

**Testimony of Secretary Ernest Moniz**  
**U.S. Department of Energy**  
**Before the**  
**House Committee on Science, Space, and Technology**  
**June 18, 2013**

Chairman Smith, Ranking Member Johnson, and Members of the Committee, thank you for the opportunity to appear before you today to lay out my vision for the Department of Energy.

I have had the opportunity to meet with several members of the Committee during my first four weeks on the job and I look forward to meeting with and working with this Committee in the coming weeks, months, and years. Indeed, I look forward to continuing my engagement with members of Congress from both parties and both chambers to constructively illuminate our perspectives on important national challenges and to seek solutions in a collaborative fashion.

I am very pleased to be back at the Department of Energy (DOE), even if some have characterized my return as a “triumph of hope over experience.” I served as DOE Under Secretary during the Clinton Administration, after working as Associate Director for Science of the Office of Science and Technology Policy in the Executive Office of the President. In fact, my experience at the Department was that we could indeed accomplish much and I do have hope and expectations for doing the same in collaboration with Congress.

I have been working on energy, science, and security issues for most of my professional career. I served on the MIT faculty beginning in 1973, including as Head of the Department of Physics and as Director of the William H. Bates Linear Accelerator Center, a DOE facility operated by MIT. 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. I was the Founding Director of the MIT Energy Initiative in 2006, a campus wide initiative that aligns well with President Obama’s “all-of-the-above” approach to our energy future.

The mission of the Department of Energy could not be more urgent or important. From our efforts to find affordable and clean sources of energy, to ensuring the security of our nuclear stockpile, to cleaning up the legacy of the Cold War — our work, which includes advancing the science that underpins these missions, is essential to our prosperity, environment, and security.

Today, I will lay out my vision for how the Department can be best positioned to address these challenges. Given the circumstances and scheduling of this hearing, my presentation is not that of a conventional budget hearing, but I will touch on some of the initiatives in the President’s Fiscal Year 2014 Budget Request for DOE and their relationship to priorities for the next few years. I will organize my remarks by DOE mission area.

## Energy Technology and Policy

As already noted, the President advocates an all-of-the-above energy strategy and I am very much in tune with this. 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.”

Since President Obama took office, the global energy landscape has undergone a profound change. In the United States, oil and gas production has increased each year, while oil imports have fallen to a 20 year low. At the same time, renewable electricity generation from wind, solar, and geothermal sources has doubled; and carbon emissions have fallen to the lowest level in the U.S. in nearly two decades. These changes have important implications for our economy, environment, and national security. Already we are seeing the effects of increased U.S. oil and natural gas production on global energy markets.

Even with the increase in domestic oil and gas production and clean energy generation, there is more work to be done. High gasoline prices impact American families and businesses every day and remind us that we are still too reliant on oil as an energy source. As the President has emphasized, there is no quick fix to a challenge that has built up over decades, but the elements of a solution are in place — more efficient vehicles as supported by the President’s CAFE standards; alternative fuels, such as potential increased use of natural gas and development of economic next generation biofuels; and vehicle electrification. Last week, the Department released eGallon, which describes the “fuel cost” for electric vehicles compared to the gasoline price when driving the same distance; the national average cost of fueling a vehicle with electricity is the equivalent of about \$1.14 a gallon compared to a similar vehicle that runs on gasoline. Together, these three advances – efficiency, alternative fuels, and electric vehicles – will reduce fuel costs for American families.

While we have made important progress in domestic production of fossil fuels and we are seeing progress in the small, but rapidly growing, electric vehicle market, we still need to support research into technological breakthroughs that will free us from the volatility of the oil market. An initiative in the FY 2014 President’s Budget is a request for \$2 billion over the next ten years, set aside from Federal oil and gas development revenue, to invest in a new Energy Security Trust that would provide a reliable stream of mandatory funding for R&D on cost-effective transportation alternatives that reduce our dependence on oil. The President’s plan builds on an idea that has bipartisan support from energy experts, retired admirals and generals and CEOs of leading companies; it focuses on one goal: shifting America’s cars and trucks off oil.

The increase in domestic natural gas production over the past five years has helped contribute to market-led reductions in carbon dioxide emissions as well as an expansion of manufacturing and associated job opportunities. The increase in U.S. unconventional oil production, combined with increased vehicle efficiency and biofuels production will continue to reduce American oil imports and our trade deficit.

The increase in domestic natural gas production is expected to continue. This May, the Energy Department announced that it has conditionally authorized the second proposed facility — the

Freeport LNG Terminal on Quintana Island, Texas — to export domestically produced liquefied natural gas (LNG) to countries that do not have a Free Trade Agreement with the United States. And we will expeditiously work through the remaining applications, reviewing each one on a case-by-case basis to ensure that all approvals are in the public interest.

The risks of global climate change threaten the health, security, and prosperity of future generations. DOE must continue to support a robust R&D portfolio of low-carbon options and key enablers: efficiency, renewables, nuclear, carbon capture and sequestration, energy storage, and smart and resilient grids. The President's FY 2014 Budget requests resources to invest in programs that support research, development, and deployment of the energy technologies of the future that will reduce greenhouse gas emissions and increase energy security. These investments will help us double American energy productivity by 2030, double renewable electricity generation again by 2020, cut net oil imports in half by the end of the decade, save consumers and businesses money by reducing energy use, and support groundbreaking research and innovation to safely and responsibly leverage every domestic source of energy. For example the Administration has already committed about \$6 billion to CCS demonstrations, and success of the forthcoming projects will be a critical step toward meeting the President's climate goals.

The President's Budget increases investments in DOE's applied energy programs. These investments include funding for programs designed to help meet the President's goals of investing in the next generation of renewable energy technologies, advanced vehicles and fuels, and energy efficiency measures that reduce energy use in Federal agencies and the industrial and building sectors. Among these efforts are the Department's successful SunShot Initiative, which aims to make solar energy cost-competitive with conventional sources of electrical energy, and cross-cutting initiatives such as the EV Everywhere Grand Challenge, which aims to reduce the overall cost of electric vehicles, and the Clean Energy Manufacturing Initiative. The Clean Energy Manufacturing Initiative focuses on strengthening U.S. competitiveness through both improved manufacturing of clean energy products and increased manufacturing energy productivity more broadly. It will help enable U.S. companies to cut manufacturing costs, enhance the productivity of their investments and workforce, and reduce the life-cycle energy consumption of technologies. DOE is one of five Federal agencies contributing to the DOD-led National Additive Manufacturing Innovation Institute in Youngstown, Ohio, which focuses on additive manufacturing, often referred to as 3D printing, and a DOE solicitation is active for a new clean energy manufacturing innovation institute focused on wide bandgap semiconductors for power electronics.

To encourage increased energy efficiency and a modernized electricity grid, the Department's Race to the Top for Energy Efficiency & Grid Modernization will incentivize states, local governments, co-operatives, and tribes to implement effective policies to cut energy waste and modernize the grid. The President's Budget requests \$200 million in one-time funding for technical assistance and performance-based awards after the policies are implemented and evaluated.

The Race to the Top initiative is an important part of my larger focus on states, tribes, and local governments. States have been out in front with innovative policies that we want to support and, as appropriate, replicate on a national scale when they prove effective. Different regions of our

country have very different energy opportunities and needs, and we need to build from those to a national policy. In this vein, our national labs have unique capabilities and expertise to provide technical assistance to regional partners. I look forward to expanding our cooperation and collaboration with governments, tribal governments, and other partners across the country.

We need to support cutting edge research across the board that will help create the clean energy economy of tomorrow. The President's Fiscal Year 2014 budget also requests continued support for the Advanced Research Projects Agency - Energy (ARPA-E), to support high-impact energy-related research projects with the potential to transform the energy sector.

ARPA-E has invested in roughly 285 high-risk, high-reward research projects that, if successful, could create the foundation for entirely new industries. Seventeen of these projects, which received an initial investment from ARPA-E of approximately \$70 million in total, have attracted over \$450 million in publicly-announced private sector follow-on funding. ARPA-E funded companies and research teams have produced a battery that doubled the energy density of any previous design, successfully engineered microbes that use carbon dioxide and hydrogen to make fuel for cars, and developed a one megawatt silicon carbide transistor the size of a fingernail.

The Loan Programs Office at DOE has been a critical force supporting large-scale clean and renewable energy projects and advanced technology vehicle manufacturing here in America. Building on work of the previous administration, the Department of Energy has made a number of investments to support these innovative technologies. When you are talking about cutting-edge clean energy technologies, not every investment will succeed — but the latest indications show that the Energy Department's portfolio of more than 30 loan projects is delivering big results for the American economy.

The portfolio includes 19 new clean energy power plants that are adding enough solar, wind and geothermal capacity to power a million homes and displace 7 million metric tons of carbon dioxide every year — roughly equal to taking a million cars off the road. And just this month, Tesla Motors repaid the entire remaining balance on a \$465 million loan from the Department of Energy, nine years earlier than required.

An important part of the President's all-of-the-above approach is nuclear energy. Addressing the disposition of used nuclear fuel and high-level radioactive waste is essential to the long-term viability of the industry. I was pleased to be part of the Blue Ribbon Commission on America's Nuclear Future (BRC) and we submitted our findings to Congress and the White House. The BRC report recommended a consent based approach focused on the dual tracks of interim storage and geologic disposal capacity. The Administration has issued a strategy that embraces the core findings of the BRC, but the path forward requires Congressional action. I look forward to working with Congress on expeditiously implementing policies that ensure that our nation can continue to rely on carbon-free nuclear power.

During my time at MIT, I had 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 Quadrennial Technology Review of 2011 was the first installment in the QER process. 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.

## **Science**

DOE's science programs provide the technical underpinnings to accomplish the Department's missions and form part of the backbone of basic research in the physical sciences in the United States. The Department 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.

Competing in the new energy economy will require us to harness the expertise of our scientists, engineers, and entrepreneurs. As the President said, "the world is shifting to an innovation economy, and nobody does innovation better than America." The President is committed to making investments in research and development that will grow our economy and enable America to remain competitive, and has requested significant resources to ensure America leads the world in the innovations of the future. The President believes in a robust scientific research infrastructure, strong support for research, and a buildup in human capacity.

Energy Frontier Research Centers (EFRCs) provide an important example of the Department's focus on supporting new and emerging research areas. These centers support scientists and engineers as they work to solve specific scientific problems to help unleash new clean energy technology development. Importantly, the EFRCs followed an outstanding process organized by the previous Administration, engaging about 1,500 scientists from across the country who identified key basic energy science challenges. So far, the EFRCs have generated some 3,400 peer-reviewed papers, 60 invention disclosures, and 200 patents; and the Centers report numerous instances of technology transfer. In their three-plus years of existence, the EFRCs have achieved scientific breakthroughs in multiple areas, from solar power and batteries to new catalysts for refining petroleum and powering fuel cells. In FY 2014, we plan to hold an open re-competition to select new EFRCs and consider renewals of some existing EFRCs. This process is not reinventing the wheel but ensuring that our research dollars are supporting projects with the highest possible impact across the energy landscape.

Earlier this month, I made my first trip as Secretary to Oak Ridge, Tennessee to visit the Oak Ridge National Lab (ORNL) and the Y-12 National Security Complex. During my visit, I toured the Spallation Neutron Source, a facility that is helping us better understand the properties of the advanced materials needed to harness and store energy, and which is just one example of the cutting edge facilities across our national labs that are critical for our economic competitiveness and our national security.

While at ORNL, I also had the opportunity to see Titan, the world's fastest supercomputer and Everest, a state-of-the-art facility for data exploration and visualization. These tools are helping us with a variety of scientific solutions, such as better prediction of climate change today by modeling the climatic changes at the end of the last ice age, 20,000 years ago, to improving the production of biofuels by visualizing how cellulosic plant materials are broken down into sugars.

We have long been the global leaders in supercomputing and DOE and its predecessors have long been key drivers. In 1954 a group of researchers at ORNL created one of the world's first supercomputers — built from vacuum tubes, transistors, and diodes. The Oak Ridge Automatic Computer and Logical Engine helped in the early research of nuclear physics and the biological effects of radiation.

Currently, the U.S. has three of the five most powerful computers in the world, but our global competitors are not far behind. Maintaining a cutting-edge, domestic advanced computing capability, however, is a crucial component to achieving our mission and furthering the science that underpins advances in energy technology, environmental remediation, and nuclear stewardship. This capability requires both advanced hardware and, equally important, the advanced software, algorithms, and operating systems that are optimized to take full advantage of our investments in new machines. These advanced computing capabilities allow us to model complex systems such as the climate and also enable us to analyze and interpret the unprecedented data streams that we are generating through our environmental sensor networks and our world-class scientific facilities. By pursuing the research necessary to enable and build the next-generation of supercomputers, exascale machines with 50-100 times more capability than the current generation, we can help ensure continued U.S. leadership in this important area.

While I was at Oak Ridge, I also visited our Consortium for Advanced Simulation of Light Water Reactors (CASL). CASL is the first of DOE's five existing Energy Innovation Hubs. Through the Hubs, we are bringing together our nation's top scientists and engineers to make game-changing progress in energy technologies. For example, CASL has released software that support simulating a virtual model of an operating physical reactor. I had the pleasure of serving as the first Chairman as CASL's Board of Directors and saw firsthand how the Hub was making a real difference on critical issues for nuclear power. The President's budget continues support for our Hubs and proposes a new Hub in electricity systems.

## **Nuclear Security**

The President, beginning with his speech in Prague in 2009, has laid out a clear vision of nuclear security. This strategy includes 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.

Last week the Department released its Stockpile Stewardship Management Plan, which lays out the Administration's plan to ensure that our nuclear arsenal remains an effective deterrent so long as we should need it.

The President's Budget requests resources to strengthen our national security with investments in the Department's National Nuclear Security Administration (NNSA) as described in the Administration's Nuclear Posture Review (NPR) of 2010. This funding proposal is the result of an unprecedented cooperative analysis and planning process jointly conducted by NNSA and the Department of Defense. The Budget meets the goals of the NPR by funding cost increases for nuclear weapon life extension programs, such as upgrades to the W76 and B61 nuclear weapons; initiating new upgrades for the W78 and W88 nuclear weapons; improving or replacing aging facilities, such as the Uranium Processing Facility; adding funds for tritium production and plutonium manufacturing and experimentation; and sustaining the existing stockpile by maintaining the underlying science, surveillance, and other support programs.

This national security investment provides a strong basis for transitioning to a smaller yet still safe, secure and effective nuclear stockpile. It also strengthens the science, technology and engineering base of our enterprise.

NNSA plays a vital role in achieving President Obama's other nuclear security objectives, including in the prevention of nuclear terrorism — and the grave and urgent threat it presents to our nation and the world. The Budget requests support for NNSA's efforts to detect, secure, and dispose of dangerous nuclear and radiological material around the world, helping the Department to fulfill its role in completing the President's four-year plan to secure all vulnerable nuclear materials worldwide.

The Department of Energy's enterprise-wide intelligence and counter intelligence capability is also critical to our national defense and nuclear security. And I intend to make sure that these assets continue to sustain our national security.

### **Environmental Remediation**

Environmental remediation at the many sites involved in decades of nuclear weapons production during the Cold War remains a major mission for the Department. This is a legal and moral imperative. DOE has made substantial progress in cleaning up this legacy waste but, as you know, the hardest challenges remain as long-term, expensive, complex projects in several states.

The President's budget requests the resources necessary to support the environmental remediation effort, led by the Office of Environmental Management. I pledge to work with members of Congress, and the affected communities and other stakeholders openly and transparently as we confront the many challenges involved in remediation efforts. As part of that effort, I will renew the Department's emphasis on the management and performance of its major projects.

One of our most challenging Environmental Management projects remains the Hanford Site in Washington. I have committed to a plan to address the serious issues at hand, and I look forward to visiting Hanford tomorrow and determining the path forward on the project.

## Management and Performance

The Department of Energy has a broad range of responsibilities that stretch across cutting edge science and technology programs, national security priorities, and complex environmental cleanup projects. Responsibility for taxpayers' money demands that we manage our resources in the most efficient manner possible. Improving the management and performance of the Department is one of my top priorities as Secretary.

I have been carefully reviewing the organization and management practices within the Department and am working with my staff to develop options to reorganize. I see this as a sustained effort for continuous improvement and I look forward to working with members of this committee and others in Congress and the Administration to elevate the focus on management and performance at DOE.

As part of this process, I have identified several areas where I plan to make improvements:

- To better support the President's all-of-the-above energy strategy, we need to improve the Department's systems approach to energy policy analysis. DOE has analysis capabilities housed in each major program area, but to strengthen our integrated policy assessment capability to provide the Secretary, the President, and the Congress with comprehensive assessments of key energy policy issues, I am considering plans to consolidate and strengthen policy and systems analysis, to make better use of existing resources.
- A key factor in successful technology innovation programs is the ability to closely integrate and move quickly from basic science, to applied research, to technology demonstration. The Department has made important strides to foster communication between its science and energy programs, but we must do more organizationally to drive this process. I am considering ways to more closely integrate the management of science and energy programs to improve the dexterity and effectiveness of the innovation process.
- The security breach at the Y-12 facility revealed unacceptable shortcomings in the Department's oversight of its security programs and systems. I plan to revamp the security oversight apparatus, including a stronger independent oversight function that will report directly to the Secretary. A culture of safety and environmental compliance go hand-in-hand with good security, and I believe that all of these functions should be given greater attention
- We need to build consistency and accountability across the entire Department. The various mission support functions of DOE require greater day-to-day oversight, coordination and integration. I am considering means of strengthening the lines of authority and management of these functions.
- Finally, I am examining the organization of the Office of the Secretary. I look forward to building councils of advisors that will provide enterprise-wide advice and analysis on

issues ranging from cyber security to the management of the National Labs. I also plan to engage the Directors of the National Laboratories regarding the Department's mission and to appoint new members to and work closely with the Secretary of Energy Advisory Board. Bringing together these measures to improve internal coordination and reaching out for expert outside advice will provide me with a broader base of information and analysis to make informed decisions.

**Conclusion:**

In summary, the Department of Energy has significant responsibilities that bear on America's economic, energy, environmental and nuclear 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. I am committed to working with the Congress in a search for the solutions to the country's energy and nuclear security challenges.

As President Obama has said, "Today, no area holds more promise than our investments in American energy. After years of talking about it, we're finally poised to control our own energy future." The investments included in the Administration's Energy Department budget request are vital to ensuring America's energy security and securing America's place as the world leader in the clean energy economy.

Thank you, and now I am pleased to answer your questions.