.

Mr. MONIZ. I happen to have an open mind and maybe can look at the report and get back with you in your office.

Senator LEE. Great.

I see my time has expired.

Thank you very much for your——

Mr. MONIZ. Thank you, Senator.

The CHAIRMAN. Thank you, Senator Lee.

Senator Manchin.

Senator MANCHIN. Thank you, Mr. Chairman.

Thank you, Doctor. Again, I enjoyed talking to you and appreciate it very much.

I'm greatly encouraged by our leadership of our committee that we will have an all in energy policy. I appreciate your indicating that. It's going to take everything that we have in this great country to become independent.

I know in the past many past secretaries have spoken about the role that coal plays. As you know coming from the State of West Virginia, it's very important. But also it's important to the Nation.

I would like to show you—not the first one, no, basically the demand. This comes from Department of Energy. From 1992 to 2010 this was a demand to load that was expected from each category whether it be coal, nuclear, renewables or natural gas.

Then 2010 to 2040 this is what we're expecting to carry the load of energy in our country. We know that the rest of the world has more of a demand for coal fossil than ever before. When you see that you're still, out through 2040, going to be depending on 35 percent here. Natural gas goes to 30. Nuke stays about the same. Renewables only gets to a high of 16.

With that being said let me show you the past, from EIA again, where your money is being spent. The research dollars, 61 percent to renewables with only a 16 percent return, as you can see. It just doesn't make sense in a business model that this would work. But it seems like we're trying to push that in a direction where this Administration wants the markets to go knowing you're not going to get a return on it.

The only thing I've asked for is a level playing field. I want all. I want wind. I want solar. I want to use everything we have in this great country of ours. But we're not all the same.

If by your own estimation you're going to be using this much depending for until 2040 until if we have the fuel of the future, we

put very little. You talked about sequestration. We're trying to do everything we can. But the Federal Government has never partnered up for a commercial project where we can prove that it can be done and, you know, to a large coal fired plant.

The only thing I'm asking, sir, I think, in the realm of what you're seeing here as far as where we are, our needs and where we're spending our money.

Put this one down.

Where we're spending our money. If you just would take a serious look at this and see if we can balance this out a little bit better. If you're expecting. You've got nothing here where fossil is 18 percent. Well 18 percent and you've got 35 and 30. You've got 65 percent you're depending on fossil. It would seem like there would be a little bit of a kind of balance or a parody there.

That's all I can ask on that.

The other thing I would like to ask as far as how much longer do you think taxpayers will have to subsidize renewables. Renewables until they are able to compete in the marketplace on their own?

Mr. MONIZ. Senator Manchin, by the way, just on the comment, I certainly again and as we've discussed, I'm very committed to having those carbon capture and sequestration projects run forward.

Senator MANCHIN. Sir, I appreciate it. I've followed your writings and basically your philosophy. You've been very, very proactive. We think we can get an all in energy policy. We're not asking for anything unreasonable.

If this is what this country is going to be demanding then we can't just villianize.

Mr. MONIZ. Right.

Senator MANCHIN. OK. Our little states produce an awful lot of energy for this country. We want to continue to do it in the best fashion we can. We need a partnership.

Mr. MONIZ. Agreed.

Then on the second question I personally believe that for any energy source we have to help. I think that our role in the government, if I'm back in the government, if I'm confirmed, is to first of all make sure that the marketplace has options. Whereby marketplace I mean all those who make different kinds of decisions, investors, companies, public servants, etcetera, have the information they need to understand the options to be chosen for producing, delivering and using energy under whatever are the market conditions at that time. The market conditions involve both public and private sector issues.

So for example, you know, a low carbon future may be being called for. It's very important in that context that we understand the renewable options, the nuclear option and the coal with carbon capture options.

Senator MANCHIN. Right.

The only thing I would ask on that is that do you believe and I think you've said, but do you reaffirm and believe that basically we should have an all in energy policy using the resources we have at our disposal in our great Nation.

Mr. MONIZ. Yes. Yes, I'm very with the President on this all of the above approach.

Senator MANCHIN. Not putting obstacles to basically or unobtainable and unreasonable——

Mr. MONIZ. Again our job is on the innovation side. So we're going to push the innovation and——

Senator MANCHIN. I've got to work with the APA to be reasonable. I understand that.

Mr. MONIZ. All those options.

Senator MANCHIN. I just hope that you would be understanding where we're coming from and what needs to be done to balance this out with some parity.

Mr. MONIZ. I do.

Senator MANCHIN. Thank you, sir.

Mr. MONIZ. Thank you.

The CHAIRMAN. Thank you, Senator Manchin.

Senator Alexander.

Senator ALEXANDER. Thanks, Mr. Chairman.

Dr. Moniz, welcome and thanks for your willingness to serve.

I've got a series of questions which I'd like to run through in my 5 minutes if I may.

Senator Franken mentioned the importance of energy research. Would you be willing to work closely with Senator Coons and me as we work to reauthorize the America Competes Act this next year which was first passed with 35 Republicans and 35 Democratic Senators and finally sponsored by the Republican and Democratic leader and to do so in a way that we reduce any program duplications and ensure that ARPA–E is functioning as efficiently as possible?

Mr. MONIZ. Senator, that's a yes.

Senator ALEXANDER. Good.

You mentioned the tax credit for unconventional gas. I believe that was about 12 years.

Mr. MONIZ. That's correct.

Senator ALEXANDER. The length of that.

Mr. MONIZ. I believe that's correct.

Senator ALEXANDER. Do you think that tax credit still should be in place?

Mr. MONIZ. For unconventional gas?

Senator ALEXANDER. Yes.

Mr. MONIZ. Again, sir, it's not in the lane of the Department of Energy, but it seems to me that it's done its job.

Senator ALEXANDER. Yes, it's done its job.

Wouldn't it be a wiser use of whatever—instead of having that tax credit in place or other tax credits for oil or gas or other forms of energy that have become material. Wouldn't it be better to spend that money to try to reach the goal that you and I share which would be to double the amount of research in energy?

Mr. MONIZ. Senator, I think I'm going to kind of really focus on the research area. There's no question, as we said earlier, that I believe we have substantial capacity to increase our research effectively.

Senator ALEXANDER. Senator Heinrich asked about linkage in the Blue Ribbon Commission. Just to make clear. Am I correct that

the report which I have before me, the concern in the Commission was that it did not want the stalemate over Yucca Mountain to prevent movement ahead on the consolidation storage sites?

While it said there needed to be a linkage. That it didn't want the linkage to be something that continues this—that blocks the delegation of consolidationsites. That in fact you said that——

Mr. MONIZ. Right.

Senator ALEXANDER. Consolidation storage capacity should proceed without further delay. Is that not correct? Is that not the spirit of the report?

Mr. MONIZ. Absolutely. Absolutely, sir.

I would just note that yet the linkage did not mean just completely parallel development. It meant doing both in parallel so that we would have geological repositories in a timely way following storage.

Senator ALEXANDER. Would you agree that the Department of Energy's advanced scientific computing research program is the best program to bring the United States to the next level of high performance computing? You're very familiar with that program, I know, from your work.

Mr. MONIZ. I am, sir. The Department has a long history in doing this. It's very important we continue.

Senator ALEXANDER. One of the biggest clean up problems we have in the cold war era is mercury contaminated water ways near Oak Ridge. We've had a radioactivity problem make great progress on that. It will cost billions to clean up the mercury so it doesn't get in the water and people eat the fish and then have the damage.

Dr. Chu was very good on this. He helped us move toward a focus on this. Would you agree that mercury clean up should be a priority? That while we're waiting for the billions of dollars to arrive to clean it up, finally, that a good temporary strategy would be to build a facility at the head of the creek where most of the contaminated water is, intercept the water from it and remove the mercury before most of it gets in our water ways?

Mr. MONIZ. Senator Alexander, I'll have to look in the details of that facility which I have not done. But clearly protecting the safety and health of our citizens is paramount.

Senator ALEXANDER. Following up Senator Manchin's question on carbon capture. It seems to me that one way to develop additional support for energy research would be to continue the research in ARPA–E which is looking for alternate ways to capture carbon and turn it into something commercially useful other than carbon capture. Carbon capture and sequestration might turn out to be too expensive for many parts of the country.

It seems to me the holy grail of energy, after unconventional gas would be to find some way to find a commercial use for carbon that comes from gas and coal plants. Would you think it's a good idea for ARPA–E to continue to invest in research that helps find ways to capture carbon from existing coal and natural gas plants other than or in addition to sequestration?

Mr. MONIZ. Yes, sir. Beneficial use of CO_2 of course would be a tremendous advance. I do note that today we are deploying around 65 million tons of CO_2 to produce around 300 thousand barrels of oil in enhanced oil recovery.

That's one form of beneficial use. But of course that can't be used everywhere in the country. So looking at alternative approaches is quite important.

It has to be an application, of course, of big scale.

Senator ALEXANDER. Yes.

Mr. MONIZ. Because there's so much CO_2.

Senator ALEXANDER. Thank you, Dr. Moniz.

Thank you, Mr. Chairman.

The CHAIRMAN. Alright. Let's see.

It's Senator Udall.

Senator UDALL. Thank you, Mr. Chairman.

Dr. Moniz, I look forward to working with you once you're confirmed on a host of issues. I'm proud to say that Colorado, I believe, is a model in its pursuit of true energy security. If you look across our State we rely on renewables, wind and solar, to be specific and we also have traditional fuel sources, as you know, like coal and natural gas. I'd like to take my time as Senator Alexander did to focus on some over arching issues at DOE, but also on some Colorado specific issues as well.

You're familiar with the National Renewable Energy Lab, NREL, as we know it. It's a crown jewel. I was out at the wind test site just a few weeks ago and had the opportunity to climb up one of the turbines that's being used for research jointly by NREL and SIEMENS. What I saw firsthand besides incredible views was a really impressive public/private partnership.

Could you comment on your vision for those kinds of partnerships? How do you come at that? How is DOE going to continue to support such partnerships?

Mr. MONIZ. Thank you, Senator Udall. First of all, I'm just an enormous fan of private/public partnerships. So I would be seeking, if confirmed, all kinds of ideas as to new ways of moving forward.

I think at NREL they have, in fact, I think pioneered some ways of doing this which is terrific. I would just, without being specific because I don't have a specific at the moment, I think that we should think about having ways of having regional, regionally, focused industry working with public or quasi public sectors to focus on moving solutions that are regionally appropriate. Because again, this was raised earlier that the regional issues for solving our energy problems, I think, are very big. We could probably do more with public/private in that context.

Senator UDALL. I look forward to working with you in that regard.

I know you and I have a shared interest in small modular nuclear reactors, so called SMRs. In fact it's an area I think you know of strong bipartisan agreement on the committee. The Ranking Member, Senator Murkowski, and Senator Bingaman, the former chairman, worked over the past two Congresses to encourage DOE's work to accelerate our understanding of how we might use SMRs.

Could you articulate your views on the viability of SMRs and how do you see the current DOE program moving forward when you're confirmed?

Mr. MONIZ. I should say, if confirmed.

Senator UDALL. I know you have to say, if. I will say, when.

Mr. MONIZ. Thank you.

I've also testified, I think, before this, no, before the Appropriations Committee, excuse me, on SMRs. I think that it's a very promising direction that we need to pursue. I would say it's where the most innovation is going on in nuclear energy.

I think the issue which remains to be seen and can be determined only when we, in fact, do it, is to what extent will the economics in manufacturing lower the costs relative to larger reactors. I think that could be—there's a great potential payout there which goes on top of what are typically very attractive safety characteristics, for example in the design of these reactors.

Senator UDALL. Let me move to climate change.

I was pleased and enthused at Senator Wyden, Chairman Wyden, talked about climate change. It's happening in Colorado. We've had unprecedented droughts. We've had low snow years. We have forest ecosystems that are being savaged by the bark beetle. We had enormous fires last year.

I think it's time to act. I think there's great opportunity presenting itself to us in the context of national security, job creation, of course the environmental benefits.

So would you talk for the remaining time about how a balanced energy portfolio can and could reduce carbon emissions and slow climate change? As I pointed out earlier we're a State that's rich in both renewable and traditional energy resources. How do you see the development of both traditional and renewable resources reducing carbon emissions and curbing climate change?

Mr. MONIZ. Easy question in 28 seconds. I certainly agree that the scientific basis for warranting action is completely clear. There could be legitimate discussions about exactly what one does and at what pace, etcetera.

What do we need to do? It's as you said—go to a low carbon economy.

That will include, as we've said, and you know I've been quoted and many others have been quoted. For example, natural gas among traditional sources as, in this country, being a bridge. We are seeing that. We saw that with the EIA announcement yesterday in terms of the lowest CO_2 emissions that we've had in quite some years in this country with natural gas playing an important role in that.

But assuming that we do go to a very low carbon economy at some point in the future, even natural gas will require capture, for example, as would coal. While we are also deploying the carbon free initiative—options of well, for power, renewables, nuclear and of course, efficiency as an important part of that story, plus the hydrocarbons with carbon capture.

Senator UDALL. Thank you for that. Again, thank you for your willingness to serve.

I'd add one editorial comment which I don't expect you to respond to, but I have great affection for my friend from West Virginia. I looked with interest at the charts he presented. One of the things you have to take into account, however, is the external cost of using coal verses renewables verses natural gas. The charts that he displayed did not include those external costs.

I'll leave it there.

Thank you, again.

Mr. MONIZ. Thank you.

The CHAIRMAN. Thank you, Senator Udall.

Senator Flake is next.

Senator FLAKE. Thank you, Mr. Chairman.

Thank you, Doctor. Thank you for coming by my office. I enjoyed the meeting.

Mr. MONIZ. Me too.

Senator FLAKE. In that meeting we talked a little about the Navajo generating station in Northern Arizona or the NGS. The EPA has issued a—proposed a regional haze rule that would require the plant owners to install the most expensive mission control technology that's known as SCRs. Now they did this even though the National Renewable Energy Laboratory, which Senator Udall referred to, which you will oversee, found that the visibility benefits are suspect at best.

In January the Secretaries of Interior, Energy, as well as EPA have formed a task force to look at this, issued a joint statement to collectively find a solution for NGS. If confirmed will you commit to working with all of the interested parties, including the Senate here, to find a solution that upholds the trust obligations that Secretary of Interior is charged with to honor its water delivery commitments, does not add to the national debt.

Is that something that you see yourself working hard on or can you work with us on?

Mr. MONIZ. Senator Flake, it's of course as you've said, I mean, clearly the decisionmaking here is with Department of Interior and EPA. But I think the Department of Energy has resources that I can use for analysis. I would be happy to work with you and others to apply those to provide—to make sure we have good data.

Senator FLAKE. We appreciate the work and the research that DOE has done in the past which shows that the cost benefit analysis—it's tough to apply or tough to justify the proposed rule of the EPA given the benefits or lack thereof as studied by DOE. So I hope that you'll assert and defend the research of DOE in this regard.

Mr. MONIZ. I will indeed, yes.

Senator FLAKE. Thank you.

Just for a second on cyber security. The President just issued an executive order regarding cyber security for the electric grid. However FERC and other organizations have issued some kind of mandatory enforceable standards that were supposed to take place in 19 or I'm sorry, 2005. We're a long way from there. Then the world has certainly changed in that regard and the threats are different.

What do you see the role of DOE in this regard to ensure that our electric grid is protected on basic cyber security attacks or cyber attacks, I should say?

Mr. MONIZ. Yes, thank you, Senator.

I think cyber security really is one of the greatest threats that we face in multiple contexts. As we know our companies and as I know just in reading, the Department of Energy and its facilities need too, a lot of protection against cyber attack. Specifically on the grid I think we need to bring together the assets across the Department from the CIO to Intelligence to the Electricity Office.

We have a lot of assets, we, the Department of Energy, I should say.

Senator FLAKE. Right.

Mr. MONIZ. The Department of Energy has a lot of assets also in its National Security labs on cyber security. So I think it's two things.

One is we need to work on the technologies, the sensors, controls, distributive decisionmaking technologies, integration systems.

But we also need to work, in my view, combining the national security assets with the energy system to forge a maximally resilient system.

Senator FLAKE. Is your vision compatible with the President's executive order?

Mr. MONIZ. Completely, yes, sir.

Senator FLAKE. Alright.

Mr. MONIZ. Yes.

Senator FLAKE. Thank you.

Senator CANTWELL [presiding]. Thank you. I'm happy to take over for Senator Wyden, who had to run to the Finance Committee for a second and fortunate for me I'm actually next on the list too.

[Laughter.]

Senator CANTWELL. So I don't know how I got that good. But following me will be Senator Risch.

So Dr. Moniz, thank you very much. You and I have had many conversations about a variety of issues. But obviously first and foremost on my list is Hanford and Hanford cleanup. I want to get a couple off the list.

First of all, I hope that you'll make it a priority to visit Hanford very soon in your tenure as Secretary of Energy.

Mr. MONIZ. If I'm confirmed.

Senator CANTWELL. If confirmed.

Mr. MONIZ. I certainly will. If I may say, Senator Cantwell, I think the—particularly seeing the recent DNFSB letter laying out the issues.

My plan would be to get hard briefings immediately.

Go to the site because I think you need to be there to understand the issues.

Come back.

Work with the chairman, work with you, Representative Murray and make sure we get a plan together going forward and do that expeditiously.

Senator CANTWELL. Great. That was first and foremost.

Second, we always have to remind ourselves that this has to be based on good science and good timeframes. So you believe in living up to the tri-party agreement?

Mr. MONIZ. The tri-party agreement is an agreement that we have to strive to satisfy. I will also be straight forward in opening a discussion if I think that there are challenges that are rooted in the science and technology. Certainly my intent is to work with you and the other members to adhere to the agreement.

Senator CANTWELL. But you believe in that document as an agreement by the Federal Government to those milestones?

Mr. MONIZ. It is an agreement with milestones.

Senator CANTWELL. OK, great.

What about this issue of the supplemental and how it impacts Hanford cleanup? Do you think that this is an important enough issue that we shouldn't be looking at ways to cut funding if that means not living to the tri-party agreement? I'm not trying to get you to make a forward looking statement.

Mr. MONIZ. Right.

Senator CANTWELL. As it relates to the Administration and the budget as much as I'm trying to emphasize. Do you believe in cutting the budget, including Hanford cleanup, if it's going to miss the milestones?

Mr. MONIZ. Clearly, I support trying to meet the milestones and that will require having the budget to do it. Again, I don't know what the budget is. I don't know the path forward.

I can assure you that I will work with you and the other involved members to try to do the best we can a, to get the resources and b, to use what resources we have most effectively.

Senator CANTWELL. I think I mentioned to you in my office, I'm literally for Energy Secretaries for life or until Hanford is cleaned up.

Mr. MONIZ. Or until Hanford is cleaned up.

Senator CANTWELL. Because every time a new Administration or new Energy Secretary comes in somebody comes up with a brilliant, oh this is the best way to do it. This is how we're going to do it. So and they come up with a new idea.

It usually ends up costing millions or billions of dollars. Then they thwart it or we throw it out or we basically say no, you can't clean up 97 percent of the tank waste. You have to clean up 100 percent of the tank waste.

I wanted to get your thoughts on the issue of the commission you served on and separating out military waste because one of the issue that has thwarted us in looking at the larger nuclear waste repository issue is that Hanford has—will have with the VIT plant producing vitrified logs, a need for storage of this military waste. Should we move forward on looking at that as a solution of separating the military, the defense waste, from other waste?

Mr. MONIZ. Senator Cantwell, that was a very spirited discussion in the Blue Ribbon Commission. The origin of it is that clearly the conditions that led to the decision in the 1980s to co-mingle are no longer arbitrative. So therefore a re-look is certainly in order. The Blue Ribbon Commission recommended that. If I'm confirmed, I really want to push that evaluation.

Senator CANTWELL. OK. You mentioned in your testimony about smart grid. Obviously we want our national laboratories to move forward on that. Obviously we would love you to visit PNNL while you're also out in the Northwest.

But making a commitment to our national laboratories in development of smart grid technology, I'm hoping that you're going to move forward on where Secretary Chu has been on developing a more concentrated strategy for our national labs.

Mr. MONIZ. I believe that we——

Senator CANTWELL. I just want to clarify, not concentrated as in only one lab as much as make a focus of national——

Mr. MONIZ. No, no, no. Yes.

Senator CANTWELL. Yes, thank you.

Mr. MONIZ. Thank you for the clarification. But I feel that the Department and the labs work best when working together in a strategic way on the major mission priorities. The grid is one of those.

So frankly I'm going to be looking, I think, to working in a somewhat different way with the laboratory directors so that frankly they are engaged more in the strategic decisions about where we all go together.

Senator CANTWELL. Thank you.

Senator Risch.

Senator RISCH. Thank you.

I'd like to thank you for taking the time and coming to my office and meeting with me. I thought that was very helpful. I appreciate it.

I want to underscore again the conversation we had about the cleanup at the Idaho National Laboratory. Probably out of all the projects you've got going on that incorporates your philosophy. You said so in your statement here. I was glad to see this where you acknowledged that the cleanup from the cold war is a legal and moral imperative.

Probably the closest one you have is in Idaho. I want to encourage you to continue to keep your foot on the accelerator on that because that's one where you can actually have a victory. Get the cleanup done over there. I think it would be good for the DOE's image and good for the Federal Government's image to get that done.

I thank you for listening to me on that. I want to encourage you to continue along that line.

Second, I'd like to hear your ideas. We talked a little bit about this, but I'd like to hear your ideas. You just touched on it briefly with what you're thinking about the laboratories.

I'd like you to elaborate on that a little bit. Because as we all know we're heading into an era where Federal spending is, because of the skyrocketing costs of the social programs that we have, other Federal spending is going to be crimped back aggressively, I think. I think the sequester that we saw is just the tip of the iceberg to what's coming.

What are your ideas about operating the laboratory, the national laboratories, and how you're going to move forward with that given the more restrained Federal spending climate that we're going to be in?

Mr. MONIZ. Senator Risch, again on the first point, I think we had a good discussion. We're on the same page, I think, there.

With regard to the laboratories, the—first I think there are some statements that are important to make which are, in some sense, independent of the budget levels. I don't know what the budget levels are going to be. I've said in my, well, in my written testimony that, you know, there's no question DOE has an unparalleled national laboratory system to pursue its multiple, complex missions.

What I was trying to communicate in the last response is that I think that we can improve the way in which, particularly the labs, the laboratory directors are engaged with the department, not just as kind of performers, but as part of the planning of where we're going. So in the Idaho case, for example, there would obvi-

ously be a special role in nuclear energy where Idaho is the lead laboratory. So John Grossenbacher should be part of the discussion about where we're going together with his fellow lab directors who are heavily engaged.

Senator RISCH. He's the right guy for that job, by the way.

Mr. MONIZ. Yes, yes.

Senator RISCH. Incredibly good at what he does.

Mr. MONIZ. I've known John for many, many years. It's quite effective.

So I think in ways I don't quite yet know, but if confirmed I really want to treat them much more as resources for how we plan going forward. I'd like to see the laboratories have relatively more of their work performed by significant multidisciplinary teams who are managing a big mission challenge for the Department and for the country with multiple years. I think the labs work best and most effectively when they have kind of a, you know, the kind of long term commitment to manage a hard problem.

Also, that's how they complement most the universities in terms of ways of working.

So that's kind of my philosophy. Then we've got to try to fit that into the size of the bucket that we see coming forward.

Senator RISCH. Thank you so much. I appreciate your thoughts on that.

Mr. MONIZ. Thank you.

Senator RISCH. Thank you, Madame Chair.

Senator CANTWELL. Thank you.

Dr. Moniz, before my colleague leaves from the Northwest I wanted to bring up an issue about cost based power in the Bonneville Power Administration. Obviously one of the issues that we care deeply about is to make sure that we continue that and that the Northwest delegation, you know, EPA ratepayers, you know, there's always an attempt every few years to try to re-focus that.

I wanted to get your commitment on continuing to make sure that BPA has strong jurisdiction within the Department of Energy relative to other ideas that people have about living up to the structure of BPA and how it exists today.

Mr. MONIZ. Senator Cantwell, I think there's no question.

First of all, I understand completely the importance of the PMAs in hard regions of the country. Bonneville is certainly a major player. We are committed, I think to maintaining sound management. The commitment to delivering low cost power to the customers and working with BPA and the interested members in a collaborative way also to make sure that they are, you know, developing in a way that's important technically and important for the Northwest.

Senator CANTWELL. I also wanted to get your comments quickly. I don't know if, I think Senator Wyden is making his way back here. So if he gets here in time we won't recess. But if he doesn't I'll have to recess for a short period of time and then pick back up when he does come back from a vote.

But I wanted to get your comments on the Manhattan Project National Park which is preserving the B reactor at the Hanford site and Department of Energy's commitment to moving forward on that with, obviously, Interior and also on land exchanges. Part of the land that we've been successful in moving forward on at Han-

ford has given us the ability to say that once this cleanup is there and completed that there's a possibility to move forward with moving that land into other functions once the cleanup is completed. So I wanted to see if you know of any reason why that would be held up in the future, either of those projects.

Mr. MONIZ. No, I don't. I know of the projects. I know of the, of course, the desire for beneficial use of additional land in there for economic development, Senator. But I don't know them in depth. I will certainly work with you on that. I certainly see no reason why that wouldn't go forward.

But again, I will be happy to work with you and your office on that.

Senator CANTWELL. OK. Then lastly, I know my colleague at the beginning of his statement had a chance to talk to you about renewable energy, but as part of the mix in portfolio. Do you see an opportunity looking back at some of the resources that we have been talking about as a way to better streamline? When you look at the marketplace and how things are being financed for clean energy solutions, do you see a better way for us to make continued progress on clean energy solutions in the development of new technology?

Mr. MONIZ. I'm certainly aware and very interested in a number of discussions about different approaches such as, you know, extension of mass limited partnerships, REITs to clean energy. If those prove to be—and I know in here members are also interested in those approaches, those or others that can help move a lot of, kind of, private capital into the game would be very, very, very interesting. I would love to work on those with the members.

Senator CANTWELL. I was thinking a little more in the sense of the Small Business Administration has been a very big catalyst for luring private sector dollars into, but by coming up with a very cost effective cheap capital to help secure private sector investment. My question, we've had a lot of this conversation on this committee about the loan guarantees and the complexity of what it takes the Department of Energy to sign off on a project. But when you think of something in a more turnkey style where a little bit of Federal dollars could be leveraged 20 to 30 times by the private sector in more of a model that would be simple in the context of the great thing about renewable energy and electricity is that you actually have a revenue source because of the power that's being generated.

So I just wondered if you had thoughts about that?

Mr. MONIZ. I think I'm going to need to listen on that and get more good ideas. But again the general idea of finding mechanisms, especially to leverage private resources, I think, would be very, very effective.

Senator CANTWELL. Thank you so much.

Mr. MONIZ. Thank you.

Senator CANTWELL. Senator Portman.

Senator PORTMAN. Thank you, Madame Chair. I appreciate it. You're a good filibusterer.

[Laughter.]

Senator PORTMAN. That means you're a good Senator.

Thank you, Dr. Moniz, for your time today and for having the ability to join me yesterday to have some good discussions about many of these issues.

I appreciate what you said earlier in response to Senator Udall on the small nuclear modular reactors. As you know the SMR program is very important to our State. I think it's critical to our energy future and in terms of low carbon future certainly nuclear power needs to play a role. I'm not going to ask more questions about it because I thought you answered the question appropriately to say that you do support the deployment and moving forward with the understanding that we need to look at the cost side.

You also talked about fracking and horizontal drilling today. I was here for part of your testimony on that as well as your response to some questions. As you know it's critically important to our State. You and I talked about the importance for our energy future, but also for our economy and specifically the renaissance of manufacturing or at least the potential for it if we don't screw it up.

Meaning that having that feed stock is important for a petrochemical business, but also having that affordable, steady supply of natural gas is critical for other energy intensive industries. We're seeing some exciting possibilities in Ohio and around the country. As you know, companies being able to relocate back into States and to add employment at a critical time when, as we've seen in that latest jobs numbers, we need those jobs badly and particularly the good paying jobs that result.

So those aren't questions I'm going to ask. I'm just going to assert on the record that you agree with me on that.

By the way, Ohio has put in place regulations, actually they date back to the 1970s, as you know, and recently updated. We want to be sure it's going to be done in an environmentally safe way and the State is handling it. So I would appreciate your sensitivity to that as well.

An issue that has come up apparently to attention today already is enriched uranium. I believe one of my colleagues on the Republican side asked a question about the barter agreements and related it to USEC and the so called American Centrifuge Project. Those are unrelated.

As you know the agreement has to do with the cleanup. The cleanup is ongoing at the Portsmouth gaseous diffusion plant which is in Ohio in Pike County. The cost of that, as you know, is significant and the bartering of uranium from the DOE stockpile has been critical to keep that project alive. We should all be for that because it enables us to ensure that there's adequate funding for demolition and waste disposal which will save money to the taxpayers over time.

We also, I think, need to be clear that this directly offsets an equal amount of taxpayer funds who would otherwise be used. But I just wanted to clarify on the record that barter agreement which I support is critical to our cleanup efforts in Piketon, Ohio at the Portsmouth Gaseous Diffusion Plant is the one related to the barter agreement not the centrifuge technology. It's separate.

Mr. MONIZ. Right.

Senator PORTMAN. So let me ask you a quick question on that. Do you intend to continue this program on the barter side understanding that the stockpiles are limited?

Mr. MONIZ. Yes, I believe there's an agreement in place that already has the forward limits, at least on bartering. I think that's part of the overall uranium strategy and the cleanup strategy and our ability to pay for it.

Senator PORTMAN. Thank you.

With regard to the American Centrifuge Project, as you know, I've been involved in this for the last decade. It's something that I think is critical for our energy security, certainly to have enriched uranium for our power plants. But it's also critical for our national security in a few ways.

One, of course, is we need tritium for our nuclear arsenal. I know you're an expert on this. It encourages me that you're stepping up to take on this role because I think we need right now to focus on that issue.

Then second, of course, with regard to nuclear proliferation we want to be able to tell other countries that we have the ability to supply them this enriched uranium. They don't need, frankly, to go down that track themselves without a domestic source. Obviously it's impossible for us to do that.

Finally the nuclear Navy, you know, our nuclear Navy reactor program depends on this enriched uranium.

As you know we have this technology at Paducah only now and that Paducah plant is being phased out. It requires a lot of energy. It's 60 years old. It's inefficient, outdated technology. Everyone acknowledges that.

So what I, if I could, ask you a couple questions.

One, do you agree with Secretary Chu, who testified on this as did Assistant Secretary Peter Lyons that the United States must have technology for a fully domestic source of enriched uranium to support our nuclear weapons program and the Navy nuclear reactor program.

Mr. MONIZ. Yes, sir. It's a requirement that we have American origin technology for enrichment.

Senator PORTMAN. Do you agree that international agreements including treaties prevent us from purchasing enriched uranium from foreign owned companies for military purposes?

Mr. MONIZ. That is certainly my understanding, yes. Yes.

Senator PORTMAN. So, again, I appreciate your interest and involvement. I know you visited the plant before. As I told you yesterday, extend an invitation for you to visit again.

There are about 120 centrifuges in place. They're moving forward with the R, D and D program which has been supported by DOE. They expect to have that program completed by the end of this year. At that point they'll be amending their application.

I would ask you today, if confirmed, will you personally focus on this application to ensure that this loan guarantee program gets the attention it deserves?

Mr. MONIZ. Yes, sir, I will. Certainly the, as you imply, I mean the next months will be very important to demonstrate the cascade performance.

Senator PORTMAN. Thank you, Dr. Moniz.

The final thing I want to ask you about it energy efficiency briefly. I know the chairman, who has now returned, and I wanted to wait and talk about it in front of him because it's always good to talk in front of the chairman about something he has said. So that he might actually have a hearing on your bill.

But he indicated he is interested in moving forward with a hearing on S. 1000 which was legislation that Senator Shaheen, a former member of this committee and I introduced last year. We're planning on reintroducing it. We think it will be—the legislation will be broadly supported again by a broad range of individuals and companies and trade associations including on the energy efficiency side, but also a lot of manufacturers who are interested in the technology.

So I would ask you today would you be willing to work with us on that to ensure that energy efficiency becomes a focus of this Congress and a continued focus of yours. I know you have an interest in it.

Mr. MONIZ. I would be very eager to do so. I think efficiency, as we discussed, is just an absolutely central part of our strategy going forward.

Senator PORTMAN. I am concerned a little bit about what I see happening at DOE under the current leadership with regard to the role of the advanced manufacturing office. The direction of R and D at the Department seems to evolve a lot. It's changing again.

As I see it this clean energy manufacturing initiative that's housed in the Advanced Manufacturing Office is an example. According to your Web site it focuses on the—well not your Web site.

Mr. MONIZ. Not you——

Senator PORTMAN. My Web site, soon to be yours. American competitiveness and clean energy manufacturing will strategically invest in technologies such as solar panels, carbon fiber additive manufacturing. To me this seems like a shift away from the traditional role of providing energy efficiency, deploying technology so it's research rather than the deployment. I know that some in the industrial sector are concerned about that.

Is this a mission of the Advanced Manufacturing Office? It seems like it's more the mission of ARPA–E in the Office of Basics—or the Office of Science, Basic Science. Is it the role of the Advanced Manufacturing Office to invest in manufacturing of solar panels, for instance or is it more for deployment of this technology?

Mr. MONIZ. Senator, I'm going to have to, I think, study that, if I'm confirmed, and try to understand the various roles and who has what. I do think that it is important somewhere in the Department, certainly, to support innovation in manufacturing processes because that's an important part of cost reduction.

Second I think it's important to also do what I think you inferred to and was done 15 years ago in a program called, Industries of the Future which was convening our energy intense industries to understand the road maps to improve efficiency and save money for them and make them more competitive as a result.

Senator PORTMAN. Yes, I think if you wouldn't mind taking a look at that, that would be much appreciated.

Mr. MONIZ. I will do that.

Senator PORTMAN. I think what you'll find is a lot of the industrial sector like the Industries of the Future program. I think that's the more appropriate role for that office, not suggesting that science and research shouldn't also be done in other offices. But this office is the one that exclusively is involved in this deployment of the technology and as you say providing, kind of, a road map for efficiency.

I have way overstepped my bounds in terms of time, Mr. Chairman. But I appreciate your indulging me. Thank you for your comments on efficiency earlier.

The CHAIRMAN [presiding]. Senator Portman, thank you.

I think you and Senator Shaheen have really been a model for going after energy in a bipartisan way. We're going to work very closely with you. My view on your energy efficiency bill is we ought to bulk it up as strongly as we can because I think this is clearly a path forward and there's bipartisan support for it. So I look forward to working closely with you.

The Senator from North Dakota, Senator Hoeven.

Senator HOEVEN. Thank you, Mr. Chairman.

I particularly came back because I wanted to hear the insightful questions offered by the distinguished Senator from Ohio, but also to greet Dr. Moniz. As so many have said, thank you for taking time to visit with me.

Mr. MONIZ. Thank you.

Senator HOEVEN. I appreciate it. I appreciate your very open, congenial attitude about talking with us. I hope and believe that will translate into the working relationship as well.

Let me start off my questions with hydraulic fracturing. I know you've had some questions on hydraulic fracturing. But my first question is do you see hydraulic fracturing across the country as the same? In other words is hydraulic fracturing in New York and Pennsylvania the same as hydraulic fracturing in North Dakota the same as hydraulic fracturing in Texas? Is it all just the same?

Mr. MONIZ. They all involve hydraulic and they involve fracturing. However, the applications are quite, quite different. The shale plays are quite different and——

Senator HOEVEN. Right.

So you'd say that there's tremendous differences as far as hydraulic fracturing in different places across the country, right?

Mr. MONIZ. Hmm-hmmmm.

Senator HOEVEN. Therefore, would you say a one size fits all approach is the right approach, never as if it's completely different across the country does a Federal one size fits all approach for every situation work?

Mr. MONIZ. Senator Hoeven, again, what I would say is that, you know, first of all at a very high level what is, I think, needs to be, kind of, uniform is we need to have best practices being used everywhere across the country. Now what those are will vary by site. I think there's no question that the states will have a very important role.

Again, the DOE is not doing regulation. But I think just the physical realities called for for states to be heavily engaged.

Senator HOEVEN. So combining those—and I understand obviously EPA is the primary regulator. Your responsibility is to help

us develop energy and do it with good stewardship. Of course, that's what we want. We look forward to working with you in that endeavor.

But based on the things that we're talking about, the fact that hydraulic fracturing is different across the country and that a one size fits all approach doesn't work, then do you see opportunity for the states to really take a lead role and help us develop these incredible resources with some fundamental safeguards. For example, making sure we have transparency and, you know, obviously there's some things that may be common across the country. But really isn't there an opportunity here to build on a State's first approach?

Mr. MONIZ. I think you're, again, when you say things like transparency again is something that is, kind of, a ubiquitous principle. Clearly the companies coming in, they are, you know, advancing the process according to the local geology. There's local water issues to be addressed.

Once again, I think, there's no doubt. Again, DOE will not be involved in regulation. But in terms of some of the technology developments, we might be. Those could be applied in different ways. Certainly looking at things like the integrated use and disposal of water is a place where, again, there may be some research developments which could be quite helpful and applied in different geologies.

Senator HOEVEN. In order to get to energy security I believe we've got to find ways to empower investment. That takes some flexibility. But by empowering investment you drive the technology deployment that produces more energy with better environmental stewardship. Clearly you're going to have a role in doing that.

How do you intend to promote that role? I'm using hydraulic fracturing as an example because look at the amazing opportunity we have if we empower that investment? How do you propose to do it?

Mr. MONIZ. In general looking forward I must say it would be wonderful to replicate the historical success of how DOE public/private partnerships and policy all come together to have take off really, lift off, in a major part of our energy sector. So I think those are the kinds of areas that I'd like to work with you and others.

Senator HOEVEN. Would you be willing to work with me on the type of State's first legislation that would empower more investment, as I've described, in things like hydraulic fracturing, carbon capture and sequestration and other energy development? Are you willing to work on that?

Mr. MONIZ. In this sense——

Senator HOEVEN. Not only the technology——

Mr. MONIZ. Yes.

Senator HOEVEN. But the legal, tax and regulatory environment. Because we're going to have to do both to really get to the kind of energy security we want.

Mr. MONIZ. Senator Hoeven, I think that really would not be appropriate for the Department of Energy to work on that legislation directly. However, I would note that one of the initiatives that we hope to move forward, again, the so called quadrennial energy review which is exactly an environment in which all of the relevant

agencies across the government will be coming together to try to advance a coherent policy. I think in this particular sphere the QER would try to address the issues that you've raised.

Senator HOEVEN. Mr. Chairman, if I may ask for just a couple minutes?

How do you see advancing clean coal technology and carbon capture and sequestration? You've either got to reduce the cost or create revenue sources or both? How do you propose to do that?

For example, do you see working with MIT and the Energy Environmental Research Center at the University Of North Dakota? Is that a way to do it?

Right now we seemed to be stalled. How do we get that ball rolling?

Mr. MONIZ. Since I will be recused from working with MIT, I guess it will have to be North Dakota.

Senator HOEVEN. Good answer.

[Laughter.]

Mr. MONIZ. I think the, again, I think there are various different issues to be addressed to get CCS advanced.

One is long term and I prefer decadal projects of injecting large amounts of CO_2, monitoring it, etcetera. That is essential for getting public confidence and getting a regulatory system in place. That we can accomplish using some of the projects that are now being funded with this nearly $6 billion.

On the cost reduction for carbon capture it is, I think, and for the beneficial uses of CO_2 both. These are areas still in research. I take, in kind of a strange way, I take comfort and have confidence that's there's a lot of run room to get these costs way down because we haven't done very much yet in terms of novel approaches to carbon capture, for example or utilization.

The one exception to utilization is enhanced oil recovery. Probably in your part of the world there may be opportunities there because I mentioned earlier already we are producing 300 thousand barrels of oil per day from CO_2 EOR. The estimates are maybe a factor of 10 more is possible. If we can do 3 million barrels a day of enhanced oil recovery from CO_2 and pay the CO_2 capturer $20 or $30 a ton and have that cost down. Suddenly we have a very interesting situation.

Senator HOEVEN. Dakota Gasification Company currently takes coal and gasifies it producing synthetic methane and then captures the CO_2, compresses it, puts it in a pipeline and uses it for tertiary oil recovery in the Canadian Weyburn oil fields.

Mr. MONIZ. Right.

Senator HOEVEN. There is a lot we can do partnering traditional and renewable sources. Are you committed to helping us do that and finding ways to drive that forward? It's going to take pushing the envelope on some of these things and getting people to come together from both the renewable and the traditional camps.

Are you willing to do it? How do you plan to do it?

Mr. MONIZ. The President is an all of the above person. I'm an all of the above person.

Senator HOEVEN. But in a practical way you can help drive that process?

Mr. MONIZ. I'd be happy to work with you on that, yes.

Senator HOEVEN. Thank you.

Mr. MONIZ. Yes.

The CHAIRMAN. The Senator from North Dakota knows that I'm going to work very closely with him on these issues. I'm looking forward to coming out to North Dakota and looking at your communities that are addressing these questions.

Senator HOEVEN. Mr. Chairman, we appreciate that very much. Thank you.

The CHAIRMAN. Thank you.

Dr. Moniz, just on the point of best practices there's an area you'll be able to help us with pretty quickly. The committee is going to start natural gas workshops here next month. One of them will be on environmental issues and particularly with respect to Federal lands.

It would be natural to have your expertise with respect to best practices and part of what you were addressing with the Senator from North Dakota. So we'll follow up with you on that.

Mr. MONIZ. Great. If I'm confirmed I'd be happy to cooperate.

The CHAIRMAN. Let me ask you about one other question quickly and then I want to turn to Hanford because we have the good fortune of having my colleague, Senator Cantwell, here. I'm going to work very closely with her and the Washington delegation on all of those issues.

The one question before we get to Hanford is the issue of energy storage. This has been a source of some frustration both for me and for the committee because, as you know, this is a field with great promise. This is really a catalyst for the expanded use of renewables, particularly when you're talking about solar and wind and sources that are intermittent. If we can get a serious effort underway in this country to promote energy storage, this could really be a spark in the area that you and I have been talking: expanding renewables and driving the cost down.

In the past I've introduced, as a member of the Finance Committee, tax legislation, for example, to catalyze investment in the private sector. But what's been frustrating is trying to get the Department to put in place an actual plan on energy storage. In effect, to get all those cubicles in the building down there, I guess it's the old Forest building together and work with the private sector and work with the research community to actually develop a technology plan for energy storage.

We have been trying for 3 and a half years, Dr. Moniz, to get a response to this request. So my question to you is, as you know, I support your candidacy here. Will you commit within 30 days after you are confirmed to get the committee an actual plan on energy storage?

Three and a half years.

Mr. MONIZ. Yes. First of all, as you know, I completely share your view that large scale storage is a key enabler and we should be pushing it.

Second, in my last go round, as you say, working across the cubicles was in fact a signature of what we did in terms of portfolio development. I will do that again.

I will definitely push this plan aggressively. I'm reluctant on the 30 days, to be honest.

The CHAIRMAN. You want 60 days?

[Laughter.]

The CHAIRMAN. Let's continue these discussions. I hope you see.

Mr. MONIZ. Yes.

The CHAIRMAN. The sense of urgency here. I wouldn't be pushing for a date certain if it wasn't for the fact a, this is such a promising field, b, it is directly related to the area you and I share which is tapping the opportunity for driving down the cost of renewables and c, we've been asking for 3 and a half years.

So we'll continue the discussion and think about 60 days.

Mr. MONIZ. I will think about 60 days. I would say my only reservation in that is that I feel it's very important to convene appropriate individuals, not just from the building, but from universities, laboratories, industry and that process may take a couple of months.

The CHAIRMAN. That's 60 days.

Mr. MONIZ. But I think expeditiously, yes.

The CHAIRMAN. Great.

Why don't you—let's leave this. Give us within 30 days a date when we'll have it, alright?

Mr. MONIZ. Bingo.

[Laughter.]

The CHAIRMAN. That wasn't water torture.

[Laughter.]

The CHAIRMAN. Let me turn to the question of Hanford. As I said I've been talking to our Washington colleagues, Governor Inslee, the chairman in the House, Doc Hastings, when I was up and of course, my friend, Senator Cantwell here.

I am not a scientist, Dr. Moniz. I have been digging into this, you know, Hanford issue now for decades. Sometimes you feel on Hanford the more you learn, the less you actually know because it is obviously an extraordinarily complicated topic.

What I have given great weight to over the years is when you have an independent, government board layout specifically what the problems are. I'm going to ask unanimous consent to put into the record the analysis done for me by the Defense Nuclear Facilities Safety Board that was done last week and without objection that will be done.

As you know, Dr. Moniz, you and I have gone through some of this before. We had a pretty spirited discussion about some of these challenges in this hearing room in 1997 when you came before us to be confirmed as Under Secretary of Energy. The problem, obviously, as documented by the Defense Nuclear Facilities Safety Board, has not gone away. Not only are the older single shell tanks leaking, but now the first double shell tank is beginning to leak. The board noted there's a continuing threat of fire and explosions in the tank farm from the generations of hydrogen gas. This is a problem that has gone on for decades.

Now the board in their letter also outlines a long list of unresolved design issues, starting with the risk of hydrogen explosions in the waste treatment plant as well, lack of adequate information about the wastes that are going to be processed, problems with the design of the waste mixing system in the plant, problems with the potential erosion and corrosion of the piping in the plant, and prob-

lems with the electrical system in the plant, to name a few. Again, these are the findings by the Defense Nuclear Facilities Safety Board. This is not a bunch of people who sort of dabble at it. These are independent experts.

I've got a couple of questions and then I certainly want to let my colleague have the last word on this issue. So my question to you to begin: Is the Department of Energy's status quo at Hanford acceptable to you?

Mr. MONIZ. No, sir, it is not.

The CHAIRMAN. Would you like to outline at this point because I have a number of other questions. Going in what is your assessment of what needs to be done recognizing that you're going in. But we also recognize that you have considerable expertise in this because you've got this history. Let's get your take on what needs to be done.

Particularly given the fact that, as the years have gone by, the price tag has gone up. Billions of dollars involved. What is your take about what the Department of Energy needs to do given that you have said the status quo is unacceptable?

Mr. MONIZ. Senator Wyden, let me ask you first, say, going back to the spirited discussions that you referred to that when I was Under Secretary you pointed out some issues that frankly I was—had not been aware of. I think we made some progress on. They range from science like really advancing the beta-zone science to managing some of the issues that we had at that time.

I think we were successful with moving the K-basin fuel, for example, away from the Columbia River. We also, I think, addressed at that time the, for lack of a better term, the hydrogen burp problem that we had, particularly in one of the tanks.

Now we come today and first I wanted to say that I read this very thoughtful DNFSB letter that you requested. Let me comment maybe along the lines of the 3 areas that they bring out. By the way I mentioned earlier to Senator Cantwell that I want to, upon confirmation, assuming I am confirmed go into this quite deeply.

Secretary Chu, I mean, obviously was very much looking into this. I might even note that my first meeting with him, the first issue he raised was the Hanford technical situation. So I will really study this very hard first.

Second, I will want to go out to the facility to the site, understand it in detail.

I will want to meet, in a serious way, with the DNFSB after I've learned more.

Then, I think, we need to work together to get a real plan put forward as soon as we can to go forward.

Now on the 3 areas.

The first was with the tank farm. For example, I mentioned that we, I think, did resolve that hydrogen burping issue then. We had the watch list, etcetera. But of course, hydrogen is constantly evolving and 5 of the double shell tanks are in fact showing these periodical leases.

I think DNFSB had recommended and I believe the Department adopted recommendation in terms of the ventilation system and understanding air flows individually through each tank. Make sure we are always well below any risk level in the hydrogen. That

would be a very important thing to understand in detail and to follow up on.

On the waste treatment facility plant, the WTP, I'm again beginning to understand some of the challenges there. As far as I could see the statements made by the DNFSB in their letter regarding the technical issues are very much along the lines of what I heard in my initial, at least, briefing on this subject. So there's seems to be agreement, at least, on the major challenges. It doesn't make them easy to solve.

Characterization of the waste remains a challenge. That's an area I want to drill down into very hard and make sure we understand what the options are.

Third was the safety culture. There the DNFSB did say that the Department had taken a number of positive steps in this direction. More work was to be done. I think we have to take the attitude that it's simply unacceptable not to have the safety culture in a place where we want it to be.

So those are the 3 key issues. As far as the technical path forward and the plan, I suspect the second of those, the waste characterization, the feed into a pre-treatment plant, the vitrification plant, the issues of the black cells are those that we will have to make sure we are on the right track. Then, if we are, go do it.

The CHAIRMAN. Let me just spend a couple minutes in each one of those areas starting with the tank leaks.

Now, I think you're aware that when I was a member of the House, legislation was passed that would call for the monitoring and management of the tanks at risk for leak or explosions. The Department since declared that what was on that watch list was stabilized. Now we have this recent announcement that at least 6 and as many as 20 tanks may be leaking.

Here's what has troubled me. Again, Senator Cantwell and I have talked about this in terms of the role of the Department, what the Department's role has been in this. The Department has apparently told the committee staff that it would take 2 years just to decide whether or not the tanks are going to be officially declared as leaking tanks. It's hard to tell the people of the Pacific Northwest that it's going to take 2 years to determine whether tanks that look like they are leaking are in fact officially leaking.

So I want to again stress the role of the Department of Energy here. I don't think it's acceptable to just say we're going to take 2 years to make a determination. Will you look at that issue specifically and get back to me?

Mr. MONIZ. I will.

The CHAIRMAN. All the members of the Northwest Congressional Delegation. It goes right to the heart of the responsibilities of the Department.

Mr. MONIZ. I will.

The CHAIRMAN. OK.

Now on the vit plant, a question with respect to Secretary Chu, again, going to the role of the Department. Earlier this year Secretary Chu expressed his confidence that construction could be restarted on some parts of the waste treatment plant other than the pre-treatment facility. The Department has suggested that it can

simply bypass the pre-treatment facility and send radioactive waste directly to these glass, you know, melters.

The safety board, again going to the role of the Department, points out that these other parts of the waste treatment plant were never designed for, I guess, conceptually it's called the direct feed.

Mr. MONIZ. Direct feed.

The CHAIRMAN. Will you address these concerns and get back to us? Again they come from the safety board, address these concerns about design problems at the waste treatment plant?

Mr. MONIZ. Yes, sir. I certainly saw that in the letter very, very sharply, this issue of alternative strategies and the board raising potential problems with that. So that's an area that's going to need a really deep, deep consideration.

It's critical because of the whole waste pre-treatment plant.

The CHAIRMAN. Finally, as you know, there's been this great debate about the safety culture there. Some make this point and others make another point. I understand that.

I met with the whistle blowers when I was at Hanford recently. Will you commit to meeting with the whistle blowers as well? These are people with extensive scientific experience in many instances.

I think it would go a long way if you would send a message that—and I was very glad that you told Senator Cantwell that you'd be out for a visit. I think it would go a long way if you say that you would personally meet with a group of the whistle blowers. We can get you the names and the Washington delegation can as well.

Mr. MONIZ. I would be happy to. In addition to meeting, of course, with the contractors etcetera and making it clear that what the expectations are in terms of the safety culture.

The CHAIRMAN. Let me see if Senator Cantwell has additional questions and comments.

Senator CANTWELL. Thank you, Mr. Chairman.

I certainly welcome your leadership. I don't think I've been at a hearing where Hanford and Hanford cleanup has been mentioned so many times by the chairman of the committee. So I certainly welcome the focus and welcome your visit to the Pacific Northwest and your visit at Hanford.

I guess as I have looked at this over 12 years the complexity from the science side of this has always interested me. As I said in my statement earlier that I think oftentimes people come in as a new Secretary and/or individuals underneath the Secretary and propose new ideas. I could provide the committee with a long list of those. Some of them have not gone so well.

But I guess from the perspective of some people who've talked about reprogramming dollars, which is always a concern, away from Hanford because of not being able to understand or crack the science. I guess I'm asking you, Dr. Moniz, whether you think that this is an issue that we don't know the answers on a scientific basis, or yes, these are problems, but any project of this magnitude and size is going to have problems from a scientific perspective that we have to solve.

I guess my question is do we know what the issues are? Are they solvable scientific problems? Are you committed to making sure

that the Department of Energy puts forward a budget that will help us solve these in a timely fashion so we aren't waiting 2 years to find out an answer about tank waste?

Mr. MONIZ. Senator Cantwell, on the first question about the scientific situation. I mean, that's what I really have to do to make my own mind up I have to go look at it carefully. My guess is that I'll come to the conclusion that the key uncertainties are identified. But there may be still some specifics in there where we'll have to do a little more work.

That's only a guess. But for example, I mean, I know going back years at how different the understanding of the waste composition is in different tanks to make sure we understand how we can get those tanks—how we can get those wastes characterized adequately and maybe mixed in the right way to be able to feed the pre-treatment and/or WTP.

So I think that's the level at which I intend to look at this. I can't answer your question today. But I can assure you for one thing I'm not out to invent a new theory of these wastes. I'd like to be as pragmatic as we can to move the project forward.

Obviously it's been a challenge.

Senator CANTWELL. But I guess what I'm asking is, I'm trying to separate out the two different issues.

One is whether we know enough about the science or are these impossible scientific questions. I think that is a little more known quantity.

This perversion that some people are apt to constant—I mean, first of all this is one of the largest nuclear waste cleanups in the entire world, not just in the United States, so the complexity of that process.

Mr. MONIZ. Yes.

Senator CANTWELL. In my mind is a separate issue from the complexity of the science and trying to distinguish what are big bumps in the road that need to be overcome from a process perspective, which are different from the scientific questions.

It's obviously hard before you dig in to give us a concrete answer on the science. But do you see anything at your first look at this that these are scientific questions that can't be answered?

Mr. MONIZ. I certainly, at this stage, know of no question that cannot be answered. I'm just reserving judgment until I—actually I'd be very surprised if there were a question that could not be answered. I was really thinking more about has been answered.

Senator CANTWELL. OK.

Mr. MONIZ. That's really the issue.

Senator CANTWELL. So you think these are challenges that can be met from a scientific perspective and obviously we need to focus on the process here and make sure that the process goes smoothly.

Mr. MONIZ. Right.

Senator CANTWELL. I don't know if you have any thoughts on that given the magnitude and scale of this project? I have always questioned the challenge of how hard it is given the size and scale of the vit plant. But that yes, we have to have accurate assessments and plans in place. But every step in the process, obviously, we find more and more information that we have to tackle and understand.

Mr. MONIZ. What I would call part of the process uncertainty is—and I just don't know the answer, the level to which the systems engineering integration has been done to make sure all the pieces are coming together in a way that makes it as resource efficient as it can be because I think the resource efficiency is going to be important for us to try to move this in a, you know, the most timely way.

Senator CANTWELL. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Cantwell.

Dr. Moniz, Senator Cantwell obviously makes a number of important points. Let me, if I might, just take it in a slightly, you know, different direction. I mean, I think it's understood that there are tough calls to me made here.

I was struck at the time that I was up recently in the information about the leaking tanks had come out. The Governors of Oregon and Washington, you know, two very good Governors, very much committed to improvements and reforms, said, well we ought to just get some new tanks. Having talked on a bipartisan basis then with the Washington Senators and Chairman Hastings I think there was a general sense, well, let's see if that's the best use of scarce dollars because we're at $12 billion plus, you know, at a time of budget sequestration and programs for the vulnerable are at stake.

I think what we're trying to convey is the sense of urgency. I believe you have the scientific expertise to come in, particularly now since you've said business as usual at the Department of Energy on Hanford is unacceptable to you. I think that's a powerful statement. I hope it will be regarded by all concerned that this is a time to really go forward in a thoughtful way, but also in a manner that reflects the urgency of the situation.

This is the most contaminated piece of Federal property. It adjoins the life blood of our region, the Columbia River. We've got to turn this around.

That's why when I heard that it was going to take 2 years to determine whether tanks that look like they are leaking are officially leaking, I said, we've got to get Dr. Moniz in there and something like that has got to be addressed. We can't wait 2 years. That's not acceptable from a public health and public safety standpoint to the people of the Northwest.

Finally let me just say that I've been pleased this morning at the breadth of encouraging words you've received from Senators on both sides of the aisle. I've heard one Senator after another say, Dr. Moniz, I appreciate your reaching out and discussing x subject or y subject. I think it's an indication that Senators of both parties and all political philosophies recognize that this gridlock and this partisan bickering on the energy issue which has gone on now for months and months has got to give way to some problem solving.

You have the expertise. It is clear that you've built a lot of good will with Senators on both sides of the aisle. I plan to support your nomination. I hope we can move expeditiously.

Let me also say, just as a procedural matter, that all Senators will have until noon tomorrow to submit additional questions for the record and for you, Dr. Moniz.

With that, the Committee on Energy and Natural Resources is adjourned.

[Whereupon, at 1:07 p.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR WYDEN

Question 1. On March 16, 2012, the current Secretary sent a memo to the Administrators of the Power Marketing Administrations, (PMAs) the Bonneville Power Administration (BPA), the Western Area Power Administration (WAPA), the Southwestern Power Administration (SWPA) and the Southeastern Power Administration (SEPA) requesting that they modify their operations, practices and policies to facilitate integration of renewables into the grid and other steps. In the Northwest, the Secretary's memo created an uproar because it was seen as an effort to manage BPA from Washington, DC instead of in the region. In response to the outcry over the proposal, it was narrowed to consider only WAPA and a stakeholder process was carried out. The end result were recommendations from the Western/DOE "Joint Outreach Team" on March 6, 2013, most of which require that WAPA consider various measures. Will you commit to consult with this Committee and key stakeholders before implementing any of the Joint Outreach Team recommendations?

Answer. I have read Secretary Chu's March 16, 2012, memo to the Department's four Power Marketing Administrations (PMAs) and subsequent March 1, 2013, memo to the Western Area Power Administration (WAPA) with the final recommendations of the DOE/WAPA Joint Outreach Team (JOT). If confirmed, I would consult with this Committee and key stakeholders on implementation of the recommendations, and to do so in collaboration with the new Administrator of WAPA, Mark Gabriel, and the DOE Deputy Secretary.

Question 2. There is a great deal of discussion at the Department of Energy regarding the possible establishment of what is known as an "Energy Imbalance Market" to facilitate the sale of ancillary services needed to integrate variable renewable power sources such as wind and solar into the grid. While I generally support efforts to promote renewable energy, the Northwest energy market is different from other regions. Any effort to promote renewables through new markets must take into account the region's unique features and be consistent with the obligation of BPA and the other PMAs to provide cost-based power to their customers. Will you commit to consult with me and stakeholders in the region prior to the Department of Energy, including BPA and WAPA, adopting any public position on such proposals?

Answer. Yes, if confirmed, I will commit to consult with you and stakeholders in the region prior to adopting a public position on such a proposal.

Question 3. The four PMAs share a common mission of delivering federal hydropower power at cost to publicly-owned utilities. However, each serves a different region and operates in different ways. Perhaps the most notable difference is that promotion of energy efficiency and renewables is an express and core statutory mission of BPA, whereas that is not the case with the other PMAs. There are activities the smaller PMAs can undertake that benefit renewable energy without adverse impacts on their own customers, in particular the WAPA transmission system. But care must be taken when doing so. Will you commit to take the differences between the PMAs into account when developing PMA policies?

Answer. Yes, if confirmed, I will commit to taking into account these differences.

Question 4. The PMA Administrators currently report to the Deputy Secretary of Energy. Will you commit that the PMAs will continue to report to the Deputy Secretary in order to assure that significant power marketing issues receive appropriate consideration in the Obama Administration?

Answer. If confirmed, I intend to have the PMAs continue to report to the Deputy Secretary. I also note that the PMAs have been and will continue to be important to the Obama Administration.

Question 5. PMA ratepayers pay the full costs, with interest, of the PMAs' power and transmission systems. Will you commit to oppose the privatization of the PMAs and commit to oppose any other proposals designed to transfer the value of the PMAs' power and transmission systems outside of their respective regions?

Answer. I am not aware of any effort within the Department to privatize the PMAs. If confirmed, I commit to abiding by the governing statutes of each PMA.

Question 6. Will you continue to support regional preference for BPA as required by law?

Answer. If confirmed, I commit to abiding by the governing statutes of each PMA, including BPA.

Question 7. The Congress gave BPA administrative and financing flexibilities to allow it to operate in a business-like manner. Will you commit to refrain from bureaucratic administrative directives that limit BPA's ability to perform its mission efficiently and consistent with its business needs?

Answer. If confirmed, I commit to ensuring each PMA is able to perform its mission as efficiently and effectively as possible.

Question 8. Before proposing any legislative or administrative actions which could change the power and transmission operations of BPA, will you commit to first discuss and vet those ideas with me and my colleagues from the Pacific Northwest and a broad range of regional stakeholders?

Answer. If confirmed, I commit to working with you and the Congressional delegation in the BPA region, as well as BPA customers and stakeholders, on any major actions that would change the power and transmission operations of BPA.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. How would you characterize our nation's competitiveness in the energy sector compared to the rest of the world—in terms of technology, specifically, but also in other respects?

Answer. First we must note the stunning developments of the last four years in terms of America's energy competitiveness. Domestic oil production has gone up every year, reaching the highest level in well over a decade, and the International Energy Agency has predicted that the US will be the world's largest producer within a decade. Domestic natural gas production has reached the highest level ever, stimulating new manufacturing activity and helping to drive CO_2 emissions to the lowest level in many years. Renewables have doubled in that period. The challenge is to sustain this highly competitive position, especially as we continue to move towards a low carbon economy both on the supply side and by enhancing efficiency.

If confirmed, one of my primary responsibilities as Secretary of Energy will be to help maintain the US position of global leadership and international competitiveness through energy innovation. To do so, it is essential that we continue to invest in basic energy science and technology development, supported by a range of incentives to promote our economic and national security, protect consumers and the environment, and help ensure that the government works as an effective partner with the private sector.

I also think that ARPA-E, the EFRCs and the innovation hubs—relatively new DOE programs focused on strategic basic energy science, transformational technologies and key links in the energy value chain including academia, industry and finance—will help maintain US economic competitiveness. DOE's national laboratories are another critical element for maintaining this competitive edge. These labs aggregate enormous talent and brainpower, and provide large platforms for a range of energy research activities, including computational, simulation and modeling capabilities among others.

Finally, as I noted in my testimony, I intend to work with the White House and other agencies to implement the recommendation of PCAST that there be a Quadrennial Energy Review, focused on developing and implementing a roadmap for transforming how we produce, distribute and use energy. Such a review must necessarily focus on improvements in the suite of existing energy technologies, at the same time it enables investment in and deployment of new technologies to support a low-carbon energy future. The appropriate sequencing of these investments and the underlying incentives the federal government might employ to maximize their value and impacts should also be an important component of such a review. This approach will provide key underpinnings for the President's all-of-the-above energy strategy, which I strongly support.

Question 2. The Department of Energy has consistently underperformed other Federal agencies in using highly qualified small and disadvantaged business to achieve their programmatic goals. There is concern that DOE may have missed valuable opportunities to contribute to the economic recovery by failing to use such businesses. If confirmed, will you commit the Department to meeting its assigned goals for contracting with small, disadvantaged business?

Answer. The President's ambitious energy goals cannot be met without harnessing small business innovation and talent. If confirmed, I will look into the Department's performance with respect to meeting its prime small business contracting goals and commit to identifying and implementing strategies towards achievement of its programmatic goals.

Question 3. DOE's tardiness in response to questions for the record (QFR) last year was indefensible. The Committee held a hearing on DOE's budget in February 2012 but did not receive the agency's answers for the record until late December—a full 10 months later. The Committee also conducted a hearing on the Clean Energy Standard in May of 2012 and did not receive answers to written questions until this year, January 2013. This is obviously unacceptable. Will you commit to this Committee that the Department will respond in a timely manner to QFRs posed to DOE witnesses?

Answer. If confirmed, I can commit to responding to the Committee's questions in a timely fashion to the best of my ability.

Question 4. The recent Executive Order on cybersecurity and the accompanying Presidential Policy Directive identify DOE as the sector specific agency for energy for implementation purposes. Please discuss your vision for the agency's role in this process. Do you anticipate needing additional Congressional authority to deal with cyber threats and vulnerabilities?

Answer. If confirmed, I would fully expect the Department of Energy to continue to execute its responsibilities as the Energy Sector-Specific Agency, as it has since 2003. If confirmed, I intend to study our existing authorities carefully to make an informed judgment on whether additional authorities would be necessary.

Question 5. Given the priority of the Electricity Sub-sector Coordinating Council and the Electricity Sector-Information Sharing and Analysis Center in the Executive Order's efforts on cybersecurity and information sharing, please detail how DOE will continue to support these efforts.

Answer. I understand that the Department supports efforts of the Electricity Sector Information Sharing and Analysis Center (ES-ISAC) at NERC to enable sector-wide cybersecurity coordination, trust, and engagement among participants, as well as rapid analysis and information sharing with the sector and its partners. The ES-ISAC serves a vital role within the Electricity Sector to increase the knowledge and understanding of physical and cyber threats that could potentially affect sector operations and grid reliability across the United States. ES-ISAC, in collaboration with the Department of Energy and other partners, should serve as the primary communications channel for the Electricity Sector and enhance the ability of the sector to prepare for and respond to cyber and physical threats, vulnerabilities, and incidents.

Question 6. Please explain your view of the role of DOE's Office of Electricity Delivery and Energy Reliability (OE) in the cybersecurity effort. How do you anticipate OE working with the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation on cybersecurity issues?

Answer. The Office of Electricity Delivery and Energy Reliability (OE) plays an important role in protecting energy infrastructure from cyber attacks. I understand that OE has ongoing efforts to improve cybersecurity technologies and capabilities through research and development, as well as to enhance situational awareness and further operational capabilities that strengthens cybersecurity protections and to increase the resiliency of the Energy sector. If confirmed, I intend to work closely with the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NAREC) on cybersecurity issues.

Question 7. In the past you have described environmental challenges related to unconventional gas development as "manageable." Is this still the case? Please elaborate.

Answer. The current increase in domestic shale gas production provides important economic and energy security opportunities for the United States. To sustain public confidence and fully realize the value of these resources, we need to develop them safely and responsibly and minimize their environmental impacts. This is challenging but manageable in the sense that best practices using available technologies can in fact minimize the environmental footprint. New technologies can shrink that footprint even more.

Question 8. You have also expressed the importance of natural gas as part of the U.S. energy portfolio. Do you continue to believe that natural gas is an important

piece of an "all of the above" energy strategy for the U.S.? Please elaborate on the role you foresee natural gas playing in helping move our economy forward.

Answer. Natural gas is a key component of the Administration's all-of-the-above energy strategy and an important part of the nation's energy supply. A highly successful mix of federal research support, tax policy and public-private partnerships has enabled us to affordably produce the nation's abundant shale gas resources; US reserve estimates now exceed 100 years of supply at current rates of consumption.

Natural gas and natural gas liquids also play a key role in economic development. Low US natural gas prices compared to those in other gas-consuming markets in the world are helping to reinvigorate key manufacturing and chemical businesses. Furthermore, the market-driven increased use of natural gas in power generation has helped to mitigate CO_2, criteria pollutant and mercury emissions from the power sector.

Question 9. If confirmed, what role do you believe the Department should play in ensuring the continued and increased production of natural gas, particularly on federal lands where development has not kept pace with production on state and private lands?

Answer. As you know, the Department of the Interior and the Department of Agriculture are the lead Federal Agencies responsible for managing oil and gas development on federal lands. However, I believe DOE can play a role in promoting best practices related to natural gas extraction, helping to promote technology development and technology transfer for environmentally responsible production, helping to convene industry discussions, and engaging in data collection.

Question 10. As you know, the public comment period on the Department's LNG export study is over. The purpose of this study was to help inform the public interest determination the Department must make to approve natural gas exports to countries with which the U.S. does not have a free trade agreement. Importantly, the macroeconomic analysis completed by NERA at the Department's request found that the U.S. would experience net economic benefits from increased exports of LNG under all export scenarios analyzed, and the greater the level of exports, the better for the U.S. economy. Do you support LNG exports? Do you believe existing laws and regulations are sufficient to move forward and review the pending applications? If confirmed, what are your plans to ensure these applications are reviewed, as required by law, and decisions made on a timely basis?

Answer. The President is committed to the safe and responsible production and use of natural gas, and I share this commitment. With regard to exports of natural gas, I am aware that the Department has pending decisions for applications to export LNG to non-FTA countries. My understanding of the Natural Gas Act is that when considering applications to export to non-FTA countries, the statute requires the Department to conduct a public interest determination review prior to the issuance of authorization orders. If confirmed, I am committed to ensuring that DOE makes transparent decisions in the public interest based on unbiased analysis and that it acts on these applications as expeditiously as possible.

Question 11. The EPA is in the process of writing rules related to climate change and other issues, which will have a significant impact on every facet of the nation's energy sector, including new and existing coal plants. I remain concerned about the impact of these and other rules on the affordability and reliability of our energy supply. In the past, DOE has often advocated for energy supply—including affordability and reliability—but that role has diminished substantially in recent years. What role do you see DOE playing in these ongoing EPA rulemakings? How will you assert yourself in the interagency processes related to them? Will you commit yourself to a more vigorous engagement in favor of energy supply on behalf of DOE in interagency collaboration and interagency review related to environmental policies and rules?

Answer. DOE, as the preeminent supporter of federal energy research and technology development, including significant analytical, modeling and simulation expertise, often has a role in supporting EPA and other agencies on the rulemakings and regulations being developed to protect public health and safety.

If confirmed as Secretary, I will work to ensure that these capabilities are used adequately to help meet the nation's needs for affordable, reliable, clean and secure energy supplies while addressing the significant environmental challenges associated with energy production and consumption. I also hope to help strengthen the interagency review processes through the Quadrennial Energy Review recommended by PCAST; this recommendation necessarily envisions a strong role for the Department of Energy both for developing energy solutions and informing larger policy decisions about energy and its impacts on the environment.

Question 12. Specific to coal-fired power, do you think that compliance with EPA rules should be possible with commercially available technologies, or do you think

it is defensible to write them in a way that essentially bans new coal plants, shuts down some existing coal plants, and causes fuel-switching on a large scale?

Answer. While EPA is responsible for the regulation of coal-fired power plants, the Department of Energy is well-positioned to work with the EPA, industry, and other stakeholders to help inform its decisions. DOE also supports research on technologies to enable an affordable transition to a low carbon economy, including carbon capture and storage (CCS) for coal plants. The objectives of the CCS program are to understand long-term storage and to reduce the cost of CO_2 capture. Since 2009, DOE has invested nearly $6 billion in CCS development; if confirmed, I will continue this commitment, within the budget constraints set by the Congress.

Question 13. DOE has recently embarked on an internal assessment of all of the R&D work and other activities related to the energy-water nexus. How can DOE work with other agencies and organizations (e.g., DOD, DOI's Bureau of Reclamation, EPRI, utilities) to productively address future coordination, best practices and R&D needs? How do you see the work of DOE being most effective in helping to reduce the risks and intensity of the energy-water relationship?

Answer. The water-energy nexus is a growing policy concern and challenge. Relevant authorities are distributed across many agencies; even within DOE, these issues cut across many programs. Fully understanding the implications of this challenge also needs to be informed by sound, consistent and systematic data bases.

DOE can play a leadership role by bringing more analytical capacity and capability to issues at the energy-water nexus, drawing on expertise in R&D programs and engaging the strengths of the national labs. Through the Quadrennial Energy Review, DOE can also provide a platform for multi-agency engagement with the energy-water nexus. Importantly, many issues surrounding the energy-water nexus affect assets owned and operated by private sector entities; developing public-private partnerships in this area can help leverage DOE capacity.

If confirmed, I look forward to continuing the Department's focus on understanding and reducing risks related to the water-energy nexus.

Question 14. There is broad consensus that legislation to deal with the long-standing issues of nuclear waste stockpiles in this country is a top priority. The DOE has recently issued its response to the BRC recommendations. What is your view on the path forward vis-a-vis the BRC recommendations and DOE's response?

Answer. I believe the Administration's response to the BRC recommendations reflects its broad agreement with those recommendations, including the BRC's call for a consent-based siting process, prompt efforts to develop consolidated storage and disposal facilities, the establishment of a new organization dedicated to implementing a nuclear waste management program and empowered with the authorities and resources to succeed, and timely access to funds dedicated to the waste management mission in the amounts needed. Clearly, implementation of most of these recommendations will require legislative action by Congress, and I am encouraged by the commitment of the leadership of Senate Energy and Natural Resources committee and the Senate Energy and Water Appropriations subcommittee to craft legislation along the lines of the BRC report. If confirmed, I commit to work with you and other interested members to help develop legislation to establish a nuclear waste management program consistent with the BRC and Administration goals and then to implement the program with high priority.

Question 15. The Department of Energy has signed an agreement with Babcock & Wilcox as the initial winner of the SMR Licensing Technical Support Program for their mPower design. A second SMR funding opportunity announcement was recently issued for up to two more designs. What role do you envision for small modular nuclear reactors in the domestic and international energy markets in the future?

Answer. Small modular reactors (SMRs) have considerable potential. SMRs can be made in factories and transported to sites where they would be ready to "plug and play" upon arrival, reducing both capital costs and construction times. The smaller size also makes SMRs ideal for small electric grids and for locations that cannot support large reactors, as is the case in many international settings. In addition, the modularity offers utilities in both developed and developing markets the flexibility to scale production as demand changes and to spread out capital commitments and manage risk, potentially leading to more favorable financing terms than would be available for today's reactors of 1000-1600 megawatts (electric) Furthermore, most SMR designs have very attractive safety and security features. The US has an opportunity to lead the market globally, creating manufacturing jobs and business opportunities.

In order to realize the promise of SMRs as the next generation of nuclear energy technology, the economies of manufacturing (learning by doing, quality assurance, dedicated work force,.) need to be demonstrated.

Question 16. With the attempted withdrawal of the Yucca Mountain license application and the proposed termination of the only expressly identified permanent repository for high-level radioactive waste and spent nuclear fuel, do you believe that the fees so far collected and deposited in the Nuclear Waste Fund under Section 302 of the Nuclear Waste Policy Act of 1982 are in excess of the amount needed to meet the repository's costs? Do you believe an adjustment of the fee is in order?

Answer. My understanding is that this issue is currently being litigated in federal court, and I am not familiar with the details of the arguments in that litigation. I understand that the Secretary makes an annual determination about the fee adequacy and his most recent Nuclear Waste Fund fee adequacy assessment did not propose an adjustment at the present time. If confirmed, I would look forward to learning more about the analysis that has gone into determining adequacy so as to guide future determinations.

Question 17. What are the research priorities in the advanced reactors program and how are these going to be implemented given current budget constraints?

Answer. I believe advanced reactors offer potential advantages of improved safety and reliability, economics, sustainability, and proliferation resistance and physical protection. Some advanced reactors and fuel cycles may offer waste management benefits. Improved safety and reliability can be achieved from the use of passive safety features, advanced fuels and inherently safe design features. I understand that DOE is currently focused on two primary advanced reactor candidates-high temperature gas reactors and sodium-cooled fast reactors. Through DOE, the U.S. currently chairs the Generation IV International Forum, comprised of thirteen countries working together to lay the groundwork for the fourth generation of advanced nuclear energy systems. If confirmed, I will work to leverage efforts with universities, industry and the international community as necessary in these times of fiscal constraint.

Question 18. What is your view of future nuclear waste reprocessing needs and associated R&D needs?

Answer. The Department has an advanced fuel cycle research and development program to help develop potential future options for nuclear waste reprocessing. I support targeted investments in R&D that explores these potential long-term options, even as we move forward in the near-term with implementing the Administration's nuclear waste management strategy focused on interim storage and permanent disposal. This is consistent with the Blue Ribbon Commission recommendations.

Question 19. Many within the domestic fusion industry believe that they are ready to move beyond the science focus on how to achieve fusion to a more energy-focused program on fusion materials and technology. What is your view on the future of fusion energy? With the debate between funding ITER or funding our domestic industry, are we seeing leadership on fusion energy move overseas? Can the United States financially continue its support for both the international ITER project while building upon the success that our domestic companies are having in the fusion industry?

Answer. ITER is a partnership of 6 countries and the European Union, and is the culmination of decades of magnetic fusion research. ITER is based on decades of effort by the international science community to establish the scientific basis for fusion energy and demonstrate the transformative potential of fusion as an energy resource. It is my understanding that 80 percent of the U.S. contribution to ITER is spent domestically, with in-kind components built in the U.S. and delivered to the project site in France. The US fusion science community also plays a strong role in developing modeling tools that will be important for understanding the experimental data. Consequently it is fair to say that the US is among the fusion R&D leaders even though ITER is in Europe.

I believe it is also essential that we invest in innovative fusion concepts and plasma science in our universities and laboratories. The Office of Science has a long tradition of working with its various science communities for setting strategic priorities. If confirmed, I intend to strongly support the established procedure of seeking research community input for long range planning within realistic budget profiles, both for fusion and for other Office of Science programs.

Question 20. Do you view the EMP issue as a national defense issue, a power issue, or both?

Answer. EMP is both a national defense and power issue. If confirmed, I intend to study the EMP issue further and evaluate the adequacy of current R&D efforts.

Question 21. What do you view as your responsibility, if confirmed as Secretary of Energy, to protect the nation's electric grid in the event of an EMP attack? How do you view the role of FERC and NERC in dealing with these issues?

Answer. DOE has worked very closely with NERC on a geomagnetic task force to develop recommendations for industry in response to a space weather EMP event. I understand that DOE also co-sponsored and partially funded a study with FERC on the effects of geomagnetic induced currents on our electric grid. That study led to the establishment of NERC's GMD (Geomagnetic Disturbance) Task Force in addition to a High-Impact, Low-Frequency Events Working Group also facilitated by NERC. If confirmed, I expect to continue this close collaboration.

Question 22. What are your thoughts on the 2004 and 2008 EMP Commission reports?

Answer. My understanding is that these two EMP Commission reports were prepared for the Department for Defense (DoD). These reports exclusively focused on nuclear attacks, where DoD has the lead in response, rather than a space weather event, which would fall under the jurisdiction of the Department of Energy. If confirmed, I will review the report with an eye towards any further actions that the DOE should take now.

Question 23. What is your view of the role of the DOE national labs in advancing technology R&D and basic science research for DOE and the nation given recent reports that raise doubts and questions about duplication of efforts across the lab complex and diminished focus on original mission areas?

Answer. I am guided by the principle of making the most efficient use of our precious research funds, and if confirmed, I will evaluate the merits of all of the Department's research efforts to ensure that we are not wasting money through duplication. I will say, however, that in my experience critics of research areas often see duplication because they are not looking at projects or programs with sufficient granularity and may miss key distinctions. If confirmed, I will enhance the mechanisms for coordinating laboratory institutional plans with each other and with the DOE research portfolio structure.

Question 24. What, in general, is your view of where this nation should be headed in development and promotion of renewable energy? What types of technologies should we be promoting, at what level of budgetary effort, and how do we avoid picking "winners and losers" in funding renewable energy research?

Answer. If confirmed, my attention on renewables will focus on three things: lowering the cost of renewable technologies to achieve price competitiveness with traditional sources of energy; accelerating the transition to a low-carbon economy; and assuring we have the key enabling technologies needed to enable renewables deployment at scale (21st century grid, energy storage, energy critical materials,. . .). This will entail an integrated portfolio management approach across DOE offices and activities, as well as engagement with the private sector, academia and the national labs.

If confirmed, the relative maturity of the technologies will be evaluated against key strategic goals and funding levels. It is my intention that the Quadrennial Energy Review and the subsidiary Quadrennial Technology Review, both recommended by PCAST, will help inform our renewable energy research and development investments, including their sequencing and what types of policies or incentives might accelerate the wide-scale deployment of renewable technologies. For renewable electricity, wind and solar will continue to be advanced, but "forgotten renewables" such as novel hydropower and geothermal technologies are also promising.

As discussed at my confirmation hearing, both the American Energy Innovation Council, a group of leading CEOs, and PCAST came to the conclusion that Federal energy science and technology funding is about a factor of three too low, but budgets are likely to be constrained for the next several years. If confirmed, I hope to work with the Congress to seek creative ways to expand clean energy research, development, demonstration and deployment, including through expanded public-private partnerships.

Question 25. Hydropower provides the largest amount of renewable electricity in the United States today. Indeed, hydropower provides almost two-thirds of all renewable generation and 8 percent of total U.S. electricity generation. In Alaska, hydropower accounts for 98 percent of renewable generation and approximately 24 percent of total electricity generation. Alaska is aiming to grow our hydropower resources to meet pressing energy needs. What is your view on the role of hydropower as part of our nation's electricity portfolio—now and in the future?

Answer. Hydropower is a key contributor today and is an important part of the President's all-of-the-above energy strategy. I believe that further innovation and advancement of hydropower technologies are both possible and necessary to lower the costs of initial installations; minimize environmental impacts in a timely, low cost way; encourage the development of new hydropower generation, including micro-generation; and lower the costs of pumped hydro storage, an important storage option for other power generation technologies. Hydropower is also poised to ex-

pand internationally and novel technologies, such as small hydro, could present interesting business opportunities.

Question 26. In addition to being a renewable energy resource itself, hydropower provides electric grid benefits to integrate other variable energy resources, such as wind and solar, and ensure reliability. In fact, U.S. hydropower is being asked to do more in these areas than many other sectors. Yet, historically, the DOE Waterpower R&D program (for both hydropower and marine and hydrokinetic technologies) is one of the lowest funded and minimally staffed programs in the EERE Office. What is your opinion on R&D funding for conventional hydropower? For marine hydrokinetics?

Answer. Hydropower plays an important role in meeting our nation's energy needs and can become even more important as a storage vehicle for large scale renewables. It is my understanding that DOE's Water Power Program is committed to developing and deploying a portfolio of innovative technologies for clean, domestic power generation from hydropower, waves and tides. As we discussed, there is renewed interest and promise in technologies such as small hydro, and perhaps significant business opportunity as well. If confirmed, I will review the status, scale and priorities of the Water Power Program in the context of the Quadrennial Technology Review update.

Question 27. The 2007 Energy Independence and Security Act contained grants programs to aid in the actual construction of renewable energy projects (Section 803 for all renewables and Section 625 for geothermal projects in high-cost areas). DOE, however, has never proposed to fund these programs, even in the 2009 American Recovery and Reinvestment Act which funded numerous programs authorized by the 2007 energy bill. What is your view of these statutory provisions to construct renewable energy projects?

Answer. Geothermal could be an important generation technology as it is a renewable form of energy capable of providing baseload power without the need for large scale storage. I support the President's all-of-the-above energy strategy, and the increased deployment of geothermal and renewables more broadly is an important part of that plan. If confirmed, I will review these sections of the Energy Independence and Security Act and integrate these considerations into the Quadrennial Energy Review process.

Question 28. Do you commit to upholding the statutory mission of the Power Marketing Administrations (PMAs) to give preference to public, municipal, and rural electric customers, and market PMA power at the "lowest possible rate consistent with sound business practices"?

Answer. Yes, if confirmed, I will abide by the governing statutes of each PMA.

Question 29. As you may be aware, there was significant bipartisan and bicameral concern over a March 16, 2012 memorandum by Secretary Chu to the Power Marketing Administrations, directing significant changes in the way the PMAs operate. That memo called for the PMAs to undertake work outside of their mission to market federal hydropower to preference customers—such as serving as test beds for cybersecurity and advancing electric vehicle deployment. I was one of approximately 160 signatories to a June 5, 2012 letter to Secretary Chu expressing concern with this unilateral directive and asking for stakeholder collaboration. Do you support the policy directives outlined in Secretary Chu's March 16, 2012 memo? If so, please explain your rationale. How do you intend to handle the concerns raised by Congress with regard to the PMAs? Do you expect the preference customers to pay for the policy initiatives set forth in the Chu memo?

Answer. I have read Secretary Chu's March 16, 2012 memo, and, if confirmed, I look forward to further understanding the unique challenges and opportunities faced by each PMA. I pledge to work with you and the stakeholders in each PMA region to ensure the PMAs are operating as efficiently and effectively as possible, both now and in the future.

Question 30. It is my understanding that while Secretary Chu's March 16, 2012 memo endorsed an energy imbalance market (EIM) for the Northwest, the Department's final recommendations instead noted the ongoing Northwest Power Pool effort to consider an EIM, including its costs and benefits. Do you support utilities' efforts to evaluate these tools at the regional level with regional solutions, as opposed to a top-down federal directive?

Answer. I fully recognize and appreciate the benefits of collaborative regional evaluation and solutions to the challenges and opportunities of an EIM. If confirmed, I will work with the Northwest Power Pool to jointly determine the best mechanisms for capturing economies of scale within the Pacific Northwest.

Question 31. What role do you envision for OE in terms of grid reliability and resiliency, such as in dealing with major storms like Sandy? Or, in dealing with an-

ticipated plant closures or natural gas supply and co-ordination issues that could adversely impact the nation's grid system?

Answer. The Office of Electricity Delivery and Reliability (OE) serves as the federal government's energy sector specific agency in responding to energy emergencies and national security, both physical and cyber. To that end, OE is prepared to respond to all hazard events and situations that disrupt energy supplies and systems.

Recent events, such as Superstorm Sandy, have reinforced the need for a reliable and more robust Federal analytical ability to not only help emergency responders but enhance predictive capabilities to identify at-risk assets in advance of events and also to advice key decision makers about necessary response actions.

Currently, OE has the capability to conduct risk analyses and reliability assessments of the nation's energy systems. I understand that OE plans to expand this capability by developing simulation and predictive analytic tools that are critically needed to provide real time situational awareness to assist federal, state and local agencies in their coordination and response to energy supply disruptions such as electricity and fuel outages. This capability provides decision makers with mitigating solutions for energy resilient approaches. In addition, it can highlight co-dependencies of different energy and communication infrastructures and their importance for emergency response prioritization.

Question 32. The Weatherization Assistance Program under EERE, which has been around since 1976, has come under some serious scrutiny since it received $5 billion under the American Recovery and Reinvestment Act (ARRA). This included several reports by the DOE's Inspector General detailing waste, fraud and abuse throughout the program. Now that the ARRA funds for weatherization are exhausted, proponents of the program say that it needs substantially more funding. Additionally, the program is due to be reauthorized, and there are proposals to "enhance" it. In your view, what does the future hold for the Weatherization program?

Answer. I support the President's strong commitment to energy efficiency and conservation, which included his recently announced goal to double American energy productivity by 2030. The Weatherization program plays an important part in helping accomplish that goal.

It is my understanding the program has largely been successful and has produced tangible results nationwide but, if confirmed, I will carefully review the IG's recommendations, ensure they are being implemented, and work to ensure that the program works to meets it overall goals while maintaining the highest standards for transparency and accountability. If confirmed, I will work to ensure that all personnel in the Department act as responsible stewards of taxpayer dollars; waste, fraud and abuse is unacceptable.

Question 33. Since 2008, the Alaska Housing Finance Corporation's (AHFC) Weatherization Program has invested more than $205 million to improve the energy efficiency of an estimated 10,500 Alaska homes used by lower-income renters and owners, serving primarily the elderly, those with disabilities or families with children younger than age six. In the past, DOE has been supportive of these efforts and "AKWarm," the Home Energy Rating software program that has been used in Alaska for many years. The IRS, however, has yet to approve AKWarm for use in the calculation of energy consumption, denying Alaskans important tax benefits for energy efficiency. Will you commit to work to resolve this issue?

Answer. While I am not familiar with this specific issue, if confirmed, I will ensure that the appropriate DOE program staff work with the IRS, stakeholders and your office to better understand these concerns with the goal of finding reasonable and timely solutions in accordance with applicable laws, regulations, and Administration policy.

Question 34. The Department of Energy has been establishing energy conservation standards for consumer products since 1979. Over the years, many of these products have been regulated to the point where there may be little more opportunity for increased energy savings, but there could be significant costs associated with such an effort, including financial burdens to large and small manufacturers and job losses. At what point does the agency consider that, as a practical matter, a product is at the limits of its efficiency or cannot be made more efficient given marketplace or manufacturing realities? Is there a next step, which may include the use of efficiency systems, encompassing buildings and consumer products as a whole and not a prescriptive product-by-product approach? Please elaborate.

Answer. It is my understanding that energy efficiency standard programs have reduced manufacturers' regulatory burden and costs, and therefore costs to consumers, by providing single national standards in place of a patchwork of state-by-state standards. The Rulemaking Standards in place have been authorized by Congress and it is my understanding that the current process engages stakeholders across the spectrum to mitigate any potential issues regarding cost-effectiveness,

technical feasibility, or economic impact. Cost-benefit analysis is an important part of the process. If confirmed, I pledge to pursue policies that will achieve the President's energy efficiency goals and will work to gain a better understanding of the program to help ensure its success. It is my intention, if confirmed, to enhance the analytical capabilities of the Department to enable us to better understand, calculate and maximize energy savings from systems. The Quadrennial Energy Review process recommended by PCAST should be informed by and include such analysis.

You also raise an important issue about the efficiency of systems, such as whole buildings including their energy-consuming devices and operations. However, I am not now familiar with the state of analysis concerning system versus component efficiency tradeoffs. If confirmed, I would like to consult with the appropriate stakeholders and the Congress to explore approaches to measuring and encouraging system efficiency.

Question 35. Regarding product standards, there have been instances of consensus agreements among product manufacturers and non-government energy efficiency advocates submitted to the DOE. However, the agency has not taken advantage of these consensus agreements. Is it correct to say that if the agency adopted these consensus agreements, they could save both money and time in bypassing the lengthy regulatory process? Is there some reason why the DOE would not accept an appliance efficiency standard consensus agreement and instead go through the rulemaking process?

Answer. I am not familiar with the details of these consensus agreements and the Department's response. However, if confirmed, I commit to working within DOE and with the appropriate stakeholders to better understand the issues associated with these consensus agreements with the goal of finding the least costly, most effective solutions.

Question 36. Alaska has more than 25 billion known barrels of Heavy Oil in tar sand deposits at the Hartselle and Kuparuk River oil fields—more than the conventional oil likely to be produced at the neighboring Prudhoe Bay oil field over its entire life. But producing that oil is going to require new technologies, research that is not economic for any one company to conduct. In your view, what is the role of the Department, if any, to conduct research into heavy oil extraction technologies?

Answer. I appreciate the potential of Alaska's reserves of heavy oil. As you know, development of heavy oil extraction technologies has not been a significant part of DOE's R&D portfolio. That said, the safe and environmentally sustainable production of America's energy resources are a core mission of DOE's Office of Fossil Energy. In a challenging budget environment, DOE must work with Congress to make the most effective use of limited taxpayer dollars across the entire research portfolio. If confirmed, I commit to working with you to examine whether expanding DOE's R&D portfolio to advance research into heavy oil extraction should be part of a comprehensive national energy policy. Public-private partnership opportunities should be explored.

Question 37. My home state has vast potential conventional geothermal power resources which could be further boosted by means of Enhanced Geothermal System technology. What is your view of the role that geothermal should play in the nation's future energy mix and what, if any, types of new research would you like to see the Department fund (and at what level)? DOE has provided financial assistance to several geothermal projects in Alaska, including at Naknek, Chena Hot Springs, and Pilgrim Hot Springs. Do you support continuation of such assistance for geothermal research and demonstration projects?

Answer. Geothermal is an important generation technology in several parts of the US. It is a renewable form of energy capable of providing baseload power without the need for large scale storage. I support the President's all-of-the-above energy strategy and the Department's role in driving down renewable energy costs to accelerate the transition to a low-carbon economy; the increased deployment of geothermal and renewables more broadly is an important part of that plan.

A 2006 report on the Future of Geothermal Energy concluded that, with a reasonable amount of R&D, Enhanced Geothermal Systems (EGS) could provide 100,000 MWe of baseload electric generating capacity in the US by 2050. Research was called for in drilling, power conversion and reservoir technologies. If confirmed, I will commit to evaluate geothermal technology costs and opportunities in the Quadrennial Energy Review process recommended by PCAST.

Question 38. Currently in Alaska there is a debate on whether to build a pipeline to bring natural gas from the North Slope to fuel electricity production for Southcentral Alaska, or whether it makes more sense for the long-term to build the gas-turbines for electrical generation close to the Prudhoe Bay gas wells and then send the power by high-voltage, Direct Current (DC) transmission lines south to the state's urban population centers. What is your view about the potential for DC

transmission to be truly cost competitive in the future against more local electrical generation?

Answer. I understand that high cost and scarcity of electricity are consistent problems throughout Alaska and that utilizing currently stranded natural gas could have a major economic impact. Without examining the problem more closely, I am not able to provide a definitive response to your question at this time. However, if confirmed, I would be happy to work with you, your staff, Alaska stakeholders, appropriate DOE and national lab technical staff, and outside experts to examine the options you have put forward and other possible solutions to using Alaska's stranded gas assets and to addressing electricity needs in rural and remote Alaska.

Question 39. In the past your Department maintained an Arctic Energy Office that was based in Fairbanks, Alaska that was devoted specifically to Arctic energy research. Over its roughly seven year existence under the National Energy Technology Lab's direction, the office did some excellent work on coal, heavy oil, carbon capture and storage, and enhanced oil recovery utilizing carbon dioxide. That office closed effectively two years ago. In your view, does DOE need to continue to do energy research with a specific Arctic focus? If so, how do you envision such research being conducted and funded in the future for all forms of energy research, not just methane hydrate research?

Answer. I am aware of the value that Alaska's congressional delegation places on this research. The Arctic is drawing increasing attention and scrutiny for its energy production potential, accompanied by significant environmental and logistical challenges. If confirmed, I look forward to hearing your thoughts on the importance of this work and how you envision it resuming in a budget constrained environment.

Question 40. What is your view of the federal role in promoting methane hydrate utilization through research? A recent Japanese test that followed up on DOE's research last year in Alaska seemed to confirm that methane gas can be freed from icy, crystaline structures and produced like conventional natural gas. The implication of that is profound, since Alaska's Prudhoe Bay holds a known mean estimate of 85.4 trillion cubic feet of methane hydrates, Alaska is expected to contain between 560 and 600 trillion cubic feet of hydrates on shore and up to 32,000 trillion cubic feet offshore—and all of America's land and waters likely contains up to 200,000 trillion cubic feet of methane hydrates (more than a 1,000 years of natural gas reserves at current American consumption rates). In Fiscal Year 2012, DOE conducted a major test on Alaska's North Slope to see if methane hydrates could be "unlocked" and made to flow to the surface. The test, partially underwritten by the Japan, Oil, Gas and Metals Corp., showed that methane hydrates can be produced by pumping carbon dioxide underground to "free" the gas. But the Department's budget for Fiscal Year 2013 contains less than $5 million to advance the research. What is your opinion of the research and would you support a more robust research effort by the Department's National Energy Technology Lab (NETL) into production of hydrates?

Answer. The Department of Energy's Office of Fossil Energy and the National Energy Technology Lab supports a number of research projects in unconventional natural gas production, including projects focused on the potential of methane hydrates. If confirmed, I will ask for an update on the DOE/NETL methane hydrates research portfolio and evaluate the future research effort in the context of the Quadrennial Technology Review update.

Responses of Ernest J. Moniz to Questions From Senator Cantwell

Question 1. Dr. Moniz, I am impressed with your knowledge and past work on Hanford issues as Undersecretary of Energy. While Hanford cleanup makes up a significant portion of the overall DOE budget, not every Secretary has focused on this national need and clean-up obligation. I believe your background will be a tremendous asset because we need an Energy Secretary ready to hit the ground running on Day One. I thank you for your willingness to serve and pursue a second tour.

While there is substantial progress being made at Hanford, we still face many challenges. Thanks to heroic efforts by Tri-City workers, we are making real tangible progress in cleaning the site up. This is not an easy job, in many cases Hanford workers have to invent new technologies to try and clean up some of the most complex, toxic brews on the planet.

We are also thankful for the boost of funding in the 2009 stimulus bill, which put us on track to reduce the active cleanup footprint of the Hanford Site by 90 percent by 2015. That reality is allowing us to start imagining a bright new future for Central Washington and the Hanford site. But we still have a long way to go.

Besides the challenges of dealing with tank waste and vitrification issues, I want to be sure you are aware that cleanup of both the Columbia River Corridor and the Central Plateau is critically important to the environment and public health.

In addition to the tank waste, the Central Plateau has nearly 2,000 cesium and strontium capsules containing over a hundred million curies of radioactivity, roughly 2,300 metric tons of spent nuclear fuel, plutonium-laced solid waste, groundwater contamination, and the Plutonium Finishing Plant.

Dr. Moniz, are you committed to the current plan to reduce the footprint of active cleanup at Hanford by 90 percent over the next few years? Will you commit to a balanced cleanup approach at Hanford that will continue making progress across the Hanford site? And will you fight for a budget that will make that possible? As the prime contracts at Hanford are extended or renewed, are you committed to finding ways to leverage local businesses more, stretching dollars further?

Answer. I am aware significant progress has been made in reducing the footprint at Hanford with the help of the Recovery Act, and there is continued momentum toward achieving a 90 percent reduction in the site's footprint. If confirmed, I look forward to visiting the site early in my tenure as Secretary to see the progress that has been made and learning more about the plans to achieve that 90 percent reduction. I certainly support that goal.

I recognize that there are two distinct cleanup efforts underway at Hanford; one administered by the Richland Operations Office, and the second administered by the Office of River Protection. If confirmed, I will work to ensure that the budget is adequate to continue each of these clean-up efforts.

I am strongly committed to ensuring that DOE remains a constructive partner in regions where it conducts business.

Question 2. Dr. Moniz, about a year and a half ago, Secretary Chu decided to reorganize the Office of Environmental Management and place it under the National Nuclear Safety Administration (NNSA). I opposed that move because I was concerned that nuclear clean-up would result in less focus from senior DOE officials. And that the Office of Environmental Management might have to compete with funds with NNSA.

Are you aware of this reorganization, and if so how do you think it worked out. Would you be willing to rethink this decision or take some other action to make sure the nuclear waste clean-up gets the attention it deserves?

Answer. I am aware that the Department shifted the Environmental Management Program to report to the Under Secretary for Nuclear Security instead of the Under Secretary but have no specific knowledge about any impacts of the change. If confirmed, I am committed to ensuring the Environmental Management program has the leadership support it needs within the Department and, in consultation with Congress, will examine the range of organizational and reporting options for this office as part of my commitment to elevate the focus on management and performance at DOE. I do agree that the issues at Hanford and at other sites require attention at senior levels in the department.

Question 3. I appreciate Secretary Chu's efforts to get the Waste Treatment Plant on track. But like Chairman Wyden, I still have significant concerns. Construction is on hold at the Pretreatment Facility. And limited construction at the Waste Treatment Plant only resumed recently.

While the Energy Department continues its review, a number of new approaches have already been proposed. I am concerned about shifting to a fundamentally new approach. Frankly, the first thing I think is "here we go again."

Every few years, the Energy Department seems to come up with a new Hanford cleanup scheme that it promises will be safer, cheaper, and will finish the job sooner. Yet, we've been down this road before. The Energy Department has already attempted and abandoned several different strategies for treating and disposing of Hanford's tank waste.

In 1989, its initial strategy would only have treated part of the waste. DOE spent $23 million dollars before abandoning this approach.

In 1991, DOE wanted to complete a waste treatment facility before the rest of the details were fully developed. DOE spent $418 million dollars on this strategy.

In 1995, a new plan to privatize tank waste cleanup was begun. After spending $300 million dollars, almost entirely on plant design, DOE terminated this plan due to its escalating costs and uncertain prospects.

Since 2000, DOE has been following the current strategy to construct the Waste Treatment Plant under a fast-track, design-build approach. The current strategy has hit bumps along the way. Construction on the pretreatment and vitrification plants was halted for more than a year beginning in 2005. And the Tri-Party Agreement was subsequently renegotiated in 2010.

As this long track record tells us, alleged shortcuts usually turn out to have a lot of mud and thorn bushes along the way. In fact, previous promises that a new course will expedite the construction process have resulted in just the opposite.

We need to stick to the legally binding milestones already in place under the Tri Party Agreement and continue working to meet them.

Dr. Moniz, are you committed to the general strategy that has been in place since 2000 for constructing the Waste Treatment Plant? Do you think the Waste Treatment Plant can be completed within ten years? Do you believe the fast-track, design-build approach still makes sense, or do you agree with GAO's recent recommendation that construction should not resume until the design and solutions to the remaining technical challenges have been verified? What are you going to do different from your predecessors to make progress cleaning up Hanford?

Answer. As I understand the circumstances, the key elements and facilities of the WTP project remain in place. The primary challenges are the technical issues associated with the project and identifying appropriate pathways for resolving those issues. As you mentioned, some construction activities have been halted pending resolution of certain technical issues but construction continues at three of the five facilities without the same technical problems. While I don't have a detailed understanding, I have been informed that the halting of construction while technical issues are being resolved is a prudent course of action. Further, it appears that shifting away from the design-build approach for all facilities while the technical issues are resolved at just two of them would introduce unnecessary cost increases and schedule delays.

If confirmed, I will give this project high priority and will be fully briefed on its status. I plan to implement an integrated, systematic and comprehensive process that ensures we effectively address the full spectrum of issues. As I noted in my hearing, if confirmed, I plan onvisiting the site early in my tenure so I can see some of the issues firsthand and talk with the project managers on the ground. I will also, if confirmed, address any remaining issues with safety culture and will meet with various stakeholders, including "whistle blowers". If confirmed, I will discuss the tank farms and the WTP with the DNFSB. And, finally, if confirmed, I will then put forward the plan that I intend to execute. I am committed to a path forward that will ensure WTP will operate safely for its design life and achieve its cleanup purposes.

Question 4. The Energy Department's original estimates projected the Waste Treatment Plant being completed by 2011 at a cost of $4.3 billion dollars. In 2006, DOE revised the estimates to completion by 2019 at a cost of $12.3 billion dollars. Although a new baseline has not been developed yet, the cost will likely be more than $13 billion dollars. And the 2019 completion date remains uncertain.

What do you think has contributed to these significant delays and cost increases, and what can be done to prevent these going forward? How would you rank the following in terms of being the most to blame: inherent technical challenges, DOE's management and oversight, and budget levels?

Answer. The Waste Treatment and Immobilization Plant is a highly complex facility with first-of-a-kind applications of many advanced technologies. Throughout the design of WTP, numerous technical issues have been resolved, but others remain. I understand the Department and the Defense Nuclear Facilities Safety Board are in agreement on the outstanding issues that need resolution. To best assess the challenges facing the project-whether it be technical concerns, DOE's management and oversight, and budget levels-I need to have a better understanding of the project as it stands today.

If confirmed, I would plan to be fully briefed on the status of the project, then visit the site for a first-hand look, meet with the DNFSB, and put forward an executable plan. I intend to implement an integrated, systematic and comprehensive process that ensures we address the full spectrum of issues effectively.

Question 5. When the Waste Treatment Plant begins producing vitrified logs of high-level waste, this defense nuclear waste will need a disposal site years before an interim or permanent site is ready for civilian nuclear waste.

As I have stated before it is unacceptable for Hanford to be the de facto repository for the vast majority of the nation's high-level radioactive defense waste. As the Defense Nuclear Facilities Safety Board's letter last week to Chairman Wyden stated, "[t]he Board believes that prolonged storage of waste in the Hanford Tank Farms represents a potential threat to public health and safety." That's why I have made clear that I will not support any nuclear waste bill that does not address our nation's defense nuclear waste.

a) Defense and civilian nuclear waste are very different animals, and frankly I believe our nation made a mistake when we choose to comingle them in the

early 1980s. And I was disappointed that the Blue Ribbon Commission, on which you served, did not address the defense waste issue head on.

b) Dr. Moniz, do you think that defense and civilian waste pose different and unique challenges and therefore should be addressed separately?

c) Do you think we should prioritize figuring out where our military waste can be disposed of first and foremost?

d) Do you think tackling defense waste first could serve as an example for the Blue Ribbon Commission's recommendation that we should dispose our nuclear waste in consenting communities?

Answer. There are certainly a number of differences between civilian and defense nuclear waste. In contrast to civilian reactor spent nuclear fuel (SNF), defense high level waste (HLW) does not have a potential energy value and is also very much bounded in its amount since we have no plans to produce more weapons material. The HLW packages will also be quite different from SNF. It is also clear that some of the reasons for the co-mingling decision of the 1980's may look different today. For these reasons, the Blue Ribbon Commission, on which I served, recommended that the Department conduct a study of the current policy of "co-mingling" defense and civilian nuclear waste. If confirmed, I intend to conduct such a study and report back to Congress expeditiously in order to inform your deliberations on potential nuclear waste management legislation.

Question 6. When we met in my office, you mentioned that you regretted the Blue Ribbon Commission wasn't able to address defense nuclear waste better.

a) What are some of your ideas on the topic that you wished were included?

b) Do you believe salt caverns offer a good geologic medium for high level waste disposal? Will you commit to continuing to explore that possibility?

Answer. The BRC did not have the time or resources to study adequately and reach a consensus on the question of whether defense and civilian waste should be managed separately, and we therefore called for a study of the current policy of "co-mingling" defense and civilian wastes.

Sound science must be the basis in determining the adequacy and performance of a geologic repository, and moving forward will require re-examining multiple geologies and geochemistries (shale, granite, salt,. . .). Alternate concepts, such as the deep borehole approach discussed in the BRC report, also need examination. Additional research is needed to assess the performance of high-level waste in salt disposal. I am aware that the Department is conducting research on the behavior of salt in the presence of heat-generating sources under geologic repository conditions and look forward to learning more about the Department's latest work.

Question 7. Within a few years, 90 percent of Hanford site will be cleaned up. As cleanup finishes, the Tri-Cities community is looking to diversify its economy. To that end, Congress provided the Energy Department with the authority to transfer nuclear defense properties over to economic development. DOE completed a Comprehensive Land Use Plan in 1999 and a 2008 update identified nearly 10 percent of the Hanford Site that could be used for industrial development in the future.

Dr. Moniz, do you agree that, when suitable, Hanford land should be made available to the community for economic development to help its transition as cleanup is completed?

If confirmed, will you make sure the review process for a proposal to transfer 1,641 acres to the local community for the establishment of an energy and industrial park is given sufficient attention and is completed as soon as possible? The Energy Department has been reviewing it for almost two years now.

Answer. As Hanford site remediation is completed, the Department intends to transition areas that have been cleaned up and are safe for other uses. I support the Department's activities working closely with local communities, stakeholders, Tribes and other entities to identify appropriate opportunities to transition available land. I am aware of the proposal to transfer some of the Hanford land and, if confirmed, I will ensure the review process underway gets proper attention and is completed as expeditiously as possible.

Question 8. The Pacific Northwest has a long tradition of local, collaborative decision-making to resolve difficult challenges. This is especially true with issues related to our clean and affordable hydropower system that is the backbone of our economy. Working together with regional electricity ratepayers, the Bonneville Power Administration (BPA) has achieved about 5,000 average megawatts of conservation since 1980; integrated over 4,400 megawatts of wind and other renewable sources of power, achieving one of the highest penetration rates in the nation; added more new transmission in the last ten years than any other region; and led efforts to test and deploy smart grid technology.

I was pleased during our meeting last month that you said that you do not see the Power Marketing Administrations (PMAs) as laboratories.

a) Are you committed to upholding BPA's requirement for cost-based rates?

Answer. If confirmed, I commit to abiding by the governing statutes of each PMA, including BPA.

b) Are you committed to opposing the privatization of BPA and the other PMAs as well as any other schemes, such as market-based rates, designed to transfer the value of the PMAs' power and transmission systems to the Treasury or other regions?

Answer. I am not aware of any effort within the Department to privatize the PMA's. If confirmed, I commit to abiding by the governing statutes of each PMA.

c) Will you categorically rule out efforts to weaken BPA's jurisdiction relative to FERC and DOE?

Answer. If confirmed, I commit to abiding by the governing statutes of each PMA, including BPA, and abiding by the Federal Power Act to the extent it relates to the PMAs.

d) Are you committed to consulting with the Pacific Northwest delegation, Congressional Committees of jurisdiction, and relevant stakeholders, and BPA ratepayers before issuing any memorandums, directives, or initiatives associated with BPA?

Answer. If confirmed, I commit to working collaboratively with Congress and BPA stakeholders on any major actions impacting BPA.

e) BPA and public power and investor-owned utilities have worked within the Northwest Power Pool to determine whether there would be benefits from an Energy Imbalance Market or other market-driven efficiencies. Are you committed to working with the Pacific Northwest delegation on this, and do you agree that regional processes and solutions should be respected and acknowledged?

Answer. I fully recognize and appreciate the benefits of collaborative regional evaluation and solutions to the challenges and opportunities of an EIM. If confirmed, I will work with the Northwest Power Pool to jointly determine the best mechanisms for capturing economies of scale within the Pacific Northwest.

f) BPA, as well as other PMAs currently report to the Deputy Secretary of Energy. Will you commit that BPA and the other PMAs will continue to report to the Deputy Secretary in order to assure that power marketing issues receive a high level of visibility within the Administration?

Answer. If confirmed, I intend to have the PMAs continue to report to the Deputy Secretary. I also note that the PMAs have been and will continue to be important to the Obama Administration.

Question 9. I believe that putting a price on carbon is necessary. It will unleash American ingenuity to diversify our energy mix and reduce our carbon intensity. But a price on carbon is not sufficient. We must also make critical investments in research and development and in the electric grid. Integrating renewables into the grid demands new investments in the grid itself.

Washington state passed a renewable portfolio standard seven years ago. Since then, renewable energy has taken off faster than anyone could have imagined. Wind, for example, now accounts for over 3,000 megawatts of my state's power capacity. Integrating this much wind into the grid so fast has produced challenges. In my home state, we have so much wind power that at a few high-water, low-demand periods it actually had to be shut off.

The past two Springs, many wind farms were asked to shut down simply because we had too much cheap power. Too much cheap power that is both clean and sustainable should be a boon for our economy—not a burden to bear.

A study by the Electric Power Research Institute estimated that the net investment necessary to create a power delivery system of the future would be between $17 and $24 billion dollars per year over the next 20 years. That same study found that every dollar of investment in the grid would return four dollars of benefits such as reduced outages, increased efficiency, and lower demand for energy at peak times.

Washington state has been leading on realizing this smart grid of the future that we so urgently need. The Pacific Northwest National Laboratory led a study to determine how willing homeowners are to use smart grid technologies; what benefits

they found in being able to control their energy use according to pricing; and how much money they could save.

Unfortunately, we're not making these critical investments. The Department of Energy's 2011 Quadrennial Technology Review confirmed this, stating simply that we are "underinvesting in activities supporting modernization of the grid."

This underinvestment delays the nation's transition to a more resilient, reliable, and secure electricity system that integrates renewables into the system.

a) Do you think a smart grid should be part of the Administration's "all-of-the-above" energy strategy?

Answer. In this year's State of the Union address, the President highlighted the grid as a priority, and I am totally aligned with this position. In my statement to the Committee, I wrote that "a 21st century electricity delivery system, including cybersecurity and a high degree of resilience to disruptions, is vital and deserves increased attention in the next years." I support the investments made in the DOE Smart Grid program. This included $4.5B in Recovery Act funds for the Smart Grid Investment Grant Program, demonstrations, as well as other efforts. The implementation of smart grid technologies is revolutionizing electric delivery in the United States to meet the needs of the 21st century economy. The transformation to a smarter grid will increase the reliability, efficiency, and security of the country's electrical system; encourage consumers to manage their electricity use; reduce greenhouse gas emissions; and allow the integration of all clean energy sources and electric vehicles into the grid of tomorrow.

b) Do you agree that grid modernization efforts and making the grid smarter are important parts of bringing more clean energy online?

Answer. I agree with the statement.

c) I and several other Senators support the concept of an Electricity Systems Innovation Hub. We have been perplexed, however, by funding proposals for this Hub that would carve the required funds out of base DOE programs that are delivering significant returns to U.S. taxpayers and consumers. None of the DOE Hubs established to date have been funded in this manner. Do you intend to pursue an Electricity Systems Innovation Hub, even if it comes at the expense of ongoing programmatic activities?

Answer. I am not aware of the details of the Electricity Systems Innovation Hub funding request. If confirmed, I will evaluate the proposal to determine its impact, if any, on other programmatic activities. I do believe that more focus on Electricity Systems is warranted, and I also support the hub concept for advancing selected technology development.

Question 10. Working with stakeholders, I am drafting on legislation to take the next steps to modernizing our electric grid. The Smart Grid legislation that I authored and incorporated into the 2007 Energy Bill laid the groundwork for the work going on today, but there's much more we can and should be doing.

The 2007 legislation also allowed us to secure $4.5 billion in the 2009 Recovery and Reinvestment Act to invest in smart grid development. That investment was leveraged many times over by the private sector, but it's still just a start to modernizing our nation's energy grid.

a) How will you ensure that we continue to make progress on modernizing our grid?

Answer. Future energy demands will require that we achieve grid modernization. These demands include the need to increase efficiency and enable greater use of renewables and distributed energy sources such as electric vehicles, demand side management and energy storage while maintaining the reliability, security, and affordability of electric power delivery. The grid needs to be more robust and flexible, as well as secure and resilient, to meet our need for a prosperous economy and a sustainable environment. I support the Administration's efforts to continue to look for new ways to work with the electricity sector and state and local governments to modernize grid infrastructure, facilitate development of new tools to empower customers to make smart energy decisions, and protect our critical infrastructure from threats. This requires supporting the development of tools and simulation software, such as GridLAB-DT at Pacific Northwest National Laboratory (PNNL) under funding for Office of Electricity in collaboration with industry and academia. Continuing our work toward a stronger, smarter, cleaner electric system will benefit American families and communities, and ensure our Nation remains competitive and innovative in a 21st century economy.

b) Can you please tell the Committee how you intend to work with the electric utility industry, particularly to facilitate a "twenty-first century" grid?

Answer. The Department is leading national efforts to modernize the electric grid, and enhance security and reliability of the infrastructure. If confirmed, I intend to continue the ongoing efforts to engage the electric utility industry and other stakeholders, providing technical assistance and hosting numerous conferences, workshops, webinars, peer reviews, on a range of key topics from renewable energy integration to microgrid energy storage to cyber and physical systems security. If confirmed, I intend to build on my experience of the last decade to convene industry, environmental groups, academics, investors, policy makers and others for constructive and consequential discussions about the grid and other critical energy issues.

c) In the wake of Superstorm Sandy and other major weather events in recent years, we are increasingly aware of the weaknesses in our electricity grid. Electricity is increasingly vital to all parts of our public safety, health and economic wellbeing. Do you intend to focus on working with local utilities to use smart grid investments to increase grid reliability and resiliency?

Answer. The Department has a long history of working with local utilities and if confirmed, I intend to focus on working with local utilities to use smart grid investments to increase transmission and distribution system reliability and resiliency.

d) Investments in our electricity infrastructure through the Recovery Act-funded projects have accelerated the adoption of new and critically important technologies and systems by the utility industry. How will DOE build on these investments and ensure that these investments across the country don't slow down now that the ARRA funding is coming to a close?

Answer. I believe it is important to continue targeted investments to promote the resiliency of our electricity infrastructure. If confirmed, I intend to work with Congress to identify ways to continue this support in a cost-effective manner.

e) Do you believe OE's role goes beyond just R&D to, for example, facilitating utilities in moving toward a "twenty-first century" Grid?

Answer. DOE's Office of Electricity Delivery and Reliability (OE) has a very important role to play in not only R&D efforts to modernize the grid, but offer technical assistance to utilities and other stakeholders, as well as serve as the sector specific agency tasked with responding to emergencies impacting the nation's critical energy infrastructure.

Question 11. Dr. Moniz, we clearly have to make some difficult choices with regard to the allocation of funding across energy R&D and other technology specific incentive programs. While there have been major improvements in many of these technologies in recent years, they still have some way to go before they can compete on an equal footing with fossil fuels and seize the expanding world market for clean energy.

a) What is your sense of the future with respect to the competitiveness of renewable energy technologies? When might we expect them to be competitive in the marketplace on their own?

b) Some have argued that the percentage of funding for R&D on certain energy sources is out of proportion to their current mix in the energy system. Do you agree that R&D funding for mature and incredibly profitable fossil fuel technologies should exceed funding levels for cleaner and more distributed renewable energy sources?

c) In your view, what are the most economically efficient policies to increase U.S. energy diversity without the need for government to pick technology or special interest winners or losers?

d) Do you agree with the many energy experts who argue that a predictable price on carbon designed in a way that minimizes price volatility is the most economically efficient and technology neutral way to realize greater energy efficiency and diversity?

Answer. I am very optimistic that renewable energy will be quite competitive sooner than many think, so long as a strong commitment to R&D is sustained both by government and by the private sector. My view of the R&D portfolio is that it should be structured so as to provide low-cost technology options in a timely way for a future marketplace that internalizes environmental, security and other public good considerations. Therefore, given the importance of a low-carbon economy, a high priority for the portfolio is R&D for "zero and low-carbon" technologies—renewables, nuclear, CCS, and associated enablers.

If confirmed, my approach to R&D portfolio management will have several linked elements: portfolio development organized around strategic goals; institutionalized portfolio analysis; roadmapping of key technology directions; R&D oversight. These elements will span multiple program offices and be the core of the Quadrennial Technology Review process.

To carry out the R&D, I support the innovative approaches put into place at the DOE over the last four years. They are well matched to DOE's energy mission and it is important that they make multi-year commitments to the performers. The Energy Frontiers Research Centers are funding small teams to seek scientific breakthroughs that will remove barriers to important energy technology development. ARPA-E is supporting high-risk projects that can move into the marketplace. Innovation Hubs support large multi-disciplinary collaborative teams of scientists and engineers who work along the entire innovation chain as appropriate, with clear goals aligned with DOE mission areas. If confirmed, I intend to review the performance and outcomes of each of these approaches so as to optimize the expenditures of taxpayer dollars.

The Administration has not proposed a carbon tax nor does it have plans to do so.

Question 12. National scientific user facilities like the Environmental Molecular Sciences Laboratory and Atmospheric Radiation Measurement Program located in Washington state play a central role in the U.S. research ecosystem by providing thousands of scientists access to unique instruments, expertise, and facilities. As state and federal budgets endure ongoing downward pressure in coming years, the importance of user facilities will grow since they are shared resources available to the entire scientific community. What is your vision for the future of DOE's stewardship of national scientific user facilities and what assurances could you provide that investment in them will remain a priority under your leadership?

Answer. I am committed to the importance of user facilities at the national labs. They are a pillar of the US research infrastructure, with over 29,000 lab, university, and industry researchers dependent on their availability. They are essential for training large numbers of graduate students who will be among our future scientific leaders. Indeed, with constrained budgets, we must assure that these facilities maintain a reasonably high level of availability for user experiments. If confirmed, I will emphasize science community input to reach a balance between facility operation for research and researcher support.

Question 13. DOE's Biological and Environmental Research (BER) Program supports critical and unique climate science programs, including the Atmospheric Radiation Measurement program and others in the high performance computing and modeling areas. These programs are rapidly advancing our understanding of the climate system and climate change impacts. Assuming DOE will be under ongoing budget pressure and its climate programs will continue to elicit close scrutiny from some Members of Congress, what assurances could you offer that these programs will remain a priority under your leadership?

Answer. The President has been clear that tackling climate change and enhancing energy security will be among his top priorities in his second term. Programs like the Biological and Environmental Research Program are critical in that effort because we cannot address these problems without the capability to measure and track them. If confirmed, I will make it a priority to ensure that we maintain our ability to do so.

Question 14. The United States is a key partner in several international "big science" projects including the International Thermonuclear Experimental Reactor (ITER) and BELLE 2 high-energy physics project.

a) In your estimation, how important are these projects to the advancement of the science frontier?

b) How would you work to ensure that the United States remains a strong and reliable partner in international projects such as these?

Answer. ITER is a partnership of 6 countries and the European Union, and is the culmination of decades of magnetic fusion research. ITER is based on decades of effort by the international science community to establish the scientific basis for fusion energy and demonstrate the transformative potential of fusion as an energy resource. It is my understanding that 80 percent of the US contribution to ITER is spent domestically, with in-kind components built in the US and delivered to the project site in France. If confirmed, I will work to make the most effective use of our research spending.

In particle physics, the value of international collaboration has been seen in two high profile discoveries within the last year: the apparent discovery of the Higgs

boson at CERN, with extensive US participation, and the first hints of dark matter detection in a US led experiment on the International Space Station.

Such massive projects could not be carried out by one country alone and provide great value to American scientists in addition to pushing the frontiers of our understanding of nature. If confirmed, I will pursue such relationships where the US has the most to gain from the international partnership. We must enter into such collaborations only with the solid support of the relevant research community and a commitment that all parties will meet their obligations.

Question 15. The DOE Biological and Environmental Research Advisory Committee recently called for a plan to accelerate U.S. leadership in biodesign by creating a "biosystems frontier network," building on the existing expertise and facilities of Office of Science/Biological and Environmental Research Program facilities. To what extent would biodesign be a priority for DOE under your leadership?

Answer. The Biological and Environmental Research Program has carried out much important research over the years. I am aware that the Biological and Environmental Research Advisory Committee (BERAC) recently recommended a Biological and Environmental Research System Network as its highest priority, and the biosystems frontier network is an important part of that concept. Its purpose is to advance biosystems engineering to enable synthetic biological solutions to energy and environmental problems. If confirmed, I will have to look more deeply at the BERAC recommendations to see how DOE can best position itself to be a meaningful contributor to biodesign.

Question 16. The Department of Energy's Basic Energy Sciences (BES) Program established the Energy Frontier Research Center (EFRC) program in 2009 to bring national labs, universities, and industry together to focus in a concentrated way on the nation's energy "grand challenges." The initial 5-year award period for the 46 EFRCs expires at the end of 2013.

a) What is your assessment of the performance of these centers and, as Secretary, would you support the continuation of the EFRC program?

b) What is your vision for the EFRC program and what role in it do you foresee for the national labs?

Answer. In my opinion, the EFRC program was established in an exemplary way, attracting considerable community input to define the key basic science barriers to transformative clean energy technologies. I feel that this is the kind of program that brings DOE's longstanding successful basic science programs to bear directly on the agencies mission objectives in energy technology. Anecdotally, I have seen the EFRCs at my home institution do excellent work, including spinning out a solar energy startup. I have heard similar good reports about several other EFRCs but would need a systematic assessment to guide future decisions. If confirmed, I will work closely with the DOE research leadership to evaluate the merits of EFRCs and all of the Department's research efforts to see what has worked effectively and what can be improved. I will be guided by the principle of making the most efficient use of our research funds to advance the DOE missions in energy, science, security and remediation.

Question 17. The United States faces stiff competition in the race to exascale computing, and losing this race could have very serious implications for our future national security and economic competitiveness.

a) Under your leadership, what actions would the Department of Energy take to ensure U.S. primacy in high performance computing generally and in being first to achieve computing at exascale?

b) How would you expand the role of high performance computing in DOE's applied energy programs, particularly in those that have not historically integrated computing into their programmatic activities?

Answer. DOE has a strong tradition in supercomputing and our current programs are second to none. I would note that DOE currently has world's fastest computer at the Oak Ridge National Laboratory, and ORNL also leads an innovation hub on the application of large scale modeling and simulation to nuclear reactors. This is a good example of expanding the role of high performance computing. When I served in the Department as Undersecretary, expanding the role of high performance computing to science and energy programs, in addition to nuclear weapons, was a priority. Exascale computing is an important goal for the Department to pursue, and it is a critical mission for DOE to remain at the forefront of this field. If confirmed, I am committed to advancing large scale computation and its application across all of DOE's missions.

Question 18. DOE supports energy storage development through the Office of Electricity and Energy Reliability, ARPA-E and the recently launched Office of

Science Energy Storage Hub. However, given the importance that grid-scale energy storage will have in a clean energy future, it will be vital to ensure continued investment in development of cost-effective grid storage technologies, and DOE should have a leadership role in expanding efforts to both develop such technologies and to facilitate their deployment, field testing and evaluation.

a) Under your leadership, how will DOE invest in further development and deployment of grid energy storage technologies?

Answer. Energy storage technologies have the potential to play a major role on the electric grid, both for integrating renewables and for improving the grid's efficiency and reliability. While pumped hydro has been widely deployed for years, other storage technologies—electrochemical and flow batteries, compressed air, flywheels, and thermal storage—are becoming viable for grid use. Accelerating progress on these technologies and deploying them onto the grid is an important national strategic goal.

DOE plays a vital role in achieving this goal. DOE R&D has directly contributed to bringing these technologies to their current levels, and it should continue to do this work. DOE should also work with private-sector partners to demonstrate energy storage in real-world grid applications, to help utilities and financiers understand the performance and cost of these technologies and gain confidence in investing in them. And DOE should work closely with FERC and other regulators, to reduce or eliminate regulatory barriers to energy storage.

Internally, DOE has several offices that work on grid-scale energy storage, including the Office of Electricity, the Office of Energy Efficiency and Renewable Energy, the Office of Science, and ARPA-E. The offices coordinate their activities through the cross-cutting "Grid Tech Team". If I am confirmed, I will focus closely on expanding this coordination. I will also focus on ensuring that DOE's technology development roadmaps for these different energy storage technologies are clear, and have wide input from the private sector.

With both good internal coordination and close partnerships with the private sector and regulators, DOE can play an effective and impactful role in advancing the national strategic goal of advancing energy storage technologies for the grid.

Finally, if confirmed, I intend to provide the Committee with a timeline for development of a grid energy storage technology roadmap.

b) Should tax incentives, similar to those employed for renewable energy deployment, be used to facilitate grid energy storage deployment?

Answer. Tax incentives do not fall within the purview of the Department of Energy.

Question 19. Secretary Chu has reengaged the national laboratories, as federally funded research and development centers (FFRDCs), in the challenges currently facing the Waste Treatment Plant (WTP) at Hanford. This has given them a leadership role in developing the technical understanding essential for the project's success. In your previous tenure as DOE Under Secretary, you engaged the national laboratories in similar fashion through the Groundwater Vadose Zone Integration Project-designed to understand the nature and migration rates of high level nuclear waste leaking from Hanford's underground tanks.

If confirmed, will you continue to rely on the national laboratories' leadership in devising technically-grounded strategies addressing critical issues facing the Department?

Answer. Yes. Our national laboratories are a tremendous resource that should continue to address the nation's scientific and technical challenges.

Question 20. The DOE national labs make significant contributions to national security through various DOE, DOD, and intelligence community efforts. The recently signed NDAA officially designates the three NNSA nuclear weapons labs (LANL, LLNL, SNL) as 'national security' labs, ignoring the significant and important contributions made by other DOE labs, most notably PNNL, ORNL, and INL. How do you plan to ensure that these and other labs are fully and directly engaged in the national security enterprise?

Answer. As you indicated, several DOE national labs managed by the science and energy offices—most especially PNNL, ORNL and INL—have significant national security roles in addition to those carried out by the NNSA labs—LANL, LLNL, and SNL. The latter have the lead for nuclear weapons stockpile stewardship, while they all have substantial responsibilities for the department's broad security and intelligence functions. Conversely, the NNSA labs contribute significantly to the science and energy technology missions of the Department. All of them are important partners with universities and industry as well. Clearly, the seventeen national laboratories need to be seen as a system addressing the complex security, science, energy

and environmental missions of the DOE and as part of the broader American research enterprise. If confirmed, I intend to work closely with all of the national labs to use their complementary capabilities in service of the DOE missions in a coordinated and cost effective manner.

Question 21. The DOE and its national laboratories have made significant investments in cyber security research and technologies. How would you ensure that the capabilities stewarded at DOE's national laboratories are appropriately leveraged and utilized by other U.S. agencies and critical infrastructure stakeholders to help the nation address its cyber security challenges?

Answer. The President has recognized cyber-security as one of the major security challenges facing the United States, with the challenges ranging from protection of energy infrastructure from internet attacks to avoiding intellectual property and sensitive data theft to defeating cyber warfare. The DOE has a special role in that it has both responsibility for domestic energy infrastructure reliability and resilience and significant capabilities that serve multiple security and intelligence agencies. These capabilities reside primarily in the national laboratories. If confirmed, I assure you that the national laboratories will collaborate with key stakeholders to address cyber-security challenges. Furthermore, I will engage the cyber-security resources across the department to enhance coordination and overall effectiveness.

Question 22. A recommendation by the Department of Energy's Inspector General to consider shuttering some of DOE's national laboratories has not gained a lot of traction. DOE IG Gregory Friedman suggested a "BRAC-style" commission should be formed to examine consolidating parts of DOE's lab and technology complex, including its nuclear weapons laboratories. What are your thoughts on consolidation of the DOE National Laboratory system?

Answer. I am not aware of any plans currently underway to create a "BRAC-style" commission to examine the national labs, nor is that something I am planning to do if confirmed. That said, particularly in this era of tightened budgets, it is helpful always to evaluate where waste can be eliminated or efficiencies gained in order to put our research funding to the best use.

Question 23. To realize the Department's mission of solving our nation's grand challenges in energy, environment, and national security, the science and technology developed at the Department's national laboratories must ultimately be commercialized and deployed. To strengthen the Department's commercialization activities, this Committee created the position of Technology Transfer Coordinator in Title X of the Energy Policy Act of 2005. Despite hiring a Technology Transfer Coordinator and the President issuing a Presidential Memorandum on Accelerating Technology Transfer and Commercialization of Federal Research in Support of High-Growth Businesses, commercialization seems to remain a relatively low priority across the Department, and our national laboratories still lack many of the tools necessary to commercialize technology and work with industry. Specifically,

a) Do you plan to give the national laboratories greater flexibility to support commercial application of potentially transformative technologies, specifically allowing the use of laboratory overhead funds for Technology Maturation, a purpose that seems completely consistent with Stevenson Wydler legislation and will most likely improve the likelihood that such technologies are transferred to the commercial marketplace for the benefit of the American economy?

b) The Technology Transfer Coordinator recently stepped down. This provides you with an opportunity to strengthen the position and elevate the role of technology transfer within the department. What actions will you take to increase the effectiveness and impact of the Technology Transfer Coordinator position?

c) Technology Transfer is currently a low priority that receives very little weight in DOE's annual lab contractor performance evaluation plans. Do you support elevating technology transfer in these plans so that transferring R&D into the marketplace and ensuring that taxpayers and the American economy are able to realize the full economic impact of Federal R&D investments is a significantly weighted and evaluated activity at national labs?

d) National labs have a new Tech Transfer mechanism for engaging non-federal entities, called Agreements for Commercializing Technology (ACT), which is being piloted by many of the labs. The advantages of ACT are many: 1) ACT allows the lab management contractor to assume risks that the federal government cannot, such as providing performance guarantees and advance payment; 2) ACT allows for the use of commercially friendly terms and conditions highly valued by industrial and other non-federal parties; and 3) ACT provides for speed of contract execution thereby allowing an ACT agreement to be completed in a fraction of the time of previous DOE-approved mechanisms. Unfortunately, this contract vehicle is not universally available. Currently, companies that

have received federal funding and want to access the capabilities of a national lab are prohibited from using ACT to partner on a project involving federal funds, a restriction that does not exist for other technology transfer vehicles employed by DOE. By continuing the restriction, taxpayer funded technologies are put at a disadvantage, with greater barriers to successfully returning benefits back to the economy. Do you support removing this restriction?

Answer. I believe that technology transfer has to be a priority of the Department, because it is primarily through that transfer that DOE's research efforts have a substantive effect on the country's energy problems. This pertains not only to R&D at the national laboratories but also to the many universities that have energy-related research support from the DOE. This is an issue that I have focused on both in my previous role as the DOE Undersecretary and while leading the MIT Energy Initiative.

If confirmed, I will certainly be appointing a new Technology Transfer Coordinator, and I will place additional emphasis on this function. I also support providing more flexibility for the laboratories and for their arrangements with industry partners. The ACT approach is a good example in that the agreements can align better with industry practice than is the case for traditional CRADAs. ACT agreements also allow greater flexibility with IP. I was not aware of the ACT restriction on certain business partners. If confirmed, I will seek to understand the basis for the restriction and, in consultation with Congress, act accordingly.

Further, if confirmed, I hope to explore the possibility of working with states and localities proximate to the national laboratories to enrich the local "innovation ecosystem". This can be a major multiplier on technology transfer actions within the labs themselves.

Question 24. Dr. Moniz, over the past several years the Confederated Tribes and Bands of the Yakama Nation have been frustrated by the lack of a proper government-to-government relationship with the Department of Energy regarding their unique interests in Hanford clean-up. As I understand them, the Yakama Nation's primary concerns are DOE's interpretation of Treaty rights at Hanford, possible redefinition of high level waste and on-site disposal, cultural resource protection and compliance with laws and regulations, and recent funding cuts which disallow Yakama government participation in the cleanup process.

If confirmed, will you commit to meet with the Yakama Nation for government-to-government consultation on Hanford?

Answer. Yes. I am committed to the government-to-government consultation with federally-recognized Indian Tribes. I am aware of the longstanding relationship the Department has with the Yakama Indian Nation and, if confirmed, I intend to fulfill this well-established commitment of government-to-government consultation. If confirmed, I would look forward to meeting with the tribal elected leaders during a visit to the site.

Question 25. Dr. Moniz, on February 16, 2012, Energy Secretary Chu testified before the Senate Energy Committee on the Department of Energy's budget request for Fiscal Year 2013. Following that hearing, Committee members submitted a number of additional and follow-up questions for the record as part of their responsibility to provide oversight for the Energy Department and safeguard the use of taxpayer dollars. Unfortunately, Senators did not receive responses to their questions until December 21, 2012.

a) Do you believe that Administration's apparent unwillingness or inability to respond to Congressional inquiries for over ten months (and on Christmas week) inhibits Congress' ability and responsibility to conduct oversight over the Energy Department and respond to the concerns of the stakeholders they represent?

b) If nominated, what would you do differently to ensure a more timely response to future questions for the record whenever the Energy Department testifies before the Senate Energy Committee?

c) If nominated, will you commit to answering the Senate Energy Committee's questions for the record following the Department's testimony on the fiscal year 2014 budget request within 30 days?

d) And if there is a delay past 30 days, perhaps due to the OMB clearance process, will you inform the Committee as to the reasons for these delays?

Answer. If confirmed, I can commit to responding to the Committee's questions promptly to the best of my ability. If confirmed, I will instruct my staff to do everything possible to respond to Committee questions in a timely fashion.

Question 26. As I understand it, today the U.S. has produces roughly 280 million gallons of methanol, primarily from the steam reformation of natural gas, and by

2015 that number will increase to one billion gallons. On the ground that means three methanol plants will be reactivated in Texas and a fourth will be moved from Chile to Louisiana to take advantage of today's lower natural gas costs.

In a study published in 2010, researchers at the Massachusetts Institute of Technology concluded that methanol was the 'liquid fuel most efficiently and inexpensively produced from natural gas,' and they recommended methanol as the most effective way to integrate natural gas into our transportation economy.

Dr, Moniz, I would appreciate knowing if you were involved with this study and your personal views as to the potential of using methanol to power our transportation system given America's now abundant supplies of cheap natural gas.

I understand that at today's natural gas prices methanol costs about 35 cents a gallon to produce, and for the past five years the wholesale price for natural gas-derived methanol has ranged between $1.05 and $1.15 a gallon. How do you think the price of methanol will change over the next decade as the price of natural gas changes?

Answer. I was the co-director of this study. Its findings and recommendations were achieved by the consensus of the 19 faculty and senior researchers involved in the study. The U.S. has significantly increased domestic natural gas and oil production over the last several years, with important implications and possible opportunities for diversifying the nation's transportation fuel mix. This diversification remains an economic and national security imperative. The President's All-of-the-Above Energy policy supports more choices for Americans among available modes of transportation and types of fuel.

There are many conversion routes for deriving liquid fuels from natural gas. Methanol is simplest and, like ethanol, needs modest engine modifications for flex fuel operation (possibly even tri-flex-fuel). More complex and costly conversion could yield "drop-in" fuels. If confirmed, I am committed to exploring the safe and environmentally sustainable development of all economically viable transportation fuels to increase consumer choice, reduce prices, improve our balance of trade, and enhance national security.

Clearly higher natural gas prices would increase methanol costs, and conversely for lower prices. While I won't speculate on the future price of methanol, I appreciate both the economic and diversity benefits of methanol as a transportation fuel, as well as the challenges it poses to both fueling infrastructure and vehicle design, especially in the context of ability to meet future environmental emissions standards over a wide range of tri-flex-fuel operation.

Question 27. The seminal Massachusetts Institute of Technology Institute report entitled "The Future of Natural Gas 2011" found that "methanol could be used in tri-flexible-fuel, light-duty (and heavy-duty) vehicles in a manner similar to present ethanol-gasoline flex fuel vehicles, with modest incremental vehicle cost. These tri-flex-fuel vehicles could be operated on a wide range of mixtures of methanol, ethanol and gasoline. For long distance driving, gasoline could be used in the flex-fuel engine to maximize range. Present ethanol-gasoline flex-fuel vehicles in the U.S. are sold at the same price as their gasoline counterparts. Adding methanol capability to a factory 85 percent ethanol blend (E85) vehicle, to create tri-flex fuel capability, would require an air/fuel mixture control to accommodate an expanded fuel/air range with addition of an alcohol sensor and would result in an extra cost of $100 to $200, most likely at the lower end of that range with sufficient production."

Dr. Moniz, were you involved with this study and do you generally agree with its conclusions? What can DOE do to promote greater adoption of tri-flexible-fuel vehicles?

Answer. I was the co-director of this study. Its findings and recommendations were achieved by the consensus of the 19 faculty and senior researchers involved in the study. Flex fuel vehicles were also a topic discussed in detail at a MIT symposium last year. Such vehicles may help enhance US energy security by diversifying our sources of liquid fuels. If confirmed, I would recommend that this technology pathway be examined in the Quadrennial Energy Review.

Question 28. Through the Renewable Fuel Standard, Congress has called for the steady increase of biofuels in the transportation sector through 2022. But today, with virtually every gallon of gasoline in America containing ten percent ethanol, coupled with very little growth in gasoline consumption, there is effectively no way to consume the additional gallons of biofuels required to be produced by the RFS. To introduce more biofuels into the transportation sector, it seems like more vehicles capable of running higher alcohol blends and the infrastructure to deliver higher blend fuels will be needed.

a) Dr. Moniz, would you support building out the infrastructure for fueling flex fuel vehicles so that they could be fueled with natural gas derived methanol?

b) Does the ability to substitute various fuels and fuel sources in Flex-Fuel Vehicles (FFVs) make methanol from natural gas a less risky investment proposition?

c) What are the relative costs of producing natural gas powered vehicles and the necessary support infrastructure compared to powering vehicles with methanol derived from natural gas?

Answer. If confirmed, I will support and implement the President's All-of-the-Above Energy strategy, relying on sound science to help enable viable alternative fuels, including natural gas-derived fuels and advanced biofuels. I am committed to exploring the safe and environmentally sustainable development of all economically viable transportation fuels to increase consumer choice, reduce prices, improve our balance of trade, and enhance national security.

I appreciate both the economic and diversification benefits of methanol as a transportation fuel, as well as the challenges it poses to both vehicle design and infrastructure. Clearly, if a large number of flex-fuel vehicles were on the road, investments in alternative fueling infrastructure would be more attractive to the private sector, which has historically financed energy infrastructure. There is a considerable interplay between vehicle design and fuel composition, so optimizing the cost proposition for different alternatives requires substantial analysis. If confirmed, I think these issues raised by the longstanding and unresolved "chicken and egg questions" associated with engine design, alternative fuels and infrastructures should receive substantial attention in the Quadrennial Energy Review process.

Question 29. Dr. Moniz, during you nomination hearing you indicated you strongly supported government expenditures to promote Carbon Capture and Coal (CCS). I understand these views are consistent with the 2007 MIT study "The Future of Coal," you were involved with.

a) Dr. Moniz, do you agree with the 2007 MIT study's recommendation that the U.S. government should provide assistance only to coal projects with CO_2 capture in order to demonstrate technical, economic and environmental performance?

b) Dr. Moniz, do you agree with the 2007 MIT study's recommendation that Congress should remove any expectation that construction of new coal plants without CO_2 capture will be "grandfathered" and granted emission allowances in the event of future regulation?

c) Dr. Moniz, do you agree with the 2007 MIT study's recommendation that the government should provide assistance to several "first of a kind" coal utilization demonstration plants, but only with carbon capture?

d) CCS has been talked about as a solution to coal's outsized impact on climate change for many years, when do you expect CCS to reach commercial viability and how much do you expect it will cost U.S. taxpayers to reach that stage of development?

e) If CCS won't reach commercial viability before 2020, why should taxpayers be expected to support CCS given that most energy experts believe that wind and solar will have exceeded price parity with coal and become much cheaper?

Answer. We can expect coal to remain a significant part of the nation's energy mix for decades to come and a fuel used around the world, particularly in developing countries. To address the emerging low carbon economy in the U.S., DOE needs to continue investments in the important and ongoing work to establish carbon capture and storage as a safe and economically viable component of any coal-fired power plant, but ultimately for all major carbon-emitting sources. DOE must provide public confidence in long-term storage of CO_2 at commercial scale. At the same time, DOE must continue to focus its R&D activities on innovation that reduces the cost of carbon capture technologies. Successfully demonstrating this combination of techniques and technologies is important for maintaining the viability of coal as a fuel option for power generation in the United States. It is perhaps even more crucial in the developing world, where coal will remain a dominant fuel even as renewables and other technologies expand their share of the market in the United States. DOE's work on carbon capture and storage could further advance exports of clean energy technology to countries where the drive for economic development will soon be met by a desire for environmentally responsible coal-based technologies. Work on beneficial uses of CO_2 at large scale is also important.

I agree that the costs for wind and solar will continue to come down. However, wind and solar are not currently dispatchable and therefore cannot serve as base-

load power unless integrated with dispatchable units or until energy storage costs are reduced.

Question 30. Dr. Moniz, I authored Section 524 of the Energy Independence and Security Act of 2007 (EISA 2007) which directs federal agencies to procure appliances and other equipment that use no more than one watt of electricity in standby power mode, if such products are available, and to procure products with the lowest standby power consumption otherwise.

The requirement is stated in 42 USC 8259b(e) in the Federal Acquisition Regulation, under Subpart 23.2-Energy and Water Efficiency and Renewable Energy, which states that, in their procurements, agencies must purchase items listed on FEMP's Low Standby Power Devices product listing.

As I understand it, currently FEMP requires standby power of one watt or less for only three product categories: cordless phones; desktop computers, workstations, and docking stations; and fax/printer machines.

a) Dr. Moniz, do you support trying to minimize standby power loads and what is the potential savings for consumers and the nation as a whole?

b) Do you believe that DOE's current level of effort meets the statutory requirement of the 2007 Energy Bill?

c) What more can DOE be doing to minimize standby electricity losses and address this growing source of electricity demand?

Answer. The President has called on Congress, state and local leaders, federal agencies, and the private sector to improve energy efficiency. The Lawrence Berkeley lab has estimated that up to 90 percent of standby power is wasted energy, and the IEA estimated that 5 to 15 percent of worldwide household electricity consumption is wasted in standby mode. The "one watt rule" is a technologically feasible way to realize considerable savings.

I strongly support efforts to minimize the amount of electricity consumed by the federal government, which is the largest single consumer of electricity in the country. While I am not yet familiar with the specifics of DOE's current energy consumption levels compared to a rigorously developed baseline, if confirmed, I pledge to pursue policies that minimize electricity use at the Department and to seek ways of promulgating the "one watt rule" more broadly.

Responses of Ernest J. Moniz to Questions From Senator Flake

NUCLEAR MODERNIZATION

Question 1. The Obama Administration's 2010 Nuclear Posture Review (NPR) stated that, "Implementation of the Stockpile Stewardship Program and the nuclear infrastructure investments recommended in the NPR will allow the United States to shift away from retaining large numbers of non-deployed warheads as a hedge against technical or geopolitical surprise, allowing major reductions in the nuclear stockpile. These investments are essential to facilitating reductions while sustaining deterrence under New START and beyond." In addition, Senate ratification of the New START Treaty was contingent on the Administration's agreement to modernize our nuclear arsenal as well as delivery systems, as the Administration itself outlined in the NPR.

If confirmed, will you make modernization of the U.S. nuclear arsenal one of your top priorities?

Answer. Yes. The core mission of the National Nuclear Security Administration (NNSA) is to maintain and enhance the safety, security and reliability of the nuclear stockpile to meet national security requirements without underground testing. This requires both science-based stockpile stewardship and the infrastructure needed to extend the life of and modernize nuclear weapons systems. The mission is carried out in partnership with the Department of Defense (DoD), with DOE/NNSA responsible for the research, development, and production activities needed to meet military requirements. I am aware that the Administration and the Congress have made large investments into the modernization of the U.S. nuclear arsenal, and that more will be needed over an extended period. If confirmed, I am committed to carrying out this mission, in partnership with DoD and the Congress, with high priority within the available resources.

Question 2. Given the difficulties the National Nuclear Security Administration has been having with project management capabilities, what is your plan for ensuring that modernization efforts do not fall victim to cost and schedule overruns?

Answer. I support the efforts of NNSA to improve its project management. I understand the NNSA has outlined a plan to improve its project management by providing its federal project directors, federal and contractor program managers, and

other key project management personnel with: 1) best-in-practice tools; 2) project management policy and procedure counsel; 3) independent project review capabilities; and 4) other project management resources to support management of NNSA construction projects. If confirmed, I look forward to reviewing this with the NNSA Administrator and the Deputy Secretary and to assuring that best practices in project management are shared and emulated across the department. Also, as noted in my hearing statement, if confirmed, I intend to elevate the focus on management and performance across the Department.

HOOVER POWER

Question 3. In 2011, Congress passed the Hoover Power Allocation Act. The Act, among other things, directed that the Western Area Power Administration (WAPA) administratively allocate a portion of the Hoover power, known as "Schedule D power" to rural electric cooperatives, municipal power users, irrigation districts and Indian tribes.

Can you provide assurances that under your leadership the Department of Energy will ensure that WAPA offers all customer classes (e.g., Indian tribes, cooperatives, and irrigation districts) and states a fair allocation of the Schedule D power?

Answer. If confirmed, I commit that DOE and WAPA will abide by the Hoover Power Allocation Act.

LOAN GUARANTEES

Question 4. The Department of Energy's loan guarantee program has come under increased scrutiny over the last few years for a variety of reasons—the Solyndra failure being the most cited example of the challenges presented by the program. There are, however, other issues with Department of Energy loan programs. In Arizona, for example, the Arizona Republic reported last week that $16 million in claims have been filed by contractors that have not received prompt payment for work on a large solar plant. The company that owns the plant and hired the contractors reportedly received a $1.45 billion federal loan.

I do not believe the loan guarantee program is prudent or effective. If, however, the Department of Energy continues down that path, what will you do to enhance the Department's oversight of these loan programs?

Relatedly, what, if anything, would you recommend the Department do to protect local contractors and subcontractors when performing work for entities that receive federal backing?

Answer. If confirmed, I will make the monitoring and oversight of the Loan Program's portfolio of loan guarantees a top priority. I am familiar with the independent review conducted by Herb Alison. I understand that the Department is working to implement Mr. Alison's recommendations. This should strengthen DOE's abilities to help ensure high impact investments while protecting the interests of the American taxpayer.

If confirmed, I look forward to getting a better understanding of the mechanics of the Loan Program Office to understand what can and should be done to protect local contractors and subcontractors.

POWER MARKETING ADMINISTRATIONS

Question 5. On March 16, 2012, Secretary Chu sent a memo to the Power Marketing Administrations (PMA), which directed significant changes in the way they do business. Those changes could increase costs on a wide variety of customers. On June 5, 2012, a bipartisan group sent a letter to Secretary Chu asking for collaboration with stakeholders before acting on those initiatives. DOE has proceeded to move forward with stakeholder involvement, starting with the Western Area Power Administration (WAPA) as the guinea pig. And, on March 1, 2013, Secretary Chu directed WAPA to develop an implementation plan for its recommendations. Many Arizonans remain concerned about the impact of these directives and who will pay the costs of studying and implementing them, particularly when ratepayers might not benefit from the changes in operations—contrary to the "beneficiary pays" principle.

If confirmed, can you give assurances that Arizona ratepayers will not be forced to pay for PMA initiatives in which they do not benefit?

Answer. If confirmed, I commit to adhering to the "beneficiary pays" principle.

NUCLEAR POWER

Question 6. In 2011, you co-chaired a study, The Future of the Nuclear Fuel Cycle. One of the conclusions from that study was that "the [uranium] market is in serious

imbalance and vulnerable to price volatility until current efforts to expand production come to eventual fruition." This need for increased domestic production is bolstered by the fact that U.S. utilities import approximately 90 percent of the uranium used in nuclear generation. During your testimony, you also emphasized the need to take into account and balance issues regarding the health of domestic industry when making decisions regarding uranium supplies. However, as you were releasing the findings of the study in 2011, Secretary Salazar was constraining domestic uranium production by withdrawing land in the Arizona Strip from new uranium mining claims.

Do you believe there is a need to increase domestic uranium production to reduce price volatility and increase energy security?

In light of the study's findings regarding increased domestic uranium production and your interest in considering the impacts of decisions on the health of domestic industry, do you support efforts to permanently foreclose uranium mining in the Arizona Strip?

Answer. As I mentioned during the hearing, I believe the domestic uranium industry plays an important role in our nuclear fuel supply, and the health of the domestic industry has been in the past and is today a factor in many Departmental decisions. Robust uranium supplies are important to competition in the fuel market that ensures reliable and affordable nuclear generation. Domestic supplies are also important for national security applications.

The Department of Energy does not regulate land management issues in the Arizona Strip or other public lands.

Responses of Ernest J. Moniz to Questions From Senator Heinrich

Question 1. A year ago NNSA all but cancelled the CMR Replacement-Nuclear Facility. Though NNSA has been clear about the need to maintain the unique plutonium research and technical base at Los Alamos National Laboratory, in my view NNSA still does not have a clear plan in place with schedules and budgets. Will you work with Congress to ensure there is an enduring capability and infrastructure in place to maintain Los Alamos National Laboratory as the center of excellence for plutonium research?

Answer. I support the Administration's strong commitment to maintaining the plutonium capabilities necessary to support a safe, secure, and effective nuclear arsenal. I take the nuclear security mission of the Department very seriously and recognize the unique research and technical capabilities at Los Alamos National Laboratory. LANL has been and will remain the center for plutonium science and technology. If confirmed, I intend to work with the NNSA Administrator and seek the support of Congress to ensure a continuous plutonium science and technology capability matched to stockpile stewardship needs.

Question 2. The Department announced its decision to compete the M&O contract for Sandia National Laboratories in December 2011. It is now some16 months later and a draft Request for Proposal (RFP) has not been released. The current M&O contract has been extended 12 months (with the option for 6 additional months) which would go until March 31, 2014. It is now almost a certainty that the current contract will need to be extended further. This protracted uncertainty, is beginning to impact Sandia's leadership and ability to fill key management positions. What is the status and likely timeframe for issuing the RFP for Sandia and awarding the contract? Will the department further extend the current M&O contract with an appropriate timeframe so the Department can, with near certainty, complete the competition and associated contract transition within the extension?

Answer. If confirmed, I will request the status of this procurement sensitive issue facing the NNSA and Sandia National Laboratories.

Response of Ernest J. Moniz to Question From Senator Heller

Question 1. As you know, the Department of Energy's model for appliance energy efficiency is to establish ceilings on total energy consumption. Currently, DOE is working towards a rulemaking on efficiency standards for set-top cable boxes. I appreciate the need for increased energy efficiency across the spectrum, and specifically for set-top boxes.

Additionally, rapid technological advances are taking place in the cable industry, and a rulemaking could stifle innovation, increase costs for consumers, and potentially impair broadband adoption and deployment nationwide.

Recently, the cable industry came together to establish the Set-top Box Energy Conservation Agreement. The agreement would put in place real energy and cost savings-to the tune of $1.5 billion per year-beginning in 2014. This is contrast to a rulemaking that would likely not take effect until 2018 at the earliest.

Given this, do you believe a rulemaking is still necessary?

Should DOE insist on a rulemaking, what will you do to assure that set-top boxes can continue to evolve rapidly and offer new features and services under a regulatory model built for mature, stand-alone appliances?

Answer. I am not familiar with the specifics of the Set-Top Box Energy Conservation Agreement. If confirmed, I look forward to gaining a better understanding of both the provisions of the agreement and the rulemaking process, with the goal of making an appropriate determination for the best path forward. In this case and more broadly, I also pledge to work closely with industry stakeholders and consumer advocates to find commonsense solutions that save energy and reduce consumer costs.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR JOHNSON

Question 1. Your testimony touched on the national security and economic arguments for reducing our dependence on oil for transportation needs. Renewable fuels are already moving us in that direction, but we've seen increasing efforts to limit their access to the marketplace. Could you elaborate on your priorities for the Department in terms of expanding the use of biofuels, including higher levels of ethanol blends and developing advanced biofuels?

Answer. The President has an all-of-the-above strategy to reduce America's dependence on oil. Renewable fuels and flex-fuel vehicles are essential elements for meeting that goal. If confirmed, I will pursue science-based, data-driven policies to develop and deploy affordable renewable fuels in accordance with applicable laws, regulations, and Administration policy. This strategy will employ an integrated research and development approach across DOE and rely, in part, on robust partnerships with academia and industry to maximize opportunities to move next-generation biofuels from the lab to the marketplace at sufficient scale to materially impact oil demand.

Question 2. The Sanford Underground Research Facility (SURF) in the Homestake Mine at Lead, South Dakota, is one of my top priorities, and I am grateful that DOE took on the project when NSF pulled back a few years ago. I'm also very pleased with our conversation when you met with me in my office a couple of weeks ago. Could you discuss here the role you envision Homestake playing in the broader goals of high energy and nuclear physics research and what is your vision for federal support for the lab in the coming years given competing interests in other facilities and research programs?

Answer. Deep underground experiments are important because extremely sensitive experiments with very weak signals can be contemplated in the absence of "background noise", such as cosmic rays, that would overwhelm the measurements if carried out at the earth's surface. The SURF, nearly a mile down in the Homestake mine, will be able to search for phenomena, such as dark matter and novel neutrino physics, that can significantly affect our understanding of elementary particle physics. The nuclear and particle physics communities have strongly endorsed this experimental direction and, if confirmed, I will evaluate the SURF's current research plan and opportunities for new experiments as well.

Question 3. The federal power program has helped ensure rural areas have access to affordable, reliable electricity from the hydropower produced by federally operated dams. The rural electric cooperatives and municipal power providers in my state count on a collaborative working relationship with the Western Area Power Administration and the certainty provided by the cost-based rate structure. Could you comment on where you think the balance can be found in advancing national priorities while respecting the complex differences among the geographic regions served by the Power Marketing Administrations?

Answer. If confirmed, I look forward to further understanding the unique challenges and opportunities faced by each PMA. I pledge to work collaboratively with you and the stakeholders in each PMA region to ensure the PMAs are operating as efficiently and effectively as possible to meet the important mission of each PMA in serving its customers.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR PORTMAN

SYSTEMS APPROACH TO ENERGY EFFICIENCY

Question 1. Dr. Moniz: 35 years ago, Congress enacted the appliance efficiency program into the Energy Policy and Conservation Act, and while there were some false starts during those intervening years, it has had the beneficial impact of promoting more energy efficient consumer products and industrial equipment by eliminating the least efficient products from the market.

For some of these products that have been regulated for a couple of decades now, we are now facing diminishing returns from regulation. Whatever incremental efficiency benefit remains for those products, there could be some significant costs: job losses, costs to manufacturers and smaller manufacturers in particular, and less return on investment to consumers. Furthermore, the Department has been struggling to keep pace with its regulatory load under this program.

So, I am wondering, Dr. Moniz, if Congress should be considering a paradigm shift that seeks to improve the nation's energy efficiency profile by focusing less on regulating specific products and components and more on systems—such as building systems efficiency, industrial factory efficiency, electrical grid efficiency. In this model, we scale back the existing regulatory program without compromising the energy efficiency gains we have achieved to date, but we set improved standards or goals for buildings, factories and the grid, provide incentives and the like for people who are building buildings and factories and adding to the electrical grid to reach those goals however they best determine with energy efficient products in the marketplace. And I am wondering what you think of such a paradigm shift?

Answer. I agree that the energy efficiency standards promulgated under the Energy Policy and Conservation Act have been very successful in reducing manufacturers' regulatory burden and costs, and therefore costs to consumers, by providing single national standards in place of a patchwork of state-by-state standards. It is my understanding that the current process for efficiency rulemaking engages a broad spectrum of stakeholders to mitigate any potential issues regarding cost-effectiveness, technical feasibility, or economic impact.

You raise an important issue about the efficiency of systems, such as whole buildings including its energy-consuming devices and operations. However, I am not now familiar with the state of analysis concerning system versus component efficiency tradeoffs. If confirmed, I would like to consult with the appropriate stakeholders and the Congress to explore approaches to measuring and encouraging system efficiency.

REDUCING GOVERNMENT'S REGULATORY COSTS WHEN THERE IS STAKEHOLDER CONSENSUS

Question 2. Dr. Moniz: In the Energy Policy Act of 2005, Congress provided the Department with some tools to streamline the appliance efficiency regulatory process, and we know that the Department has used or considered some of those tools in a few regulatory proceedings. But I am wondering if there are some barriers to the wider adoption of those proceedings?

For example, taking advantage of one of the tools that Congress enacted to improve the regulatory process, a group of NGO's, manufacturers, and states submitted a joint proposal to the Department to raise energy efficiency standards for electric motors that would have allowed the Department to meet last year's statutory deadline for the regulation and would have resulted in very significant energy savings more quickly. Yet the deadline has passed and the nation won't realize the energy savings as quickly as they proposed. It seems that this was a lost opportunity.

Answer. I certainly agree that efficiency in electric motors could result in substantial energy savings but I am not familiar with the specifics of the joint proposal regarding electric motor energy efficiency. However, if confirmed, I commit to looking into the issue with the goal of understanding the decision-making process at the Department and ensuring we promote timely standards and regulatory processes for increased energy efficiency in accordance with applicable laws, regulations, and Administration policy.

ENERGY SAVINGS PERFORMANCE CONTRACTS

Question 3. Dr. Moniz: Energy Savings Performance Contracts, commonly referred to as ESPCs, are a guaranteed way for the government to save taxpayers' money and reduce the deficit by reducing energy waste in federal facilities. Because the energy savings are guaranteed by the energy service company performing the energy efficiency upgrade, there is no chance that the government will be left paying for a project that doesn't perform.

The Department of Energy has completed ESPCs in 281 federal buildings since 1998, saving the Federal Government $7.2 billion dollars in cumulative energy savings. What can DOE do to further expand the use of ESPCs to eliminate energy waste and save taxpayers' money?

Answer. It is my understanding that the ESPC program has been quite successful. In this era of limited resources, ESPCs allow agencies to use private-sector financing to fund energy and water projects that ultimately pay for themselves. ESPCs help federal agencies achieve energy savings beyond what direct appropria-

tions would provide. This allows for a strong return on taxpayer dollars, as well as improved function and utility of federal buildings.

If confirmed, I will work with the Administration to build upon the success of and perhaps expand the use of ESPCs with the goal of maximizing energy efficiency savings for the federal government while ensuring that these savings are measured against a rigorously developed, accurate baseline.

NATURAL GAS

Question 4. With the growing reserves of natural gas, and the move to natural gas as a fuel for electric power generation, how should natural gas utilization be addressed to ensure lowest cost and highest efficiency electric power generation?

Answer. Natural gas is a key component of the Administration's all-of-the-above energy strategy and an important part of the nation's energy mix. A highly successful mix of federal research support, tax policy and public-private partnerships has enabled us to affordably produce the nation's abundant shale gas resources; US reserve estimates now exceed 100 years of supply at current rates of consumption.

The Department of Energy does not regulate electricity generation from natural gas and decisions about natural gas use in power generation relative to other fuels are largely made by utilities, assuming reliability and other requirements are met. As you know, there has been significant fuel-switching in recent years due to low-cost natural gas. The result has been lower emissions of CO_2 and other criteria pollutants. Also, DOE is working to advance technologies to enable cleaner and more efficient power production. DOE has partnered over the years with major turbine manufacturers to produce cleaner and more efficient combustion turbines. Today, turbines are appearing on the market with very fast ramping times, which is important for accommodating more variable sources like wind and solar, and modern Natural Gas Combined Cycle plants can currently reach efficiencies appreciably greater than 50 percent.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR LANDRIEU

Question 1. In June 2010, President Obama at a joint press conference with Russian President Medvedev stated, "And to prevent terrorists from acquiring nuclear weapons, we came together at our Nuclear Security Summit, where our two nations made numerous commitments, including agreeing to eliminate enough plutonium for about 17,000 nuclear weapons." Are you going to honor the commitment President Obama made to Russian President Medvedev and fully fund NNSA's Office of Fissile Materials Disposition and the MOX Project?

Answer. If confirmed, I intend to carry through on the President's commitment to the U.S. Plutonium Disposition mission, fulfilling our obligations under the US-Russia Plutonium Management and Disposition Agreement. I understand that NNSA is assessing the MOX project and potential alternative plutonium disposition strategies to identify options.

Question 2. The United States and Israel have begun developing a strong bilateral energy relationship over the last few years. The US-Israel Energy Cooperation program, established by Congress in 2008 connects DOE with Israel's Ministry of Energy and has proven an excellent catalyst to private sector cooperation between the countries. Secretary Chu sought to further this relationship through hosting Israeli energy delegations in Washington to explore new areas ripe for cooperation. Now, against the backdrop of a natural gas revolution both at home and within Israel, new opportunities present themselves to deepen our relationship, and move it beyond the programmatic cooperation we've seen to a more strategic realm.

Do you share these views? What growth opportunities do you see for the US-Israel energy relationship?

Are you committed to continuing to fund the US-Israel Energy Cooperation Program?

Answer. I value the role U.S.-Israel Energy Cooperation Program has played in furthering clean energy technology research, development, and commercialization partnerships between U.S. and Israeli companies. I have been told that DOE is also working together with Israel on critical energy infrastructure protection, energy efficiency standards, strategic planning for natural gas development, natural gas utilization, investment in resource development and potential trade opportunities.

If confirmed, I plan to continue to develop our already strong relationship with Israel on strategic energy matters and look forward to working with the leadership of the Israeli government, including the Ministry of Energy and Water Resources and other relevant entities.

Question 3. I'm a supporter of the Department's Small Modular Reactor program, and believe SMRs have the potential to reinvigorate the U.S. nuclear energy indus-

try, helping us retain our technology leadership and create jobs. I was disappointed, however, that DOE only selected one technology last year rather than two, as Congress directed and as DOE said they were going to in their program description and in the Funding Opportunity Announcement. Now I understand that DOE has put out a second FOA and is relaxing the criterion on expeditious commercialization and on the requirement for having a utility customer. The point of the program is to get an SMR licensed and build as soon as possible to ensure U.S. leadership, and it seems DOE is going in the wrong direction with its delay in selecting the second vendor and by easing up on the deployment goal. Given that there are major U.S. nuclear energy companies that are capable and interested in building SMRs submitted proposals for the first FOA, how can DOE justify this delay and why not just select the 2nd SMR technology from the current applicants?

Answer. Like you, I support the Small Modular Reactor program. I believe small modular reactors represent a promising next generation of nuclear energy technology, providing a strong opportunity for America to lead this emerging global industry, creating jobs and business opportunities.

While I am generally aware of the DOE solicitations related to SMRs, I do not know the details of ongoing negotiations and therefore am not in a position to comment on pending applications or the selection process.

Question 4. What is your opinion on the current review and approval process for LNG export terminals-do you believe that it represents an appropriate level of review and ensures that review is completed in an appropriately timely manner?

Answer. The Federal Energy Regulatory Commission is responsible for the siting approval of LNG export terminals. DOE is responsible for the license to export LNG as a commodity.

If confirmed, I am committed to ensuring that DOE makes transparent decisions in the public interest based on unbiased analysis and that it acts on these applications as expeditiously as possible.

Question 5. Do you have any specific changes that you would make to the DOE review process for LNG export terminals?

Answer. The Federal Energy Regulatory Commission is responsible for the siting approval of LNG export terminals. DOE is responsible for the license to export LNG as a commodity.

If confirmed, I am committed to ensuring that DOE makes transparent decisions in the public interest based on unbiased analysis and that it acts on these applications as expeditiously as possible.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR BARRASSO

Question 1. During the time you served on USEC's Strategic Advisory Council, did you contact anyone at the Department of Energy (DOE) about USEC? If so, whom did you contact, how often did you contact this individual (or individuals), and what was the purpose for contacting DOE about USEC?

Answer. I had no contact with anyone at DOE about USEC issues when I served on the USEC Strategic Advisory Council from 2002-2004.

Question 2. U.S. utilities currently import approximately 90 percent of the uranium used to fuel their nuclear reactors. Do you believe it is important to increase uranium production here in the United States? If so, why?

Answer. As I mentioned during my hearing, I believe the domestic uranium industry plays an important role in our nuclear fuel supply. Robust uranium supplies provide competition in the fuel market to help ensure reliable and affordable nuclear power generation. The health of the domestic uranium industry has long been a factor in DOE's overall uranium strategy.

Question 3. Section 3112(d) of the USEC Privatization Act (42 U.S.C. 2297h-10(d)) states that the Secretary may sell or transfer natural or low-enriched uranium from DOE stockpiles provided that:

> the Secretary determines that the sale of the material will not have an adverse material impact on the domestic uranium mining, conversion, or enrichment industry, taking into account the sales of uranium under the Russian HEU Agreement and the Suspension Agreement.

If confirmed, what steps would you take to ensure that any Secretarial Determination: (1) will not harm our domestic uranium production, conversion, and enrichment industries; and (2) is in compliance with Section 3112(d)?

Answer. I am committed to following the Department's statutory obligations regarding uranium disposition. As part of that process, and as we discussed during the hearing, I will, if confirmed, make sure we look at implications for the uranium

mining industry of any sale or transfer before finalizing any such decision so as avoid adverse material impacts.

Question 4. DOE's 2008 Excess Uranium Inventory Management Plan capped annual uranium dispositions at 5 million pounds or 10 percent of annual domestic fuel requirements. Since 2008, DOE has failed to adhere to its Plan. Do you believe that DOE's failure to follow its Plan has created uncertainty, and in turn, undermined our domestic uranium production, conversion and enrichment industries? If so, why?

Answer. I am not familiar with the entire uranium disposition history of the last several years but will, if confirmed, look into this. Like you, I believe that it is important for the Department to finalize and release the uranium management plan to provide industry and other stakeholders with an understanding of DOE's plans regarding its uranium inventory.

Question 5. Under the Consolidated Appropriations Act of 2012, Congress required that DOE issue a new excess uranium inventory management plan by June 30, 2012. The plan is over 9 months late. In our personal meeting, you suggested that DOE, at the very least, should release the plan by June 30, 2013. Will you commit to releasing the plan by June 30, 2013?

Answer. As you know, I am not currently in a position to know the present status of the draft plan nor do I know how quickly the Senate will move on my nomination. However, if confirmed, I can commit to you that I will work to make sure that the plan is released expeditiously and will commit to following up with you and your staff to on the status of the plan and the projected timing of its release.

Question 6. The Natural Gas Act establishes a presumption that liquefied natural gas (LNG) exports to countries which do not have a free trade agreement (FTA) with the United States are in the public interest. However, DOE continues to delay making a final decision on 15 pending applications to export LNG to non-FTA countries. If confirmed, what steps, if any, would you take to expedite the review and decision-making process with respect to these export applications?

Answer. The President is committed to the safe and responsible production and use of natural gas, and I share this commitment. With regard to exports of natural gas, I am aware that the Department has pending decisions for applications to export LNG to non-FTA countries. My understanding of the Natural Gas Act is that when considering applications to export to non-FTA countries, the statute requires the Department to conduct a public interest determination review prior to the issuance of authorization orders. My understanding is that the Department is currently reviewing a large number of public comments. If confirmed, I am committed to ensuring that DOE makes transparent decisions in the public interest based on unbiased analysis and that it acts on these applications as expeditiously as possible

Question 7. Opponents of LNG exports have called for DOE to continue to delay approving any LNG export applications to non-FTA countries. They have called on DOE to: (1) conduct a programmatic environmental impact statement on natural gas development in the United States; (2) issue a new rulemaking; and (3) revisit and/or conduct additional studies-all prior to approving pending export applications. These proposals would take years and cost tens of millions of taxpayer dollars. If confirmed, would you support taking any of these steps prior to making a decision on the pending export applications? If so, which steps would you take and why?

Answer. To my knowledge DOE already considers environmental factors as part of its criteria for the public interest determination required by the Natural Gas Act for export of natural gas to non-FTA countries. If confirmed, I am committed to ensuring that DOE makes transparent, analytically-based decisions on pending applications as expeditiously as possible.

Question 8. Do you believe DOE could deny an LNG export application to a country, which is a member of the World Trade Organization (WTO) yet does not have an FTA with the United States, and still be in compliance with our nation's WTO obligations?

Answer. I am not a trade expert and do not have specific knowledge of our obligations to the WTO. If confirmed, I will ensure any decisions made by DOE are in compliance with the law and the United States' treaty obligations.

Question 9. Please describe how LNG exports from the United States would strengthen our national security interests.

Answer. As I noted in my confirmation hearing, the diversion of LNG imports from the United States to Europe as a result of the shale boom freed up large LNG volumes and added to spot market cargoes. This put downward pressure on Russian imports to Europe. If confirmed, I would recommend the Quadrennial Energy Review as a mechanism for combining the different threads of energy from multiple agencies—including the State Department and the Department of Defense—so that our national security interests are fully evaluated and considered in our energy decisions.

Question 10. What role, if any, do you believe low-sulfur Powder River Basin coal should play in our nation's energy portfolio?

Answer. I support the President's all-of-the-above energy strategy, and I believe that the continued development of conventional energy sources, including coal, remains an integral part of this strategy. Low sulfur Powder River Basin coal production grew very considerably in response to the regulatory requirement of reduced SO_2 emissions. If confirmed, I am committed to ensuring the responsible development of our nation's coal resources, while protecting the environment on which our communities depend for their health, safety and way of life, and to advancing CCS technology.

Question 11. What role, if any, do you believe low-sulfur Powder River Basin coal should play in the world's energy portfolio?

Answer. I support the President's all-of-the-above energy strategy, and I believe that the continued development of traditional energy sources, including coal, remains an integral part of this strategy. Low sulfur coal reduces emissions linked to acid rain. The Department of Energy does not have a role in the considerations related to coal exports. However, DOE's Fossil Energy Office plays a key role in advancing technology that will enhance the safe and efficient use of coal, including support for a major CCS program.

Question 12. DOE has a very small program called the Experimental Program to Stimulate Competitive Research (EPSCoR). I understand that nine of the ten largest energy producing states, including Wyoming, are EPSCoR states.

a) If confirmed, what steps, if any, would you take to strengthen this research program?

b) Would you provide a state-by-state listing of the amount of R& D funding made available to each state from DOE during the most recent three years for which such information is available?

Answer. The Experimental Program to Stimulate Competitive Research (DOE EPSCoR) is a government wide program that is designed to provide research grants to institutions in states and territories with relatively small research and development funding. DOE applies eligibility criteria established by the National Science Foundation. I was associated with EPSCoR at its inception in 1980 and then again during my tenure at OSTP. The program has a strong educational component and, in my opinion, succeeds in building basic research infrastructure across the country. If confirmed, I will delve into the DOE EPSCoR program with an eye towards new opportunities. One possibility might be strengthened undergraduate research opportunities associated with EPSCoR research projects.

If confirmed, I would be happy to have state-by-state R&D funding data assembled and made available.

Question 13. One of DOE's advisory committees is the Basic Energy Sciences Advisory Committee (BESAC). BESAC is responsible for a broad range of programs in material sciences and engineering, chemical sciences, geosciences and the physical biosciences, but BESAC represents a rather concentrated geographic area. How can states like Wyoming participate more fully in DOE's advisory committees?

Answer. DOE's science advisory committees are a critical tool to help the Department to make sound decisions about how to best spend our precious research and development funds, as well as identify other opportunities to advance the Department's research priorities. In accordance with the Federal Advisory Committee Act, all meetings of DOE's advisory panels are open to the public and the minutes of the meetings are published on the Department's website. Broad participation from all interested parties is encouraged. If confirmed, I will assure that nominations for membership are sought broadly.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR UDALL

Question 1. In an effort to diversify fuel sources and lessen the impacts of high global oil prices, the Navy, under the authority of the Defense Production Act, has entered into a Memorandum of Understanding (MOU) with the Department of Energy and the Department of Agriculture to promote the development of a domestic advanced biofuel industry through the construction of domestic biofuel plants and refineries. As Secretary of the Energy, would you support the goals outlined in the MOU between the Departments of Defense, Agriculture, and Energy?

How would you work with your counterparts in the Department of Defense and the Department of Agriculture to promote the development of a domestic advanced biofuel industry through the construction of domestic biofuel plants and refineries to provide the military with flexibility in its fuel procurement and lessening its demand for foreign fossil fuels?

Do you believe that the Departments of Defense and Agriculture have justifiable roles in the development of alternative energy sources to include biofuels?

Answer. The President is committed to reducing the United States' dependence on oil and increasing American competiveness and security by investing in biofuels in accordance with the Defense Production Act.

While I am not familiar with the specific provisions in the Defense Production Act that you reference, it is my understanding that this MOU and the initiative it supports has the potential to lessen our dependence on oil and to help ensure that the United States is the global leader in the development of advanced drop-in biofuels.

Moreover, the approach leverages the respective strengths and resources of the various agencies by: building upon DOE's biofuels work to address the technology risks and bring these technologies to market; employing USDA's expertise to address feedstock issues, including production and supply chains; and utilizing the Navy's need to enhance the national security benefits associated with biofuels manufacturing capability and supplies. If confirmed, I will contact my counterparts at Agriculture and Defense to advance planning under the MOU.

Question 2. If the U.S. does not become an exporter of natural gas, potential customers are likely to turn to Russia, Australia and other countries for their supply of LNG. In its processing of potential LNG permits, DOE should of course make sure that any exports are in the U.S. interest and done in an environmentally responsible way. Does DOE also factor in the lost opportunities that could result from delaying the processing of these applications? How does DOE balance these interests?

Answer. The President is committed to the safe and responsible production and use of natural gas, and I share that commitment. With regard to exports of natural gas, I am aware that the Department has decisions pending before it with regard to applications to export LNG to non-FTA countries. My understanding of the Natural Gas Act is that when considering applications to export to non-FTA countries, the statute requires the Department to conduct a public interest determination review prior to the issuance of authorization orders. The public interest criteria set forth decades ago include the economic considerations related to both production and use of natural gas. If confirmed, I am committed to ensuring that DOE makes transparent decisions in the public interest based on unbiased analysis and that it acts on these applications as expeditiously as possible.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR RISCH

Question 1. The 1995 Settlement Agreement between Idaho and the federal government is a guide for the consent based approach that DOE has recently touted for waste disposal. The settlement agreement establishes INL as the Department of Energy's lead laboratory for spent fuel. And details that, "DOE shall direct the research, development and testing of treatment, shipment and disposal technologies for all DOE spent fuel, and all such DOE activities shall be coordinated and integrated under the direction of the Manager, DOE-Idaho Operations Office." Is DOE meeting this commitment? If so, can you provide specific details as to how it is meeting this commitment?

Answer. Although I am not familiar with the current details of the Department's spent nuclear fuel programs, I am aware of the role that the Idaho National Laboratory is playing in developing technology solutions and providing guidance and management support for DOE's spent nuclear fuel and high-level waste.

If confirmed, I look forward to working with you to understand your concerns about INL's role in this effort and to pursue a coordinated and integrated approach to spent nuclear fuel management for the DOE complex.

Question 2. There are a number of Court decisions pending regarding the Yucca Mountain repository program. If the Court orders the restart of the Yucca Mountain licensing process will you ensure DOE complies with the court order?

Answer. As stated by Secretary Chu and Assistant Secretary Lyons, the Department will comply with any orders issued by the courts. If confirmed, I will do so with the guidance of General Counsel and presuming the availability of sufficient appropriated funds. I am aware in general terms of the litigation, but I am not now familiar with the specifics of the issues being contested.

Question 3. DOE has failed to deliver the repository at Yucca Mountain required by law and is now asking Congress to come up with another solution without providing adequate information. In their response to the Blue Ribbon Commission report, DOE's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste" establishes a new repository date of 2048, which violates Idaho's agreement with the federal government for removing waste from the state. The report also calls for consent based siting without providing any details

on how this should be done or what measures should be taken if consent based siting efforts fail. Will you commit to proactively working with Congress to develop a specific legislative proposal and language to address the specific legislative changes you think are required to address this national need?

Answer. If confirmed, I commit to proactively work with Congress to develop and implement an effective nuclear waste management strategy.

Question 4. The Blue Ribbon Commission report, as well as DOE's response, is short on details when it comes to disposing of defense wastes. Should you be confirmed as Secretary will you pursue policies that would decouple spent nuclear fuel and defense waste for permanent disposal? If so, given limited DOE resources, how would you pay for it?

Answer. The Blue Ribbon Commission, on which I served, recommended that the Department conduct a study of the current policy of "co-mingling" defense and civilian nuclear waste. If confirmed, I intend to conduct such a study and report back to Congress expeditiously in order to inform your deliberations on potential nuclear waste management legislation.

This study would include an analysis of costs in order to inform related budget decisions.

Question 5. Dr. Moniz, DOE's Environmental Management program's mission is to cleanup Cold War legacy materials which includes operations in Idaho. We also have an obligation to support these efforts across the country. While safety and security are paramount we must also not lose sight of conducting these operations at the best value for the taxpayer. I would like to get your views on capitalizing on the investments already made. Earlier this year the Idaho Leadership In Nuclear Energy (LINE) Commission offered the following endorsement of AMWTP. " . . .Over $1 billion has been invested in this facility, which is a national asset. Once the Idaho cleanup efforts are completed the facilities at the AMWTP could be effectively used to assist in the characterization and cleanup being performed at other national locations."

Rather than spending resources twice to recreate what has already been developed and operating at AMWTP, would you be willing to work with us to take full advantage of the highly-trained workforce in place?

Answer. I am aware of the valuable role the Advanced Mixed Waste Treatment Project (AMWTP) provides in processing and disposing of transuranic and mixed waste for the Department. If confirmed, I look forward to working with you to ensure the AMWTP facilities are efficiently utilized to help address the mixed waste disposal needs for the Department, and that we can take full advantage of the skilled workforce that is helping to complete this mission.

Question 6. The Department of Energy has recently engaged in a public-private partnership program to develop small, modular nuclear reactors. These reactors offer several advantages, including the potential to enhance energy security at military installations. How do you intend to engage with the Department of Defense on energy security and, in particular, the small, modular reactor program?

Answer. I share your support for DOE's Small Modular Reactor program and its focus on public-private partnerships to develop this promising technology. I believe small modular reactors could represent the next generation of nuclear energy technology, providing a strong opportunity for America to lead this emerging global industry. In particular, small modular reactors may be applicable to Department of Defense activities, including providing baseload power at U.S. military installations. If confirmed, I would look forward to working with you and the Department of Defense to determine how small modular nuclear reactors may appropriately benefit our military operations.

Question 7. Dozens of reports have been written in the past 15+ years that have indicated DOE and NNSA's approach to managing, governing, and overseeing the nuclear security enterprise is broken. For instance, in 2009 the bipartisan Strategic Posture Commission said, "The NNSA was formed to improve management of the weapons program and to shelter that program from what was perceived as a welter of confusing and contradictory DOE directives, policies, and procedures. Despite some success, the NNSA has failed to meet the hopes of its founders. Indeed, it may have become part of the problem, adopting the same micromanagement and unnecessary and obtrusive oversight that it was created to eliminate." This and many other studies have recommended fundamental reform to address these long-standing, well-documented problems—do you agree? As Secretary, what specific steps will you take to fix these problems?

Answer. If confirmed, I will want to meet early on with the NNSA Administrator, the weapons lab directors, the DoD, engaged members of Congress, and others to understand in more depth the organizational, management and performance challenges associated with NNSA. I support the efforts of the Department to clarify and

streamline roles and responsibilities within the NNSA organizational structures and to harmonize directives, policies, and procedures across the entire department (this is important since many DOE sites have major NNSA and non-NNSA programs). I am aware of the Congressional commission formed to recommend ways to improve NNSA performance. I consider this an opportunity to formulate and implement a plan in relatively short order and, if confirmed, will be available to work with the commission as appropriate.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR FRANKEN

Question 1. If confirmed, will you continue Department of Energy efforts to support the development of cellulosic, algal, and other advanced biofuels?

Answer. I support the President's all-of-the-above strategy as well as his recently announced goal of cutting net oil imports in half by 2020. Developing advanced biofuels is an important part of that plan and, if confirmed, I will support research and policies that will advance next-generation renewable fuels to market competitiveness.

Question 2. One of the challenges associated with commercializing new biofuels is limited market space. Will you support the Renewable Fuel Standard to make sure incentives are available for cellulosic, algal, and other advanced biofuels?

Answer. The Renewable Fuel Standard is administered by the Environmental Protection Agency but it serves as a significant driver for DOE's technology development programs including advanced biofuels. If confirmed as Secretary of Energy, I would be strongly committed to supporting and advancing this research. As I mentioned during my testimony, if confirmed, I plan to focus on lowering the cost of next generation energy technologies such as advanced biofuels to accelerate our transition to a low-carbon economy.

Question 3. If confirmed, how will you utilize your resources in the Department of Energy to make sure that methane leakage during the extraction, processing, and delivery of natural gas is properly measured, monitored, and reduced? Will you ensure that data on methane leakage is effectively accounted for when climate change impacts of natural gas are compared to other fuels?

Answer. Natural gas is an important part of the Nation's energy mix. I share the President's concern about climate change and methane is a powerful greenhouse gas even though its residence in the atmosphere is relatively short. In order to mitigate the climate impacts of methane emissions from natural gas systems, we should support the development and deployment of technologies to address methane leakage and fugitive emissions at the wellhead and along pipeline corridors, and in distribution systems. If confirmed, I would also like DOE to help assess current "end-to-end" leakage and to determine the best monitoring technologies at all stages of production, distribution and use. This will allow us to set priorities for minimizing leakage. Other energy sources and systems should be studied as well.

Question 4. How can the Department of Energy better assist states with the deployment of energy efficiency and renewable energy technologies?

Answer. The States, including state energy offices, have been significant policy innovators in energy efficiency and renewable technology deployment and I applaud them for these efforts. If confirmed, I look forward to learning more about what technical assistance the Department is currently providing to states in this area and to increasing the level of the dialogue with states and cities. The Administration-proposed Race to the Top will provide a new way of working with the states on energy efficiency.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR SCOTT

MOX

Question 1. The MOX program has demonstrated bipartisanship through three administrations. President Obama has stated support, as late as the State of Union Address in February, for this critical non-proliferation program which includes agreements with Russia. Can you commit that the Obama Administration will continue this support?

Answer. If confirmed, I intend to carry through on the President's commitment to the U.S. Plutonium Disposition mission, fulfilling our obligations under the US-Russia Plutonium Management and Disposition Agreement. I understand that NNSA is assessing the MOX project and potential alternative plutonium disposition strategies to identify options.

Question 2. There are contingencies if the MOX program is cancelled, specifically financial compensation to South Carolina that could cost the federal government

hundreds of millions of dollars more to store plutonium in the State—do you know if there are any plans to return the plutonium to other facilities around the country?

Answer. I am not aware of any plans to return plutonium to other facilities.

LNG EXPORTS

Question 3. As you well know, the DOE has long-delayed the approval of 16 applications for licensure of LNG exports, under its authority granted by Section 3 of the Natural Gas Act. However, the study DOE commissioned NERA Energy Consultants to complete last year regarding the macroeconomic impacts of LNG exports found that they will lead to a "net economic benefit" to the U.S. across all of their study scenarios. Do you still believe, as you said in Congressional testimony you gave on behalf of the MIT Energy Initiative in 2011, that "For economic and geopolitical reasons we recommend support for the development of a global market, and that would entail, for example, erecting no barriers to either the export or import of LNG"?

If confirmed, will you work to expeditiously review and take action on the existing LNG export license applications?

Some opponents to natural gas exports have suggested that any export licenses should be approved slowly, and on a staggered basis, with long review times between the approvals of deserving licenses. Do you agree with this approach?

Answer. The President is committed to the safe and responsible production and use of natural gas, and I share that commitment. With regard to exports of natural gas, I am aware that the Department has decisions pending before it with regard to applications to export LNG to non-FTA countries. It is my understanding that the Natural Gas Act requires that DOE, when considering applications to export to non-FTA countries, conduct a public interest determination review prior to the issuance of authorization orders. If confirmed, I am committed to ensuring that DOE makes transparent decisions in the public interest based on unbiased analysis and that it acts on these applications as expeditiously as possible.

If confirmed, I am committed to ensuring that DOE makes transparent, analytically-based decisions on these applications as expeditiously as possible.

I am aware that DOE in the Sabine Pass decision stated that it would take into consideration cumulative impacts of LNG exports. If confirmed, I am committed to ensuring that DOE makes transparent, analytically-based decisions as expeditiously as possible.

SAVANNAH RIVER SITE

Question 4. Please give me your thoughts about the future of SRS and the important role it pays in our national security and energy future as well as the economy of South Carolina.

Answer. Work at SRS—including the Savannah River National Laboratory—involves important practical application of SRS nuclear expertise and its engineering capability to safely and effectively manage nuclear materials. SRS also plays a critical role in the disposition of fissionable materials and the manufacture of critical nuclear weapons components. I am aware of the breadth of the Savannah River Site (SRS) cleanup efforts, which include treating, storing and disposing of a variety of radioactive and hazardous waste streams, cleaning up soil and groundwater, deactivating and decommissioning unneeded facilities, and the secured storage of foreign and domestic research reactors spent (used) nuclear fuel. I support the site's continued contribution to the Department as it completes the environmental remediation of legacy waste sites and advances the Department's national security mission.

FOREIGN OIL

Question 5. Recently, the U.S. Energy Information Administration (EIA) released data that shows the United States has been increasing its dependence on oil from the Middle East, one of the most unstable regions in the world. Middle Eastern oil now accounts for more than 25 percent of American oil imports—a nine year high that has come at the same time as record gasoline prices. As Secretary of Energy, what will you do to decrease this trend? In your opinion, from a national security perspective, should America import more oil from Canada or OPEC countries?

Answer. The President has an all-of-the-above strategy to reduce oil imports. The data demonstrate the success of this strategy. Domestic oil production is now at a 15-year high, fuel economy standards were substantially increased for the first time in decades, and oil imports have been cut by more than 3.6 million barrels per day. If confirmed, I will strongly support the President's efforts in this regard and his goal of cutting net oil imports in half by the end of the decade. Meeting this goal will be achieved, in part, by reducing overall oil consumption. At DOE, advances in

research and development of electric vehicles and next-generation fuels can and will aid that effort by significantly reducing oil demand.

NUCLEAR TRADE

Question 6. There is a growing global market for civilian nuclear power plants. Worldwide, 70 commercial nuclear reactors are under construction and an additional 170 reactors are planned or on order. The Commerce Department estimates the commercial opportunity over the next decade may be worth as much as $740 billion. However, many of these opportunities are in regions where U.S. nuclear companies are not present, such as the Middle East and Southeast Asia. If U.S. suppliers were able to capture nominally 25 percent of this market, they would create or sustain up to 185,000 high-paying American jobs. Can you assure us that, as Secretary of Energy, you will work to open up markets for U.S. nuclear exports in emerging nuclear countries?

Answer. Yes. Having US firms engaged in the global nuclear technology industry serves American interests both for economic reasons and for national security reasons. The Secretary of Energy has a very important role to play in the export licensing process regulated under 10 CFR part 810 (Part 810). Part 810 regulates the export of unclassified nuclear technology and assistance by persons subject to the jurisdiction of the United States, to facilitate international commerce while at the same time protecting against the spread of nuclear technologies and material that would be contrary to the nonproliferation and other national security interests of the United States. Part 810 has not been comprehensively updated since 1986 and the Department has been working on rulemaking since 2011 that better reflects changes in the nuclear technology market. If confirmed, I look forward to briefing you after the rulemaking process has been finalized and to discussing U.S. nuclear exports to emerging economies.

SET-TOP BOXES

Question 7. The Department appears to still be moving towards a regulatory mandate for set-top boxes. In the meantime, the department has failed to complete many other rulemaking that are long overdue.

Please explain why the DOE has given such high priority to spending taxpayer money on something already covered by the Set-Top Box Energy Conservation Agreement. Given that the industry is already committed to saving consumers billions of dollars more in electricity years before any regulatory approaches could take effect, doesn't the DOE (and consumers) have far more to gain—in immediate energy savings, innovation, and competition—than to lose by suspending its proceedings and giving the Set-Top Box Energy Conservation Agreement a chance to work?

Answer. I am not familiar with the details of the Set-Top Box Energy Conservation Agreement. If confirmed, I look forward to learning about the agreement and its relation to the rulemaking process. My goal, if confirmed, will be to ensure the Department makes an appropriate determination for the best path forward. In this case and more broadly, I also pledge to work closely with industry stakeholders and consumer advocates to find commonsense solutions that save energy and reduce consumer costs.

TRANSPARENCY

Question 8. President Obama promised to make his administration the most transparent in history. However, former EPA administrator Lisa Jackson used an alias email address to conduct official agency business—do you plan on using alias or personal emails to conduct official business? What will you do to ensure the utmost transparency at the Department of Energy?

Answer. If confirmed, I intend to conduct business in a transparent manner. I have no intention of using an alias or personal e mails to conduct official business. Furthermore, I will work with the General Counsel, Chief Information Office, and other officials to ensure the Department's document retention policies are understood and adopted by all DOE employees.

CARBON PRICING

Question 9. Dr. Moniz, in an interview last year you said that if the U.S. starts "squeezing down on carbon," inevitably the cost of energy would increase. Do you think this is a good time to increase the cost of energy on American families? If no, when is a good time? If yes, what kind of impact do you think that will have on the economy? What do you think the price of a gallon of gasoline should be?

Full quote: "If we start really squeezing down on carbon dioxide over the next few decades, well, that could double; it could eventually triple.. I think inevitably if we squeeze down on carbon, we squeeze up on the cost, it brings along with it a push toward efficiency; it brings along with it a push towards clean technologies in a conventional pollution sense; it brings along with it a push towards security. Because after all, the security issues revolve around carbon-bearing fuels."

Answer. The Administration wants to lower energy bills for Americans, not raise them. I do not think that a push toward clean energy requires everyone to spend more. To the contrary, my focus as Secretary of Energy, if I'm confirmed, will be to help drive down the cost of all forms of energy while still meeting our environmental and energy security needs. This is why my quote includes a reference to energy efficiency which could enable net savings in energy costs relative to the cost of supply. The increase in the MPG requirements in the new CAFE standards is a case in point. Even if the international price of oil goes up, Americans will still save billions of dollars on gasoline in the future because of doubled fuel economy. Also, as I noted in my hearing, the objective of our investments in low/no carbon energy technologies should be cost reduction to ensure that consumers do not pay more for these technologies in the future.

ENERGY SUBSIDIES

Question 10. Recently, the Energy Information Administration forecasted the percentage of America's energy consumption by fuel source 27 years from now. Despite the billions of dollars in government taxpayer money spent on renewable energy programs, by 2040 wind, solar and biomass will only account for 8 percent of America's energy consumption. Considering the United States is $16 trillion in debt, and the troubled history of some of the taxpayer subsidized energy programs, do you believe it's the best use of taxpayer funds to continue to shovel billions of dollars at these questionable renewable programs if the U.S. is still going to be 80 percent dependent on traditional energy in 27 years? If yes, why? At what percentage of total consumption would you consider renewable energy sources like solar and wind mature enough to stop receiving federal subsidies? Shouldn't the market decide what energy sources are economically competitive and viable?

Answer. The research community studying climate science for several decades overwhelmingly agrees that we need to accelerate the transition to a low carbon economy as an essential strategy for mitigating the most serious impacts of climate change. The pattern of impacts predicted long ago is increasingly evident and costly to our society. As I mentioned in my testimony, many military and religious leaders also emphasize the importance of accelerating the transition to a low-carbon economy.

This is not an easy task. Energy infrastructures take decades to turn over and we have an obligation to develop and deploy affordable energy technologies at a scale sufficient to power and fuel the nation. To have a material impact on these challenges without significant economic dislocation, we need a two-pronged approach to energy research: improve existing technologies and fuels to reduce their carbon impacts by, for example, increasing efficiency and capturing carbon; and increase our investments in developing transformational technologies that are affordable, abundant and more environmentally benign. A key for acceleration is lowering the cost of low-carbon options for the marketplace, and that is the goal of DOE's R&D portfolio.

RESPONSES OF ERNEST J. MONIZ TO QUESTIONS FROM SENATOR MANCHIN

Question 1. You have stated that you understand the need for Coal and Coal related Research Programs, including carbon sequestration. Would you be receptive to increasing the Carbon Capture and Sequestration (CCS) budget and do you see benefit in increasing the budget for coal program areas outside of CCS?

Answer. Coal will remain an important component of the nation's energy mix for decades and the Administration has committed nearly $6 billion to carbon capture and sequestration technology development since 2009. We must continue to invest in research and development for all of our Nation's energy sources as we transition to a low carbon economy, including oil and gas, wind and solar, nuclear, and clean coal. If confirmed, I intend to work with DOE research leadership and key stakeholders to assess the research portfolio structure and balance. With regard to CCS, I would hope to be able to extend the storage demonstrations period at a small number of sites to a decadal time scale. Ultra-high efficiency plants could be another

direction to explore if resources are available, especially since this would provide a better basis lower cost CCS.

Question 2. It seems to me that the majority of the energy research we are doing right now is related to future technologies which have not been proven as economically, or even technologically viable. Yet there are several published studies which identify how—through making modest upgrades to existing infrastructure, notably coal-fired power plants—we can affect significant reductions in Greenhouse Gas emissions. As Secretary of Energy, do you see an opportunity for greater funding of "now-term" projects—through public/private partnerships or otherwise—to take advantage of this low-hanging fruit?

Answer. As I mentioned in my previous response, the Administration has made historic investments in advancing clean coal technologies, having committed nearly $6 billion to carbon capture and storage technology since 2009. I believe public-private partnerships initiated by DOE have had tremendous success in promoting technological development. If confirmed, I will seek out additional public-private partnerships that will be successful in advancing DOE's mission with fewer taxpayer dollars.

Question 3. As Secretary of Energy, would you support a robust suite of research programs into other coal related technologies including power efficiencies, combustion research, gasification, fuel cells, and coal-to-liquids?

Answer. If confirmed, I will commit to review the research programs within the Office of Fossil Energy to ensure that Department is supporting an appropriate suite of technologies to meet the Administration's energy policy, security, economic and environmental objectives. As noted in an earlier response, increased efficiency (for combustion or gasification) is a key enabler for CCS.

Question 4. What about your vision for the DOE Office of Fossil Energy? Some of their programs, such as combined heat and power, co-firing of coal and biomass, and reliability management, have been recently moved to other areas of DOE. When will they be brought back to the FE fold of work?

Answer. If confirmed, I will assess the distribution of research activities across the Department to ensure the Department's research is being conducted in ways that maximize the Administration's energy policy, security, economic and environmental objectives. When I served as DOE Undersecretary, I instituted a portfolio planning process that cut across organizational "stovepipes", since many key energy technology challenges do not fit neatly in one of the existing offices. If confirmed, I intend to follow a cross-cutting outcome-oriented portfolio management process through an updated Quadrennial Technology Review.

Question 5. It is reported that the United States has tens of billions of barrels of oil left stranded in known reservoirs. This is in addition to the recent increased production of natural gas and oil as a result of shale reservoirs, which I might add, DOE played a significant role in research and development thereof.

It is obvious that advanced technologies are needed to unlock this substantial domestic resource of "stranded" oils. However, this Administration consistently requests zero, I repeat, zero funding for Department of Energy oil research.

My question to you Dr. Moniz is—given this significant potential and all the associated benefits to our nation if we develop this "stranded" oil resource, would you, if confirmed, advocate for research funding focused on Enhanced Oil Recovery, including funding for carbon dioxide enhanced oil recovery technologies?

Answer. If confirmed, I will assess the distribution of research activities across the Department to ensure the Department's research is being conducted in ways that maximize the Administration's energy policy, security, economic and environmental objectives. A Quadrennial Energy Review could provide guidance on priorities to be pursued with constrained resources. With regard to EOR specifically, a study carried out for the EIA suggested that 3M bbl/day might be produced domestically with CO_2 EOR, and this is part of several of the CCS projects currently being supported. Such a factor of ten increase in CO_2 EOR compared with today would require capture of over five hundred megatons of CO_2 from power plants and/or appropriate manufacturing facilities.

Question 6. The Department of Energy's research portfolio seems void of research aimed at improving the efficiency of natural gas production from shale formations and other unconventional formations, and in maximizing resource recovery. Such research would have widespread benefits for many businesses and for our nation.

That being the case, do you recognize the value in production-related research and would you actively work to secure funding from Congress through the DOE Office of Fossil Energy to conduct this research?

Answer. As you mention in your previous question, DOE played a significant role in the research and development that has led to U.S. industry greatly increasing our Nation's natural gas and oil production from shale. Going forward, if confirmed,

I will work to ensure the Department's research is appropriately focused to facilitate our transition to a low carbon economy that includes a broad range of domestic energy sources, including natural gas. I would also note that DOE/NETL oversees research expenditures from the Royalty Trust Fund created in the 2005 Energy Policy Act. This research program supports environmentally sound unconventional natural gas production, among other programs such as ultra-deep water, small producers, and methane hydrates.

Question 7. Many of the landowners and businesses alike involved in the recovery of Shale gas are concerned about the usage of water in that process. Given the enormous economic potentials of this shale gas, such a concern should be addressed. To reduce the Environmental footprint of Natural Gas production, "a comprehensive program is needed to address the issues of water use and backflow and produced water in unconventional gas production." If those last words sound familiar, they are from a report issued from an MIT study group you chaired in 2011.

Would you support the funding of a program in the DOE office of Fossil Energy to accomplish such an important goal?

Answer. I believe the safe and environmentally sustainable production of America's energy resources are a core part of the mission of the Office of Fossil Energy. I am aware of the cross-cutting work happening now with the Environmental Protection Agency and the Department of Interior to address this issue. The integrated use and disposal of water is a place where DOE could support research and developments that would help states incorporated the best practices to make sure that we develop natural gas safely and responsibly.

Question 8. What is your view on Government-owned/Government-operated (GO/GO) national laboratories, instead of the more common DOE structure of Government-owned/Contractor-operated (GO/CO)?

Answer. The Government-owned/Contractor-operated lab model has its roots in the Manhattan Project era. At most DOE sites, the GO/CO model has remained in place. As you are aware, the exception to this model is the National Energy Technology Laboratory (NETL), which is operated as a Government-owned/Government-operated lab. In contrast to the GO/CO labs, NETL has substantial contract management responsibilities that call for Federal employees.

APPENDIX II

Additional Material Submitted for the Record

STATEMENT OF HON. DEBBIE STABENOW, U.S. SENATOR FROM MICHIGAN

Mr. Chairman, I am glad to support the President's nomination of Ernest Moniz to serve as the Secretary of Energy. Dr. Moniz has the knowledge and experience to be a very effective leader of the Department of Energy.

His career has prepared him of this position. As an outstanding physicist and engineer at MIT, Dr. Moniz understands the large benefits that federal investments in both basic and applied scientific research bring to our country. For example, Michigan State University is on track to serve as the home of the Facility for Rare Isotope Beams. It will be a world-leading nuclear isotope research facility that will provide advances in medicine, energy, material sciences, and national security.

As a current member of the President's Council of Advisors on Science and Technology, and with his ongoing work at MIT, he understands the many challenges and opportunities in developing new and cleaner energy sources for the future. Michigan is leading the way on advanced vehicle technologies and clean energy manufacturing. I believe that Dr. Moniz will be a strong partner in accelerating that effort.

I am confident that Dr. Moniz will use his experience as a former Under Secretary of Energy and Director in the DOE's Office of Science to lead the Department of Energy in meeting its many responsibilities and helping our nation win the global race to develop clean energy sources.

UNIVERSITY PROFESSIONAL AND TECHNICAL EMPLOYEES,
CWA LOCAL 9119, AFL-CIO,
Berkeley, CA, April 4, 2013.

Hon. RON WYDEN,
Senator, 221 Dirksen Senate Office Building, Washington, DC.

RE: Confirmation Hearing on April 9, 2013 of Dr. Ernie Moniz for Secretary of Energy

We would very much appreciate if you would be able to either ask these questions at the hearing or submit them in writing. Of course, feel free to rephrase as you see fit. Background details are in the letter we sent to President Obama, a copy of which is attached.

PROPOSED QUESTIONS

1) Do you believe that milestone-driven science with a management system that ties bonuses to meeting project milestones undermines core scientific competencies or would the old system (at LANL and LLNL) of hypothesis-driven research be more effective?

2) Do you believe that this new for-profit management style has led to more or less transparency and accountability compared to the past public sector management model?

3) The for-profit monopoly managing Los Alamos and Lawrence Livermore National Labs has been obsessed with selling the design of new and untested warhead physics packages (Reliable Replacement Warhead or RRW). Do you believe this is a wise tax expenditure and in the best interest of national security?

4) Is the Administration committed to fixing the deteriorating state of affairs at the nation's national security laboratories (Los Alamos and Lawrence Livermore National Laboratories), as documented in the recent study conducted by the National Academy of Sciences?

5) In particular, will you build a path toward returning the Labs to public-sector management, not only saving $300 million to $400 million annually, but returning the focus to serving the public interest?

6) As a very minimum, would you be prepared to stop the current practice of yearly one-year extensions to the management contracts?

Sincerely,

JEFF COLVIN,
Legislative Director, SPSE-UPTE at LLNL.

RODNEY ORR,
Legislative Director, UPTE-CWA Local 9119.

ATTACHMENTS

SOCIETY OF PROFESSIONALS, SCIENTISTS AND ENGINEERS,
UNIVERSITY PROFESSIONAL AND TECHNICAL EMPLOYEES,
CWA LOCAL 9119, AFL-CIO,
Livermore, CA, February 4, 2013.

Hon. PRESIDENT OBAMA,
The White House, 1600 Pennsylvania Avenue, NW, Washington, DC.

DEAR MR. PRESIDENT, We are writing to urge you to select a new Secretary of Energy who will commit to fixing the deteriorating state of affairs at the nation's national security laboratories, Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL). As you may be aware, these national labs were managed since their founding by the University of California (UC) as public, non-profit entities until 2006-2007, when their management contracts were awarded to private, for-profit companies: Lawrence Livermore National Security (LLNS, LLC) at LLNL and Los Alamos National Security (LANS, LLC) at LANL. Since the two companies share the same parent firms and board of governors, they constitute, in our view, a dangerous for-profit monopoly in the mission of this nation's nuclear weapons certification.

One of the principal objectives in bidding the labs was to achieve more transparency and accountability[1]. Instead, the result has been far less of each. This has led to one fiscal and/or national security problem after another. Of continuing concern to the employees at these labs, the transition to private, for-profit management at the labs has resulted in a serious degradation in employee morale, employee recruitment and retention, and overall scientific productivity.

As part of a Congressional directive, the National Nuclear Security Administration (NNSA) of the US Department of Energy (DOE) contracted with the National Academies (NAS) to conduct a study of the effects of the management structure of the NNSA labs on their science and national security missions. The NAS study concluded what the employees had already concluded, that by almost any measure, things are worse at the labs since the management transition. The NAS, however, placed all of the blame for the identified problems on over-regulation of the labs by NNSA and none on the LLNS&LANS for-profit monopoly management structure itself. This is a fundamental flaw in the NAS report, which, in our view, negates its usefulness. We are not the only ones to notice this obvious flaw; Hugh Gusterson, a columnist for Bulletin of the Atomic Scientists, has also written about it.[2]

Further, NAS was dismissive of the extra $300,000,000 or so per year of direct cost to support the LLNS&LANS management structure, but that $300M is enough in fact to support an ongoing Stockpile Life Extension Program, or SLEP (at least, this was true before the LLNS&LANS era of inflated costs and estimates).

With no competition and a "revolving door" relationship with NNSA and others, LLNS&LANS has been obsessed with pedaling the design of new, untested nuclear warhead physics packages (aka RRW, Reliable Replacement Warhead) ever since the genesis of LLNS&LANS in 2004. This course for the future is not only unnecessary and expensive, but puts national security at risk due to the reckless design philosophy. Much of the nuclear weapons old guard has echoed these risks. Yet, due in part to the conditions of this unaccountable for-profit monopoly structure, renamed "Back door" RRW plans persist to this day, risking tax dollars but also risking national security itself.

Meanwhile, bids for traditional SLEPS (e.g., B61, W78) have escalated by factors of ten over what they were before the failed LLNS&LANS era. Bids for new facilities to support stockpile stewardship have escalated in a similar manner (plutonium

[1] House Energy & Commerce hearing on National Labs, 1 May 2003.

[2] Gusterson, Hugh, "Weapons Labs and the Inconvenient Truth", Bull. Atomic Scientists, 28 February 2012.

metallurgy at LANL, NIF at LLNL, and even uranium at the Y-12 production plant), as the LLNS&LANS partner LLCs become proficient in the tactics of running up bids and holding the taxpayers hostage to a for-profit monopoly.

Worse, both labs have steadily moved away from doing hypothesis-driven science to a focus on milestone-driven science, under a management system that ties the management bonuses the companies receive to meeting project milestones. The profit-driven management structure makes it harder and harder to maintain the core scientific competencies on which the national security missions of the labs depend.

We have included two background items for your consideration:

1. Our 13 February 2012 testimony for the record, provided at the 16 February 2012 House Armed Services Committee (HASC) hearing on the NAS study discussed above.
2. Our 29 February 2012 letter in response to the NAS statements at that hearing, including our recommended path forward for these national labs.

We respectfully request that you work with the new DOE Secretary to build a path toward returning the labs to public-sector management, with a return of their focus to serving the public interest. As a very minimum, we ask that the Administration stop the current practice of yearly one-year extensions to the contracts as a reward for good performance.

Sincerely,

ROGER LOGAN,
Retired from Los Alamos and Livermore.

JEFF COLVIN,
UPTE, Lawrence Livermore.

MANNY TRUJILLO,
UPTE, Los Alamos.

UNIVERSITY PROFESSIONAL AND TECHNICAL EMPLOYEES,
CWA LOCAL 9119, AFL-CIO,
Berkeley, CA, February 13, 2012.

MICHAEL TURNER,
Chairman, House Armed Services Subcommittee on Strategic Forces, 2216 Rayburn House Office Building, U.S. House of Representatives, Washington, DC.

LORETTA SANCHEZ,
Ranking Member, House Armed Services Subcommittee on Strategic Forces, 2216 Rayburn House Office Building, U.S. House of Representatives, Washington, DC.

DEAR CHAIRMAN TURNER AND RANKING MEMBER SANCHEZ: As your Subcommittee prepares to hold a hearing on the governance, oversight and management of the nuclear security enterprise and to hear from the National Academy of Sciences (NAS) in regards to their report on the issue, we felt it necessary to share with you some of our views and concerns. As individuals with a long history working in this environment and leaders of the organization representing employees at the DOE/NNSA laboratories, the Los Alamos National Laboratory and the Lawrence Livermore National Laboratory we believe that we can provide critical insight on this vital subject matter. We applaud you for holding the hearing and hope that a number of important issues will be addressed at the hearing.

BACKGROUND

The National Academy of Sciences (NAS) recently completed their year-long study of the effects on their scientific and national security missions of the transition to private, for-profit monopoly management of the DOE/NNSA laboratories, the Los Alamos National Laboratory and the Lawrence Livermore National Laboratory. The final NAS report was just released. In our testimony today we would like to summarize and amplify what we told the NAS about the many ways the work environment has changed at the Labs since the management transition, and how these changes have had a detrimental effect on accomplishment of the Labs' missions. The changed environment has affected careers through program misdirection and loss of trained personnel, and has escalated a decline in science and engineering productivity. Both Labs have suffered from a decline in recruitment and a continued loss of senior people.

We believe that the root cause of all these problems is the for-profit monopoly management structure itself. We would like to summarize here the two main rea-

sons why we believe this, and suggest to you what can and should be done to correct these problems.

CORRUPTION OF THE SCIENTIFIC METHOD BY FOR-PROFIT MONOPOLY MANAGEMENT

In order to understand better what is fundamentally wrong with the way the science enterprise is now conducted at the Labs, we first would like to describe for you the right way to do science. The right way to do science is to follow strictly the scientific method. The scientific method was first developed over 400 years ago, and its implementation has led to fundamental advances in our understanding of natural phenomena, a seemingly endless sequence of technological developments based on new understandings of nature, and a consequent vast increase in human prosperity that has become the foundation of modern civilization. In other words, hypothesis-driven science, based on the scientific method, has a long history of success.

In hypothesis-driven science, we first inductively construct a mathematical model of the observed properties and behavior of the physical system of interest, then we use the model to develop a hypothesis of how the physical system will behave or respond to new or different conditions, then we test the hypothesis by carefully designed experiment, then we use the experiment results to refine the model. Iterating these steps advances our knowledge and understanding. In hypothesis-driven science, modeling and experiment work synergistically. No incentive is necessary, since the advancement of knowledge is simultaneously its own incentive and its own reward. At the Labs now, there is not much hypothesis-driven science being done. Instead, it is mostly milestone-driven science, and much more so since the transition to private for-profit management. In milestone-driven science, we develop a milestone, or a set of milestones, for model prediction, and a separate set of milestones for experiment. Modeling and experiment results are ends in themselves, detached from any need to advance understanding. Unlike hypothesis-driven science, milestone-driven science does not have an already built-in incentive.

At the Labs, milestone-driven science is incentivized by monetary reward, particularly the performance-based incentive management bonuses built into the management contract. Thus, with the for-profit management structure, the focus has shifted dramatically to meeting contract performance goals and earning the maximum performance fee. This single-minded focus on milestone-driven science has resulted in less tolerance for the open debate and discussion that is necessary both for good science and engineering and for regulatory compliance. In other words, any critiques—vitally necessary to the success of hypothesis-driven science—that are viewed by management as potentially putting the management fee at risk are strongly discouraged, even suppressed. Scientists and engineers cannot function properly in such an environment.

At the start of the NAS Study, we presented to the Study panel one example of how, at Lawrence Livermore, milestone-driven science has impeded the progress of scientific understanding vital to the nation's goal of achieving fusion ignition. The example we gave at that time concerned the determination of the high-pressure compressibility of deuterium. Measurements made at different Labs using different experiment facilities and different measurement techniques came up with widely different values for deuterium compressibility at a pressure of about a million atmospheres. Despite several proposals that were advanced by Livermore scientists and others on how we might resolve the issue of which measurement is correct, management's attitude was that the matter was closed—after all, the Lab did meet the milestone to get the measurement—and resources would instead be directed at moving on to the next milestone. Management's focus on meeting milestones rather than advancing understanding is a principal factor in why the issue of the correct compressibility of deuterium remains unresolved to this day.

Now, a more recent happening, also in the National Ignition Campaign, provides an even more dramatic example of the failures of milestone-driven science and how it has put the Lab's future in jeopardy.

The first strategic error was to promise fusion ignition by a date certain, and then devise arbitrary experiment milestones to get to the goal by the promised date. Unexpected results were obtained last September in National Ignition Campaign experiments on the National Ignition Facility (NIF) laser at Livermore. These experiment results were a serious setback to meeting the performance milestones in the National Ignition Campaign. Management's response to this setback was to postpone all other experiments on the NIF laser—experiments by the weapons program, DOD experiments, and other science experiments—and to reallocate resources from other programs so as to conduct an accelerated National Ignition Campaign. In other words, they doubled-down on the original bet, still banking on meeting the

milestones and getting to the promised land by the promised date. If the original bet was risky, the doubled-down bet is riskier still.

Meanwhile, there has been a major disruption for almost all employees at the Lab. Some have seen a complete cessation of the work they were doing. Others have been re-assigned to other tasks in direct support to the National Ignition Campaign, sometimes without a good fit to their expertise. How this is all going to play out over the coming months is yet to be seen.

The recognition that milestone-driven science is a problem is not original with us, or with the NAS Study panel. More than two years ago, on January 28, 2010, Dr. Richard Garwin of IBM prepared information for Congress. At that time this is what he said:

> "Scientists and weapons experts were seriously demoralized—however unintentionally—by the transfer of Los Alamos and Livermore to corporate management, with no prior recognition that for each Laboratory there would be a $100 million management fee and a similar further program budget reduction because Laboratory activities would no longer be exempt from tax. This lack of foresight and the apparent valuation of bureaucratic milestones over technical performance has been a substantial problem in recent years."

If Congress allows the current arrangement of for-profit milestone-driven science to stay in place at the Labs, there will just be an endless series of such disruptions and failures, and the damage to the Labs and their scientific missions will be irreparable. The time is now to make the fix. The fix to us is obvious: re-compete the management contracts, and deprivatize.

Before we get to that, however, we discuss briefly another serious flaw in the current for-profit monopoly management structure of the Labs.

WASTING PUBLIC MONEY BY FOR-PROFIT MONOPOLY MANAGEMENT

The original objective of Congress in putting the Labs up for bid was to improve efficiency, accountability, and transparency[1]. NNSA's awkward bid process, however, all but precluded the transparency of a public C-Corporation and instead compelled the opaque private LLC structure we have now.

Furthermore, a private monopoly is anything but efficient; hence the existence of anti-trust laws. A for-profit monopoly funded by the government is worse still, and when we add a lack of tangible, customer-testable products (nuclear warheads), this is the worst situation of all.

"Free Market" capitalism involves a willing buyer, with a choice of which supplier to choose (e.g., Coke or Pepsi) and which price to pay (e.g. $1.89 as an emergency walk-in or $0.99 on sale). The availability of competing choices is what makes the system work—and lacking these ingredients, for-profit privatization becomes a very Un-American idea indeed.

"Free Market" capitalism for the employees (or as LLNS and LANS calls them, "the most valuable resource") means not just an option to leave a defective or corrupt firm, but an option to leave, join the competition instead, and help to sink the defective or corrupt firm. This helps keep greed, incompetence, and corruption in balance. This model has of course failed in the case of LLNS & LANS since, as a taxpayer subsidized private monopoly, they have no competition.

The result has been apparent from day 1: LLNS and LANS cost the taxpayers an extra $400 million per year. But in another way, the $400M/yr (now approximately $2B after 5 years) is a small amount of money.

Guided by the nuclear weapon design desires of LLNS and LANS, the NNSA has spent well over $30B since their takeover of the Labs and associated production complex. Since that time we have seen an endless (and failed) stream of LLNS and LANS proposals for new, untested combinations of plug-n-play nuclear weapons, designed to provide for easily met performance bonuses and easy management at LLNS and LANS. All of this has had the effect of diverting valuable resources, at great cost, from other missions—whether in science, energy, environment, or even in the curatorship and certification of the existing nuclear weapons stockpile to modern, professional standards. It is easier for LLNS and LANS to take the easy route, and NNSA rewards this bad behavior. The transparency of a public, non-profit structure would have a huge effect on discouraging such bad behavior.

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[1] House Energy & Commerce, "Review of the University of California's Management Contract for Los Alamos National Laboratory" Subcommittee on Oversight and Investigations, 1 May 2003.

Nuclear weapons certification is another expensive failure of the LLNS and LANS monopoly. In this core mission, the National Academies reviewed the LLNS and LANS stillborn certification methodology[2] after 7 years of promises, and the NAS recommended that a different process be used[3]. An unaccountable monopoly resulted in a stagnant and inferior weapons certification process. The real world, both open public and corporate, has developed and implemented product certification based on national standards while the LLNS and LANS monopoly has only languished and spent massive tax dollars on "Key Personnel" salaries that are 10 to 20 times the American national average salary.

NNSA was advised by several competent sources[4] not to award both Labs to the same "Firm". Yet, they did so anyway. The resulting monopoly led to a string of inevitable failures. In the real world, whether the open, non-profit, public world or an open, for-profit corporate world with competition, these failures would lead to the liquidation of LLNS and LANS, with the mission going to its competitors instead.

ACTION REQUESTED

We believe that nuclear weapons science and certification, the major role of these NNSA labs, is inherently a public, non-profit mission. For this reason, and for the reasons outlined above, we strongly urge the Committee to include language in the National Defense Authorization Act for 2013 to re-compete the management contracts for the Los Alamos and Lawrence Livermore National Laboratories in such a way that these Labs are managed as public or private non-profit entities operating in the public interest, and to return their focus to their original science and national security missions. We also strongly believe that further Congressional delay in taking such action will be harmful to the national interest. We cannot continue to wait year after year since in the meantime, massive amounts of tax dollars are being wasted—not just the extra $400 million per year cost of the LLNS and LANS monopoly structure, but the misdirection of the entire $7 billion per year NNSA weapons budget. The future certification pedigree of the B61, W78, and W88 are now under direct threat.

We also recognize that, in the current political climate, only smaller incremental steps may be possible in the near term. One step that we could take immediately would be to introduce lowcost competitors to the LLNS and LANS monopoly on site at each of the taxpayer-owned facilities of Los Alamos and Livermore. Several management-level people have expressed interest in such "small business enterprises". Will we continue to stifle their entrepreneurship and its potential benefits for the nation and its taxpayers? This small inexpensive step would introduce real free-market competition and help guide us toward the ultimate solution to the LLNS and LANS problem. The cost of these small independent non-profit enterprises could easily be covered by imposing a cap on the current LLNS and LANS management fees.

We would again like to thank you for your attention to this critical issue and are available to answer any questions that you may have for us. Again, we believe that the input of the employees that work in the labs are critical in reviewing the developments of this change. Thank you for your attention and time.

Respectfully,

DR. JEFF COLVIN,
LLNL Physicist,
SPSE Legislative Director.

DR. ROGER LOGAN,
1st Directed Stockpile Work Leader at LLNL,
Retired from Los Alamos and Livermore.

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[2] National Academies, "Evaluation of Quantification of Margins and Uncertainties Methodology for Assessing and Certifying the Reliability of the Nuclear Stockpile", Mar 2009, http://www.nap.edu/catalog.php?record—id=12531

[3] Logan, R.W., "U.S. Nuclear Weapons Design and Certification Infogram: Comments on the NAS Draft Report on QMU", Dec 2008.

[4] Brian, Danielle, Project On Government Oversight, "POGO's comments to the Draft Request for Proposals for the contract to manage Los Alamos National Laboratory", Project On Government Oversight, 6 Jan 2005. http://www.pogo.org/pogo-files/letters/nuclear-security-safety/nss-lanl-20050106.html

SOCIETY OF PROFESSIONALS, SCIENTISTS AND ENGINEERS,
LOCAL 11, UNIVERSITY PROFESSIONAL AND TECHNICAL EMPLOYEES,
CWA LOCAL 9119, AFL-CIO,
Livermore, CA, February 29, 2012.

Hon. MICHAEL TURNER,
Representative, 2454 Rayburn HOB, Washington DC.

DEAR REPRESENTATIVE TURNER:

UPTE RESPONSE TO THE NATIONAL ACADEMIES' LABS MANAGEMENT REPORT AND CONGRESSIONAL HEARING

On 15 February 2012 the National Academies (NAS) National Research Council released a congressionally mandated Report on their study of the management of the nation's national security laboratories: Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratories (SNL). A subcommittee of House Armed Services (HASC) held a hearing on the topic less than 24 hours after the NAS Report was released. Motivating the study was the 2006-2007 transition of LANL and LLNL to private, for-profit monopoly management by Los Alamos National Security, LLC and Lawrence Livermore National Security, LLC (LLNS&LANS for brevity). A quick Summary of the NAS report is as follows:

1. Neither scientific productivity, nor operational efficiency, nor employee morale has improved since LLNS&LANS was given a for-profit monopoly. In fact, they have gotten worse. The reasons are debatable, but the NAS Report says things are worse—and we agree.
2. The LLNS&LANS for-profit monopoly costs more. The exact amount of the increased cost is arguable—the Report gives a range of numbers between ~$210 million and more than $300 million per year—but in any case it is greater than the salary of thousands of average Americans, a number large enough to support an entire ongoing nuclear weapon refurbishment each year. Astonishingly, the NAS Report is dismissive of the increased cost, stating that it is "a small fraction of the total operating budget of the Labs".
3. Summing up [1] and [2] means LLNS&LANS management of the Labs is a poor investment for the taxpayers. The NAS Report does not emphasize this fundamental conclusion, but it also does not refute this fact. At the HASC hearing, former LLNL Director Dr. George Miller stated that "we cannot waste a single precious dollar on bureaucracy". Subcommittee Chairman Turner stated that "we cannot afford such inefficiency and waste" referring to "many hundreds of millions of dollars each year". Both were referring to the inferred dollars wasted due to excess NNSA oversight. But the direct cost of subsidizing the LLNS&LANS for-profit monopoly is an equal amount of money, and this cost does not have to be inferred—it is documented.
4. The NAS Report puts the focus on excessive government oversight, and the troubles with the National Nuclear Security Administration (NNSA)-Labs relationship as the main cause of the problems at the Labs.

In our opinion, the NAS Report failed to recognize many issues, but they also noted several important things. The two main points NAS missed were addressed in our Letter for the Record to House Armed Services. We noted in our letter a [1] deleterious mutation of the scientific method from hypothesis-driven to "Performance Based Incentive" (PBI)-driven (what we have referred to as "milestone-driven") science, and [2] the fact that a for-profit government funded monopoly, with no competition, is doomed to failure in numerous ways. Both can be easily fixed.

Should there be less oversight? Sure, we agree with that, but as even the NAS Report and testimony admitted, that takes more trust and trust has to be earned over time.

We agree with the NAS Report that the excessive formalities, checklists, and oversight put science, and experimental science in particular, in jeopardy. Of course, this does not mean that the lab employees should just show up every day and work without any documented goals or milestones.

We, the people of these labs, know we are spending tax dollars—billions of them. We know the taxpayers deserve to see results, and to know whether we meet milestones or are late with a credible scientific explanation. We believe, however, that it is the new profit-driven PBI process that skews these milestones into those that are scientifically either reckless or meaningless, more akin to checking boxes to make easy PBI's.

In other words, the NAS report attributes the decline of science at the Labs solely to excessive oversight by NNSA, and misses the connection between excessive oversights and the PBI/ for-profit governance structure.

This destructive pattern of PBI-driven milestones must change. It has been suggested that we revisit the maximum "for-profit" award fee. It is not clear what cutting the maximum award fee would do. It might reduce the incentive for greed and PBI-based milestones. It might not. In any case, we won't find out for another six years (until 2018 when the re-bid process is done) and by that time it will be too late to avoid permanent damage to the Labs and their important science and national security missions. We need a solution right now, to help set the Labs on the right course and make sure that we spend tax dollars wisely.

We believe strongly that the Labs' management contracts should be re-bid now, and Labs management returned to some appropriate non-profit entity and governed in such a way as to return their focus to their science and national security missions. We recognize, however, that in the current political climate there is little possibility of accomplishing such a large change all at once and in one large step.

In the interim, we suggest that Congress begin the process in small steps. In its legislation for FY2013, Congress should mandate the formation of at least two small "Mini-Labs", one on each of the taxpayer-owned Lab sites in Los Alamos and Livermore. These Mini-Labs could serve as a pilot program to chart the way to return the Labs to nonprofit, public operation, and as a pilot program to show the benefits of rescuing our Labs from a stagnant for-profit monopoly. The evolution of these Mini-Labs over the next few years will help the nation and Congress decide the proper course of these Labs as a whole. Hopefully, by the time of re-bidding circa 2017 at the latest, we will have discovered how to permanently fix the problems identified in the NAS Report.

To start, the first two of these small (couple dozen people) Mini-Labs could be organized to compete against the giant LLNS&LANS for-profit monopoly in its core mission of "Annual Certification" of the nuclear stockpile. Funds to do this are already available from NNSA's massive "Advanced Certification" campaign and other sources. This would accomplish three things:

1. Establish a test case for an entity with a mission of nuclear stockpile Annual Assessment, but one that exists outside of NNSA/DOE as suggested during the 16 February 2012 House Armed Services Hearing.
2. Provide some competition to the stagnant LLNS&LANS monopoly during the next six long years until a fresh entity takes over after rebidding, and meanwhile provide a desperately needed and substantive independent analysis of the needs and future course for the required annual certification of the nuclear stockpile.
3. Provide the beginnings of an alternative for employees of LLNS&LANS. Until now, Lab employees have had only the choice to quit LLNS&LANS, and in so doing their expertise is typically lost to the nation. The Mini-Labs can provide a solution to this staff retention problem that works "The American Way"—providing some employees a choice to not just quit, but to quit and join the competition.

We are not the only ones to have drawn attention to the connection between the problems at the Labs and the for-profit management structure. Former LANL Director Sig Hecker told the NAS study committee in his presentation to them in July 2011 that the Labs are doing "an inherently government mission" and the transition to for-profit management was a mistake. The NAS Report, sadly, makes no mention of Hecker's views. Hecker was even more explicit in his written testimony submitted to the 16 February 2012 HASC hearing, in which he says the following: "The deliberate change to for-profit contractors at LLNL and LANL have exacerbated the problems rather than fixed them".

In conclusion, now that the NAS has fulfilled its charge and documented the problems standing in the way of the Labs effectively carrying out their science and national security missions, it is time now for Congress to act.

HEARTLAND,
Madison, SD, March 21, 2013.

Hon. RON WYDEN,
Chair, Senate Energy and Natural Resources Committee, 304 Dirksen Senate Office Building, Washington, DC.

DEAR SENATOR WYDEN: This letter is to express our support for the nomination of Dr. Ernest Moniz to become Secretary of Energy. Dr. Moniz has a distinguished background in a variety of energy resources.

We expect he will utilize his expertise and experience to build support for a national energy policy that embraces a goal of utilizing a variety of energy resources that are affordable and reliable for consumers. Heartland has embraced that approach to resource planning. Our resources portfolio includes Federal hydropower, base load nuclear and coal, utility scale wind generation, natural gas/diesel peaking units, and a roof top solar photo voltaic array that provides power to Heartland's LEED Platinum headquarters.

We look forward to working with Dr. Moniz in strengthening the long standing role of the Federal Power Marketing Administrations in serving the needs of our rural communities, as well as collaborating on cost effective energy solutions that both protect the environment and provide affordable, reliable energy to consumers.

Heartland is a political subdivision of the State of South Dakota created in 1969 based in Madison. Heartland provides affordable, reliable wholesale power to municipalities, state agencies and one electric cooperative in South Dakota, Minnesota and Iowa.

Sincerely yours,

MIKE MCDOWELL,
General Manager and CEO.

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