

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2012

WEDNESDAY, MAY 18, 2011

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 2:41 p.m., in room SD-192, Dirksen Senate Office Building, Hon. Dianne Feinstein (chairman) presiding.

Present: Senators Feinstein, Murray, Tim Johnson, Landrieu, Lautenberg, Alexander, Cochran, McConnell, Collins, Murkowski, and Graham.

DEPARTMENT OF ENERGY

OFFICE OF THE SECRETARY

STATEMENT OF HON. STEVEN CHU, SECRETARY

OPENING STATEMENT OF SENATOR DIANNE FEINSTEIN

Senator FEINSTEIN. Good afternoon, ladies and gentlemen, and welcome to the Energy and Water Subcommittee's budget hearing on the Department of Energy's (DOE) fiscal year 2012 budget request.

DOE has requested \$30.5 billion for fiscal year 2012. That is an increase of \$4.8 billion, or 19 percent, from fiscal year 2011. About \$1.1 billion of the \$4.8 billion increase, or 25 percent, is for the National Nuclear Security Administration's (NNSA) nuclear weapons for nonproliferation and Naval Reactor programs.

This subcommittee has already explored NNSA's budget with Administrator D'Agostino 2 weeks ago. The rest of the increase is for energy efficiency and renewable energy projects, loan guarantees, and basic energy research.

It is my understanding that DOE submitted this budget request before the Congress passed the 2011 continuing resolution, and so it does not reflect the new spending reality. So, it is clear that DOE and the Congress will have to make some joint, painful decisions and focus the limited resources that we have on the highest priorities. Therefore, I think knowing your highest priorities is of substantial importance to us, Secretary. I hope that you will highlight those. Do not feel shy.

I would like to just highlight the three largest increases in this budget.

The largest single increase would be for the Office of Energy Efficiency and Renewable Energy (EERE), which would see an increase of \$1.4 billion or 76 percent. The only programs in this account that see a decrease are hydrogen and water power, and I know we want to discuss that.

Given the across-the-board budget increases for all other programs, it is hard to determine which of these research and development (R&D) programs would have the biggest impact on energy use and the clean-energy economy.

Second, the Office of Science would see an increase of \$5.5 million or 11 percent. So, those are the first two, EERE and Office of Science.

Innovation clearly drives economic prosperity. The Office of Science has been one of the leaders in new scientific and technologies deliveries. For example, Argonne National Lab in Illinois spent 10 years researching cathode materials for a lithium ion battery that was small, energy efficient, and low in weight. General Motors used this technology to develop the battery it now uses in the Chevy Volt, the first mass produced plug in hybrid electric vehicle. So, that is significant.

Despite these successes, the Office of Science must do a better job explaining how basic research can lead to new clean-energy technologies, and how it can better leverage large scientific facilities to help American industry remain competitive. I mean, I would hazard a guess that that would be a substantial priority for all of us.

Third, Advanced Research Projects Agency-Energy (ARPA-E) would see an increase of \$370 million or 206 percent. ARPA-E, of course, holds a promise of advancing high-risk, high-reward technology.

Even though ARPA-E is a new agency, I would like to ask that you apply ARPA-E program management to other DOE offices, such as the rigorous peer review process and contract or grant negotiations completed in just a few months. Streamlining contracting processes and assembling high-quality program management teams, I think, would benefit many DOE energy programs.

My last observation is that outside of NNSA, DOE's budget does not provide a 5-year spending plan. Without this plan, it makes it difficult to buy into committing to programs that create large, out-year obligations.

Joining us today is, of course, Dr. Steven Chu, the Secretary of Energy. In the full disclosure, I want to say that I have the greatest respect and fondness for Secretary Chu. I happened to meet him when he was head of Lawrence Berkley Labs, and his achievements are many, marked, and quite astounding. So, we all grant that you are a most brilliant secretary, Secretary Chu, and we are delighted to have you here.

But let me turn to Senator Alexander for his remarks, if I might.

OPENING STATEMENT OF SENATOR LAMAR ALEXANDER

Senator ALEXANDER. Thank you, Madam Chairman.

When I was the Education Secretary and was in your shoes, I did not get that kind of compliment from the chairman of the subcommittee, so I am a little jealous.

But, you know, I agree with her. I think, Dr. Chu, you are one of the President's best appointees, that you have been a terrific leader, and I am glad that you are spending this part of your life in this form of public service.

I want to, in my remarks and then in the questions when my time comes, I want to focus on some of the things that Senator Feinstein talked about. And, for me, I would say it would be putting a priority on energy research for our country, something I know, Dr. Chu, you have long advocated.

In 2008, I went to the Oak Ridge National Laboratory and gave a talk called "A New Manhattan Project for Clean Energy Independence", and suggested that we apply the same rigor and ambitious goals to energy research that we did to the Manhattan Project in World War II, and listed several objectives of such a new Manhattan Project, most of them taken from The 14 Grand Challenges of Engineering in the 21st Century that Chuck Vest and the National Academy of Engineering had said. But they included plug in electric cars, carbon capture, solar power and recycling, used nuclear fuel, advanced bio fuels, green buildings, and even fusion.

Now, you were a part, Dr. Chu, of the National Academy's effort to say to the Congress what we should do to help our country be more competitive. We called it "America Competes" based upon your report. And you have moved to form hubs, you call them, in several areas, and in your request, you want to form more. So, I would like to indicate my broad agreement with that sort of strategy and work with you to find ways, even in this tight budget situation, to find—to prioritize spending and to find more money for clean-energy research.

For example, my colleagues have wanted to talk this week about subsidies for energy for big oil. If we are going to do that, I think we should talk about all subsidies. I suggested on the floor this morning we might talk about big wind. The taxpayers are on the hook for \$27 billion over the next 10 years to subsidize windmills, which is more money than we would save if we cut out the tax breaks for the five big oil companies. That is just an example. And I am—that was based upon the production tax credit that was put into place temporarily in 1992.

Now, my staff research indicates we only use about—spend about \$6 billion on energy research in our Federal Government every year, and I would wonder whether some of these long-term subsidies for energy, whether big oil or big wind, might be better spent for energy research.

There are other parts of the budget, even this budget, where I wonder whether the energy efficiency section, I wonder if energy efficiency money should go up at the level that it is mentioned here, or we should increase the research budget. There is \$4 billion in unspent American Recovery and Reinvestment Act (ARRA) funding and weatherization and State energy grants. You're seeking \$384 million more. Would that not be better spent to take the Federal research budget up closer to \$7, \$8, or \$9 billion a year?

I, too, like ARPA-E. I think that is a very promising area. We were only able to find \$180 million for it this year, although it is authorized at \$300 million, and it is now fully authorized.

So, I would just—I would like to weigh in favor of energy research. I think many of my Republican colleagues see energy research as an appropriate role for the Federal Government. Long-term subsidies some of my Republican colleagues have problems with. I deal with long term. Short-term, I support jump starting electric cars, maybe natural gas trucks, jump starting the first new nuclear plants through loan guarantees. All these are things that you have suggested.

But, so I will be looking to work with you on seeing if we can prioritize money from the current request, maybe look at these long-term subsidies, and apply more our dollars over the next 10 years to what you call hubs and I call a new Manhattan Project for clean-energy independence.

Thank you, Madam Chairman.

Senator FEINSTEIN. And I thank you, Senator Alexander.

We will proceed in 5-minute rounds and use the early bird rule straight as people come in to attend. And so, Secretary Chu, why do you not proceed with your remarks, and then we will go to questions.

SUMMARY STATEMENT OF STEVEN CHU

Secretary CHU. Thank you, Chairman Feinstein, and thank you, Ranking Member Alexander, and the other members of the subcommittee, first, for your kind remarks, and—but also for giving me the opportunity to present and discuss the President's fiscal year 2012 budget request for DOE.

President Obama has a plan for the United States to win the future by out-innovating, out-educating, and out-building the rest of the world, while at the same addressing the deficit. Many countries are moving aggressively to lead in clean energy. We must rev up the great American innovation machine to create jobs and win this clean-energy race.

And to that end, President Obama has called for increased investments in clean-energy research, development, and deployment. In addition, he has proposed a bold, but achievable, goal of generating 80 percent of America's electricity from clean sources by 2035. DOE's fiscal year 2012 budget request of \$29.5 billion supports these goals and strengthens the Nation's economy and security.

We recognize that families are feeling the effects of high gas prices right now, and while there are no silver bullets to this challenge, President Obama is committed to breaking our dependence on foreign oil and easing the burdens on families. This budget helps reduce our reliance on oil by developing the next generation of home grown bio fuels and by accelerating electric vehicle research, development, and deployment. And through energy efficiency programs, we will save money for consumers by saving energy.

In addition, the budget supports the research, development, and deployment of renewable energy, the modernization of the electric grid, and advancement of carbon capture and sequestration technologies. The budget also supports loan guarantees for renewable and energy efficiency technologies. Nuclear energy has an important role to play in our energy portfolio, and that is why the budget

requests additional loan guarantee authority and invests in the research and development of advanced nuclear technologies.

To unleash innovation, the President's budget supports the groundbreaking research through DOE's Office of Science. For example, we are investing in basic energy sciences, advanced scientific computing, biological and environmental science, and all key areas for economic competitiveness. In addition, the Office of Science supports widely used facilities that provide unique analysis tools for materials, chemistry, and biology research.

The budget invests \$515 million in ARPA-E, and this will allow ARPA-E to continue to support research projects that aim to deliver game-changing clean-energy technologies. ARPA-E's projects are generating excitement in the private sector.

For example, through a combined total of \$24 million from ARPA-E, six companies have already been able to advance their research efforts and show the potential viability of their cutting-edge technologies. This early support enabled those companies to achieve R&D milestones that, in turn, have attracted more than \$100 million in private sector funds to the projects. This is precisely the innovation leverage that is needed to win the future.

Another key piece of our research effort is the energy innovation hubs. Through the hubs, we are bringing together top scientists and engineers to achieve similar game-changing energy goals, but where a concentrated effort over a longer time horizon is needed to establish innovation leadership. The budget requests \$146 million to support the three existing hubs and to establish three new hubs in the areas of batteries and energy storage, smart grid technologies and systems, and critical materials.

Finally, the budget supports the Energy Frontier Research Centers (EFRC), which are working to solve specific scientific problems that are blocking clean-energy development. To better integrate and maximize our research efforts, DOE is organizing along the lines of business. This will help us create a sum that is worth more than the parts.

In any specific technological area, we are examining current business projections and looking across ARPA-E, the Office of Science, and our applied technology side to determine where we in DOE can add the most value to accelerate the pace of innovation.

For example, we have instituted a SunShot Initiative with participation from ARPA-E, Office of Science, and EERE to make the solar energy cost competitive with any other form of energy before the end of this decade. And this would position the United States to lead in this growing industry.

At a time when industry, the Congress, and the American people are making critical energy decisions, we need to make sure to adequately fund the Energy Information Administration (EIA), the Nation's premier source of independent statistical information about energy production and use. Even a modest increase to support the EIA will go a long way in providing the Congress and others with an unbiased data and analysis needed to make informed decisions.

In addition to strengthening our economy, the budget also strengthens our security by providing \$11.8 billion for DOE's NNSA. The request of \$7.6 billion for weapons activities provides

a strong basis for transitioning to a smaller, yet still safe, secure, and effective nuclear stockpile without additional nuclear testing.

It also provides much needed resources to strengthen science, technology, and engineering capabilities, and to modernize the physical infrastructure of our nuclear security enterprise.

To support the President's goal of securing all vulnerable nuclear material around the world in 4 years, the budget invests \$2.5 billion in the Defense Nuclear Nonproliferation program. Through our investments, the Obama administration is laying the groundwork for the Nation's future prosperity and security. At the same time, we are mindful of our responsibility to the taxpayer. We are streamlining operations and cutting back in multiple areas, including eliminating unnecessary fossil fuel subsidies.

PREPARED STATEMENT

The United States faces a choice: Will we lead in innovation or will we fall behind? To lead the world in clean energy, we must act now, and we cannot afford not to.

Thank you and I am pleased to now answer your questions.
[The statement follows:]

PREPARED STATEMENT OF STEVEN CHU

Chairman Feinstein, Ranking Member Alexander, and members of the subcommittee, thank you for the opportunity to appear before you today to discuss the President's fiscal year 2012 budget request for the Department of Energy (DOE).

In his State of the Union Address, President Obama laid out a plan for the United States to win the future by out-innovating, out-educating, and out-building the rest of the world, while at the same time addressing the deficit. The President's budget request invests in much-needed programs while cutting back where we can afford to.

Many countries are moving aggressively to develop and deploy the clean-energy technologies that the world will demand in the coming years and decades. As the President said, this is our generation's "Sputnik moment".

We must rev up the great American innovation machine to win the clean-energy race and secure our future prosperity. To that end, President Obama has called for increased investments in clean-energy research, development, and deployment. In addition, he has proposed a bold, but achievable goal of generating 80 percent of America's electricity from clean sources by 2035.

A clean-energy standard will provide a clear, long-term signal to industry to bring capital off the sidelines and into the clean-energy sector. It will grow the domestic market for clean sources of energy—creating jobs, driving innovation, and enhancing national security. And by drawing on a wide range of energy sources including renewables, nuclear, clean coal and natural gas, it will give utilities the flexibility they need to meet our clean-energy goal while protecting consumers in every region of the country.

DOE's fiscal year 2012 budget request of \$29.5 billion supports these goals and strengthens the Nation's economy and security by investing in the following priorities:

- Supporting groundbreaking basic science, research, and innovation to solve our energy challenges and ensure that the United States remains at the forefront of science and technology;
- Leading in the development and deployment of clean and efficient energy technologies to reduce our dependence on oil, accelerate the transition to a clean-energy economy, and promote economic competitiveness; and
- Strengthening national security by reducing nuclear dangers, maintaining a safe, secure and effective nuclear deterrent, and cleaning up our cold war nuclear legacy.

While we are investing in areas that are critical to our future, we are also rooting out programs that aren't needed and making hard choices to tighten our belt. Additionally, we are improving our management and operations so we function more efficiently and effectively.

LEADING IN THE GLOBAL CLEAN-ENERGY ECONOMY

As the President said in his State of the Union Address, investing in clean-energy will strengthen our security, protect our planet, and create countless new jobs here at home. DOE's budget request invests \$3.2 billion in energy efficiency and renewable energy programs.

Through programs to make homes and buildings more energy efficient, including a new "Better Buildings Initiative" to make commercial buildings 20 percent more efficient over the next decade, we will save money for families and businesses by saving energy. That is money that can be re-invested back into the economy. In addition, the budget supports the research, development, and deployment (RD&D) of renewable sources of energy like wind, solar, and geothermal. It supports the modernization of the electric grid and the advancement of carbon capture and sequestration technologies. And it helps reduce our dependence on oil by developing the next generation of biofuels and accelerating electric vehicle research and deployment to support the President's goal of putting 1 million electric vehicles on the road by 2015. This includes a \$200 million competitive program to encourage communities to invest in electric vehicle infrastructure.

We're also focused on moving clean-energy technologies from the lab to the marketplace. Over the past 2 years, DOE's loan programs have supported more than \$30 billion in loans, loan guarantees, and conditional commitments to guarantee loans for 28 clean-energy and enhanced automotive fuel efficiency projects across the country, which the companies estimate will create or save more than 61,000 jobs. Building on this success, we are requesting new credit subsidy that will support approximately \$1 to \$2 billion in loan guarantees for innovative renewable energy and energy efficiency technologies. These deployment efforts build on the substantial investment made in the clean-energy sector by the American Recovery and Reinvestment Act (ARRA), and are supplemented by tax incentives that have also played an important role in bringing clean-energy projects to market, such as the 48C manufacturing tax credits and the 1603 cash grants in lieu of investment tax credits, which the 2012 budget also expands. We are also requesting \$100 million in credit subsidy for a new "Better Buildings Pilot Loan Guarantee Initiative for Universities, Schools, and Hospitals", which will guarantee up to \$2 billion in loans to support energy efficient retrofits.

Nuclear energy also has an important role to play in our energy portfolio. To jumpstart the domestic nuclear industry, the budget requests up to \$36 billion in loan guarantee authority. It also invests in the research and development (R&D) of advanced nuclear technologies, including small modular reactors (SMR).

SUPPORTING GROUNDBREAKING SCIENCE

To spur innovation, the President's budget request invests in basic and applied research and keeps us on the path to doubling funding for key science agencies, including DOE's Office of Science. As Norm Augustine, former chairman of Lockheed Martin and former Under Secretary of the Army, has said, underfunding R&D in a time of austerity is like removing the engine of an aircraft to reduce its weight.

That is why the budget request increases support for DOE's comprehensive research strategy to accelerate energy breakthroughs.

Through \$5.4 billion for the Office of Science, we're expanding our investment in basic energy sciences, advanced scientific computing, and biological and environmental sciences—all key areas for our future economic competitiveness.

The budget invests \$550 million in the Advanced Research Projects Agency-Energy, (ARPA-E). The administration also seeks an additional \$100 million for ARPA-E from the Wireless Innovation Fund to support wireless clean-energy technologies. This investment will allow ARPA-E to continue the promising early stage research projects that aim to deliver game-changing clean-energy technologies. ARPA-E's projects are generating excitement both in DOE and in the private sector. For example, through a combined total of \$24 million from ARPA-E, six companies have been able to advance their research efforts and show the potential viability of their cutting-edge technologies. This extremely valuable early support enabled those companies to achieve R&D milestones that, in turn, have attracted more than \$100 million in private sector funds to the projects. This is precisely the innovation leverage that is needed to win the future.

Another key piece of our research effort is the Energy Innovation Hubs. Through the Hubs, we are bringing together our Nation's top scientists and engineers to achieve similar game-changing energy goals, but where a concentrated effort over a longer time horizon is needed to establish innovation leadership. DOE has established three Energy Innovation Hubs in the areas of energy efficient buildings, modeling, and simulation for nuclear reactors, and fuels from sunlight. The budget re-

quests \$146 million to support the three existing Hubs and to establish three new Hubs in the areas of batteries and energy storage, smart grid technologies and systems, and critical materials. The Energy Innovation Hubs were modeled after DOE's BioEnergy Institutes, which have established an outstanding 3-year track record.

Finally, the budget continues to support the Energy Frontier Research Centers (EFRCs), which are mostly university-led teams working to solve specific scientific problems that are blocking clean-energy development.

The Energy Innovation Hubs, ARPA-E, and EFRCs represent three complementary approaches to advance groundbreaking discovery. When you think of the EFRCs, think about a collaborative team of scientists such as Watson and Crick unlocking the secrets of DNA. When you think of ARPA-E, think about visionary risk-takers launching new technologies and start-up companies out of their garages. When you think of the Hubs, think of large, mission-oriented research efforts such as the Manhattan Project, the development of radar at MIT's Radiation Laboratory during World War II and the research in America's great industrial laboratories in their heyday.

We don't know where the big energy breakthroughs are going to come from. To reach our energy goals, we must take a portfolio approach to R&D: pursuing several research strategies that have proven to be successful in the past. But I want to be clear—this is not a “kitchen sink” approach. This work is being coordinated and prioritized, with a 360-degree view of how these pieces fit together. Taken together, these initiatives will help America lead in science and technology innovation.

NUCLEAR SAFETY AND SECURITY

In addition to strengthening our economy, the budget request also strengthens our security by providing \$11.8 billion for DOE's National Nuclear Security Administration (NNSA). The 5-year fiscal year 2012 to fiscal year 2016 request of nearly \$65 billion for NNSA reflects the President's nuclear security priorities, as well as his commitment to modernize the U.S. nuclear weapons enterprise and sustain a strong nuclear deterrent for the duration of the New Strategic Arms Reduction Treaty (New START) and beyond.

The request of \$7.6 billion for weapons activities provides a strong basis for transitioning to a smaller yet still safe, secure and effective nuclear stockpile without additional nuclear testing. It also provides much-needed resources to strengthen science, technology, and engineering capabilities and to modernize the physical infrastructure of our nuclear security enterprise.

The President has identified the danger of terrorists getting their hands on nuclear weapons or the material to build them as the greatest threat to global security. To support the President's goal of securing all vulnerable nuclear material around the world in 4 years, the budget invests \$2.5 billion in the NNSA Defense Nuclear Nonproliferation program. This is part of a 5-year, \$14.2 billion commitment for the program.

The budget also requests \$1.2 billion to support the Navy's nuclear powered submarines and aircraft carriers. And it provides \$6.1 billion to protect public health and safety by cleaning up the Nation's cold war nuclear legacy.

FISCAL RESPONSIBILITY

Through our investments, we are laying the groundwork for the Nation's future prosperity and security. At the same time, we are mindful of our responsibility to the taxpayer.

We are cutting back in multiple areas, including eliminating unnecessary fossil fuel subsidies, reducing funding for the fossil energy program and reducing funding for the hydrogen technology program. We're streamlining operations to reduce administrative costs. And we're making some painful cuts, including ending operation of the Tevatron accelerator and freezing salaries and bonuses for hard-working National Laboratory, site and facility management contractor employees.

Finally, we continue to make progress on a management excellence agenda to improve our operations.

HIGHLIGHTS OF THE FISCAL YEAR 2012 BUDGET REQUEST

In his State of the Union Address, President Obama said that America faces “our generation's Sputnik moment” and that we need to out-innovate, out-educate, and out-build the rest of the world to capture the jobs of the 21st century. “In America, innovation doesn't just change our lives. It's how we make our living.” Through innovation in promising areas like clean energy, the United States will win the future and create new industries and new jobs. To lead in the global clean-energy economy, we must mobilize America's innovation machine in order to bring technologies from

the laboratory to the marketplace. DOE is on the front lines of this effort. To succeed, DOE will pursue game-changing breakthroughs, invest in innovative technologies, and demonstrate commercially viable solutions.

In addition to energy advances that spark economic growth, national security remains fundamental to the Department's mission. Through bipartisan ratification of the New START treaty with Russia, America, and its global partners are leading by example in implementing the focused expansion of domestic and international activities to reduce the threat of nuclear weapons, nuclear proliferation, and unsecured or excess weapons-usable materials. The NNSA supports the international effort to secure all vulnerable nuclear materials around the world within 4 years. The NNSA also fulfills the President's commitment to modernize the Nation's nuclear stockpile until a world without nuclear weapons can be realized.

DOE's fiscal year 2012 budget request is \$29.5 billion, an 11.8 percent or \$3.1 billion increase from fiscal year 2010 current appropriation levels. The fiscal year 2012 request supports the President's goals to increase America's competitiveness by making strategic investments in our Nation's clean-energy infrastructure and to strengthen our national security by reducing the global threat of nuclear materials. The President has called for advancing research on clean-energy technologies and manufacturing, doubling the share of electricity generated from clean-energy supplies by 2035, and putting 1 million electric vehicles on the road by 2015. DOE's request prepares for a multi-year effort to address these interconnected objectives and prioritizes R&D of renewable energy technologies to expand sustainable energy options for the United States.

The fiscal year 2012 budget builds on the intense planning, execution, and oversight of the \$35.2 billion from ARRA. By the end of fiscal year 2010, DOE successfully obligated \$32.7 billion of ARRA funds, including all funding that was set to expire. In developing the fiscal year 2012 budget request, the DOD has taken these investments into account and will oversee execution of these funds with value to the taxpayer in mind. ARRA investments are focused on:

- energy conservation and renewable energy sources (\$16.8 billion);
- environmental cleanup (\$6 billion);
- loan guarantees for renewable energy and electric power transmission projects (\$2.4 billion);
- grid modernization (\$4.5 billion);
- carbon capture and sequestration (\$3.4 billion);
- basic science research (\$1.6 billion); and
- the ARPA-E (\$0.4 billion).

DOE's ARRA activities are strengthening the economy by providing much-needed investment, saving or creating tens of thousands of jobs, cutting carbon pollution, and reducing U.S. dependence on oil.

The President's fiscal year 2012 budget supports three strategic priorities:

Transformational Energy.—Accelerate the transformation to a clean-energy economy and secure U.S. leadership in clean-energy technologies.

Economic Prosperity.—Strengthen U.S. science and engineering efforts to serve as a cornerstone of our economic prosperity and lead through energy efficiency and secure forms of energy.

Nuclear Security.—Enhance nuclear security through defense, nonproliferation, naval reactors, and environmental clean-up efforts.

As the President has articulated, innovation is essential to America's economic competitiveness. To meet the challenge of "our generation's Sputnik moment", DOE supports a coordinated strategy for research and development across all of its programs. With every initiative DOE undertakes, sound science is at the core. In fiscal year 2012, we will increasingly emphasize cross-cutting initiatives to link science throughout DOE, specifically with energy and national security programs in order to deliver results to the American taxpayer. In the Office of Science, the Department requests \$5.4 billion, a 9.1 percent or \$452 million increase more than the fiscal year 2010 current appropriation levels, to support an elevated focus on the advancement of the United States' leadership in fundamental research. ARPA-E is building on established gains since its initial funding in fiscal year 2009 through the ARRA to perform transformational research and create game-changing breakthroughs for eventual market adoption. The fiscal year 2012 budget request includes \$550 million for ARPA-E to sustain investment in new energy technologies.

Energy Innovation Hubs play a key role in solving specific energy challenges by convening and focusing top scientific and engineering talent to focus on those problems. The Hubs bring together multidisciplinary teams of researchers in an effort to speed research and shorten the path from scientific discovery to technological development and commercial deployment of highly promising energy-related technologies. DOE is proposing to double its commitment to this research approach by

requesting three new Hubs to focus on batteries and energy storage, critical materials, and Smart Grid technologies and systems. DOE will continue funding the three Energy Innovation Hubs introduced in fiscal year 2010 to focus on developing fuels that can be produced directly from sunlight, improving energy efficient building systems design, and using modeling and simulation tools to create a virtual model of an operating advanced nuclear reactor. Complementing the Hubs, DOE plans in fiscal year 2012 to continue coordination with the Office of Science's EFRCs, which exemplify the pursuits of broad-based science challenges for energy applications.

Energy Security—Promoting America's Energy Security Through Reliable, Clean, and Affordable Energy

In his State of the Union Address, the President outlined clearly to the American people his roadmap for transforming our Nation's energy economy to meet the demands of future generations. "Instead of subsidizing yesterday's energy, let's invest in tomorrow's", he said. To meet the President's challenge, DOE must recruit the sharpest research minds and build on its aggressive discovery agenda across all programs to achieve breakthroughs on the most-pressing energy challenges facing the United States.

In his address, President Obama laid out a goal for clean-energy sources to account for 80 percent of America's electricity by 2035. In fiscal year 2012, DOE requests funds to help achieve this Presidential objective and address many of the energy delivery challenges facing American families and energy providers.

Applied Research, Development, and Deployment.—Meeting the President's goal of making America the first country to have 1 million electric vehicles on the road by 2015, DOE will research cost-competitive methods to develop electric vehicles, increase the adaptability and capacity of the grid to enable vehicle charging, incentivize communities to invest in electric vehicles and infrastructure and send these vehicles to the Nation's roadways. DOE will also launch competitive manufacturing research for breakthrough technologies in energy efficiency diagnostics and retrofits to help business owners around the country save money on energy costs.

Loan Guarantees.—The Loan Programs Office (LPO) is a vital tool for promoting innovation in the energy sector across a broad portfolio of clean and efficient energy technologies. In fiscal year 2012, DOE is requesting credit subsidies to support approximately \$1 to \$2 billion in loan guarantees for renewable energy deployment and up to \$36 billion in additional authority to loan guarantees for nuclear power projects. DOE will also continue to streamline and prioritize the issuance of loan guarantees to leverage private sector investment in clean-energy and energy efficiency projects that will save and create jobs.

Better Buildings Initiative.—Last year, commercial buildings consumed roughly 20 percent of all energy in the U.S. economy. Improving energy efficiency in our buildings can create jobs, save money, reduce our dependence on oil, and make our air cleaner. The President's Better Buildings Initiative will make commercial buildings 20 percent more energy efficient over the next decade through initiatives that include:

- re-designing the current tax deduction for commercial buildings and upgrades to a credit that is more generous and that will encourage building owners and real estate investment trusts (REITs) to retrofit their properties;
- improving financing opportunities for retrofits through programs including a new Better Buildings Pilot Loan Guarantee Initiative for Universities, Schools and Hospitals, for which DOE requests \$100 million in credit subsidy to guarantee up to \$2 billion in loans for energy efficiency retrofits for these facilities;
- creating a \$100 million Race to Green competitive grant program for State and municipal governments to implement innovative approaches to building codes, performance standards, and regulations so that commercial building efficiency will become the norm in communities across the country; and
- calling on CEOs and university presidents to join DOE and other Federal partners in a Better Buildings Challenge to make their organizations leaders in saving energy.

The Better Buildings Initiative builds on our investments through ARRA and our continued commitment to passing "HOMESTAR" legislation to encourage American families to make energy saving upgrades in their homes.

Electricity Reliability and Energy Management.—Reliable, affordable, efficient, and secure electric power is vital to expanding economic recovery, protecting critical infrastructures, and enabling the transition to renewable energy sources. The fiscal year 2012 request invests \$238 million to bring the next generation of grid modernization technologies closer to deployment and commercialization, to assist States and regional partners in grid modernization efforts, and to facilitate recovery from

energy supply disruptions when they occur. The request includes a new Smart Grid Technology and Systems Hub that will address the total electricity system, covering applied science, technology, economic, and policy issues that affect our ability to modernize the grid. The fiscal year 2012 request also plans an expansion of the Home Energy Score program that provides homeowners with information on how their homes can be more energy efficient and guidance for saving on home energy costs. This is in addition to the President's support for passage of the HOMESTAR rebate program in 2011.

Investing in energy efficiency, renewable energy generation, and grid modernization are fundamental steps necessary for creating a clean-energy economy. We must also invest in the improvement of existing sources of energy that will provide a bridge between current and future technologies. These technologies are already a major segment of the energy mix and will play a critical role in providing a solid foundation that will make possible the creation of a new energy economy.

Leadership in Nuclear Energy.—Nuclear energy currently supplies approximately 20 percent of the Nation's electricity and 70 percent of the Nation's clean, noncarbon electricity. The request for the Office of Nuclear Energy includes \$380 million for R&D, in addition to key investments in supportive infrastructure. In addition, DOE is engaging in cost-shared activities with industry that may help accelerate commercial deployment of SMRs. The request includes funding for cost-shared design certification and licensing activities for SMRs, the deployment of which holds promise for vastly increasing the generation of clean energy on a cost competitive basis. DOE will also promote nuclear power through the Loan Guarantee program, which is requesting up to \$36 billion in additional loan guarantee authority in fiscal year 2012.

Advanced Fossil Energy—Experience in Carbon Capture and Storage.—The world will continue to rely on coal-fired electrical generation to meet energy demand. It is imperative that the United States develop the technology to ensure that base-load electricity generation is as clean and reliable as possible. The Office of Fossil Energy requests \$452.9 million for R&D of advanced coal-fueled power systems and carbon capture and storage technologies. The budget focuses resources within the fossil energy program on activities that can reduce carbon pollution and have potential benefits for both the existing fleet and new power plants—specifically, postcombustion capture R&D and geologic carbon storage R&D.

Ending Tax Subsidies to Fossil Fuel Producers.—In accordance with the President's agreement at the G-20 Summit in Pittsburgh to phase out subsidies for fossil fuels so that we can transition to a 21st century energy economy, the administration proposes to repeal a number of tax preferences available for fossil fuels. Tax subsidies proposed for repeal include, but are not limited to:

- the credit for oil and gas produced from marginal wells;
- the deduction for costs paid or incurred for any tertiary injectant used as part of a tertiary oil recovery method; the ability to claim the domestic manufacturing deduction against income derived from the production of oil and gas and coal; and
- expensing the exploration and development costs for coal.

Improving Energy Information.—Because of the central connection between energy and the U.S. economy, the Nation's leaders, energy markets, producers, manufacturers and consumers need reliable, timely, impartial, and transparent information, and analyses. Such information enhances the debate over energy utilization strategies, the development of alternative energy sources, and investment decisions, and is essential during times of energy "shocks". The EIA requests \$124 million to update its energy data collection and analysis programs to reflect the current industry composition and operation in order to continue to provide a comprehensive picture of energy markets and industry as a whole. The request places a special emphasis on providing better data on energy consumption in homes, commercial buildings, and manufacturing establishments to enable EIA to maintain the high-quality of the information needed to inform decisions by the private sector, by Government policymakers, and by households.

Economic Security—Sharpening America's Competitive Edge Through a Clean-Energy Economy

To meet "our generation's Sputnik moment" and promote economic competitiveness, the United States must demonstrate leadership in clean-energy technologies. "We'll invest in biomedical research, information technology and especially clean-energy technology—an investment that will strengthen our security, protect our planet, and create countless new jobs for our people", said President Obama before the Congress in the State of the Union Address. President Obama outlined his comprehensive vision to lead our Nation's clean-energy economy and provide economic security to Americans. As the administration seeks to reduce Federal Government

spending, DOE recognizes its role and has tightened its expenditures in several areas such as oil and natural gas. The fiscal year 2012 budget request acknowledges DOE's missions to achieve these imperative goals while setting forth a clean-energy economy for entrepreneurs and manufacturers to reclaim their competitive edge in clean-energy innovation.

DOE plans to promote economic security by building on the progress made through the more than \$32 billion in grants and contracts under ARRA, which made historic investments in the Nation's economy and has put the country on target to double renewable energy generation by 2012. ARRA helped create tens of thousands of jobs and, combined with the fiscal year 2012 request, will help DOE accelerate the transition of our Nation to a clean-energy economy.

The President's fiscal year 2012 budget supports the plan to rebuild our economy through clean-energy research and development by:

Expanding ARPA-E To Spur Innovation.—The President's request proposes \$550 million for the ARPA-E program, plus an additional \$100 million for the program from the Wireless Innovation and Infrastructure initiative for a total of \$650 million. ARPA-E performs transformational and cutting-edge energy research with real-world applications in areas ranging from grid technology and power electronics to batteries and energy storage. The budget also supports programs with significant promise to provide reliable, sustainable energy across the country, such as the SunShot initiative aimed at making solar energy cost competitive. With focused investment in manufacturing innovation and industrial technical efficiencies, the President's proposal will move private sector capital off the shelves and into the marketplace.

Targeting Investments for Future Economic Growth.—To secure a competitive advantage in high-tech industries and maintain international leadership in scientific computing, we will invest in core research activities for energy technologies, the development of general biological design principles and new synthetic molecular toolkits to improve understanding of natural systems, and core research activities to advance the frontiers of high-performance computing. Underlying these investments in research is the education and training of thousands of scientists and engineers who contribute to the skilled scientific workforce needed for a 21st century innovation economy.

Doubling the Number of Energy Innovation Hubs To Solve Key Challenges.—Innovation breakthroughs occur when scientists collaborate on focused problems. The fiscal year 2012 budget request proposes three new Energy Innovation Hubs that will bring top American scientists to work in teams on critical energy challenges in areas such as critical materials, batteries and energy storage, and Smart Grid technologies. These will join three existing Hubs that focus on fuel generation from sunlight, building efficiency, and nuclear reactor modeling and simulation.

Integrating Research and Development.—DOE has identified areas where coordinated work by discovery-oriented science and applied energy technology programs hold the greatest promise for progress in achieving our energy goals. The Energy Systems Simulation to increase the efficiency of the Internal Combustion Engine (ICE) will produce a set of modern, validated computer codes that could be used by design engineers to optimize the next generation of cleaner, more efficient combustion engines. An initiative on extreme environments will close the gap between actual and ideal performance of materials in nuclear environments. And DOE's Exascale Computing initiative will allow DOE to take the lead in developing the next generation of scientific tools and to advance scientific discoveries in solving practical problems.

Pursuing the Passage of HOMESTAR.—Enactment of this program will create jobs by providing strong short-term incentives for energy efficiency improvements in residential buildings. The HOMESTAR program has the potential to accelerate our economic recovery by boosting demand for energy efficiency products and installation services. The program will provide rebates of \$1,000 to \$3,000 per household to encourage immediate investment in energy-efficient appliances, building mechanical systems and insulation, and whole-home energy efficiency retrofits. This program will help middle-class families save hundreds of dollars a year in energy costs while improving the comfort and value of their most important investment—their homes. In addition, the program would help reduce our economy's dependence on fossil fuels and support the development of an energy efficiency services sector in our economy.

Extending Access to Tax Credit and Tax Grant Programs.—Two provisions of ARRA have been extraordinarily successful in spurring the deployment of renewable energy projects and building advanced manufacturing capabilities:

—section 48C Advanced Energy Manufacturing Tax Credit program; and

—the section 1603 Energy Cash Assistance program.

The administration is pursuing an additional \$5 billion in support for the section 48C program, which, by providing a 30 percent tax credit for energy manufacturing facilities, will continue to help build a robust high-technology, U.S. manufacturing capacity to supply clean-energy projects with U.S.-made parts and equipment. The section 1603 tax grant program has created tens of thousands of jobs in industries such as wind and solar by providing upfront incentives to thousands of projects. The administration is seeking a 1-year extension of this program.

Promoting Efficient Energy Use in Our Everyday Lives.—Currently, weatherization of more than 300,000 homes of low-income families has been achieved, providing energy cost savings and financial relief to households. The fiscal year 2012 request of \$320 million continues residential weatherization, while increasing the focus on new innovative approaches to residential home weatherization.

National Security—Securing Nuclear and Radiological Materials, Maintaining Nuclear Deterrence, and Advancing Responsible Legacy Cleanup

A pillar of President Obama's national security agenda for the United States is to eliminate the global threat posed by nuclear weapons and prevent weapons-usable nuclear material from falling into the hands of terrorists. As part of this agenda, the administration and the Congress worked tirelessly toward the December 2010 bipartisan ratification of New START with Russia, which cuts the number of strategic nuclear weapons each country can deploy to 1,550. After signing this agreement in April 2010, President Obama said, "In many ways, nuclear weapons represent both the darkest days of the cold war, and the most troubling threats of our time. Today, we've taken another step forward . . . in leaving behind the legacy of the 20th century while building a more secure future for our children. We've turned words into action. We've made progress that is clear and concrete. And we've demonstrated the importance of American leadership—and American partnership—on behalf of our own security, and the world's."

DOE's NNSA, through work with global partners and efforts to secure vulnerable nuclear materials, achieved significant milestones during fiscal year 2010 and fiscal year 2011 to reduce the risk of proliferation and leverage science to maintain our Nation's nuclear deterrence. Additionally, the environmental management program made progress advancing responsible nuclear cleanup from the cold war. DOE's fiscal year 2012 request seeks to build upon these successes and advance the President's nuclear security agenda.

Reduce the Risk of Proliferation

In 2009, President Obama committed the United States to an international effort to secure vulnerable nuclear material worldwide in 4 years. To solidify international support for this effort, and to address the threat of nuclear terrorism, the President convened leaders from 47 countries at the Washington nuclear security summit in April 2010. The summit resulted in a communiqué which stated, "Nuclear terrorism is one of the most challenging threats to international security, and strong nuclear security measures are the most effective means to prevent terrorists, criminals, or other unauthorized actors from acquiring nuclear materials."

The fiscal year 2012 budget for the NNSA Defense Nuclear Nonproliferation program will help advance further work that is needed to meet the goals of President Obama and the nuclear security summit, recognizing the urgency of the threat and making the full commitment to global cooperation on nonproliferation. The budget provides \$2.5 billion in fiscal year 2012, and \$14.2 billion through fiscal year 2016 to detect, secure, and dispose of dangerous nuclear and radiological material worldwide. This request is a decrease of 5 percent, or \$138 million, from the fiscal year 2011 request, which reflects completion of accelerated efforts to secure vulnerable nuclear materials within the President's stated timeframe. The decrease also reflects our decision to await agreement between the United States and Russia on detailed implementation milestones prior to requesting additional U.S. pledged funding to support Russian plutonium disposition. The fiscal year 2012 budget request follows through on securing vulnerable materials and supports efforts to design new technologies in support of treaty monitoring and verification, which will contribute to implementation of New START. The budget also broadens cooperative nonproliferation initiatives with foreign governments and international organizations in support of the President's objective of a world without nuclear weapons. The budget continues the provision of security upgrades at selected sites, both within the United States and in foreign countries, to address outsider and insider threats, and

accelerates the pace of research reactor conversions from use of highly enriched uranium fuel to low-enriched uranium fuel.

Leverage Science To Maintain Nuclear Deterrence

The fiscal year 2012 budget request advances DOE's commitment to the national security interests of the United States through stewardship of a safe, secure and effective nuclear weapons stockpile without the use of underground nuclear testing. The 2010 Nuclear Posture Review Report calls for the United States to reduce nuclear force levels. As the United States begins the reduction required by New START, the science, technology, and engineering capabilities and intellectual capacity within the nuclear security enterprise become more critical to sustaining the U.S. nuclear deterrent. NNSA continues to emphasize these capabilities, including functioning as a national science, technology, and engineering resource to other agencies with national security responsibilities. Through the NNSA, DOE requests \$7.6 billion for the weapons activities appropriation, an 8.9 percent, or \$621 million, increase from the President's fiscal year 2011 request. It also is an 18.9 percent, or \$1.205 billion increase from the fiscal year 2010 enacted appropriation. This increase reflects an investment strategy that provides a strong basis for transitioning to a smaller yet still safe, secure, and effective nuclear stockpile without additional nuclear testing, strengthening the science, technology and engineering base, modernizing the physical infrastructure, and streamlining the enterprise's physical and operational footprint. These investments will further enable the Nuclear Posture Review's comprehensive nuclear defense strategy, based on current and projected global threats that rely less on nuclear weapons, while strengthening the Nation's nuclear deterrent through completing major stockpile system life extensions, stabilizing the science, technology and engineering base, and modernizing the infrastructure.

The Naval Reactors program ensures the safe and reliable operation of reactor plants in nuclear-powered submarines and aircraft carriers, constituting 45 percent of the U.S. Navy's combatants. The fiscal year 2012 request for Naval Reactors of \$1.2 billion, is an increase of \$83.2 million or 7.8 percent more than the fiscal year 2011 request and \$209 million or 18.1 percent above the fiscal year 2010 enacted appropriation. Funding for this program is ramping up for reactor design and development efforts for the Ohio Class replacement submarine (\$121 million), refueling of the Land-Based Prototype (\$99.5 million), and recapitalization of the naval spent nuclear fuel infrastructure for the Spent Fuel Handling Recapitalization program (\$53.8 million) at the Naval Reactors Facility located at the Idaho National Laboratory.

Advance Responsible Environmental Cleanup

The fiscal year 2012 budget includes \$6.13 billion for the Office of Environmental Management (EM), to protect public health and safety by cleaning up hazardous, radioactive legacy waste from the Manhattan Project and the cold war. This funding will allow the program to continue to accelerate cleaning up and closing sites, focusing on activities with the greatest risk reduction. Acceleration of cleaning up sites where funding would have immediate impact was established as the overarching objective of the \$6 billion in ARRA funding. EM will use the remaining \$309 million of ARRA funding during fiscal year 2012 as it completes footprint reduction and near-term completion clean-up activities.

As DOE continues to make progress in completing environmental cleanup, the fiscal year 2012 budget request of \$170 million for the Office of Legacy Management supports DOE's long-term stewardship responsibilities and payment of pensions and benefits for former contractor workers after site closure.

DOE FISCAL YEAR 2012 PROGRAM OFFICE HIGHLIGHTS

Office of Science—Invest in the Building Blocks of American Innovation

DOE's Office of Science (SC) delivers scientific discoveries and major scientific tools to transform our understanding of energy and matter and advance the energy, economic, and national security of the United States. SC is the largest Federal sponsor of basic research in the physical sciences, supporting programs in areas such as physics, chemistry, biology, environmental sciences, applied mathematics, and computational sciences. In fiscal year 2012, DOE requests \$5.4 billion, an increase of 9.1 percent more than the fiscal year 2010 current appropriation, to invest in basic research. The fiscal year 2012 request supports the President's Strategy for American Innovation, and is consistent with the goal of doubling funding at key basic research agencies, including the SC. The fiscal year 2012 SC budget request supports the following objectives from the Strategy, including:

—Unleash a clean-energy revolution;

- Strengthen and broaden American leadership in fundamental research;
- Develop an advanced information technology ecosystem; and
- Educate the next generation with 21st century skills and create a world-class workforce.

In fiscal year 2012, SC continues to support fundamental research for scientific discovery, but today our country needs to move strongly to solve our energy problems. Therefore, the central theme of this year's budget in SC is research in new technologies for a clean-energy future that address competing demands on our environment. These efforts, coordinated with DOE applied technology programs and with input from the scientific community and industry, will emphasize research underpinning advances in noncarbon-emitting energy sources, carbon capture and sequestration, transportation and fuel switching, transmission and energy storage, efficiency, and critical materials for energy applications.

In the area of advancing noncarbon energy sources, the fiscal year 2012 budget request will provide for new investments in the science of interfaces and degradation relevant to solar photovoltaics, basic actinide chemistry research related to advanced nuclear fuel cycles, and research in materials under extreme environments relevant to extreme nuclear technology environments, and genomics-based research on biological design principles and synthetic biology tools to underpin bio-based energy solutions. Carbon capture and sequestration research will focus on novel molecular design for materials and multiscale dynamics of flow and plume migration, respectively. SC will initiate an energy systems simulation research effort focused on predictive modeling of combustion in an evolving fuel environment in support of DOE's efforts in transportation and alternative fuels. Also underpinning transportation and fuel switching, as well as energy storage, the fiscal year 2012 request will support an Energy Innovation Hub for Batteries and Energy Storage. The Fuels from Sunlight Hub, established in fiscal year 2010, as well as the EFRCs and DOE Bioenergy Research Centers also continue. Research in enabling materials sciences will support needs of future electricity transmission systems and novel building materials to improve building efficiencies.

The fiscal year 2012 budget request also provides for foundational science in condensed matter and materials physics, chemistry, biology, climate and environmental sciences, applied mathematics, computational and computer science, high-energy physics, nuclear physics, plasma physics, and fusion energy sciences; and provides for research facilities and capabilities that keep U.S. researchers at the forefront of science. The fiscal year 2012 request supports targeted increases in areas such as computational materials and chemistry by design, nanoelectronics, and advanced scientific applications and integrated application hardware-software co-design for exascale, which position the United States to secure a competitive advantage in high-tech industries and maintain international leadership in scientific computing. Underlying these investments is the education and training of thousands of scientists and engineers who contribute to the skilled scientific workforce needed for the 21st century innovation economy.

The SC supports investigators at about 300 academic institutions and from all of DOE laboratories. More than 26,000 researchers from universities, national laboratories, industry, and international partners are expected to use the SC scientific user facilities in fiscal year 2012.

ARPA-E—Transformational Research and Development

The fiscal year 2012 budget request includes \$550 million for the ARPA-E plus an additional \$100 million for the program from the Wireless Innovation and Infrastructure Initiative for a total of \$650 million. ARPA-E was launched in fiscal year 2009 to sponsor specific high-risk and high-payoff transformational R&D projects that overcome the long-term technological barriers in the development of energy technologies to meet the Nation's energy challenges, but that industry will not support at such an early stage. An essential component of ARPA-E's culture is an overarching focus on accelerating science to market. Beyond simply funding transformational research creating revolutionary technologies, ARPA-E is dedicated to the market adoption of those new technologies that will fuel the economy, create new jobs, reduce energy imports, improve energy efficiency, reduce energy-related emissions, and ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies.

Office of Energy Efficiency and Renewable Energy—Investing in Breakthrough Technology and a Clean-Energy Future

The Office of Energy Efficiency and Renewable Energy (EERE) supports research, development, demonstration, and deployment activities on technologies and practices essential for meeting national security goals by reducing dependence on oil,

meeting environmental goals by minimizing the emissions associated with energy production and use, and stimulating economic growth and job creation by minimizing the cost of energy services. The EERE portfolio emphasizes work areas where the potential impact is largest, where Federal funds are most critical. It balances investments in high-risk research with partnerships with private firms that speed the translation of innovations into practical business opportunities. The diverse set of technologies supported helps ensure that the United States has many options for meeting its energy goals. Program management is designed to identify the best groups in the country to address these challenges and supports work in universities, companies, national laboratories, and consortia.

The fiscal year 2012 budget request of \$3.2 billion, the increase of 44.4 percent more than the fiscal year 2010 current appropriation, is aimed at accelerating innovation and change in the Nation's energy economy. The request includes programs associated with meeting the President's goals of investing in the next generation of clean-energy technologies, vehicles and fuels, and energy efficiency measures that reduce energy use in Federal agencies and the industrial and building sectors.

Clean, Renewable Energy Generation

The fiscal year 2012 budget request continues to work to transform the Nation's energy infrastructure by investing more than \$1,164.9 million in a variety of renewable programs including:

- solar (\$457 million);
- wind (\$126.9 million);
- water (\$38.5 million);
- hydrogen (\$100.5 million);
- biomass (\$340.5 million); and
- geothermal (\$101.5 million).

Research, development, and deployment of these technologies will reduce the production of greenhouse gas emissions and revitalize an economy built on the next generation of domestic production. The request includes the solar SunShot program which will invest in transformative research focusing on achieving radical cost reductions in photovoltaic modules, balance of systems, and power electronics.

Energy Efficiency

DOE implements a number of efforts to increase energy efficiency in homes, transportation, and industry. The fiscal year 2012 budget requests \$1,805.3 million to accelerate deployment of clean, cost-effective, and rapidly deployable energy efficiency measures in order to reduce energy consumption in residential and commercial buildings, and the industrial and Federal sectors. DOE will invest \$470.7 million in the Building Technologies program and \$33 million for the Federal Energy Management program. Federal assistance for State-level programs such as:

- State energy program (\$63.8 million);
- Tribal (\$10 million); and
- weatherization assistance program (\$320 million) will continue to help citizens implement energy efficiency measures, lower energy costs and greenhouse gas emissions, and build a technical workforce.

For industry (\$319.8 million), DOE will provide a balanced portfolio of advanced R&D and pursuit of near-term, low-cost opportunities with the objectives of increasing U.S. competitiveness, enhancing clean-energy manufacturing, and improving energy productivity. There will be a focus on next generation manufacturing processes and materials, activities for clean-energy manufacturing, and refocused efforts for Industrial Technical Assistance to achieve greater results with less funding through more effective leveraging of funding for deployment partnerships. A new Energy Innovation Hub on critical materials will be competed through the Industrial Technologies program. The fiscal year 2012 request also includes \$588 million to accelerate research, development and deployment of advanced vehicle technologies, working in concert with biomass RD&D to reduce the use of petroleum and greenhouse gas emissions.

Better Buildings Initiative for Commercial Energy Savings.—The President's Better Buildings Initiative is focused on achieving a 20 percent improvement in commercial buildings' energy use by 2020. The initiative will include many new components to achieve this goal. The following are supported in DOE's fiscal year 2012 request: launch of the Race to Green competitive grant program for States and municipal governments to encourage higher standards for commercial energy efficiency, which is funded within the Buildings Technologies program; a new pilot loan guarantee program to support energy efficiency retrofits for buildings that serve as community assets; and increased R&D funding for building technologies. The Depart-

ment intends to work with the business and academic communities to make their organizations leaders in saving energy.

Office of Electricity Delivery and Energy Reliability—Enabling a Clean-Energy Economy

The Office of Electricity Delivery and Energy Reliability (OE) is responsible for leading national efforts to modernize the electric grid, enhance the security of energy infrastructure, and facilitate recovery from disruptions to the energy supply. DOE's fiscal year 2012 budget request for OE of \$238 million, a 38 percent increase more than the fiscal year 2010 appropriation, represents a clear and determined effort to accelerate the transformation of one of the Nation's key enablers of a clean-energy economy—the electricity delivery system.

The U.S. electricity delivery system was built on technology that was developed early in the 20th century and designed for the demands and challenges of that era. Today, this aging and often congested system is facing many new and complex challenges that require considerable improvements in the physical and technological components of the system. In order to alleviate the stress on the system from increasing demand for electricity and to enable greater use and integration of renewable and distributed resources, all while maintaining the reliability, security, and affordability of electric power, R&D breakthroughs and new energy management approaches are critical in the areas of transmission and distribution, energy storage, and cyber security.

OE's fiscal year 2012 budget request provides \$193 million for R&D in these critical areas to bring the next generation of grid technologies closer to deployment and commercialization. The increased investment reflects the President's vision and OE's role in competing in a worldwide technological race. As such, with \$20 million in fiscal year 2012, OE will establish a new Energy Innovation Hub, or in the words of President Obama, one of "the Apollo projects of our time". The Smart Grid Technology and Systems Hub will bring together a diverse, multi-disciplinary group to develop an integrated approach to enhancing smart grid technologies and systems. OE will also expand its advanced modeling capabilities to include other system layers in order to provide a more in-depth system understanding. The energy storage program will expand to aggressively support the deployment of grid-scale energy storage technologies with new demonstrations, and the cyber security program will continue to focus on the development and integration of secure control systems.

The budget request continues to support Permitting, Siting, and Analysis (PSA) with \$8 million to develop and improve policies, State laws, and programs that facilitate the development of electric infrastructure needed to bring new clean-energy projects to market, and to provide technical assistance to States and regions. It also supports Infrastructure Security and Energy Restoration (ISER) with \$6.2 million to enhance the reliability and resiliency of critical energy infrastructure and to facilitate recovery from energy supply disruptions.

Office of Environmental Management—Meeting Commitments and Making Progress

The mission of EM is to complete the safe cleanup of the environmental legacy brought about from more than six decades of nuclear weapons development, production, and Government-sponsored nuclear energy research. This clean-up effort is the largest in the world, originally involving 2 million acres at 110 sites in 35 States, dealing with some of the most dangerous materials known to man.

EM continues to pursue its clean-up objectives within the overall framework of achieving the greatest comparative risk reduction benefit and overlaying regulatory compliance commitments and best business practices to maximize cleanup progress. To support this approach, EM has prioritized its clean-up activities:

- Activities to maintain a safe and secure posture in the EM complex;
- Radioactive tank waste stabilization, treatment, and disposal;
- Spent nuclear fuel storage, receipt, and disposition;
- Special nuclear material consolidation, processing, and disposition;
- High-priority groundwater remediation;
- Transuranic and mixed/low-level waste disposition;
- Soil and groundwater remediation; and
- Excess facilities deactivation and decommissioning.

The fiscal year 2012 budget request for \$6.13 billion will fund activities to maintain a safe and secure posture in the EM complex and make progress against program goals and compliance commitments by reducing the greatest risks to the environment and public health, using science and technology to reduce life-cycle costs, and reducing EM's geographic footprint by 90 percent by 2015. EM continues to move forward with the development of the capability for dispositioning tank waste, nuclear materials, and spent (used) nuclear fuel. The budget request includes the

construction and operation of three unique and complex tank waste processing plants to treat approximately 88 million gallons of radioactive tank waste for ultimate disposal. It will also fund the solid waste disposal infrastructure needed to support disposal of transuranic and low-level wastes generated by high-risk activities and the footprint reduction activities.

EM carries out its clean-up activities with the interests of stakeholders in mind. Most importantly, EM will continue to fulfill its responsibilities by conducting clean-up within a “Safety First” culture that integrates environment, safety, and health requirements and controls into all work activities to ensure protection to the workers, public, and the environment, and adheres to sound project and contract management principles. EM is also strengthening its project and planning analyses to better assess existing priorities and identify opportunities to accelerate clean-up work. Working collaboratively with the sites, EM continues to seek aggressive but achievable strategies for accelerating cleanup of discrete sites or segments of work. In addition, functional and cross-site activities such as elimination of specific groundwater contaminants, waste or material processing campaigns, or achievement of interim or final end-states are being evaluated.

After the EM program completes cleanup and closure of sites that no longer have an ongoing DOE mission, postclosure stewardship activities are transferred to the Office of Legacy Management (LM). LM also receives sites remediated by the U.S. Army Corps of Engineers (Formerly Utilized Sites Remedial Action program) and private licensees (Uranium Mill Tailings Radiation Control Act, title II sites). Post closure stewardship includes long-term surveillance and maintenance activities such as groundwater monitoring, disposal cell maintenance, records management, and management of natural resources at sites where active remediation has been completed. At some sites the program includes management and administration of pension and post-retirement benefits for contractor retirees.

LPO—Helping Finance Clean-Energy Deployment

Innovative Technology Loan Guarantee Program.—To encourage the early commercial deployment of new or significantly improved technologies in energy projects, DOE requests up to \$36 billion in loan guarantee authority for nuclear power facilities and \$200 million in appropriated credit subsidy to support an estimated \$1 billion to \$2 billion in loans for renewable energy system and efficient end-use energy technology projects under section 1703 of the Energy Policy Act of 2005. The additional loan guarantee authority for nuclear power projects will promote deployment of new plants and support an increasing role for private sector financing. The additional credit subsidy will allow for investment in the innovative renewable and efficiency technologies that are critical to meeting the administration’s goals for affordable, clean energy, technical leadership, and global competitiveness.

The fiscal year 2012 budget also requests \$38 million to evaluate applications received under the eight solicitations released to date and to ensure efficient and effective management of the Loan Guarantee program. This request is expected to be offset by collections from borrowers authorized under title XVII of the Energy Policy Act of 2005 (Public Law 109–8).

Advanced Technology Vehicle Manufacturing Program.—DOE requests \$6 million to support ongoing loan monitoring activities associated with the program mission of making loans to automobile and automobile part manufacturers for the cost of re-equipping, expanding, or establishing manufacturing facilities in the United States to produce advanced technology vehicles or qualified components, and for associated engineering integration costs.

Better Buildings Pilot Loan Guarantee Initiative for Universities, Schools, and Hospitals.—To spur investment in energy efficiency retrofits for buildings which serve as assets to our communities, DOE requests \$100 million for loan guarantee subsidy costs to support up to \$2 billion in loan authority for universities, schools, and hospitals. This pilot program is one component of the President’s Better Buildings Initiative and would fund cost-effective technologies and measures to assist universities, schools, and hospitals save on energy usage and associated energy costs. DOE also requests \$5 million for administrative expenses to carry out the program. The request is subject to the enactment of legislation authorizing this program.

Office of Nuclear Energy—Investing in Energy Innovation and Technical Leadership

DOE is requesting \$852.5 million for the Office of Nuclear Energy (NE) in fiscal year 2012—a decrease of 0.6 percent from the fiscal year 2010 current appropriation. NE’s funding supports the advancement of nuclear power as a resource capable of meeting the Nation’s energy, environmental, and national security needs by re-

solving technical, cost, safety, proliferation resistance, and security barriers through research, development, and demonstration as appropriate.

Currently, nuclear energy supplies approximately 20 percent of the Nation's electricity and more than 70 percent of clean, noncarbon-producing electricity. More than 100 nuclear power plants are offering reliable and affordable baseload electricity in the United States, and they are doing so without air pollution and greenhouse gas emissions. NE is working to develop innovative and transformative technologies to improve the competitiveness, safety and proliferation resistance of nuclear energy to support its continued use.

The fiscal year 2012 budget supports a balanced set of RD&D activities. This program is built around exploring, through its R&D: technology and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors; improvements in the affordability of new reactors to enable nuclear energy to help meet the administration's energy security and climate change goals; development of sustainable nuclear fuel cycles; and minimization of risks of nuclear proliferation and terrorism.

NE is requesting \$125 million for Reactor Concepts Research, Development and Demonstration. This program seeks to develop new and advanced reactor designs and technologies. NE is also requesting \$67 million for the Light Weight Reactor SMR Licensing Technical Support program, which will support cost-shared design certification and licensing activities for two light water reactor-based designs. SMRs are a technology that DOE believes has the promise to help meet energy security goals. Work will continue on R&D for the Next Generation Nuclear Plant to support demonstration of gas-cooled reactor technology in the United States. The program also supports research on Generation IV and other advanced designs and efforts to extend the life of existing light water reactors.

The fiscal year 2012 request includes \$155 million for Fuel Cycle Research and Development to perform long-term, results-oriented science-based R&D to improve fuel cycle and waste management technologies to enable a safe, secure, and economic fuel cycle. The budget also requests \$97.4 million to support the Nuclear Energy Enabling Technologies program, focused on the development of cross-cutting and transformative technologies relevant to multiple reactor and fuel-cycle concepts. The Crosscutting Technology Development activity will focus on a variety of areas such as reactor materials, creative approaches to further reduce proliferation risks, and establishing advanced modeling and simulation capabilities to complement physical experimentation. The Transformative Nuclear Concepts R&D activity supports, via an open, competitive solicitation process, investigator-initiated projects that relate to any aspect of nuclear energy generation ensuring that good ideas have sufficient outlet for exploration. Modeling and Simulation Energy Innovation Hub, supported within this program, will apply existing modeling and simulation capabilities to create a "virtual" reactor user environment to simulate an operating reactor and is a prime example of the type of crosscutting, transformative activity that will enhance many research areas within NE. NE will also continue its commitments to investing in university research, international cooperation, and the Nation's nuclear research infrastructure—important foundations to support continued technical advancement.

Office of Fossil Energy—Sustaining American Energy Options Through U.S. Ingenuity

The fiscal year 2012 budget request of \$521 million for the Office of Fossil Energy (FE) will help ensure that the United States can continue to rely on clean, affordable energy from traditional domestic fuel resources. The United States has 25 percent of the world's coal reserves, and fossil fuels currently supply more than 80 percent of the Nation's energy.

DOE is committed to developing technologies and providing technology-based options having public benefits including enhanced economic, environmental and energy security impacts. In FER&D, the emphasis, in keeping with Presidential priorities, is in supporting long-term, high-risk initiatives targeted at carbon capture and storage as well as advanced energy systems and on cross-cutting research.

In addition, \$122 million of FE's \$521 million request will be to provide for national energy security through the continued operations of the Strategic Petroleum Reserve (SPR). The budget proposes to sell \$500 million of SPR oil in order to provide operational flexibility in managing the SPR.

NNSA—Leading Global Partners on Nonproliferation by Securing Vulnerable Nuclear Materials; Reaffirming Commitment to Stockpile Modernization

NNSA continues significant efforts to meet administration and secretarial priorities, leveraging science to promote U.S. national security objectives. The fiscal year

2012 President's budget request for NNSA is \$11.8 billion; an increase of 5.1 percent from the President's fiscal year 2011 request. The 5-year fiscal year 2012–2016 President's request for NNSA reflects the President's global nuclear nonproliferation priorities and his commitment to modernize the U.S. nuclear weapons complex and sustain a strong nuclear deterrent, as described in the 2010 Nuclear Posture Review (NPR) Report, for the duration of the New START Treaty and beyond. NNSA's defense and homeland security-related objectives include:

- ensuring that the U.S. nuclear deterrent remains safe, secure, and effective while implementing changes called for by the 2010 NPR and the New START Treaty;
- broadening and strengthening the NNSA's science, technology, and engineering mission to meet national security needs;
- transforming the Nation's cold-war era weapons complex into a 21st century national security enterprise;
- working with global partners to secure all vulnerable nuclear materials around the world and implement the President's nuclear security agenda expressed in the May 2010 National Security Strategy and the Nuclear Posture Review report; and
- providing safe and effective nuclear propulsion for U.S. Navy warships.

The fiscal year 2012 budget request of \$7.6 billion for the weapons activities appropriation provides funding for a wide range of programs. Requested activities include providing direct support for the nuclear weapon stockpile, including stockpile surveillance, annual assessments, life extension programs, and warhead dismantlement. science, technology, and engineering programs are focused on long-term vitality in science and engineering, and on performing R&D to sustain current and future stockpile stewardship capabilities without the need for underground nuclear testing. These programs also provide a base capability to support scientific research needed by other elements of DOE, the Federal Government national security community, and the academic and industrial communities. Infrastructure programs support facilities and operations at Government-owned, contractor-operated sites, including activities to maintain and steward the health of these sites for the long term and construct new facilities that will allow the United States to maintain a credible nuclear deterrent. The unique nuclear security expertise and resources maintained by NNSA are made available through the National Laboratories to other DOE offices, agencies and to the Nation for security and counterterrorism activities.

The weapons activities request is an increase of 8.9 percent more than the President's fiscal year 2011 request. This level is sustained and increased in the later out-years. The multi-year increase is necessary to reflect the President's commitment to maintain the safety, security, and effectiveness of the nuclear deterrent without underground nuclear testing, consistent with the principles of the Report on the Plan for the Nuclear Weapons Stockpile, Nuclear Weapons Complex, and Delivery Platforms (known as the "1251 Report") and the Stockpile Management program as stipulated in sections 1251 and 3113(a)(2) of the National Defense Authorization Act for Fiscal Year 2010. Increases are provided for direct support of the nuclear weapon stockpile, for scientific, technical, and engineering activities related to maintenance assessment and certification capabilities, and for recapitalization of key nuclear facilities. The President's request provides funding necessary to protect the national resource of human capital at the national laboratories through a stockpile stewardship program that exercises and retains these capabilities.

The fiscal year 2012 request for Defense Nuclear Nonproliferation (DNN) is \$2.5 billion; a decrease of 5.1 percent from the President's fiscal year 2011 request. This decrease reflects completion of long-lead procurements for the Mixed Oxide Fuel Fabrication Facility (MOX) and Waste Solidification Building (WSB). It also reflects our decision to await an agreement between the United States and Russia on detailed implementation milestones prior to requesting additional United States-pledged funding to support Russian plutonium disposition. The administration prioritizes U.S. leadership in global nonproliferation initiatives as directed through the National Security Strategy and has advanced this agenda through commitments from global partners during the 2010 nuclear security summit. In addition to the programs funded solely by the NNSA, DNN programs support interagency and international efforts to protect national security by preventing the spread of nuclear weapons and nuclear materials to terrorist organizations and rogue states. These efforts are implemented in part through the International Atomic Energy Agency, the G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction, and the Global Initiative to Combat Nuclear Terrorism.

DNN supports the President's goal to secure vulnerable nuclear materials around the world within 4 years. The Global Threat Reduction Initiative's emphasis in fiscal year 2012 is to convert domestic and international nuclear reactors from weap-

ons-usable highly enriched uranium fuel to low-enriched uranium fuel (LEU); while preserving our capability to produce the critically needed Molybdenum 99 isotope. The fiscal year 2012 President's request for International Nuclear Materials Protection and Cooperation reflects selective new security upgrades to buildings and sites in accordance with the President's goal to secure vulnerable nuclear materials around the world within 4 years, as well as enhancements and sustainability support for previous work. The Fissile Materials Disposition program continues domestic construction of the MO_x Fuel Fabrication Facility scheduled to come online in 2016; and design for the pit disassembly and conversion capability to provide it with plutonium oxide feedstock.

The President's request of \$1.2 billion for Naval Reactors is an increase of 7.8 percent more than the President's fiscal year 2011 request. The program supports the U.S. Navy's nuclear fleet, comprised of all of the Navy's 72 submarines and 11 aircraft carriers, which constitute 45 percent of the Navy's combatants. The United States relies on these ships every day, all over the world, to protect our national interests. The budget provides funding increases for the *Ohio* class replacement submarine to design and develop required submarine reactor plant technologies. R&D is underway now, and funding during this Future Years Nuclear Security program is critical to support the long manufacturing spans for procurement of reactor plant components in 2017, and ship construction in 2019. Resources are also requested in fiscal year 2012 to support design work for the recapitalization of the spent nuclear fuel handling infrastructure and refueling of the Land-based prototype.

The Office of the Administrator appropriation provides for Federal program direction and support for NNSA's headquarters and field installations. The fiscal year 2012 request is \$450.1 million; a 0.4 percent increase more than the President's fiscal year 2011 request. This provides for well-managed, inclusive, responsive, and accountable organization through the strategic management of human capital, enhanced cost-effective utilization of information technology, and integration of budget and performance through transparent financial management practices. The increase reflects additional Federal oversight for construction of the Pit Disassembly and Conversion project, the Uranium Processing Facility, and the Chemistry and Metallurgy Research Replacement Facility.

CONCLUSION

The United States faces a choice today: will we lead in innovation and out-compete the rest of the world or will we fall behind? To lead the world in clean energy, we must act now. We can't afford not to.

Thank you, and now I am pleased to answer any questions you may have.

HYDROGEN TECHNOLOGIES

Senator FEINSTEIN. Thank you very much, Secretary.

I am going to try to get three quick questions in my first round. One is on hydrogen and one is on the SunShot Initiative, and the third on the loan guarantee program.

You have proposed to cut hydrogen by \$100 million in fiscal year 2012. That is a cut of \$70 million from the 2010 level, and you zeroed out all funding for fuel cells in the fossil energy program. We gather your advisory committee was dismayed by that. But I think it is important that you tell us what your current view is on hydrogen technology and whether it can be successful or not.

Secretary CHU. Sure. First, in terms of the fuel cells, we do have a research program in fuel cells for stationary fuel cells. There has been very good progress made in fuel cells and in the longevity in fuel cells and bringing down the costs.

The idea of a hydrogen economy is something that is very helpful, but the fundamental issue is we need a source of hydrogen that will make good economic sense. Right now, our hydrogen comes from reforming natural gas. When you reform natural gas, you create hydrogen and carbon dioxide, so in terms of the carbon benefit, there is none unless you sequester the carbon dioxide.

In order for that to happen, I think we have to develop more sources of natural gas that can allow you to do those things. So, the first priority is to develop sources of hydrogen that will make economic sense, and to sequester the excess carbon dioxide. There is a hydrogen storage issue in automobiles. Right now, we are going to continue the research in the area of high-pressure tanks. And so, there is the storage part, there is the source of hydrogen, which I think is the most fundamental issue. You know, it is a transformation of energy from one form to another. And the fuel cell part is actually going along well. The stationary fuel cells, because of the higher efficiency, are something we can see can be deployed quickly in the next 5 or 10 years. There are a number of commercial companies doing this, and so we will continue in research on developing better fuel cells for stationary sources. And we also are looking at how we can actually develop the source of hydrogen that will actually lead to a hydrogen economy.

So, that is why we are——

Senator FEINSTEIN. Quickly, how realistic is all of that?

Secretary CHU. I think the fundamental thing is the source of hydrogen. Right now it is natural gas, but natural gas will have to be significantly more abundant and less costly. We are going in the right direction, but it will have to be significantly more abundant. Or the gasification of coal, again, with carbon sequestration, but that is a technology issue to make it cost effective. But there has to be—it is turning a hydrocarbon into hydrogen and sequestering the carbon.

SOLAR TECHNOLOGY PRICES/SUBSIDIES

Senator FEINSTEIN. Okay. Now, the second question is on the SunShot Initiative, which seeks to reduce the cost of solar power to roughly \$1 per watt and at that price. The goal is for solar power generation to become cost effective without subsidies with other forms of electricity generation.

I am very pleased to see that the SunShot Initiative will include the photovoltaic manufacturing initiative. As you will recall, several years ago, you told me that photovoltaic was not cost effective, but you expected at that time that it would take 4 to 5 years to become cost effective. So, I would like to know what progress has been made there as well. Do we need to focus resources on the SunShot Initiative on domestic manufacturing?

Secretary CHU. Well, first, the cost of photovoltaic—of solar energy has gone down by a factor, too. It has been decreased by 50 percent in the last 5 or 6 years worldwide. The full cost of 10 megawatt or above—large scale—not rooftop, but large scale. So it has come down by that much.

In this decade, we have talked to business, not only in the United States, but abroad, and every manufacturer says that in their business plan, if the cost does not come down by another factor or two, we cannot produce them to be a factor or two less, then we will probably go out of business. So, they are actually banking on this.

And then taking that as the starting point, we have started to engage in these companies and in ways to say, can we accelerate this? Can we do something with these companies and with research

that can actually accelerate this progress? And so, our ambitious goal is to say, can you reduce the cost by 75 percent instead of 50 percent by the end of this decade? That is a magical price because at that price, in many parts of the United States, then without subsidy, it is competitive with any other form of energy. So, that is a big deal.

When you drop by 50 percent, there are certain areas of peak demand, I think it will be. And so, our goal in most of our energy endeavors is to devise a plan so we can get there without subsidy. You know, I, too, share the belief that you might need to subsidize for a little while, but you do not want to subsidize for 100 years. And is there a technology pathway that can develop these things without subsidies? And so, the SunShot Initiative is really to say this is within reach. And there has been remarkable progress.

In terms of your question about manufacturing, manufacturing innovation is another key part of what we will need to do in order to be competitive with the rest of the world. And it is that manufacturing innovation that began with Henry Ford, that he was willing to invest 5 years of Ford's money in a beginning company to develop an assembly line. They started by making handmade cars, but it transformed the automobile industry.

So, there are things that we are invested in that we are actually quite excited about—new approaches of either thin film or even silicone, a totally new approach to manufacturing sili-composed cells could actually transform the landscape. And so, we are hoping companies research and develop new manufacturing things that will give us a competitive edge in the decades to come. And that is an important part of what we are doing as well.

Senator FEINSTEIN. Thank you very much. My time is up.

Senator Alexander.

Senator ALEXANDER. Madam Chairman, I see the Republican leader is here. I would be glad to defer to him and then go after him.

Senator FEINSTEIN. I was looking on the wrong side for you, Mitch. Sorry.

Senator ALEXANDER. We hope he is there.

Senator FEINSTEIN. I recognize the Republican leader.

Senator MCCONNELL. Thank you very much, Senator Alexander and Chairman Feinstein.

ENRICHED URANIUM TAILS AT PADUCAH

Mr. Secretary, welcome. I am here to focus your attention on the Paducah Gaseous Diffusion Plant, which is, I believe, you know, has been enriching uranium for 60 years. It happens to be the economic engine of far western Kentucky. Many people think of Kentucky as a coal State, which we are, but we are also a nuclear State.

The plant has 1,200 employees and it is in the process of closing down. There are, however, 40,000 cylinders of depleted uranium at Paducah, which are typically referred to in the business as tails. If they were re-enriched, it would be a profitable venture.

These are Government-owned resources, highly valued, stored in a lot which could be sold to create revenue for the Government, and in the meantime, happily enough for western Kentuckians,

keep 1,200 people from collecting unemployment. So, a revenue raiser for the Government and an avoidance of unemployment for 1,200 people, are you familiar with the tails issue at the uranium enrichment plant?

Secretary CHU. Yes, I am.

Senator MCCONNELL. It is my understanding that DOE, at least at the moment, does not have a current plan for re-enriching those tails at Paducah. Is that correct?

Secretary CHU. That is correct.

Senator MCCONNELL. Kentucky's unemployment rate is right at 10 percent. We cannot afford to lose 1 more job, let alone 1,200. If there is the potential for DOE to save these jobs, would you not think that would be worth pursuing?

Secretary CHU. We are certainly very concerned about any job impacts in actions we take, but there are other issues that I would be happy to talk to you about, having to do with another commitment for uranium in another uranium enrichment plant. We cannot release more than 10 percent of the uranium market because the uranium mining industry in the United States could be affected. And so, we are bound to only release 10 percent or less of what is ever on the market. We have commitments in 2011 and 2012 for another uranium enrichment process going on. And so, we have made that commitment, and so we have to try to figure out what to do about the Paducah plant beyond that. But we are certainly very aware and very sympathetic to this plight.

Senator MCCONNELL. Well, let us assume we do not do that. Then the question is, do we have the funds in the 2012 budget to safely and secure idle the plant after it closes and returns to the control of the Government?

Secretary CHU. Well, what we need to do is work with you on trying to figure out a path forward for these jobs. I have to be candid. The gaseous diffusion technology is one which is very energy intensive. And I would rather us invest in more forward-leaning technologies such as improved centrifuges. I do think the United States would like to have an in-house institute for a technology of our—

Senator MCCONNELL. But that is not the issue at Paducah, is it? That is going to happen in Portsmouth.

Secretary CHU. No, it is going to happen in Portsmouth.

Senator MCCONNELL. So, in Paducah, the issue is, will we re-enrich the tails and actually make money for the Government, or if we are not going to do that, will the Government pay for a cleanup, because we have been getting the clean-up funding on an annual basis, but there is apparently no plan in your budget for cleanups after the operation ceased. So, under this scenario, it strikes me the Government loses an opportunity for revenue, we lose 1,200 jobs, and you are not funding the cleanup, which would cost you money, whereas re-enriching the tails would actually gain the Government money. Is that—am I correctly understanding that?

Secretary CHU. Yes and no. I mean, certainly it will be our obligation to clean up if and when Paducah closes down. But that depleted uranium will be there. And, again, to go forward in the most cost effective way, if there is a technology that they can more effectively enrich those tails, we would be more biased to just doing

that. But certainly we have an obligation to clean up that plant, once it is closed down.

Senator McCONNELL. When are we going to see the plan?

Secretary CHU. We will get back to you and your staff on that.

Senator McCONNELL. Well, you know, we have got 1,200 employees sitting there wondering if they are going to be without a job. And I understand it is a tough time for everyone. Unemployment is high in Kentucky. But here you have an opportunity to continue 1,200 people working, actually raise revenue for the Government by re-enriching these tails. And what I think I hear you saying is you have got no plan for either contingency at the moment. Is that correct?

Secretary CHU. Right now, we have to make very, very hard decisions given the budget reality. As Chairman Feinstein said, we do not expect the Congress to give us our proposed budget. We need to work—

Senator McCONNELL. How many of your tough decisions give you an opportunity to actually raise revenue?

Secretary CHU. Well, we are actually raising revenue on, as you mentioned, on the United States Enrichment Corporation (USEC) side for the same reason. And so, it is raising revenue in the most cost-effective way. And we always like to raise revenue. But remember, we are at this limit of 10 percent.

Senator McCONNELL. Well, it is not a very satisfying answer if you are an employee in western Kentucky. I think I correctly heard you that you have no plan to re-enrich the tails, and you have currently not intended to budget, at least according to our figures, by 2014, you are not even going to meet the annual cleanup needs that have been met on an annual basis at the plant, and have no current plan for addressing the shortfall.

Secretary CHU. We can look at the cleanup issue, but, again, you know, the tails are still there. And it is not as though we are either going to move on it next year or the year after.

Senator McCONNELL. No, I understand that. But you start re-enriching them now; you still employ 1,200 people—

Secretary CHU. Right.

Senator McCONNELL [continuing]. And the Government makes money. You leave them sitting there and then you have got the clean-up obligation, which costs you money. I am curious as to why you think this makes sense.

Secretary CHU. Because if we do this enrichment with this old and now it is a very energy-consuming technology that was developed during World War II, and there are better technologies that we would like to use and develop in house, in house meaning in the United States. And so, again, it is a decision with our limited budget.

Senator McCONNELL. So, you would rather make the money later than make the money now.

Secretary CHU. Well, I would go back to—we can enrich it now, but then we cannot make the money because we cannot release it on the market because of already what is being put in place with USEC.

Senator McCONNELL. Well—

Senator FEINSTEIN. Senator—

Senator MCCONNELL. Thank you very much, Madam Chairman.

Senator FEINSTEIN. I have tried to be as liberal as possible.

Senator MCCONNELL. No, I appreciate it very much. Thank you so much.

Senator FEINSTEIN. Thank you very much. Senator Lautenberg, early bird, you are next.

GLOBAL ENERGY RACE

Senator LAUTENBERG. Thank you, Madam Chairman, and thank you, Secretary Chu for the wonderful work you do for our country and for helping us now to try and solve problems that will directly affect how our economy recovers and how we protect ourselves from a lack of energy to fuel our needs.

In 2009, China surpassed the United States in private sector clean-energy investment for the first time. In 2010, China began to pull away, attracting \$54 billion in private investment. Now, they recently announced that its government would begin investing the equivalent of \$75 billion in clean energy annually. Now, will your agency's roughly \$30 billion budget invest enough for us to regain the lead in the global clean-energy race?

Secretary CHU. You are quite right to be concerned about China's investment, but it is not only China. I would add it is Korea and it is the European Union, Germany, and Great Britain. Other countries are also looking at clean-energy development, both on the efficiency side and on the generation side. These are going to be the big business opportunities in the world market going forward in the coming decades. And so, what we need to do is position the United States so that we can be a leader in this. We have been a leader in other technologies. It is, quite frankly, ours to lose because we still have the best research institutions. We have a national lab system that is incomparable. And we need to develop the mechanisms to allow American industry to make the inventions and to manufacture in the United States.

Now, in terms of what you specifically asked, what China and others are doing, they are helping companies with, for example, loans and—or loan guarantees. As you know, we have an oversubscribed loan program. I think Senator Feinstein was—we could not get to that part of it, and it is something that we feel it is a good, highly leveraged way of supporting industry investment and to—because when we see these companies beginning to build manufacturing facilities abroad, this is one of the factors that comes through loud and clear, that they are getting loan guarantees from countries like China. And I think so, looking forward, I would love to work with the Congress. You know, part of our loan guarantee program is dependent upon if ARRA falls through—it is highly leveraged, and it is a guarantee. So, those programs I think would be an important part going forward.

Senator LAUTENBERG. Right, but does that, Secretary Chu, suggest that we are going to fall further behind this—back of these countries with the kind of budget that we are talking about at this moment?

Secretary CHU. Well, I think, you know, that's why the President has chosen to increase the energy budget, when other agencies were going down. And the President said that this is a very—in

order to preserve the future and to win the future, in order to actually go forward, that investments in the science and research and the development of these things is going to be crucial to our economic prosperity going forward. And this is why there were hard decisions made and why the energy budget saw the increase that it did.

ENVIRONMENTAL IMPACT OF FRACKING

Senator LAUTENBERG. Earlier this month, you appointed a panel to study and make recommendations on the practice of fracking. Cornell University recently released a study that says the natural gas extracted using fracking as the technique to produce—can produce much more global warming pollution than coal. And given the administration’s commitment to reduce greenhouse gasses, would your panel consider recommending that the industry capture some of these emissions—can they capture some of these emissions from natural gas?

Secretary CHU. Well, this advisory board, is actually going to be meeting for the first time today and tomorrow. I am aware of that Cornell study. There was, in fact, another paper just published last week in the “Proceedings of the National Academy of Sciences”, which I read very thoroughly. And it does raise some questions that will need to be answered regarding this.

We are very concerned about the environmental impact, but we also see that if you can do this safely and you can extract the gas safely, and not have excess emissions or pollution of water tables, that it is a transition to a clean-energy future, and it is producing energy in the United States. And so, the administration wants to do this in an environmentally responsible way. We need to do it in an environmentally responsible way. There is no question about that. But there are these studies that we are very well aware of, and personally given the charge of the subcommittee, have spent a couple of weekends reading about this stuff, learning about this, and there are some concerns. But we want to get all the perspectives and find out what is really going on.

Senator LAUTENBERG. We will be anxious to get the panel’s report, and hope that we can establish the fact that this does not present other environmental problems—

Secretary CHU. Right.

Senator LAUTENBERG [continuing]. That it worsens the situation rather than improve it.

Thank you very much, Mr. Secretary.

Senator FEINSTEIN. Thank you very much, Senator Lautenberg. Senator Alexander.

ENERGY RESEARCH AND SUBSIDIES

Senator ALEXANDER. Thank you, Madam Chairman.

Mr. Secretary, Governor Haslam recently traveled to visit with you and Senator Cochran and me about environmental cleanup at Oak Ridge, urging a focus on the dangers of the mercury there. And factoring in the large population in the region, I would be remiss if I did not thank you for the meeting and underscore the importance of that.

My questions, though, are along the lines of my comments in the opening statement about energy research. Does it sound about right that the Department has about \$6 billion more or less for energy research?

Secretary CHU. Roughly speaking, yes.

Senator ALEXANDER. Roughly \$6 billion. What should it be? If you were Professor Chu and were not bound by the office of budget, I mean, what should—well, let me put it another way. You talk about hubs; I talk about Manhattan Projects. I think—are we not both talking about accelerating energy research in a focused way?

Secretary CHU. Yes, and, I am here in defense of the President's budget—

Senator ALEXANDER. Right.

Secretary CHU [continuing]. But I would love to see increases. I think, as I said before, that this is research we do with a goal of getting the private sector to pick up this stuff and run with it and to give them, as Chairman Feinstein said, you know, the research center—Argonne National Laboratories, using a light source, a facility actually gave a leading edge and developed a series of patents that allow us to make better batteries.

Senator ALEXANDER. So, if I may interrupt, we are talking about 500-mile batteries and \$1 a watt solar power and a better way to recycle, use nuclear fuel—

Secretary CHU. Right, right.

Senator ALEXANDER [continuing]. And trying to lead the country in that. And even crusty, miserly Republicans often agree that research is an appropriate role of the Federal Government, while we might worry about some other things.

Given the importance of that—I mean, and as we—given the budget problems we have with 40 cents of every \$1 being borrowed and we all know that we are going to have a rough 2, 3, or 4 years trying to make up a budget, should we not be looking hard at such things as long-term subsidies? I think particularly, you know, my colleagues talk about big oil all week, you know. I think we ought to talk about big wind. And I mentioned earlier that we are committed to spending \$26 billion—taxpayers are—over the next 10 years on wind subsidies in a production tax credit that was passed as a temporary measure in 1992.

Now, you have got in your budget money for research on offshore wind. It seems to me that is appropriate. It seems to me that to continue to subsidize over a long term a mature technology is not appropriate—jump starting electric cars, jump starting natural gas, research for offshore wind. All those things might be appropriate, but if we looked at long-term energy subsidies, whether they're big oil or big wind, it looks to me like we could find money to take a fairly modest energy research budget of \$6 billion and make it \$7, \$8, \$9, or \$10 billion, and move us much more rapidly toward a low-cost, clean-energy future rather than a high-cost, clean-energy future. I mean, we have \$1 solar power. That is cheaper. If we have 500-mile batteries, that is cheaper. That uses a lot less gas.

So, why shouldn't we be developing a policy that takes money from these long-term subsidies and putting them into energy research?

Secretary CHU. I would agree with you absolutely that what we need to do in designing any energy research program or any energy development—we are responsible for the entire innovation chain. And what we need to do is design things and have a program going forward where we do not want to start businesses that cannot survive indefinitely without a subsidy. That is just not the way to do things. So, I think we are in total agreement with that, whereas—and you spoke about this—for example, offshore wind has great possibilities. We need to develop that to get it going. And the SunShot, if we see—it is going to be an international race, and it is. And batteries, it is an international race.

Senator ALEXANDER. Right.

Secretary CHU. And, therefore—but it is going to be the research—

Senator ALEXANDER. But the amount of money to do the research is relatively modest. I mean, you asked for—in offshore wind it was \$27 million maybe—

Secretary CHU. Right.

Senator ALEXANDER [continuing]. For small nuclear reactors, \$60 million, ARPA-E is \$100 million and—well, you have asked for \$500 million, but you got—I mean, you got \$180 million.

Secretary CHU. Right.

Senator ALEXANDER. And these big subsidies, whether it is big wind or big oil, you know. It seems like the money could be better spent, and that one of the things we might be able to help do is reduce the long-term subsidies and focus it more on energy research where I think there is probably a consensus about the appropriateness of Federal spending.

Thank you, Madam Chairman.

Senator FEINSTEIN. Thank you, Senator.

Senator Cochran.

NUCLEAR ENERGY AND ENERGY SECURITY

Senator COCHRAN. Madam Chairman, thank you for chairing this hearing.

Welcome, Mr. Secretary. We appreciate your being here to help us understand the administration's proposal for spending in your Department for the next fiscal year.

I am pleased to notice that it is recommended that nuclear energy continue to have a place in the national strategy for energy independence and guarantee supplies of energy for our country. There is an increase in funding for the Office of Nuclear Energy we noticed in the budget request.

I wonder, what do you think the priorities of that office should be in terms of reaching our goals and helping maintain our energy security as a Nation?

Secretary CHU. Sure. I would love to answer that question. Again, the way we are approaching this is we are looking at what industry is going to be doing and then saying what can we do to add value to this? And it is on things like, for example, using high-performance computing, which is in a very sweet spot.

Like what is done at Senator Alexander's laboratory in Oak Ridge. They are the leader of the fastest civilian—fastest. Actually now it is China that is pushing out ahead. But to use high-perform-

ance computing to design next-generation reactors and how to deal with these things so you can skip engineering steps, engineering design things that you can simulate in a much wider space. So, we think that we can do things of that nature.

Senator Alexander spoke about how to develop fuel recycling that makes economical sense and that makes anti-proliferation sense, so that the amount of electricity you generate from the nuclear field could be 10, 20 times more than what we do today. And so, for the same amount, you can do a lot more. I think that is something that is very much part of what we want to do, you know.

So, new recycling technologies, there is a long road home, but we have to continue these new advanced reactor technologies, things of that nature.

STRATEGIC PETROLEUM RESERVE (SPR)

Senator COCHRAN. One decision that has been made by the Department relates to the SPR. In our State of Mississippi, that program is dead in the water, as I understand it. There is a decision that I am advised canceled the expansion of the SPR in our State. And we have submitted requests for information, explanation, what plans do you have for that program, and we have not received a response from DOE. I wish you could go back and see if you do have a response to that question. We would like to know about what your plans for the future are with respect to the SPR. You could ask for that now, if you would like.

Secretary CHU. Well, we will get back to you on the details. But right now, the SPR, we are required to have a 90-day supply in case of a disruption of supply, of which 75 days comes from the SPR and the rest from civilian stock. And right now, the—we are repairing one of our caves, but we are actually at very close to full capacity. And so, but we can get back to you on the details of what we have planned going forward.

But the point is, we are at—we are very close to maximum capacity. We have a cavern or two that needs repair. I do not quite remember whether this was in Mississippi or not, and we have to tend to that.

Senator COCHRAN. Well, we do know that we have been trying to get answers to questions about that for 2 years now, I'm told, and have not gotten a satisfactory response. So, I do not know that there is a response, but I think we are entitled to hear—

Secretary CHU. Sure, you are right.

Senator COCHRAN [continuing]. What your plans are.

Last year after the President recommended cancelling that program, the Congress voted to rescind all the funds that we had worked for to provide the Department about \$70 million for the expansion of the SPR. So, there is a breakdown in communication and about whether you need the money. And if you are not going to use the money, we may help you think up other ways to do it than what you are planning to do with the money.

YUCCA MOUNTAIN/NUCLEAR WASTE

Well, there was a Blue Ribbon Commission chartered last year by President Obama to study nuclear waste disposal options. I wonder if you could give us any information about this program,

whether or not you have a specific plan. We understand the recently cancelled Yucca Mountain program is in limbo, unclear about whether funds are going to be used for that program or not. It gives me the impression that we are having a hard time finding out what the Department is up to in some of these areas. Could you tell us about what your plans are for storage at Yucca Mountain?

Secretary CHU. Sure. First, I believe that there is a first draft of an outline of some of the recommendations from this Blue Ribbon Commission. I think rather than comment here on these draft things that have been put out, I would rather them give an official report. Well, let me comment on one or two of them.

What they have said is that, first, that there—one of the things they said again goes to Senator Alexander's point that while there is no immediate technology that we can use for reprocessing, you know, we still should continue to develop that technology. They have looked at other countries that have found siting for notably Sweden and Finland, where there was a process that seemed to have more acceptance of the local people in those regions of the country. And so, at least in this draft recommendation they are saying we should look at those processes. We have examples of low-level waste where things have gone very successfully, and there has not been opposition. And so, there are a number of other things.

So, we need to go far in this. It is the responsibility of DOE. As you know, we are positive on nuclear power in the future. And whatever occurs is a DOE responsibility to deal with the waste.

Senator COCHRAN. Madam Chairman, my time has expired.

Senator FEINSTEIN. I thank you very much, Senator Cochran.

Senator Johnson.

Senator TIM JOHNSON. Secretary Chu, welcome.

DEEP UNDERGROUND SCIENCE AND ENGINEERING LABORATORY
(DUSEL) AT HOMESTAKE

I am pleased to see DOE is continuing support for DUSEL at Homestake Mine in Lead, South Dakota. I appreciate that your agency included \$15 million for the project in your fiscal year 2012 budget request.

I understand DOE is nearing conclusion of an internal review of the project and am interested in its results. Specifically, could you talk about how DOE is prepared to work with the project team to ensure that your recommendations are known and included in future financial and construction planning?

Secretary CHU. Well, first, I know we are undergoing this review, and I have not specifically spoken with Bill Brinkman about this yet. We are working, though, as you well know—the National Science Foundation (NSF), is having some second thoughts—this is very discouraging to us—about that, especially since they started it.

But in any case, I think we are trying to figure out a path forward on the investments that have been made by South Dakota and DOE and NSF. So, in the interim we continue to get funds to pump the water, continue doing this. But if we lose on the long term this—you know, the support of what was supposed to be

roughly a 50/50 partner, we are trying to understand how we can go forward in a perhaps reduced program or what our options are, especially in whatever funding we will be getting in fiscal year 2012 and going forward.

And so, these, again, are going to be very difficult choices. There are a few requirements that we would like to have done, and we still remain committed. We need to get some of those experiments done. But as I said, I have not seen the report or—and so I will be waiting for that.

Senator TIM JOHNSON. On a related note, as you know, a great deal of activity is already underway at Homestake, and we had previously hoped NSF would be, at this stage, be providing more support for these activities. In lieu of significant NSF construction funding, and in order to preserve the great progress and investment we have already made, what is DOE prepared to do to ensure that no jobs are lost while you evaluate your long-term plans for the project and for high-energy physics in general?

Secretary CHU. Yes. We are very aware of that and trying our best to keep the—there is a very dedicated scientific team that has been assembled on this. And while we try to put this path forward, again for 2011 and 2012, there is going to be continued funding, we do not want to lose and dissipate the scientific teams that have been developed, and just as we do not want the water to come back into the mine.

And, again, I do not know exactly the timing of when or how the Office of Science will bring forward a recommendation to me, you know, and I am sorry. It is disappointing, but that is all I can say about it. And it is an unbiased—completely unbiased point of view, I have to say that my old laboratory was the lead laboratory in this, so I know personally how it is affecting a lot of people. But, you know, not that I am going to play favorites, but it is—I know personally—and I know personally. As you know, I visited the mine in South Dakota, and I know personally all the investments that South Dakota has made in this.

HIGH-PRIORITY EXPERIMENTS

Senator TIM JOHNSON. You referenced high-priority experiments. Could you list a few?

Secretary CHU. Sure. For high-energy physics, we are investing in what we call the high-intensity frontier. We are also investing in the highest-energy machine, CERN, the highest-energy machine there. So, right now because of what happened decades ago for the super connecting collider, the highest-frontier energy machine is turning on the large hadron collider at CERN. And they had a hiccup, but they have recovered well from that hiccup. And so, what we have done is we still want to deal with high-energy physics as a significant part of our program. We still wanted to go forward. And so, the good news is American scientists are actively participating in that machine, and, for the first time, an American scientist is now the lead in one of the major detectors.

But we also want to make investments here in the United States. And so, we have going forward, and with the Fermilab Lab director, Piermaria Oddone, he made and we collectively made a decision that since the large hadron collider is going great guns, we

need to invest in the future, which is the new sources for neutrino beams at Fermilab. So, we have every intention of continuing to invest in Fermilab in those—and, again, as you know, in one of the experiments in the Fermilab investments for the neutrinos is the use of the detector in South Dakota. So, that is why we are especially disappointed in the events that unfolded last year.

Senator TIM JOHNSON. Thank you, Secretary Chu.

Senator FEINSTEIN. Thank you, Senator Johnson.

Senator Landrieu.

Senator LANDRIEU. Thank you, Madam Chair.

MISSISSIPPI RIVER LEVEL

If the subcommittee will just give me 1 minute of latitude before we get into Energy, Madam Chair, I wanted to just call everyone's attention to the fact that the Mississippi River, as we meet here today, is flowing at an extraordinary historic level, and this subcommittee has jurisdiction over water and energy. And I just wanted to put into the record, Madam Chair, these statistics that are startling.

The river is flowing at 172 billion cubic feet per week, 7.2 billion cubic feet every hour. And as one article today described it, it said it is a snarling, powerful beast barging its way south. This subcommittee has jurisdiction, as you know, and has done, I might say, Madam Chair, a remarkable job in the course of the last decade with a lot of help to build this Mississippi River system. But it is going to be up to us to watch to see how it works in the coming days and weeks and be prepared to do what we need to do to make sure that people are protected should this ever happen again. So, I would like to submit that to the record without objection.

Senator FEINSTEIN. So ordered.

I thank you for the comments, and I thank every member of this subcommittee. You know, I come from earthquake country, know what you have gone through constantly, and how hard it has been.

Senator LANDRIEU. And it is not just Louisiana; it is Tennessee and Mississippi. And Senator Cochran full well knows what the people in north Mississippi are experiencing right now and the Senator from Tennessee. But this subcommittee has jurisdiction over that system.

LOAN GUARANTEES FOR ADVANCED TECHNOLOGY AUTOMOBILES

But three questions really quickly. One, Mr. Secretary, you and I have spoken several times about this, a project that is pending before your Department now. The Department's loan programs have supported more than \$30 billion in loans, loan guarantees for about 28 clean energy and enhanced automotive efficiency projects. One of those projects is pending in Louisiana right now. And the reason I bring this to your attention is it is very timely. Our legislature is meeting as we speak. They have reserved basically \$68 million to support this project.

The application has pending before you and your Department for 2 years. Do you have any update for us at all on Next Auto Works, what the timeline looks like, when they might know yes or no, because this application we think is quite strong and quite competitive, it could create more than 1,000 jobs in this part of the coun-

try. But as importantly as that, it can produce vehicles that can achieve 40 miles per gallon, which I know the chair, who has been a leader on CAFE standards, would appreciate. This is new technology for the combustible engine, but a new technology that seems to us to meet the goals of what the President and what you are touting.

Can you give us any update at all about where we would be with this application?

Secretary CHU. Well, I do not think it would be appropriate in a Senate hearing. As you know, in policy, we really—the details of specific loan applications, we have to honor the relationship we have with the applicant.

Senator LANDRIEU. I realize that, but generally—and I realize you cannot give the details. I am not asking. But generally, does this fit with your goals of creating new automobile companies that are pressing forward with new technologies to produce automobiles that can almost double our efficiency? Does that generally meet with the goals of your Department?

Secretary CHU. Well, if you are asking—I think what you are asking is, are we in favor of the advanced technology automobile program that we have and its loan, and the answer is yes. We think it played a very important part in actually helping not only, you know, innovative companies, but also established companies, in developing a new line of automobiles with advanced technology that get better mileage and are at high efficiencies. That means that we can, again, take back a leadership role in automobiles. I mean to be candid, we had this for three-quarters of a century, but it is something, you know, that Europeans and Japanese and the Koreans are now wrestling with. And so, we are in favor of supporting innovative technologies like that.

Senator LANDRIEU. Well, let me ask you because I do not want to lose my time, if you could give to my office some time by the end of the week just an update on this, because I have to tell our legislature something. I mean, they have been holding \$68 million to support this in a public/private partnership, Federal/State partnership. And, you know, we have got budget constraints like everyone.

FRACKING

My second question is, and Senator Lautenberg alluded to this, we have had a breakthrough, as you know, in this country in finding almost 100 years, I understand, of natural gas reserves. This is terrific. People want to go around saying we have no reserves of oil, which is not true. We have not looked for the oil. I think we have a lot more. But we know how much natural gas we have. The industry has surprised itself at what it is finding.

So, my question is on this fracking issue, what is the Department doing and are you being aggressive to find some conclusions? We think, because we have done this for a while in Louisiana, that fracking is safe under certain circumstances. What are you doing to come to some final determination on this so we can take advantage of 100 years of supply of natural gas, which can reduce our greenhouse gases, I understand, by 40 to 50 percent?

Secretary CHU. Well—

Senator LANDRIEU. If you could do it in 30 seconds or less.

Secretary CHU. Thirty seconds or less. First, we have to establish what is really going on, and it could be different in different regions of the country. And so, that is why the President asked DOE to form this subcommittee. And so, we need to find out what is going on.

Senator LANDRIEU. When do you expect some results or some conclusions from that?

Secretary CHU. We are tasked that 90 days after the first, which is starting today, 90 days from now we will have a preliminary set of recommendations. And that committee—that subcommittee then goes—in that 90 days goes before the full advisory—

Senator LANDRIEU. Madam Chair, let me just say I think that is a very important component of our work in this next year because natural gas is, you know, a 40 percent reduction in greenhouse gases. We have a 100-year supply. The technology, I believe, is there. I think we are going to find that there is a safe path forward. So, if we could just take a focus on that. And then my time has run out, but I am going to submit a question in writing about exporting natural gas and the pending application you have for southwest Louisiana.

Secretary CHU. All right. Thank you.

Senator FEINSTEIN. Thank you very much, Senator.

Senator COLLINS.

Senator COLLINS. Thank you.

Madam Chairman, Senator Graham had to leave and asked that he be afforded the opportunity to submit questions for the record.

Senator FEINSTEIN. Absolutely.

Senator COLLINS. Thank you.

DEEPWATER OFFSHORE WIND TECHNOLOGIES

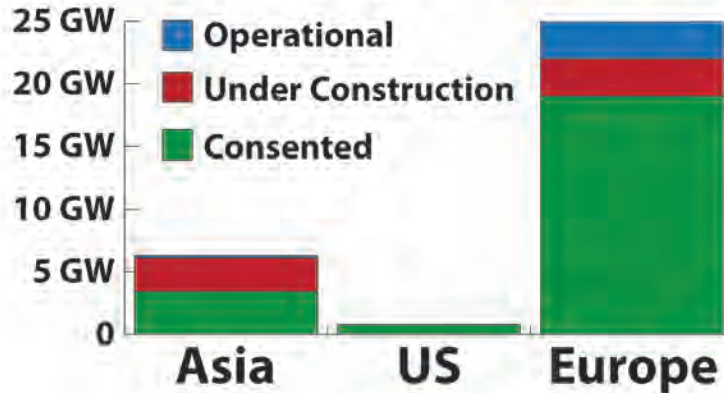
Secretary Chu, it is great to see you again. Let me begin by thanking you for visiting the University of Maine last June to see the very exciting research and development technology that is under way in the area of deep water offshore wind. I would say to my friend and colleague from Tennessee that deep water wind does not face the same challenges as land-based wind, because it can be located out of sight. And the winds are much stronger and more persistent offshore, so you have more energy produced. But there is the need for investment into the technologies, so that the challenges of siting wind turbines in deep water offshore can be met. And I am very excited about the work that is going on at the University of Maine.

To bring the Secretary up to date, a key milestone was reached just this month in which three scale models of floating turbines were successfully tested. And that is providing key data to advance the technology.

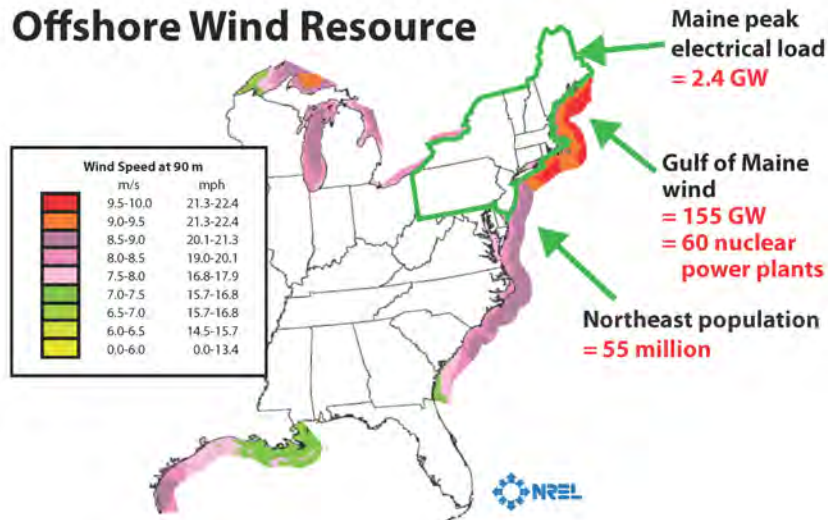
But one of my concerns is that our country should not lose the global race in developing deep water offshore wind technology. And if you look at this chart, and I believe the Secretary has it as well, we are losing the race right now. Consented means permitted, for those who are not into the lingo here. But as you can see, Europe is making considerable investments in deep water offshore wind, Asia is as well, while the United States really lags. And yet, this

offers the potential of providing clean domestic energy to large population centers in close proximity to wind resources.

Offshore Wind Activity Worldwide by May 2011



Offshore Wind Resource



I am pleased to see the investment that the DOE is making. And just for the record, to make sure that I understand the Department that you have submitted, it is my understanding that you just delivered the operating plan for the remainder of 2011 to the Appropriations Committee this week. And it includes funding under the category of Advanced Technology Demonstration Project-Wind Energy. And just to clarify, it is the intention of the Department to do a competitive solicitation for deep water wind energy using some portion or all of that funding?

Secretary CHU. If it is deep water, the answer is yes.

Senator COLLINS. And that is the answer I was hoping to hear, so I am pleased that that is the case.

Senator Alexander made a very important point, that we have these technologies that are not going to be able to move forward unless we have a partnership with the Federal Government, with State government, and with the private sector. And I believe that that investment of \$26.3 million will help jump start the investment.

I would note that the State of Maine has passed a bond issue and is providing millions of dollars for this as well. And we have also put together a consortium of private companies in Maine that are investing. And we are working with a company that is partially owned by the Netherlands that also is investing in this technology. But it really is very exciting.

Can you give me some idea of what the time table for putting out the solicitation for that \$26 million is?

Secretary CHU. I would need to get back to you on the details of it, but we hope it is soon. Again—see? This is really good. You are on a roll—in a couple of weeks.

Senator COLLINS. That is also great news because I think it is important that we move forward.

Secretary CHU. I think the best news is Senator Alexander actually said a kind word for wind.

Senator COLLINS. Believe me; that made my day. I sent him a little note.

Secretary CHU. Because I read his book.

Senator COLLINS. I mentioned that there is a consortium in Maine; it is called the Deep Sea Wind Consortium, which is led by the University of Maine. But it is a broad-base collaborative effort that involves 35 partners, including the State of Maine, academic institutions, nonprofits, utilities, and industry leaders. And what we have found is that kind of collaborative interdisciplinary approach is absolutely essential when you are trying to spur innovation further.

When there are a lot of Federal agencies that are involved in the effort to jump start offshore wind, and I am hoping that we can see a similar collaboration among the Federal agencies and departments that are involved so that we can avoid duplication and maximize efficiency, and stretch those resources.

Could you share with us how DOE is working, particularly with the Department of the Interior, which has some permitting responsibilities, but there are other Federal partners as well, like NSF, the Fish and Wildlife Services.

Secretary CHU. Yes. I think because these are, you know, largely going to be in Federal waters that is the Department of the Interior's jurisdiction, that they are very supportive of this. But, of course, you know, you have to go through the necessary requirements because of exactly what you said there, you know. There could be environmental concerns, and you have to make sure that you examine them in a thoughtful about them.

But I think there is a general acknowledgment. If you can get the technology to work and that is an if and so is the research. The opportunity for offshore wind and deep water wind is there. It is closer to population centers. It is steadier, and the siting problems

are not as great as long as, you know, environmentally we make sure that that is okay. So, the opportunity is great, but it is one of reliability and technology.

And again—and so that is why we chose to shift the research. We think onshore wind is a mature technology. And so, to focus on the more innovative aspects and that is why we repositioned the program.

Senator COLLINS. Thank you, thank you for your efforts, and thank you, Madam Chairman.

Senator FEINSTEIN. Thank you very much, Senator Collins.

Senator COLLINS. Thank you, Senator Alexander.

Senator FEINSTEIN. Senator Murkowski.

Senator MURKOWSKI. Thank you, Madam Chairman. And Secretary, welcome. Good to see you as always.

I have a whole laundry list of questions, and many of them are questions that were asked of you at the hearing before the Energy Committee back in February—February 16. And I did not have an opportunity to ask all of the questions, and so we submitted them for the record to be received in writing. We have not yet—

Secretary CHU. Really?

Senator MURKOWSKI [continuing]. Received those responses, so I wanted to alert you to that because some of the questions I am going to ask you now are hopefully ones that you have already asked and they are in the mail. But if I can just let you know that we are still awaiting some of those.

Secretary CHU. I apologize for that. We were trying to get our system to be more responsive and quicker, but I will look into that.

Senator MURKOWSKI. Well, we will look forward to receiving them.

GEOHERMAL FUNDING

I wanted to ask you just a little bit about the budgets increase for geothermal. Your budget calls for an increase in funding. It is actually a tripling in funding from \$101 million—to \$101 million from existing \$43 million. Kind of pleasantly surprised me because I am a big advocate of geothermal and what we can do with that resource.

But the question to you this morning or this afternoon is whether or not the Department will be able to spend this out in a timely way. We have, and you have been updated on this, but we have been dealing with a project in NecNec, Alaska, an enhanced geothermal project that we feel has great prospect, great hope, and we are really encouraged about it. It is exactly what the Department has supported in the past. But the sponsors have had just a nightmare of issues in dealing with your Golden Field Office.

Now, some of the issues have come about because of things that the sponsor was involved with. But if you are able to secure money in the budget for the geothermal component, what assurances can you give us that the Department is able to get these dollars out into the field in a timely manner so that we can move these technologies?

Secretary CHU. I think it was remarked already before, we use—we have an existence proof that within DOE and within the Federal Government, you can create a funding organization that is

nimble, that is thorough, that has the high standards of review processes, and that is RP. And we are now focusing very quietly on getting that way of doing business out to the rest of DOE. There are pockets where it is very good, and there are pockets where it is less good. And so, we are very committed in order to get these processes moving in a much more efficient way. And, quite frankly, it would improve the way we do things.

And so, I will look into this because what we are finding is sometimes we have a field office that is almost in competition with central headquarters, and then all of a sudden, the Freedom of Information Act, they start to debate what is going on.

Senator MURKOWSKI. Well, I am glad that you recognize that because that seems to be the sense that we have as we are working with constituents on this. So, if you can look into that. But again, from the bigger perspective, we want to make sure that if these dollars are directed this way that actually they are being translated out into the field.

YUCCA MOUNTAIN

Let me ask you about nuclear and section 302 of the Nuclear Waste Policy Act that requires the establishment of the Nuclear Waste Fund, collecting fees from the utilities, and contained within that—the act, it expressly identifies Yucca Mountain as the sole permanent repository. And it further directs you as the Secretary to propose an adjustment to the fee that is collected from the utilities if the amount collected is insufficient or in excess of the amount that is needed to meet the costs of construction.

So, given where we are with the attempted withdrawal of the Yucca Mountain license application, do you believe that the fees that are collected and deposited within the fund are in excess of the amount that is needed? Do you think an adjustment of the fee is in order? Where do we go with the collection of fees given the status right now in Yucca?

Secretary CHU. Well, you are right. The status of Yucca is yet to be determined. It is in the Nuclear Regulatory Commission (NRC) and also in the courts. But regarding the fee, we still have a responsibility to deal with their spent fuel.

And again, a draft recommendation from the Blue Ribbon Commission is we do see a need for—they have suggested—again, it is just a draft, but they have suggested both interim storage sites and also—but eventually as—again, it is going to be dependent on the technology going forward at interim storage sites, but there will be an eventual time if we develop the technologies—recycling—that after that there would need to be a permanent waste disposal site, and most likely underground.

Senator MURKOWSKI. Understanding all that, but insofar as what is happening right now with the collection of the fees—

Secretary CHU. Right.

Senator MURKOWSKI [continuing]. Is the Department, are you as the Secretary, looking at whether or not an adjustment might be appropriate, given the fact that you have this withdrawal that is pending?

Secretary CHU. Right. We have looked at it, and I think your question, if I would rephrase it is, okay, right now it is in limbo.

That does not mean that going into the future we have this responsibility. We do have this responsibility.

Senator MURKOWSKI. We do, yes.

Secretary CHU. And because of that, if we—I think it would be unwise to say, okay, for the next 5 or 10 years no fee until we have a plan going forward, have a slow steady—but we will need to—but it is, you know, it is a virtual bank, if you will, as you well know.

Senator MURKOWSKI. Well, and I think the frustration has been that, well, if there is a plan in place, I can understand why I should be depositing fees. But if there is no plan, you are just asking for a collection of fees that seemingly is not going to go anywhere. I understand and I think you and I both agree we have to deal with the repository issue. But I think you can also understand some of the frustration that the utilities have out there.

I am over my time. I thank you, Mr. Secretary. Thank you, Madam Chairman.

Senator FEINSTEIN. Thank you very much, Senator Murkowski. Senator Murray.

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM) BUDGET AND
NUCLEAR CLEANUP

Senator MURRAY. Thank you very much, Madam Chairman. Secretary Chu, welcome to the subcommittee, and I am sure that you and everyone else in this room today knows what I am going to ask you about, obviously Hanford Nuclear Reservation in my home State of Washington.

As you well know, Hanford is the largest Federal nuclear clean-up site in the country, and it is part of the larger complex that is run by the Department's Environmental Management program.

When you go back through DOE's lineage, the Department actually was created to manage nuclear activities, and the Federal Government has a fundamental and legal responsibility to clean up the contamination that has been left behind by our Nation's nuclear weapons production activities.

So, I am concerned that that this administration does not seem to take these legal obligations seriously because I look at the budgets and see that you continue to increase programs that do not have any legal obligations associated with them, but EM remains largely flat. And I do not think I am the only one of my colleagues on the subcommittee that is concerned about that.

So, I wanted to ask you today, what is your plan to increase the EM budget to meet our legal commitments on cleanup?

Secretary CHU. Well, first, because of ARRA, and as you well know, with your help and others the clean-up program received an additional \$6 billion in ARRA. Thanks to this additional funding, we feel that we can meet our legal commitments in 2011–2012, not only in your State, but in Tennessee, in South Carolina, and in other States.

Beyond 2011–2012, we will need to look at our budget requirements. With our current budget request we feel comfortable through 2012. What is going to happen to our 2012 budget, which is what this hearing is about, is a real question. And, you know, we put in a request in 2011, and in 2011 we did not get the full

amount of that request in the continuing resolution. And so, we have to make adjustments.

I think all the States that have nuclear waste concerns, are very concerned about this as well. I think you were not here, but Senator Alexander said that Tennessee has nuclear concerns. They have a higher density of population. There are not only nuclear concerns there are also mercury waste concerns there as well.

So, what we need to do is try to make the best technical assessment of the things that have the highest risk and remediate the risk in the most efficient way possible. That is where we are.

EM has done a very good job in a number of projects that are ahead of time and ahead of budget. However the waste treatment plant is at risk for going over budget, so we have diverted additional funds to the waste treatment plant so that we can—

Senator MURRAY. Well, let me get into that for just a minute—in just a minute. But overall, the only legal obligations that your Department has are for nuclear weapons cleanup and waste storage. And it is disappointing that we have to fight the administration year after year after year to meet those legal obligations. I am sorry I missed your testimony; I had another obligation. But I did read it and it highlights significant increases in a lot of other program offices, including those without any legal obligations. And so, it is troubling to see the EM budget, which is the legal obligation, continue to struggle, and the Department is asking for funds for other programs. So, I will ask you about some specifics.

I appreciate the work that the Department has done on the waste treatment plant and its use of independent reviews, like the construction project reviews. However, I have to tell you I am concerned about the singular focus on the waste treatment plant. I have been very clear with you and everyone in the Department and in the administration that if the administration intends to move forward with the proposed modified funding profile for the waste treatment plant, the only successful way to achieve that is for the administration to increase funding for the entire EM program to make sure that we meet the legal obligations across the complex. And to be very frank with you, I just do not see that happening in you keeping up your side of the obligation.

The waste treatment plant is a priority, but we cannot increase funding for that and decrease funding for other legal obligations to meet that proposed funding level. So, that is my question to you, is how are we going to meet all of those legal obligations? The only way to do it is to increase the entire EM budget.

Secretary CHU. Well, yes. As I said, because of ARRA investments, we will be meeting our legal obligations in the coming couple of years. After that, there is a concern and I will be honest with you there. But also, the President put in a large increase in the Energy budget in part because of the nuclear security issues, but also in large part because we think that the investments in the R&D and some deployment activities will position the United States for future prosperity. Yes, we do not have legal obligations there, but I think we have to make these calls as to what would be in the—with whatever funds the Congress gives us, what would be the best—

Senator MURRAY. But I do not see how you can say, well, we cannot meet our legal obligations, but we are going to increase funding elsewhere in DOE.

Secretary CHU. Well, as I said, because of ARRA and the \$6 billion—

Senator MURRAY. Well, and we are talking about fiscal year 2012 and beyond.

Secretary CHU. No, fiscal year 2012, I think we will be meeting our legal obligations. And then after that, it again depends on what the budgets are going to be. The legal obligations of our waste legacy, our cold war legacy, is something which is, quite frankly, the third-largest Government liability. This could be hundreds of billions of dollars. And we need to develop a plan going forward, not just for me, but my successors, on how do you meet these liabilities. And, again, this again goes back to how to best spend that money. And so, in order to meet these obligations in the limited budget scenario, there are ways that we can do our business better in EM.

Senator MURRAY. Mr. Secretary, it has to start with the request from DOE stating this is our priority, we have to meet our legal obligation, and this is what I expect your Department to do, and that is why I am disappointed.

But I have to say that it is a legal obligation. It is a moral obligation. It is a real obligation. We have waste at our nuclear facilities that is leaking toward the Columbia River, and we expect your Department to let the Congress know what the obligation is and how we meet it within your budget. And that is what I am requesting.

Secretary CHU. All right.

Senator FEINSTEIN. Thank you very much, Senator Murray. And I am going to begin a second round, and you might just want to stay for this first question.

SPENT NUCLEAR FUEL STORAGE

I have become very interested in the nuclear fuel cycle, particularly following Daiichi. We have 104 nuclear power plants in this country; California has 2. To my understanding, we have around two dozen plants that are of the same model as the boiling water reactors at Daiichi. Now, when others have said, we have better technology, Daiichi comes back and says, well, we upgraded ours to meet that as well.

In looking at the two nuclear power plants in California, and particularly the spent fuel part of it, which is what Senator Murray is really referring to in a sense, the fact that these spent-fuel pools are really, to some extent, fallible. They are restacked. They can have large numbers of rods in them. In our State, they are kept there for as long as 24 years. The ranking member and I had the head of the NRC, Mr. Jaczko, before us, and he said, well, this is good for 100 years. Candidly, I do not know how anybody knows that this stuff is good for 100 years.

What I also saw were the dry casts and the transference of the rods into the casts. When I asked questions, I was told, well, these casts were specially built for transfer to some form of repository.

I have really come to my own conclusion that the way we best protect Americans is by having some regional facilities where the

storage of nuclear waste can be done over the hundreds of years, supervised by the Government. Otherwise, who knows what Mother Nature will bring down? I mean, I never remember funnel clouds in the Pacific. I never remember the level of hurricanes that we have had. Now, last night, the television said a tornado may be on the ground in a part of Virginia, so who knows what might happen?

I am very concerned that we really need to pay attention to spent fuel and what happens to it. I have caught you unaware, I am sure. But if you have any comments on this subject, I certainly would appreciate hearing them.

Secretary CHU. Well, okay, I think regarding the spent fuels, certainly the accident at Fukushima Daiichi is something that we are paying and the NRC especially is paying a lot of attention on. Again, it is in NRC's jurisdiction, but there is—it is certainly true that when you have a pool of spent fuel with water that it is a higher risk than dry cast storage where you have just natural air circulation. You do not have to worry about something that could breach the pool and things of that nature. It is just very passive, and it is more robust.

And so, certainly I will transition to that so-called dry cast storage is something that I anticipate will be happening. That is, I think, one of the recommendations—the preliminary draft recommendations of the Blue Ribbon Commission, you know. I do not want to second guess what the NRC is going to—going to be doing about this, but certainly it is something that they are saying, yes, that there will be a number of interim—interim being these dry cast facilities in the United States, and I believe that is one of their recommendations, at least in draft.

Senator FEINSTEIN. Good. Good. I was very impressed with the testimony of a Dr. Moniz, M-o-n-i-z, from MIT—on the subject.

LOAN GUARANTEE PROGRAM/CREDIT SUBSIDIES

Let me go to one of my favorite issues, your renewable loan guarantee program. I believe you have just \$200 million in the budget for that and that you have sent letters to 50 renewable energy developers who had applied for loan guarantees saying their applications were on hold because DOE believed these would have difficulty making the September 30 construction start requirement.

I do not know how we developed wind and solar power without a very aggressive loan guarantee program. Really, I thought we had it, and putting these projects on hold with so little in your budget really concerns me because I do not know anybody that can do it without a loan guarantee.

Secretary CHU. So, the reason we looked at this has to do with the fact that if you did not have it at a certain time—a conditional loan that goes through the approval process, that you have conditions that would have to be met, and then you would actually have to start on the project before September 30.

And so, we looked at the portfolio of our projects. We could, with these conditional loans, see that we could use the remaining funds. But we did not think it would be fair to those companies to continue investing in this knowing that as we approach this September 30 deadline where they still would have to do other

things—they would have to secure the 20 percent funding, there would be other conditions, and each loan was different. So, we felt that it would not be fair to say, so it is put on hold until there is a path going forward and whether it is going to be continued funding.

We have asked for continued funding. I know that Senators Bingaman and Murkowski are looking at other mechanisms for financing these things. And I am supportive of a capital loan program and want to work with the Congress on that.

Senator FEINSTEIN. Well, thank you very much. We will see what we might be able to do, and we will certainly consult you.

So, I have to excuse myself. Senator, I am going to speak on the floor for the nominee that the vote is pending on at 4:30 p.m., so may I turn it over to you, and you can go full bore.

Senator ALEXANDER. I will go for it.

Senator FEINSTEIN. Thank you.

Senator ALEXANDER [presiding]. I will just have a couple of questions. I was going to follow up on Senator Feinstein's about the loan guarantees. Since nuclear power produces 70 percent of our carbon-free electricity, and renewable—and other renewables produce a few percent, why should nuclear power have to pay for its loan guarantee subsidy and wind and solar not be?

Secretary CHU. Well, because there was a—somewhat before my time, but the reasoning was that nuclear power is a more mature technology. Also fossil fuel has to also, in the 1703 program, have to pay for their credit subsidies, and that the nuclear loans actually should get lower credit subsidy scores. I mean, the first one, the one we did do with Southern and others had a, you know, a pretty modest grade subsidy. And so, but it was felt that because it was a more mature technology.

Now, you know, things have changed, and so—

Senator ALEXANDER. Well, did you just testify that wind was a mature technology?

Secretary CHU. Wind is a mature technology, and if we are going to fund—well, it is a mature technology in the sense that if we are going to fund and research and develop it, we would rather fund research and development it in offshore wind and, particularly, deep offshore wind.

Senator ALEXANDER. Well, I am all for offshore wind research and development, but I am just wondering if wind is a mature technology and it produces a puny amount of intermittent power, why you give it, in addition to paying for its loan guarantees, why you pay for its loan guarantees and not pay for nuclear power's loan guarantees.

Secretary CHU. Again, well, first, you know, we are—

Senator ALEXANDER. It is not as if we are building a lot of nuclear plants right now. I mean—

Secretary CHU. Right. So, we have put in a request for research in nuclear energy, which I am very pro for. And so, I think that to be—but regarding the loans, for example, again, if you look at the companies that before had been putting forward loan applications, they have the assets and things that one could actually say that they—and there is not as much of a structure for the deployment of wind. And as that goes forward, I think, you know, we—

Senator ALEXANDER. Well, Mr. Secretary, there is a 2.1 cent subsidy for all—

Secretary CHU. Right, right.

Senator ALEXANDER [continuing]. The wind power produced in the country, which is costing taxpayers \$26-plus-billion just over the next 10 years. And you do not have anything like that for nuclear power.

Secretary CHU. Yes and no. I mean, I think there is no production tax credit, for example.

Senator ALEXANDER. Right.

Secretary CHU. I agree with that completely. But, you know, the people who are against nuclear feel that there are other things that the U.S. Government does for nuclear. And so, gosh, I thought you were pro wind.

SMALL MODULAR REACTORS (SMR)

Senator ALEXANDER. I am pro research, including offshore—the offshore wind. Let me ask you one last question, and then we will conclude. You have a request in your budget for research for the small modular—

Secretary CHU. Right.

Senator ALEXANDER [continuing]. Reactor, which I know you—is a priority of yours. My question—and it is of mine, and it is of many, many people. It looks like it could be an opportunity for the United States, given our experience with small reactors with the Navy that these could be reactors that we could build here, sell here, lead the world in building, and they would be cheaper. And so, there is a nice scenario ahead of us for SMRs perhaps.

So, my question is, is the amount of money that you have requested for this year, what will that permit you to do, and, two, are you set up—are you organized to learn anything from the United States Navy and its experience since the 1950s with small reactors?

Secretary CHU. Okay. So we preliminarily requested a large fraction of that would be to help firms complete their engineering designs for NRC approval so they can go forward. There is another fraction of, a smaller part, that would be for essentially research and development that could complement what is being done in the history books.

We feel that if there are things that—you know, if industry can invest in the research and do it, you know, we would like them to do it, but if there are other things—

Senator ALEXANDER. Well, part of your money, if I understand it, goes to pay for things that the NRC would normally pay for. I mean, you are helping them pay for some of their work, is that right or wrong?

Secretary CHU. No. It is actually to help the companies complete engineering design that NRC would require of them.

Senator ALEXANDER. Okay.

Secretary CHU. Okay. So, it is really to help the companies complete engineering, just as we help with the AP1000 engineering design. Now, we do have a lot of experience. The companies, like BMW and others, that have participated in the nuclear—Navy—

certainly have experience in there, certainly one of the companies that want to go forward and try to get licensing from the NRC.

It is a very different type of reactor. The Navy reactors are highly enriched uranium reactors. The newest generation will be designed so that they last the whole life of the summer in 40 years, a very high-performance reactor. As Admiral Donald said, when I first time boarded it at DOE, I asked him, you know, can we use your experience with nuclear reactors in the Navy, and particularly the summer E-fleet, because this is an SMR in the civilian fleet. And he kind of looked at me and said, you cannot afford my reactors. They are very high-performance reactors.

But there are things that do leak over, and some of the companies that build the Navy reactors are—want to go forward with the licensing. The most critical thing, again, is we are looking at what can we add value to to help industry move along in a path that we think is important. But as I think we both agree, that SMRs are a totally different model for how to drive up safety, drive up the effectiveness and drive down the costs and to recapture the nuclear lead. And so, that is why I have been out in front and pushing SMRs. I think it is an opportunity—very different because the economy of scale of building a very large one—you know, 1,000 to a 1,500 megawatt reactor, because of all of the fixed costs of siting and licensing and everything else.

Now, you build an assembly line plant that you can ship not only anywhere in the United States, but anywhere in the world. And you can—and then you can right size the generation to the transmission infrastructure at that site. So, it is a very different model, but it means that you have to be able to essentially mass produce these reactors with that economy of number.

You know, it is not proven that we can do this, but we think that there is an opportunity there, and we were also trying to engage with industry and the right economic models to do this so that—the utility companies—and it also, it is bite sized. If you have to spend \$8 billion they think very hard about that because you are spending a large fraction of the company assets on this next project. If it were delayed a year or two, that would have financial consequences. When it is a factory-generated thing, a lot of those things go away, because you can stamp them out. And so, the uncertainties and delays in schedules, there is another real opportunity. It takes away a lot of the uncertainty people might have about the industry.

NUCLEAR FUEL RODS AND DRY CAST STORAGE

Senator ALEXANDER. Senator Feinstein mentioned before she left that the Chairman of the NRC has said that in their judgment, used nuclear fuel rods could be stored safely for up to 100 years. Do you have any reason to disagree with that?

Secretary CHU. I think the fuel rods and dry cast storage is a determination the NRC has, and what I know about it, that appears to be correct. Different than spent fuels and wet storage because of things we saw in Fukushima. I do not think the NRC said that spent-fuel pools were, you know—you want to go to dry cast storage.

Senator ALEXANDER. No, I think he did.

Secretary CHU. Oh, he really did?

Senator ALEXANDER. Yes. I mean, well, there is nothing inherently—I mean, the problem is, as long as you have electricity and water, your spent-fuel pool should be perfectly safe, should they not?

Secretary CHU. Well, I do not want to contradict Chairman Jaczko.

Senator ALEXANDER. Well, I do not want to misrepresent him either, so maybe I—

Secretary CHU. So, I will—

Senator ALEXANDER. Maybe I heard him wrong. But the—in the first place, you cannot put these rods in the dry cast storage immediately, is that correct?

Secretary CHU. That is correct.

Senator ALEXANDER. It takes several years before they are cool enough to put into dry cast storage.

Secretary CHU. That is correct. I think—

Senator ALEXANDER. During that time, you have no reason to think that they are in a—

Secretary CHU. No.

Senator ALEXANDER [continuing]. In a dangerous condition when stored under NRC regulations on site.

Secretary CHU. Right. No, I agree with Chairman Jaczko on that, that, first, you are absolutely right. For the first 5 or 6 years, they are too hot to be air cooled. And the way, as I—actually, the way these spent fuels—we have backup systems in case the main water supply is interrupted there. There is secondary piping and things of that nature.

Senator ALEXANDER. Well, there are second, third, fourth, and fifth redundancies. Well, I mean, I went to Watts Par with one of the commissioners recently, and I asked the question, I mean, if one—if the backup electricity system goes down, there is another electricity system, and then there is another one.

Secretary CHU. Right.

Senator ALEXANDER. And then there is finally a way to get water in even if all of it goes down.

Secretary CHU. I think that is absolutely what we need.

Senator ALEXANDER. So, there is enough water—if there is enough available water, the fuel rods would be safe, is that not right?

Secretary CHU. Right, right. And so, you know, can I be 100 percent guaranteed that nothing would—no, but I think there are these backup systems that I feel safe about, okay? And so, I would, but without trying to contradict NRC and Chairman Jaczko, I think dry cast storage, if you do not have water, you do not have that. It would be more robust, but that does not mean that the current storage system is endangering Americans.

Senator ALEXANDER. Okay. Well, thank you, Dr. Chu, for coming today.

ADDITIONAL COMMITTEE QUESTIONS

At this time I would like to ask the subcommittee members to submit any additional questions they have for the Secretary.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR PATTY MURRAY

ENVIRONMENTAL MANAGEMENT

Question. Mr. Secretary, in your oral testimony you mentioned the need to find ways to do business better when referring to Environmental Management. I've been pleased to hear about site wide management for infrastructure and support services at Hanford.

Please tell me how this new approach is working and whether it would be beneficial at other sites across the Department of Energy (DOE) complex.

Answer. The Department's purpose for the creating a Mission Support Contract (MSC) was three-fold:

- to make it possible for multiple contractors (which is why the MSC concept is particularly well-suited for the Hanford site) to focus on performing their different short- and long-term environmental clean-up mission;
- to create a scalable infrastructure that can shed excess capacity and its associated costs over time as the clean-up mission progresses; and
- to provide efficient and effective delivery of infrastructure and site services in support of the clean-up mission.

DOE developed an aggressive and comprehensive Performance Measurement Evaluation Plan (PEMP) that assigns all award fee to specific strategic outcomes of the contract. To date, MSC at Hanford is achieving the three objectives established for this acquisition. Since the start of the contract period in August 2009, the MSC has increased service responsiveness to the clean-up mission by implementing benchmarked service standards and a broad range of service performance measures that obtain feedback from the clean-up contracts regarding costs, effectiveness, and quality of services provided. Thus far in the contract period of performance, the MSC has greatly increased the scalability of the IT infrastructure and leads the DOE complex in innovation and efficiencies in this area. Currently, the MSC is increasing capacity where required to support the operation of the Waste Treatment Plant. Award fee was assigned to the development of an Infrastructure Services Alignment Plan to provide a comprehensive plan developed in cooperation with other Hanford Site contractors for the realignment of the existing infrastructure to meet the future needs of the clean-up mission.

It was anticipated early in the development of the acquisition strategy that this approach, if successful, would be a strong candidate for implementation at other Environmental Management (EM) sites.

The primary assumption that a mission support contract would enable more focus on the part of the site contractors tasked with the clean-up mission (since time of award in 2009) has been proven valid and it is felt that with the experience gained, the Department is in a prime position to leverage this strategy across the EM complex.

Question. Secretary Chu, obviously both you and I would like the fiscal year 2012 budget request of \$6.1 billion to advance through the appropriations process to ensure that the Department can meet its legal commitments.

However, in the event that the Congress does not enact an Energy and Water Development appropriations bill by September 30, can you please tell me how the Department would determine interim funding levels for the EM program?

Answer. We are hopeful that the Congress will complete work on the 2012 appropriations bill by September 30, 2011, and do not want to speculate about hypothetical future scenarios.

Question. If the Department uses the fiscal year 2011 final year-long continuing resolution as a base number going into fiscal year 2012, what will the impacts be at each site in the EM complex in terms of work scope, regulatory compliance milestones, and jobs?

Answer. We are still analyzing the effects of the 2011 funding levels and do not want to speculate about hypothetical future scenarios.

LOAN GUARANTEE PROGRAM

Question. Secretary Chu, I appreciate your leadership in getting the Loan Guarantee program up and running and commend you on efforts made thus far, including 28 conditional commitments for loan guarantees.

I understand that last week, the Loan Programs Office sent letters to all pending section 1705 loan guarantee applicants, indicating that DOE was either putting projects “on hold” or moving them through the section 1705 process.

I know that most of these companies have spent significant amounts of both time and money to prepare their applications and to comply with due diligence requirements, and I am very concerned that a large number of companies who have already spent a lot of money are facing a very uncertain path forward.

Can you please tell me how many applicants were in each category—“moving forward” versus “on hold”?

Answer. The Department notified 17 applicants that their applications were moving forward and notified 42 applicants that their applications are on hold.

Question. Of the applicants that were moved forward, did the Department include any companies, including affiliate companies, with more than one application pending in the section 1705 program?

Answer. The projects we support are large and complex, and each one involves multiple parties, including developers, sponsors, EPC contractors, equity participants, advisors, and—in Financial Institution Partnership Program transactions—other lenders. Sometimes, on a given project, the same entity (or its affiliates) may play more than one of these roles. There are entities that are involved, in some capacity, in more than one of the projects that were moved forward under 1705.

Question. If so, how many of those companies or their affiliates have one or more applications pending? How many applications for each of those companies are moving forward?

Answer. As discussed above, given the many roles that exist in the context of each project, it is difficult to provide a precise number in response to this question.

Question. Have any of the companies in the “moving forward” category already been approved for a loan guarantee under the section 1705 program?

Answer. There are entities involved in the “moving forward” category that are also involved in other projects that have already been approved for a loan guarantee under the section 1705 program.

Question. What are the specific criteria the Department used to determine which letter—again, moving forward or “on hold”—an applicant received?

Answer. The Department based its decision on an application’s readiness to proceed. Specifically, we identified those projects most likely to be in a position to reach financial close and commence construction by the 1705 program’s congressionally mandated September 30, 2011 expiration date. These projects received “moving forward” letters. All other 1705-eligible projects in our pipeline received the “on hold” letter. It was important to notify these companies that we do not expect them to receive a loan guarantee under the 1705 program as soon as possible, so that they could avoid spending further time and resources unnecessarily.

Question. What is the likelihood that one of the remaining section 1705 applicants is not able to meet the program’s equity requirements?

Answer. As is always the case, there can be no guarantee that any given project will ultimately receive a conditional commitment or, if it does, that it will meet all conditions precedent to financial close in a timely manner. That said, DOE’s decision to move forward with certain projects was based on our analysis of the project’s ability to meet our programmatic requirements by the September 30, 2011 sunset date.

Question. If such a situation occurs, what is the Department’s plan to ensure those funds are made available to otherwise qualified applicants whose applications were put on hold?

Answer. DOE determined that the projects placed on hold were unlikely to reach financial closing by the program’s September 30, 2011 expiration date.

Question. How will the Department determine those pending applications (that have been put on hold in the section 1705 program) which will be eligible to access the \$170 million in credit subsidies appropriated in the fiscal year 2011 year-long continuing resolution under the section 1703 program?

Answer. We are currently working to develop a process for implementing this new provision.

Question. What is the Department’s plan to quickly and efficiently move those section 1705 applicants to the section 1703 pool?

Answer. Pursuant to the fiscal year 2011 continuing resolution, some of the projects with active 1705 applications (including those put on hold) are eligible for the section 1703 program (most of these projects would have been eligible for 1703 in any event, provided they satisfy certain restrictions in the applicable budget authority). Projects eligible for 1703 will not need to submit a new application to be considered for a guarantee under that program.

Question. Will this information be made available to the Congress and the applicants?

Answer. The Department will continue to ensure that applicants and the Congress are appropriately informed of programmatic developments.

Question. How many companies are currently in the application pool for the section 1703 program?

Answer. DOE currently has approximately 20 active applications from projects that are eligible for the 1703 program, but not the 1705 program.

Question. How will the transfer of eligible applications from the section 1705 program affect the current section 1703 program?

Answer. There will be significant competition among qualified applicants for the appropriated funds under 1703.

Question. What criteria will the Department use to determine how the \$170 million in credit subsidies will be distributed among the new pool of section 1703 applicants?

Answer. We are currently working to develop a methodology for implementing the programmatic changes and appropriations included in the fiscal year 2011 continuing resolution.

Question. What is the Department's commitment to the Loan Guarantee program for renewable energy projects going forward?

Answer. The Department is committed to the Loan Guarantee program which aims to accelerate the domestic commercial deployment of innovative and advanced clean-energy technologies at scale. Under the 1705 program, DOE has issued loan guarantees for 28 projects representing more than \$16 billion in loan guarantees for projects that will create more than 16,000 direct jobs.

WATER POWER PROGRAM

Question. Secretary Chu, I like what you have said about hydropower being an "incredible opportunity", our "lowest cost, clean energy option" and your comments about adding this resource to our clean-energy portfolio. And as you know, marine and hydrokinetic power is a promising source of renewable energy.

Despite your positive comments, you are yet again proposing to cut the Water Power program, as you have every year. In fact, it is only 1 of 2 programs to be cut in Energy Efficiency and Renewable Energy (EERE), which received an increase of \$1.4 billion more than fiscal year 2011 enacted levels. I do understand that we are facing tough budget times, but I fail to understand the logic behind your cut of 20 percent to the Water Power program when you have increased the budget for wind, solar and geothermal.

Why isn't the Water Power program more of a priority for the Department?

Answer. The Department remains optimistic about the opportunities to further develop the full range of water power technologies, including emerging marine and hydrokinetic (MHK) energy technologies. Given the current state of MHK development, we believe that the \$38.5 million requested for water power research in fiscal year 2012 is sufficient to continue the program's ongoing efforts to advance these water power technologies and accelerate their greater market adoption. We are currently completing a comprehensive set of resource assessments, and undertaking detailed techno-economic assessments of emerging technologies, which will help us to effectively determine the opportunities and costs associated with these technologies. These important analyses will help the Department determine what funding levels are necessary and appropriate to realize water power's potential.

Regarding hydropower—as you know, hydropower accounts for about 7 percent of our Nation's total electricity generation. And you and I have both applauded a recent National Hydropower Association study showing the potential to double existing hydro capacity and create 1.4 million jobs. There's a lot going on in hydro—from low-impact hydro to small projects to increasing efficiency and output at existing projects. And while hydro is a more mature technology than some others, developing technology innovations is still important. As you know, we continuously work to develop innovations in other resources—from automobiles to other renewable energy resources like wind—and I believe we should be doing so with hydro as well.

Question. Would you agree that doubling our hydro capacity is doable, and necessary? What is your plan to make this happen?

Answer. DOE agrees that substantial increases in hydropower capacity, including pumped storage, from a baseline of about 100 GW in 2009 are feasible by 2050. New hydropower development is possible across several different resource types, including:

- capacity upgrades and efficiency improvements at existing hydropower facilities;
- adding power plants at existing, nonpowered dams;

- installing new hydropower power capacity on constructed waterways; and
- new environmentally sustainable hydropower at natural streams.

As most of the traditional concerns over environmental impacts typically associated with hydropower generation can be effectively mitigated through technology improvements and sustainable development practices, these opportunities present a low-cost, renewable energy resource that can help meet the administration's clean-energy economy goals.

The Department has a multi-pronged approach to assist industry in increasing hydropower capacity. We are currently completing a set of resource assessments, undertaking detailed techno-economic assessments of existing hydropower plants, and engaging in research, development, and deployment of emerging technologies. The Department announced a Conventional Hydropower Funding Opportunity in 2011 that will help spur the development of conventional hydropower including pumped storage hydropower. Current Department-funded projects such as the Hydropower Advancement Project and water use optimization project will help the hydropower industry implement best practices to increase power production and assess their plants for capacity and efficiency upgrades. The Department has also funded an innovative "fish-friendly" turbine project, a turbine design that allows fish to safely pass through the hydropower turbine. This will allow industry to install hydropower units at locations where water is otherwise spilled to allow for fish passage.

Question. Regarding ocean and tidal energy, I believe you are aware that my home State of Washington has made a strategic decision to be an international leader in the commercialization of the emerging ocean renewable energy industry. As you know, the United States has significant ocean, marine, and tidal energy resources. Development of the technologies to capture these ocean energy resources can play a significant role in our Nation's economic recovery and expand our renewable energy portfolio.

I strongly support the efforts underway in Washington and am proud of the work being done in my State to capture the jobs that will be created by the design, construction, and deployment of wave energy converters. For example, the University of Washington and Snohomish Public Utility District are working hard to support this new domestic clean electricity generation industry that has the potential to provide up to 10 percent of our Nation's power needs.

Unfortunately, the United States is falling behind in the race to capture the rich energy potential of our oceans, and the jobs that will come with this new industry. Many countries, particularly in Europe, have already deployed viable, operating, electricity generating projects using the emission-free power of ocean waves, currents, and tidal forces. The Ocean Renewable Energy Coalition calculates that more than \$370 million US has been spent by the UK Government on wave energy research and development (R&D) over the past several years. That total approaches \$500 to \$600 million US over the same period if you add in commitments to ocean energy R&D from France, Portugal, Spain, Norway, and Denmark.

Given this competitive situation, I am particularly disappointed with the fiscal year 2012 budget request for the Water Power program

While the Congress has provided increased funding for the Water Power program, I'm disappointed that the Department hasn't been more aggressive in its efforts to help commercialize this technology. We need the enthusiastic support of you and your senior leadership team to help speed the deployment of ocean energy technologies and secure U.S. leadership in this emerging clean-energy industry.

What is your plan to stop the United States from losing these jobs to Europe?

Answer. DOE's Water Power program is building a comprehensive understanding of emerging MHK technologies and facilitating innovation and technology development that leverages previous advancements, including those made in Europe. In order to promote the development of a competitive MHK industry in the United States, DOE's Water Power program is supporting the establishment of three national test centers. These centers are planning to build open-water testing infrastructure, which will allow the developers of MHK devices to efficiently test in a realistic marine environment.

DOE's Water Power program is also developing state-of-the-art technology design tools that simulate the behavior and performance of MHK devices in complex marine environments (covering tidal/ocean current and wave resources). These models will identify key cost-of-electricity drivers, facilitate rapid design optimization, and support detailed techno-economic assessment of MHK technologies as is required per congressional direction. Ultimately, the analytical results provided by these design tools will guide the Department's future investment decisions by identifying not only technology leaders but also the best opportunities to make these technologies cost competitive with other energy portfolio options.

The program recently funded three full-scale MHK demonstration projects, including a \$10 million grant to the Snohomish Public Utility District tidal energy project. In funding these advanced projects, the program seeks to demonstrate successful MHK operation and testing in U.S. waters and drive the development of future projects.

Finally, the program is strategically working to remove barriers to deployment by engaging in research that answers questions regarding the potential environmental impacts of MHK technologies and by developing technologies to monitor and mitigate these potential impacts. Collectively, these efforts are strategically aimed at advancing a domestic MHK industry that can contribute to our Nation's clean-energy future.

Given the early stage of MHK development, the Department is taking a very deliberate and comprehensive approach to our investments in MHK technologies. Future investments (Federal and private sector) will spur economic development only if the technologies can be proven to be competitive in the market place. Our efforts to spur such economic development are focused therefore on proving marketplace competitiveness of the technologies, and ultimately supporting the development of a competitive U.S.-based MHK industry that will create green jobs in the United States.

Question. I am concerned that your budget request does not support development of a testing infrastructure in the United States, something that is vital to ensure this industry can move forward. For example, Europe currently has several wave and tidal energy test facilities, including its main facility in Scotland. We clearly have a need for this infrastructure here in the United States, and I know that the Northwest National Marine Renewable Energy Center (NMREC) has a strong desire to compete for funding to establish a testing center in the Pacific Northwest.

Can you please comment on why your budget request does not support development of such testing infrastructure and can you tell me your plan to build it?

Answer. The development of an MHK technology testing infrastructure in the United States is considered vital to helping ensure that the industry can continue to progress toward commercialization. To advance the MHK industry, the Department continues to invest in, and support, three NMRECs. The Northwest NMREC, the Hawaii NMREC, and the Southeast NMREC are important partners in the ongoing development of a viable MHK industry in the United States.

The Department is currently undertaking quantitative assessments of the energy that can be extracted from wave, tidal and ocean current, and ocean thermal energy resources, and is preparing a comprehensive techno-economic assessment of MHK technologies and resources. This information will serve to identify the potential contribution that MHK resources can provide to our Nation's energy mix, and will also point to promising technologies that merit further investment. This information will inform the Department's future investment decisions, including testing facilities.

HYDROGEN AND FUEL CELL TECHNOLOGIES

Question. I understand that the primary goal of the DOE Fuel Cell Technologies program is to advance fuel cells, including those that provide backup power, to be competitive in the marketplace. The market transformation program has been successful in meeting this goal by introducing fuel cells to larger markets and competing effectively in terms of life-cycle costs, performance, durability, reliability, and significantly reduced greenhouse gas emissions.

Given the program's success, why does your budget request zero out the market transformation program, right when it's gaining traction?

Answer. The Department's strategy is to sustain a balanced R&D portfolio, with an emphasis on nearer-term priorities, such as batteries, advanced vehicle technologies, and technologies for renewable power and energy efficiency. Fuel cell electric vehicles (FCEVs) are still part of the portfolio of options under development. In fact, DOE's increased funding for battery R&D will also be beneficial for FCEVs which rely on batteries in addition to fuel cells.

The Department will continue its critical efforts in hydrogen and fuel cell R&D, which have already reduced the cost of fuel cells by more than 30 percent since 2008 and 80 percent since 2002.¹ In fact, DOE's hydrogen and fuel cell program has been extremely successful, resulting in approximately 200 patents, 30 products being put on the market, and industry currently pursuing development of more than 50 emerging technologies.² The fiscal year 2012 budget sustains DOE's core R&D ef-

¹ http://hydrogen.energy.gov/pdfs/10004_fuel_cell_cost.pdf.

² <http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/pathways.pdf>.

forts which will continue to advance the technologies and improve the likelihood of a successful rollout by automobile manufacturers in the coming years.

SOLAR ENERGY TECHNOLOGY PROGRAM

Question. Secretary Chu, your fiscal year 2012 budget request for the Solar Energy Technology program represents an increase of nearly 50 percent more than the fiscal year 2011 budget request, and an increase of 87 percent more than the fiscal year 2010 enacted level. However, your budget request includes only \$50 million for the Concentrated Solar Power (CSP) program, and as I understand it, you are proposing an approximately 8 to 1 ratio of funding in favor of Photovoltaics (PV) over CSP.

Given that the United States still co-leads both technologically and commercially in the CSP field, do you believe that the Department should maintain a more balanced funding ratio between PV and CSP?

Answer. The administration's 2011 budget request for CSP included \$50 million for a Solar Demonstration Zone which would help validate cutting-edge CSP and other concentrating solar technologies. This was in addition to a base CSP R&D program of approximately \$50 million. The administration did not seek additional funding for the Solar Demonstration Zone project in 2012 as it is unlikely that these funds could be fully utilized in 2012 if funds were also provided through the 2011 budget. The request for base CSP R&D for 2012 is consistent with the request in 2011. As part of the 2012 budget request, the administration also announced its SunShot initiative which seeks to reduce the cost of electricity from solar technologies by 75 percent by the end of the decade to be competitive with conventional generation sources of electricity without subsidy. The administration believes this is an ambitious but achievable goal. For 2012, the administration's funding request for the SunShot initiative has been largely designated through the Photovoltaic Research and Development subprogram. We believe, however, that CSP technologies also have the potential to reach the SunShot Initiative goals and are assessing this potential as part of our future portfolio balance.

ADVANCED CABLE AND CONDUCTORS PROGRAM (FORMERLY HIGH TEMPERATURE SUPERCONDUCTING PROGRAM)

Question. Mr. Secretary, your budget request proposes to zero out the High Temperature Superconducting program (recently renamed the Advanced Cable and Conductors program). I understand that your justification is that the program has met its technical milestones. However, as you may be aware, other countries—namely China, Japan, and Korea—are aggressively demonstrating and deploying high-temperature superconducting systems and the United States is not.

Given this, I believe it doesn't make sense for the Department to eliminate this program prior to the demonstration and deployment of high-temperature superconducting (HTS) systems, including advanced cryogenic and cryocooler systems.

Do you agree?

Answer. HTS is an integral part of Smart Grid technologies that can provide for a more reliable, secured and efficient electricity delivery infrastructure. After investing more than \$600 million over the past 20 years, second-generation HTS wires in sufficient lengths with good performance can now be produced by U.S. manufacturers. These wires are beginning to be sold around the world, and are the primary components in many international demonstration projects.

With the availability of these commercial wires, the Department's Office of Electricity Delivery and Energy Reliability (OE) believes that HTS wire research has reached a point that second-generation HTS wire technology can be successfully transitioned to the U.S. manufacturing base. While OE is winding down its involvement in HTS wire research, it continues to support several innovative HTS system demonstration projects funded through the American Recovery and Reinvestment Act. These power systems include a grid-scale HTS fault current limiter, HTS power cable, and HTS fault current limiting transformer.

In addition, DOE's Advanced Research Projects Agency-Energy (ARPA-E) is supporting a project to develop an advanced HTS superconducting magnetic energy storage system that will store significantly more energy than current designs at a fraction of the cost. Moreover, I am aware of HTS system demonstration projects that are being performed by other agencies. For example, the Department of Homeland Security is investigating the feasibility of a HTS fault current limiting power cable that can enable connectivity between electrical substations to share power in case of emergencies. And at the Department of Defense, the Navy is developing innovative HTS applications and advanced cryogenic systems for military usage.

To summarize, while OE is winding down its second-generation HTS wire research activities, DOE and other agencies are continuing to support the development and deployment of innovative HTS system applications. By studying the fundamental science of superconductivity, engaging in HTS systems development, and keeping up-to-date on worldwide progress in HTS wires and systems research, DOE will be in a position to take advantage of any significant HTS discovery and innovation.

Question. If the United States eliminates programs that will encourage the demonstration and deployment of high-temperature superconducting technologies, I am seriously concerned that this will be another example of our Nation inventing and developing a promising advanced energy technology, only to lose commercial leadership to other countries, as happened with wind turbines and photovoltaic systems.

Given your focus, and the President's focus, on innovation, can you please tell me your plan to ensure this situation does not happen with high-temperature superconducting technologies?

Answer. Superconductivity is a crosscutting technology that can benefit energy applications in many fields of use. For the past 20 years, the Department has focused its wires research and applications development activities in power delivery systems. With the Department's support, second-generation HTS wires manufactured in the United States are now available commercially and prototype HTS power systems have been demonstrated.

To maintain U.S. leadership in superconductivity, however, fundamental understanding of HTS needs to be obtained and more novel superconductors need to be discovered. In addition, HTS applications other than power delivery systems should be developed to broaden the market and sustain the U.S. manufacturing base. Moreover, a more strategic approach to developing advanced HTS materials and conductors and means to integrate them into a nonsuperconducting Smart Grid infrastructure need to be established.

In the area of basic superconductivity research, DOE's Office of Science Energy Frontier Research Center for Emergent Superconductivity is performing work to discover new superconductors. Furthermore, the Office of Science supports basic research on synthesis, advanced characterization, and theory to understand fundamental phenomena related to superconductivity. To broaden the HTS market, a number of DOE offices are considering the benefits of various applications ranging from light weight superconducting generator for offshore wind turbines to very high field superconducting magnet systems suitable for scientific and medical applications. Moreover, the fiscal year 2012 request for the Office of Electricity Delivery and Energy Reliability includes a Smart Grid Technology and Systems Hub, which can leverage crosscutting technologies and capabilities developed under the superconductivity program to impact this and other energy applications.

The Department believes that the United States will maintain its leadership position in superconductivity by fully implementing the plan to understand and discover novel superconductors, demonstrate innovative and diverse HTS applications to broaden the market base, and develop advanced materials and systems that will integrate seamlessly into a reliable, secured, and efficient Smart Grid infrastructure.

CLEAN RENEWABLE ENERGY BONDS

Question. Secretary Chu, the fiscal year 2012 budget request proposes another 1-year extension of the 1603 Treasury grant program to incentivize renewable energy. As you know, 1603 only applies to private developers and utilities; it is not available to consumer-owned utilities like many of those in Washington State. The Clean Renewable Energy Bond (CREBs) program is available to those municipal and rural cooperative utilities to incentivize renewable resources.

Given that increasing the CREBs bonding level would help the administration achieve its 80 percent clean-energy goal, would the administration support an increase in the CREBs program?

Answer. The administration recognizes the instrumental role that CREBs have played in catalyzing investment in renewable energy by nontaxable entities as a complement to other incentives such as Federal tax credits. Raising the cap on CREBs is one among several policy measures that can encourage investment in renewable energy, which is consistent with administration policy objectives for a clean-energy economy.

QUESTIONS SUBMITTED BY SENATOR TIM JOHNSON

Question. I appreciate the administration's commitment to the research and development necessary to advance renewable energy. Cellulosic biomass has a promising

future for both transportation fuel and power production, and it is important that we understand how much biomass can be produced sustainably and economically for bioenergy. To this end, the Department of Energy (DOE) has supported the development of the Regional Feedstock Partnership, a collaborative effort of Federal agencies, national laboratories, and universities that is now into its third and fourth year of field work.

The DOE budget justification suggests that the United States Department of Agriculture (USDA) will take a lead in sustainable feedstock production beginning in fiscal year 2012. That may be a reasonable approach; however, I have several questions regarding the impacts to the Regional Feedstock Partnership and ongoing research within DOE Office of Biomass programs.

My understanding is that the development of the Regional Feedstock Partnership was reviewed and approved by the Office of Management and Budget. The program has enjoyed bipartisan support and has been included in the administration budget requests for the last several years. In fiscal year 2012, however, the administration proposed to greatly reduce the Sustainable Feedstocks funding account that supports the Partnership.

Is the reason for reducing the Sustainable Feedstocks account due to the intent to shift the lead on biomass feedstocks to USDA?

Answer. On February 3, 2010, The White House issued *Growing America's Fuels: An Innovative Approach to Achieving the President's Biofuels Target*.³ This document established lead agency responsibility for each biofuel area supply chain segment. USDA was identified as the lead for both Feedstock Development and Feedstock Production Systems, and was directed to coordinate with DOE to enhance the work being conducted by the Regional Feedstock Partnership. In an effort to help align feedstock activities with each agency's expertise and minimize redundant focus areas, the emphasis for DOE feedstock-related funding was shifted to focus primarily on feedstock logistics systems in the fiscal year 2012 budget request.

Question. From your point of view, has the DOE Regional Feedstock Partnership been a success?

Answer. The DOE Regional Feedstock Partnership has successfully established more than 100 biomass energy crop field trials in 39 States through the work of more than 96 university, USDA Agricultural Research Service, and industry scientists. DOE considers the information collected from the field trials to date, as well as the extensive relationships that have been established under the Partnership, to be highly valuable to the Nation's biomass feedstock production efforts. The March 2011 progress report "Regional Biomass Feedstock Partnership Executive Summary" details other Partnership successes to date.⁴

Question. After funding the Partnership for several years, is it an effective use of taxpayer dollars to terminate the program just as the field research results are beginning to come in?

Answer. DOE plans to support the Regional Feedstock Partnership through fiscal year 2013. It was the original intention of DOE to support the Regional Feedstock Partnership for at least 6 years (fiscal years 2008–2013) in recognition of the need for longer-term studies associated with perennial biomass energy crops. These systems often take multiple years to establish, and the full potential of their productivity, as well as potential environmental services provided by perennial systems, cannot always be realized within just a few years. Conversely, field trials for annual biomass energy crops and residues, such as energy sorghum or corn stover, have provided valuable data from the first year they were established.

Question. Would it not make more sense to complete the program for at least the remaining 2 years of this OMB-approved process, in order to get the benefit of the work that has already been done rather than start over and duplicate these efforts through another Department?

Answer. USDA has been designated lead agency under *Growing America's Fuels: An Innovative Approach to Achieving the President's Biofuels Target* for Feedstock Development and Feedstock Production Systems. The difficult aspects of establishing this type of research program have already been addressed, including:

- development of a nationwide network of more than 90 scientists to participate in the Partnership;
- development of comparable field management and data collection protocols for nine different biomass energy feedstocks across five different geographical regions; and

³Available at http://www.whitehouse.gov/sites/default/files/rss_viewer/growing_american_fuels.PDF.

⁴Progress report available at <http://www.sungrant.org/NR/rdonlyres/F374DEB6-810C-4B05-9A21-26D6B0576E78/2834/ExecutiveSummary33111.pdf>.

—establishment of difficult and costly perennial energy-cropping systems. These successes will be leveraged by USDA as it takes the lead on feedstock development and production systems.

QUESTIONS SUBMITTED BY SENATOR FRANK R. LAUTENBERG

Question. The United States leads the world in fuel cell patents. Fuel cells can help reduce our dependence on oil and air pollution while at the same time creating jobs. In New Jersey, companies like BASF employ hundreds in their fuel cell divisions. How will the reductions in funding for fuel cell technology in this budget affect our ability to win the clean-energy race?

Answer. The Department's strategy is to sustain a balanced research and development (R&D) portfolio, with an emphasis on nearer-term priorities, such as batteries, advanced vehicle technologies, and technologies for renewable power and energy efficiency. Fuel cell electric vehicles (FCEVs) are still part of the portfolio of options under development. In fact, the Department of Energy's (DOE) increased funding for battery R&D will also be beneficial for FCEVs which rely on batteries in addition to fuel cells.

The Department will continue its critical efforts in hydrogen and fuel cell R&D, which have already reduced the cost of fuel cells by more than 30 percent since 2008 and 80 percent since 2002.⁵ In fact, DOE's hydrogen and fuel cell program has been extremely successful, resulting in approximately 200 patents, 30 products being put on the market, and industry currently pursuing development of more than 50 emerging technologies.⁶ The fiscal year 2012 budget sustains DOE's core R&D efforts which will continue to advance the technologies and improve the likelihood of a successful rollout by automobile manufacturers in the coming years.

Question. In response to high gas prices, some have suggested we need more offshore drilling with fewer safeguards. The Energy Information Administration found that opening all of the offshore areas in the lower 48 States would lower gas prices by just 3 cents per gallon—decades from now. How will the President's budget invest in real solutions to high gas prices?

Answer. Even while committed to safe and responsible domestic oil and gas production, the administration has taken steps to improve efficiency across the entire transportation sector and to develop and expand alternative fuels, including advanced biofuels. Energy innovation will increase the potential for the replacement of petroleum. Therefore, the administration's budget provides increases for programs, such as the Advanced Research Projects Agency-Energy (ARPA-E), that support energy innovation. The budget helps advance the goal of 1 million electric vehicles on the road by 2015 including through a shift from the existing tax credit incentive to a rebate that would be available to consumers at the point of sale and a \$588 million investment in research, development and deployment programs for advanced vehicle technologies. It also proposes \$341 million for biofuels and biomass R&D within the Office of Energy Efficiency and Renewable Energy, including a new reverse auction to promote advanced biofuels across the country.

Question. The Princeton Plasma Physics Laboratory in New Jersey carries out research that could lead to major innovations in energy technology and help make the United States a world leader in clean-energy technology. One area of research is developing energy from fusion. A breakthrough in fusion energy could be the solution to the world's energy problems by providing the planet with a safe, clean, and limitless supply of energy.

I support a significant increase in funding for the Plasma Physics Lab. Would an increase in funding help accelerate progress toward game-changing clean-energy breakthroughs?

Answer. DOE believes that the funding levels proposed for the Princeton Plasma Physics Laboratory are appropriate and in balance with other priorities within DOE and throughout the Federal Government.

QUESTIONS SUBMITTED BY SENATOR TOM HARKIN

BIOFUELS

Question. Secretary Chu, as you know, biofuels are a remarkable success. They displace close to 10 percent of our gasoline demand. While we can and should also be promoting other oil displacement alternatives, such as electric vehicles, continued

⁵ http://hydrogen.energy.gov/pdfs/10004_fuel_cell_cost.pdf.

⁶ <http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/pathways.pdf>.

expansion of biofuels seems to be the best option we have for displacing another 10 percent of our gasoline demand. The Congress recognized that in passing the renewable fuel standard (RFS) in the 2007 Energy bill.

Biofuels also face a major marketplace problem. Most biofuel usage today is in the form of E10, a 10 percent blend of ethanol with gasoline. As we continue to expand the contribution from biofuels, we need to remember that a large share of that will continue to be in the form of ethanol. Thus, we need to be able to use higher ethanol blends. We need filling stations that offer higher blends, and we need vehicles that can use those higher blends.

What is the Department of Energy (DOE) doing to promote the availability and use of higher blends of ethanol, beyond E10 and E15? What more could the Department do, and what support from the Congress would be most useful to that end?

Answer. In addition to sponsoring the E15 and E20 test program, DOE's Office of Energy Efficiency and Renewable Energy (EERE) supports several activities to promote higher ethanol blend usage. Specifically, the Energy Policy Act of 1992 requires that Federal, State, and utility fleets acquire alternative fuel vehicles (AFV) annually at determined percentages. These vehicles largely include flex-fuel vehicles that are capable of operating on E85 fuel. EERE's Vehicle Technologies Program (VTP) and Federal Energy Management program manage and monitor AFV acquisitions and alternative fuel usage in those fleets. Additionally, VTP and the Biomass Program are sponsoring fuel dispensing research with Original Equipment Manufacturers and Underwriter's Laboratory to develop and list E15 dispenser retrofit kits that can be installed in retail stations throughout the country. Through the State Energy program and the Energy Efficiency and Conservation Block Grant program, EERE has encouraged recipients to use money for installing renewable energy infrastructure. Last, DOE is actively working with Federal agencies to install alternative fuel pumps at fueling stations, in accordance with Energy Independence and Security Act of 2007 requirements. DOE also supports ongoing research to ensure that fuel dispensed by blender pumps meets American Society for Testing and Materials (ASTM) specifications.

Question. One program that could help expand markets for higher ethanol blends is the Clean Cities program. How much funding in the Clean Cities program will be devoted to expanding markets for E85 and other higher blends in fiscal year 2012, and what will that accomplish?

Answer. The Department agrees that the Clean Cities initiative is an excellent way to expand alternative fuel markets. The President's fiscal year 2012 budget request for Vehicle Technologies Deployment includes \$29 million for Clean Cities activities to facilitate the deployment of renewable and alternative fuels and advanced technologies, as well as the infrastructure to support their widespread use. Clean Cities funds would support competitively awarded vehicle infrastructure deployment projects, including E85 and other renewable biofuel vehicle projects; the funding opportunity would require a minimum 50 percent cost share. Clean Cities funds also would be used to provide technical assistance, tools, and consumer information related to renewable and alternative fuels and advanced technologies that reduce petroleum consumption. Examples include safety information related to renewable fuels for permitting officials and first responders, GPS data and mapping tools for locating renewable fuel stations (the current public database includes more than 3,000 sites for E85 and B20 biodiesel), and the Federal Fuel Economy Guide and FuelEconomy.gov, which include vehicle information on E85 flex-fuel vehicles available in the United States.

Question. When we met with your Deputy Secretary Dan Poneman and with EPA Administrator Lisa Jackson last August, we learned that DOE was testing E20 in a fleet of autos in parallel with your testing of E15. What are the results of those tests, please? Would those tests support authorizing use of E20 in all vehicles of model year 2001 and newer?

Answer. DOE is in the process of testing the final four vehicle models on E20 fuel. The test results are expected to be ready by December 2011. As you know the E15 testing was completed in December 2010 and the waiver request was ruled upon by EPA in January 2011 largely based on DOE data. The EPA determination allows up to E15 blends to be used in all model year 2001 and newer vehicles. Any decision to allow E20 use for the same model year vehicles would have to be determined by EPA. DOE will continue to share the data with EPA as it becomes available.

Question. We share a belief in the importance of accelerating the development and commercialization of advanced biofuels, and I am pleased that you are proposing to conduct a reverse auction for advanced biofuels in fiscal year 2012. I believe conducting an earlier reverse auction, in this fiscal year 2011, would be a good way to get some experience with this process for both DOE and the industry.

Will you conduct an initial reverse auction for advanced biofuels in fiscal year 2011? Please tell me when the fiscal year 2012 auction will take place.

Answer. The Department had originally planned to conduct an initial reverse auction in fiscal year 2011; however, because many of the companies planning to build biorefineries to produce cellulosic biofuels have been delayed due to economic conditions, it was decided to postpone the proposed auction until fiscal year 2012. It was felt that a larger auction would validate the concept and result in a more meaningful effect on the marketplace. The timing of the fiscal year 2012 auction will depend on several factors including industry conditions and the budget process.

HYDROGEN AND FUEL CELLS

Question. Secretary Chu, in the early 1990s, I was one of the first in the Congress to call for research and development (R&D) of hydrogen and fuel cell technologies in the DOE's energy programs. I was pleased when these technologies were given legitimate program status in the DOE's energy R&D portfolio along with reasonable funding within that portfolio. I'm told that this program has been quite successful in meeting its goals and milestones. However, your budget proposal for fiscal year 2012 proposes a very significant cut to this program area.

Why are you proposing to cut the hydrogen and fuel cells program budget by 41 percent in fiscal year 2012 in the context of a proposal for an overall budget increase of 46 percent across all of the EERE programs?

Answer. The Department of Energy's (DOE) strategy is to sustain a balanced R&D portfolio, with an emphasis on nearer-term priorities, such as batteries, advanced vehicle technologies, and technologies for renewable power and energy efficiency. Fuel cell electric vehicles (FCEVs) are still part of the portfolio of options under development. In fact, DOE's increased funding for battery R&D will also be beneficial for FCEVs which rely on batteries in addition to fuel cells.

The Department will continue its critical efforts in hydrogen and fuel cell R&D, which have already reduced the cost of fuel cells by more than 30 percent since 2008 and 80 percent since 2002.⁷ In fact, DOE's hydrogen and fuel cell program has been extremely successful, resulting in approximately 200 patents, 30 products being put on the market, and industry currently pursuing development of more than 50 emerging technologies.⁸ The fiscal year 2012 budget sustains DOE's core R&D efforts which will continue to advance the technologies and improve the likelihood of a successful rollout by automobile manufacturers in the coming years.

DISTRIBUTED WIND

Question. Secretary Chu, we're all aware of the benefits of large-scale wind projects in the United States, and I'm especially proud of the leadership role Iowa is playing in windpower manufacturing and power generation. However, there also is great potential for smaller-scale "distributed wind" projects. In fact, smaller wind turbine systems can often result in outsized benefits to rural communities, farmers, ranchers and other citizens. Small wind systems also offer a domestic manufacturing development opportunity given that 95 percent of the small wind systems installed in the United States in 2009 were manufactured domestically. Moreover, much of that manufacturing activity is occurring in economically challenged rural areas.

In fiscal year 2010, DOE spent approximately \$80 million on research, development, and demonstration (RD&D) for wind energy, but only about 2 percent of that total, about \$1.6 million was for small- and medium-sized wind.

Given the significant contributions that distributed wind can make to our rural economy and our clean-energy future, do you think that the Department ought to place more emphasis on this important renewable energy technology?

Answer. In fiscal year 2010, roughly \$5.9 million, approximately 7.4 percent, of the total DOE budget for wind energy RD&D went to distributed wind energy technology, including small (greater than 1 kilowatt and less than or equal to 100 kilowatts) and midsize (greater than 100 kilowatts and less than or equal to 1 megawatt) technologies. While distributed wind technology remains a part of the portfolio, the Department has recently increased its emphasis on less mature offshore wind technologies, as indicated by the President's fiscal year 2012 budget request. DOE nevertheless plans to continue to support activities related to product testing, standards development, and the establishment of an accredited third-party certification body for small wind turbine technology. The Department also plans to fund

⁷ http://hydrogen.energy.gov/pdfs/10004_fuel_cell_cost.pdf.

⁸ <http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/pathways.pdf>.

the remaining \$3.2 million of a \$5.1 million funding opportunity to support midsize turbine prototype development by the close of fiscal year 2011.

The Department plans to consider research and development efforts that build on this funding opportunity to ensure that a range of domestically manufactured midsize turbines is commercially available. Other planned future program activities include risk mitigation through demonstration projects, testing, and standards development to support the development of the midsize turbine technology. The Department also plans research and development on high-throughput manufacturing techniques for wind technologies in order to remain cost-competitive in the export market while supporting domestic jobs.

Question. Will you agree to take a close look at DOE's wind power program very soon and take steps to increase DOE's focus and support for distributed wind power?

Answer. The DOE Wind and Water Power program is supporting the development of a distributed wind industry roadmap to be completed in 2012. This roadmap will be a reference document to help the wind industry prioritize strategic activities required to overcome barriers hindering widespread development and deployment of distributed wind technology. Currently, the program supports activities related to product testing, standards development, and the establishment of an accredited third-party certification body for small wind turbine technology. The program also plans to fund the remaining \$3.2 million of a \$5.1 million funding opportunity to support midsize turbine prototype development by the close of fiscal year 2011.

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QUESTIONS SUBMITTED BY SENATOR JON TESTER

FUEL CELLS

Question. Fuel cells are manufactured in America from American raw materials, and produce clean energy that uses American resources efficiently. Montana is home to the only platinum mine in the country, which provides the catalysts for stationary and vehicle fuel cells. Montana also has the largest recoverable coal reserves in the United States and though fuel cells are viable now, they also offer a potential future for coal, as they are the most efficient way to use any fuel, including fossil fuels. I feel very good about the progress fuel cell manufacturers have made and will continue to make in reducing the amount of platinum used in these catalysts, to bend down the cost curve.

The industry believes that the best way to continue those reductions is through commercialization, but that your fuel cell and hydrogen budget misplaces priorities with an over-emphasis on research and development R&D, while eliminating commercialization support for solid oxide fuel cells and fuel cell forklifts, just as they are beginning to achieve market success. Is the industry wrong?

Answer. The Department's strategy is to sustain a balanced (R&D) portfolio, with an emphasis on nearer-term priorities, such as batteries, advanced vehicle technologies, and technologies for renewable power and energy efficiency. Fuel cell electric vehicles (FCEVs) are still part of the portfolio of options under development. In fact, DOE's increased funding for battery R&D will also be beneficial for FCEVs which rely on batteries in addition to fuel cells.

The Department will continue its critical efforts in hydrogen and fuel cell R&D, which have already reduced the cost of fuel cells by more than 30 percent since 2008 and 80 percent since 2002.⁹ In fact, the Department of Energy's (DOE) hydrogen and fuel cell program has been extremely successful, resulting in approximately 200 patents, 30 products being put on the market, and industry currently pursuing development of more than 50 emerging technologies.¹⁰ The fiscal year 2012 budget sustains DOE's core R&D efforts which will continue to advance the technologies

⁹ http://hydrogen.energy.gov/pdfs/10004_fuel_cell_cost.pdf.

¹⁰ <http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/pathways.pdf>.

and improve the likelihood of a successful rollout by automobile manufacturers in the coming years.

Question. Both fuel cell and hydrogen researchers and the industry believe that if your fiscal year 2012 budget is enacted, its structure and dollar amount will cause the United States to lose its competitive edge in fuel cells for stationary power and transportation applications. Is the industry wrong? If not, are you comfortable losing this industry to Germany, Japan, South Korea, China, and South Africa?

Answer. To the contrary, the Department's basic R&D work is absolutely essential to ensuring American automakers have the best technology available to be competitive in the global marketplace.

DISTRIBUTED WIND

Question. Secretary Chu, while we're all aware of the myriad benefits of large, industrial-scale wind projects in the United States, there is great potential for smaller-scale "distributed wind" projects as well. In Montana, we have second-best wind potential in the United States. In fact, smaller wind turbines or projects can often result in outsized benefits to rural communities, farmers, ranchers and other citizens. And buy-in for smaller wind translates into social acceptance of larger-scale projects.

It can also help to reinvigorate our Nation's manufacturing base given that 95 percent of the small wind systems installed in the United States in 2009 was manufactured domestically and much of that manufacturing activity occurred in economically challenged rural areas.

In fiscal year 2010, DOE spent approximately \$80 million on research, development and demonstration (RD&D) for wind energy, but only about 2 percent of that total, about \$1.6 million was for small- and medium-sized wind. By contrast, your agency spent roughly \$250 million on solar RD&D in that same time period.

Given the significant contributions that distributed wind can make to our rural economy and our clean-energy future; do you think that the Department ought to place more emphasis on this important renewable energy technology?

Answer. In fiscal year 2010, roughly \$5.9 million, approximately 7.4 percent, of the total DOE budget for wind energy RD&D went to distributed wind energy technology, including small (greater than 1 kilowatt and less than or equal to 100 kilowatts) and midsize (greater than 100 kilowatts and less than or equal to 1 megawatt) technologies. While distributed wind technology remains a priority for DOE, the Department has recently increased its emphasis on less mature offshore wind technologies, as indicated by the President's fiscal year 2012 budget request. DOE nevertheless plans to continue to support activities related to product testing, standards development, and the establishment of an accredited third-party certification body for small wind turbine technology. The Department also plans to award the remaining \$3.2 million of a \$5.1 million funding opportunity to support midsize turbine prototype development by the close of fiscal year 2011.

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Answer. The DOE Wind and Water Power program is supporting the development of a distributed wind industry roadmap to be completed in 2012. This roadmap will be a reference document to help the wind industry prioritize strategic activities required to overcome barriers hindering widespread development and deployment of distributed wind technology. Currently, the program supports activities related to product testing, standards development, and the establishment of an accredited third-party certification body for small wind turbine technology. The program also plans to fund the remaining \$3.2 million of a \$5.1 million funding opportunity to support midsize turbine prototype development by the close of fiscal year 2011.

WESTERN AREA POWER ADMINISTRATION (WAPA) TRANSMISSION

Question. As you know, in February 2009 (in the American Recovery and Reinvestment Act [ARRA]), the Congress provided WAPA with ample and broad borrowing authority to plan, finance, build, study, and operate new and upgraded electric power transmission lines that deliver or facilitate the delivery of power gen-

erated by new renewable energy resources. Last year in this same hearing, we discussed how little of that \$3.25 billion in borrowing authority had been exercised. Unfortunately, nothing has changed and still less than 5 percent of that money is obligated.

The legislation is pretty clear. The Administrator of WAPA is supposed to use that borrowing authority to go forth and build. That's not completely autonomous authority, but the Congress intended WAPA to be fairly independent when using it. WAPA can't run a program like the Congress intended if they have to renegotiate each deal with each level of DOE then Office of Management and Budget (OMB). The developers will lose interest and quit. That's just a recipe for inaction laid on top of all the other permitting challenges for new transmission and renewable energy projects.

Mr. Secretary, what's going on? Could you describe the review and approval process for this borrowing authority and who is the transmission expert in charge at the Department for guiding this important program?

Answer. When a project proposal is presented to WAPA, WAPA reviews the proposal and works with the project developer to address any deficiencies. Once this is complete, WAPA begins an analysis of the project, including an in-depth review by subject matter experts and independent examiners such as Deloitte Corporate Finance, LLC. The proposal is evaluated against the criteria specified for the Transmission Infrastructure Program (TIP) in a Federal Register notice published on May 14, 2009. Specific terms and conditions may have to be negotiated with the project developer in order to ensure there is reasonable expectation the Treasury borrowing will be repaid.

When WAPA is satisfied the project has merit and is appropriate for borrowing authority funding, WAPA presents the project to the DOE and the Office of Management and Budget for their approval.

In June, 2011, Secretary Chu appointed Lauren Azar as the Secretary's Senior Policy Advisor for Transmission. Ms. Azar is an expert on electric power transmission, and played a critical role in the Department's review and approval of TIP projects since her arrival.

Question. Could you, Director Lew and Secretary Geithner lay down some simple guidance for WAPA that will let them get to work?

Answer. Yes. In April 2009, WAPA signed a Memorandum of Understanding (MOU) with the Treasury Department that established the terms and conditions for loans made by the U.S. Treasury to WAPA pursuant to borrowing authority provided WAPA in ARRA (Public Law 111-5). This MOU has been reviewed and revised periodically, and the arrangement is working well.

Question. Could you tell us, for the record, how many miles of new transmission lines have been built thus far under WAPA TIP)?

Answer. To date, to WAPA's TIP has funded the construction of 33 miles of new transmission line. This construction is for the Montana-Alberta Tie Ltd. Transmission Project.

Question. How many miles for Bonneville Power Administration (BPA)? And, what has BPA done with the increase in their already massive borrowing authority provided by ARRA?

Answer. BPA finances its operations with a business-type budget and on the basis of self-financing authority. Authority to borrow from the U.S. Treasury is available to BPA on a permanent, indefinite basis. The amount of Treasury borrowing outstanding at any time cannot exceed \$7.7 billion and must be repaid at interest rates comparable to borrowings at open market rates for similar issues. BPA's Treasury borrowing authority is used to finance projects that sustain and enhance the Federal Columbia River Power System, including transmission, hydropower modernization, fish and wildlife mitigation, and conservation. Transmission investments and enhancement use the greatest amount of U.S. Treasury borrowing.

BPA's transmission system now includes more than 15,000 circuit miles of line and 263 substations. The capital financing required to sustain this system and meet new demands is significant. Before receiving the additional \$3.25 billion of borrowing authority as part of ARRA, BPA estimated it would reach its Treasury borrowing authority limit between 2013 and 2016. The new increment of borrowing authority gave BPA the certainty of sufficient access to capital to proceed with new-start projects and ensured that existing capital projects could proceed as planned. With this financing certainty, BPA commenced construction work on two major network reinforcement projects and another two are in planning and environmental review stages. If all four lines are constructed, these lines will add more than 220 miles of lines to the Northwest transmission grid, improve reliability, and allow BPA to provide transmission service to about 5,853 megawatts of requests for BPA transmission; including 4,891 megawatts of additional wind integration and green

energy. BPA has completed construction on a total of 75 transmission towers and 58 miles of transmission on the McNary-John Day line, the first project that was ready to begin at the time the ARRA was enacted.

Additional upgrades, additions and replacements also have modernized the transmission grid assets, more than 50 percent of which were built prior to 1960.

In addition to investments in the TIP system, BPA's Treasury borrowing authority is used for investments in hydro modernization, fish and wildlife, and energy efficiency. For example, with the additional access to capital, BPA was able to fund a major rehabilitation of the Grand Coulee Third Powerhouse that will improve hydro efficiency and is critical to the Federal Columbia River Power System (FCRPS) for power production, water management, system stability, and ancillary services to the main transmission grid. Because of increased access to capital, BPA is investing \$203 million through 2017 in upgrades and replacements at Federal dams. Also, the additional borrowing authority has enabled BPA to fund three major fish hatchery projects and will help BPA meet its portion of the aggressive targets for energy efficiency in the Northwest Power Planning and Conservation Council's Sixth Power Plan. Conservation is the region's resource of choice for meeting load growth for the next 5 years and beyond.

While BPA's total borrowing authority, including the new increment, is one single funding authority, as of this time, BPA has identified up to \$2 billion in major capital projects attributed to ARRA through 2017. Of this total, \$583 million has been expended to date. The capital projects attributed to ARRA include several of the transmission, hydropower modernization, fish and wildlife mitigation, and conservation projects mentioned earlier.

The additional \$3.25 billion in borrowing authority has been instrumental in providing BPA with assurance that it can proceed with essential investment in the region's aging infrastructure and meet the increasing demands of its entire capital program. Without available borrowing authority, BPA would have to defer or reduce valuable capital work needed to keep the FCRPS delivering the clean, renewable electricity that is the backbone of the region's economy. Even with the ARRA providing a sizable increase in BPA's authority to borrow from the Treasury, the agency will continue to face capital funding challenges as the pace of capital spending increases to meet the infrastructure and energy efficiency needs of the region. BPA continues to seek opportunities for alternative funding sources with third parties.

COORDINATION OF POWER MARKETING ADMINISTRATIONS AND DOE POLICY

Question. The Power Marketing Administrations and Tennessee Valley Authority are all somewhat different animals, due to their enabling legislation. But, presumably, they and their Senate-confirmed board members are all working together with you and the administration to further the goals of the President—energy efficiency, renewable and clean energy, a more reliable and smarter grid and so on. How does all that work, because it's not obvious from out here that it's all hanging together with any specific goals in mind?

Specifically you released a proposal to promote development of Pump Storage Hydro, while at the same time one of the PMAs was turning away companies interested in working with the Agency to develop permitted projects in their service territory.

Where does it all get knitted together at the Department?

Answer. The DOE briefed Senator Tester's staff on this issue.

Question. Do the heads of the PMAs meet regularly with you and your team?

Answer. The DOE briefed Senator Tester's staff on this issue.

RURAL IMPLEMENTATION

Question. While DOE is certainly the premier Federal agency dealing with research, development, and demonstration for energy, many other agencies—the Department of Agriculture (USDA), the Department of Defense, the Environmental Protection Agency (EPA) and the Department of the Interior—also have authority and resources to support Energy development. Along those lines you've teamed up with the Department of Agriculture to work on the development of biofuels. That is a good first step.

But how are you coordinating with these agencies to expand information about your solicitations, projects and commercialization opportunities, especially in rural America where they develop and harness this energy? How about with development of distributed technologies? Are you willing to commit to working with your sister agencies to identify opportunities to expand opportunities for distributed wind and other technologies?

Answer. The Department is committed to regularly engaging with other agencies about program activities in order to maximize coordination and prevent interagency overlaps. For example, regarding biomass-related activities, DOE regularly coordinates through the Biomass Research and Development Board¹¹, which is an interagency collaborative composed of senior decisionmakers from Federal agencies and the White House—including DOE and USDA (cochairs); the Departments of the Interior, Transportation, and Defense, EPA; the National Science Foundation; and the White House Office of Science and Technology Policy. The Board is charged with maximizing the benefits of Federal programs and bringing coherence to Federal strategic planning in biomass research and development, including minimizing unnecessary duplication of activities. Several other interagency formal and informal collaborations function to leverage existing expertise across agencies with similar missions and goals, such as Memoranda of Understanding (MOU), regular working group meetings, joint solicitations, and other mechanisms. Examples of MOUs signed over the last 2 years include one on hydrogen with the Army Corps of Engineers and the Interior Department, one on off-shore wind, marine and hydrokinetic devices with the Interior Department, and an updated MOU with EPA on Energy Star.

MECHANICAL INSULATION PROGRAM

Question. Mr. Secretary, Montana was part of a very successful pilot program, the Mechanical Insulation Education and Awareness Campaign, which initially received \$500,000 in fiscal year 2010 through the DOE's Industrial Technologies Program (ITP).

Montana performed an energy assessment in partnership with DOE and the mechanical insulation industry. The program looked at 25 buildings in the capitol complex and found that installing or replacing mechanical insulation in those buildings would save 6 billion Btus per year, representing roughly 8 percent of the total natural gas consumption of the facilities analyzed, with an overall payback period of 4.1 years.

This is such low-hanging fruit to replace damaged mechanical insulation puts people to work immediately and cuts our energy consumption.

How to plan to expand and invest in this successful program, promoting it to other States and locations?

Answer. Through the activities conducted under the Mechanical Insulation program, ITP has developed 5 calculation tools that allow users to find cost-effective insulation opportunities such as those identified in Montana and to calculate ROI and paybacks. These tools, once broadly distributed the summer of 2011, will carry forward the results of the Montana pilot program and encourage similar assessments in all States across the United States. In addition, the Campaign has developed 7 online training modules that will be completed by September 2011 that educate industrial facilities, building owners, property managers, and the construction industry on how to find and implement energy efficiency opportunities through greater and more effective use of mechanical insulation. Because of these self-paced tools and training modules, ITP believes that thousands of users can be educated on the benefits of mechanical insulation at little additional cost to DOE and the taxpayer. Success stories will be developed on Mechanical Insulation and promoted on the ITP Web site and disseminated through organizations such as equipment suppliers, the National Association of State Energy Officials and the National Insulation Association.

Question. How does your budget efficiently invest in more energy efficiency programs we can implement today?

Answer. ITP is collaborating with approximately 100 companies, helping them measure and manage their energy usage so as to demonstrate that significant energy savings are possible. For example, after receiving three energy savings audits from ITP, an automotive manufacturer reduced its energy intensity 29 percent in 1 year at a U.S.-based facility.

Now that ITP has demonstrated that significant energy intensity reductions are possible, the program is developing a set of standard tools and protocols to increase its leverage and reach. By investing in these standard tools and protocols that help private sector companies measure and manage their energy usage, ITP is fostering the energy management industry. ITP is also developing Professional Certification programs for energy management professionals and auditors who will be employed

¹¹The Board, as well as the Technical Advisory Committee and the annual solicitation, were established by the Biomass Research and Development Act of 2000, and later amended by section 9001 of the Food Conservation and Energy Act of 2008.

in the emerging energy management industry, as part of its development of a broader industrial energy efficiency certification program.

ITP is also investing in the training of next-generation energy management engineers. Since 2002, 650 graduate and undergraduate students have been successfully trained in energy management through university-based Industrial Assessment Centers (IACs). ITP plans to continue to train additional students through these IACs over the coming years.

All of these activities are being implemented in the near term, will result in energy efficiency gains, and will help create jobs and improve the competitiveness of U.S. companies.

QUESTIONS SUBMITTED BY SENATOR DANIEL K. INOUE

Question. I wish to thank you and the Department for maintaining the Hawaii office to manage the energy programs and to coordinate with the military, the Department of Energy (DOE), and State endeavors. The office has been invaluable and continues to support the development and implementation of alternative energy policy including those important to State and local efforts, partnerships between military and civilian efforts in the field and new partnership opportunities involving other nations, including Japan. It is my sincere hope that this office will continue in fiscal year 2012 and beyond.

Does the Department have any plans to make meaningful commercial investments in ocean thermal energy conversion (OTEC)? If so, how would the Department mitigate any environmental concerns? What would be the Department's time-frame for such investments?

Answer. As part of the Department's investments in water power technologies, we are currently evaluating the life-cycle costs of OTEC power generation and undertaking a rigorous OTEC resource assessment. The results of these studies will provide important baseline information regarding the potential contribution that OTEC could make to our Nation's renewable energy portfolio, as well as the cost of energy from OTEC. These reports, which will be completed this fiscal year, will serve to inform the Department's investment strategy going forward, and allow us to make appropriate investments across all renewable energy technologies. While OTEC development and production costs are currently estimated to be significantly higher than some other energy technologies, the Department has been pursuing a small number of targeted technology development projects that aim to advance technology readiness, establish a baseline for cost estimates, and improve the cost-competitiveness of OTEC generation.

The Department has been working closely with the National Oceanic Atmospheric Administration (NOAA) and the U.S. Navy in the assessment of OTEC technologies, with a particular focus on the environmental concerns associated with OTEC power generation. In partnership with NOAA, DOE is developing guidelines that consider the full realm of potential environmental impacts, while also considering potential mitigation strategies. This effort includes a series of workshops with technical, scientific, and environmental experts from within the Federal Government as well as key stakeholder groups. This information will serve to inform our future investment strategy so that any future commercial development is undertaken in an environmentally sustainable manner.

In order to fully evaluate the technical, environmental, and economic performance of a fully integrated, open-ocean OTEC system, it is envisioned that a demonstration project in the range of 10 MW to 100 MW would likely be required. Initial cost estimates for plants of this size are \$350 million to \$1.1 billion. Given the magnitude of such an investment and the early stage of OTEC technology development, the Department does not envision making any investments in OTEC at this scale in the near future.

Question. Does the Department plan any follow-on competitions to follow-up on the successes from the stimulus investment?

Answer. The DOE intends to continue supporting the Pacific Office established in 2010 in Honolulu, Hawaii, and we are pleased with your perception of our accomplishments and progress. In August 2011, the Office of Electricity Delivery and Energy Reliability, with financial support from the Department of Defense (DOD), will be stationing a staff member in the J-9 office of the U.S. Pacific Command (PACOM) to support Command interests in energy and security issues. That staff member and the DOE Pacific Office staff will coordinate efforts with DOD while continuing the 3 years of effort with the State of Hawaii and other U.S. Pacific activities.

Regarding future competitive funding opportunities, the citizens and government of Hawaii will be informed of future announcements. It is our normal practice to competitively award research and deployment projects. We are aware that both the Governor's office and several Hawaii government agencies are routinely exploring and applying for new project grants from DOE.

QUESTIONS SUBMITTED BY SENATOR LAMAR ALEXANDER

OAK RIDGE CLEANUP

Question. Department of Energy (DOE) is requesting about \$400 million in fiscal year 2012 for clean-up activities at the Oak Ridge Reservation (ORR). Can you assure me the highest-risk safety concerns are being addressed at Oak Ridge Reservation? DOE is bartering its uranium inventory to help pay for costs of cleanup at the Portsmouth gaseous diffusion plant. Oak Ridge (East Tennessee Technology Park) is home to 1 of the 3 original uranium gaseous diffusion plants. Why shouldn't this facility (K-25) be cleaned up with funds gained in barter of uranium?

Answer. The highest-risk safety concerns are being addressed at the ORR. The K-25 Building at the East Tennessee Technology Park (ETTP) is the highest-risk safety concern on the Reservation due to its age and deterioration, as well as the presence of special nuclear material and radiological and hazardous contaminants. The \$400 million in fiscal year 2012 addresses this highest risk. For some of the other high risks on the ORR, such as mercury at Y-12 and nuclear materials in the Central Campus at the Oak Ridge National Laboratory (ORNL) (specifically, legacy materials at two of the former isotope production facilities, Buildings 3026 and 3038; and those found in the Tank W-1A area soils, the most significant source of groundwater contamination in that area), funds from the American Recovery and Reinvestment Act (ARRA) are being used to address these risks. As for the use of bartering of the uranium inventory to provide additional funding, DOE has established priorities for the transfer of uranium through 2013. The total proposed Department transfers through calendar 2013, including scheduled transfers by National Nuclear Security Administration (NNSA), are approximately 2,000 metric tons of uranium per year, or about 10 percent of U.S. reactor demand, which is a level consistent with the principles and policies set forth in the Department's Excess Uranium Inventory Management Plan.

BLUE RIBBON COMMISSION ON NUCLEAR WASTE

Question. Among the draft recommendations of the Blue Ribbon Commission is increased Federal investment to reduce nuclear waste with advanced materials. Please describe how your budget for nuclear energy would fund research in this area.

Answer. The Reactor and Fuel Cycle Technology Subcommittee of the Blue Ribbon Commission on America's Nuclear Future (Commission) presented draft recommendations to the full Commission. These recommendations of the subcommittee are draft, and subject to further consideration by the full Commission. The Department will carefully consider the Commission's recommendations and advice contained in their final report—due in January 2012—and determine a path forward at that time.

ARRA

Question. The DOE has roughly \$2 billion in unspent ARRA funds for weatherization grants, and another \$2 billion from the State Energy Grant program. Why do these balances exist, and why are additional funds being requested for fiscal year 2012 given the unspent balances?

Answer. The DOE set an aggressive 3-year performance period in the original grant contracts to maximize the timely job creation potential of the funds delivered to State and local communities under ARRA. This timeline has supported thousands of jobs, delivered energy-saving technologies that will save money for families, businesses, and State and local governments across the Nation for many years, and spurred American competitiveness in the global market for energy efficiency and renewable energy.

As of December 19, 2011, grantees of the Weatherization Assistance Program (WAP) have spent \$4 billion of their total \$4.8 billion ARRA allocation. This leaves less than \$850 million remaining to be spent in the final 4 months of the original grant period. It is anticipated that some grantees will have balances remaining on March 31, 2012 and will request performance period modifications so funds can continue to be used for their original purpose of weatherizing the homes of low-income

families. WAP has already exceeded its original ARRA production goal of 593,000 homes weatherized with 4 months remaining and could eclipse 700,000 homes using the balances on existing grants.

Grantees of the State Energy Program (SEP) have spent \$2.1 billion, or more than two-thirds of their \$3.1 billion ARRA allocation. DOE is working with each grantee to assess opportunities to responsibly deploy additional ARRA funds to fully use each grant and create jobs in their State and local communities. The vast majority—about 90 percent—of ARRA grant funds by DOE's SEP will be spent within the current performance period on projects that have supported thousands of jobs, saved energy, deployed clean-energy solutions, and strengthened the economic foundation of communities across the country. It is anticipated that some grantees will have relatively small balances remaining on April 30, 2012, and will request performance period modifications that will be considered on a case-by-case basis. SEP ARRA investments have supported energy-efficiency upgrades of more than 60,000 buildings and building roofs, totaling approximately 361,000,000 square feet, upgraded and repurposed more than 625,000 square feet of manufacturing space to produce clean-energy products, and contributed to the installation of 350,000 kW of renewable energy systems. These projects have supported high-paying jobs in the fields of construction and design/engineering, manufacturing and transportation while saving energy and money over the long term.

Additional funds are included in the fiscal year 2012 budget request to support the efforts of WAP and SEP in their proven ability to drive economic development and job creation and to leverage Federal dollars using the lessons learned under ARRA. The majority of the Weatherization and Intergovernmental Programs (WIP) ARRA grants have a performance period ending in early 2012. Even with the performance-period modifications, the majority of ARRA funds will be expended by then or shortly thereafter. The need for 2012 funding is vital to cushion the ramp down of production and employment in the weatherization network and to provide State and local governments with support in the continued administration of more than \$530 million in revolving loan funds initiated in 35 States and 100 communities with ARRA funds. ARRA funding for WAP helped fund as high as 15,600 full-time positions in the network and still is listed as seventh in the ARRA portfolio with 14,200 jobs supported last quarter. In addition, WAP has leveraged more than \$800 million each year of ARRA in Federal and non-Federal funding to support the weatherization work at the local level. This leveraging has contributed significantly to the number of homes weatherized and jobs supported, and has assisted in expanding the array of services provided in each home. SEP will also continue to expand and replicate the many best practices developed with ARRA grant funds throughout the country, leveraged by the innovative financing programs they have started. These types of activities continue with any annual appropriations provided by the Congress.

CONTRACTS MANAGEMENT

Question. The DOE has been on Government Accountability Office's (GAO) high-risk list for potential fraud, waste, and abuse for contractor oversight since 1990. According to GAO, "GAO designated DOE's contract management as a high-risk area in 1990 because of DOE's record of inadequate management and oversight of its contractors." While the Office of Science (SC) was removed from the "high risk" status, Environmental Management and NNSA remain. What steps is DOE taking to improve contracts management within the Office of Environmental Management (EM)?

Answer. Over the last 2 years, EM has continued to implement corrective actions and been recognized by GAO as having met 3 of the 5 criteria for removal from the high-risk list. EM leadership remains fully committed to continuing this improvement journey. GAO also acknowledged positive actions for the two criteria not yet achieved. These actions include the establishment of clear project and contract management policies and guidance, use of a certified earned value management system by our contractors as well as ensuring our Federal oversight staff was certified at the appropriate level. GAO has noted "the steps illustrate DOE's commitment to improving its contract and project management, but the results of these efforts must ultimately be demonstrated through improved project performance." Toward that end, the current project performance data show that EM will meet or exceed the success criteria of completing 90 percent of capital asset projects within 10 percent of original cost and schedule baselines.

The two remaining criteria which GAO has judged EM as having not achieved are providing the capacity, both people and resources, to address problems, and independent validation that corrective measures are effective and sustainable.

EM has taken the following actions to address capacity:

- EM has assigned senior, experienced project managers as Headquarters Project Sponsors for three large capital projects, Sodium Bearing Waste Project in Idaho, Salt Waste Processing Facility at Savannah River, and U-233 Facility at Oak Ridge.
- EM has hired a Chief Scientist to serve as a direct advisor to the Assistant Secretary of EM for complex technical and design issues.
- EM has arranged for high-caliber technical expertise through use of a Technical Expert Group which has access to multiple DOE national laboratories.
- EM has continued review of project staffing adequacy during recurring independent project reviews.

EM has taken the following actions to address validation:

- Conducting monthly project reviews incorporating lessons learned from transparent reporting on ARRA projects.
- Completing Independent Project Reviews, modeled after the SC approach, on a semi-annual schedule for the larger capital projects.
- Actively participating in recent Department-wide initiatives for improvement in contract and project management.

EM is committed to continuous improvement in its performance of its mission and in the achievement of all the GAO criteria.

SCIENCE LABS

Question. The SC is currently operating 10 DOE labs across the country. Can we afford to continue to operate all of these facilities? Should we start looking at reducing the number of national labs?

Answer. We believe that continued operation of DOE's national laboratories, at the levels proposed in the fiscal year 2012 President's budget, is a national priority. The 10 Office of Science laboratories play a critical role in the Nation's research and development (R&D) enterprise. The Department's national laboratories are home to the world's largest collection of scientific user facilities, supporting more than 26,000 unique users from universities, national labs, other Federal agencies and businesses large and small each year. Functioning as an interdependent system with an exceptional set of world-leading facilities and distinctive capabilities, they deliver clear benefits to the Nation's research community and help solve problems of national importance. They work in partnership with universities and industry, transfer the results of their R&D to the marketplace, and support the training of the future science and engineering workforce.

It is increasingly clear that transformational science and breakthrough technologies will be needed to overcome the complex challenges that we face as a Nation in the 21st century:

- increasing the availability of clean, reliable, and affordable energy;
- ensuring our national security in a changing world; and
- enhancing U.S. competitiveness by encouraging innovation.

DOE national laboratories are uniquely equipped and positioned to make substantial contributions to the U.S. research enterprise.

More than 80 Nobel prizes have resulted from research affiliated with DOE, much of which was made possible by the unique instrumentation and equipment available to the scientific community through the national laboratories.

Some recent results of research conducted by the laboratories operated by the SC include:

- development of the world's smallest battery;
- development of software that searches databases 10 to 100 times faster than large commercial database software;
- development of a technology to use complementary strands of synthetic DNA to build functional materials from the smallest building blocks—future applications include biosensors, optical nano-devices, and new kinds of solar cells;
- development of the first microbe that can produce an advanced biofuel (an alternative to petroleum) directly from fatty acids in biomass;
- development of nanoscale catalysts and multifunctional membranes that may greatly enhance the practicality of fuel-cell powered vehicles; and
- development of a technique to create thin diamond films that are helping industry create energy-saving, ultra-low friction and wear coatings for mechanical pump seals and tools.

Each of these accomplishments was made possible by a consistent and sustained investment in DOE's national laboratories, which provide unique capabilities for maintaining U.S. leadership in science and technology. These national laboratories also contain the world's largest suite of synchrotron radiation light source facilities,

neutron scattering facilities, electron-beam microcharacterization centers, and nanoscale science research centers, which provide open access to specialized instrumentation and expertise that enable scientific users from universities, national laboratories, and industry to carry out experiments and develop theories that could not be done at their home institutions.

During these tough economic times, DOE recognizes the need to identify savings throughout its budget. In the fiscal year 2012 budget request to the Congress, SC funded its national laboratories at a level consistent with the needs of the Department and the scientific community. Savings will be realized in fiscal year 2012 with the termination of operations at the Holifield Radioactive Ion Beam Facility (HRIBF) national user facility at ORNL. In addition, by the end of fiscal year 2011, we are completing operation of the world's largest proton-antiproton collider, the Tevatron, at the Fermi National Accelerator Laboratory (FNAL). The planned closure of the Tevatron coincides with the full start of operations of the Large Hadron Collider in Europe.

Question. Should we start looking at reducing the number of national labs?

Answer. SC regularly reviews the status of the projects and programs underway at the laboratories to ensure that they are focused, unique, and producing the significant scientific results required and expected from the investment of taxpayer dollars. Science's laboratories are not static. SC actively engages its labs to assure continued relevance and renewed infrastructure. No lab demonstrates that better than SLAC National Accelerator Laboratory. A few years ago, it was single-purpose particle physics lab. Through prudent investments, such as the Linac Coherent Light Source, SLAC is now a vibrant, multi-program laboratory making significant contributions in photon science, astrophysics, particle physics, and accelerator research. ORNL in your home State has similarly been revitalized and renewed over the past decade. The programs and projects at the national laboratories are designed, executed, and monitored to leverage, not duplicate, the activities conducted by other participants in the global scientific and academic communities. It is critical to our national security, as well as our economic, technical, and scientific standing in the world that these national laboratories continue to foster the future technological innovations and scientific discoveries that will continue to lead the United States on a path of prosperity.

FOSSIL ENERGY

Question. If one of the goals of this administration is to reduce emissions, then why reduce funding for fossil energy? If we want cleaner coal or carbon sequestration, how do you accomplish this without continued investment in fossil fuels research?

Answer. The Fossil Energy (FE) fiscal year 2012 budget request upholds the President's goals to develop America's innovative competitive edge through strategic investments in our Nation's clean-energy research, development, and demonstration (RD&D) activities. FE's budget request takes into consideration the need for budget restraint, which requires making tough choices across all DOE R&D program areas. We are investing in only the key enabling technologies that are on critical paths and that show the highest-potential impacts on achieving the program goals and benefits in the timeframe needed for deployment. In addition, ARRA funding provided substantial investments in carbon capture and storage R&D and demonstrations (\$3.4 billion from ARRA funds).

STRATEGIC PETROLEUM RESERVE

Question. DOE proposes to sell some crude oil reserves to generate \$500 million in budgetary savings. Please describe in detail the rationale for reducing the inventory? If the proposal is driven based on the need to free up space for inspection and maintenance purposes, why isn't DOE proposing a specific number of barrels, rather than a dollar amount? What type grade do you propose to sell (light, heavy, sweet or sour), and what is the basis for that plan?

Answer. The sale is proposed to provide operational flexibility in managing the reserve. The Strategic Petroleum Reserve (SPR) seeks to reduce its inventory by 5–6 million barrels in order to alleviate unplanned overcapacity at some SPR caverns. The overfilling occurred due to the relocation of crude oil from Bayou Choctaw Cavern 20 to other caverns and the need to free up cavern space throughout the SPR complex. Spare capacity and operational flexibility is needed for example to perform casing inspections and workovers, to allow on-site oil movements that may be required from time to time, and to comply with a recent Texas Railroad Commission requirement for more stringent inspections. No decisions have been made about what grade of crude oil would be sold.

QUESTIONS SUBMITTED BY SENATOR MITCH MCCONNELL

Question. Does the Department have a timeline for considering an unsolicited proposal on tails re-enrichment or releasing an updated uranium inventory management plan? Given that there are more than 1,200 jobs on the line, is there no sense of urgency at the Department to accelerate the consideration of re-enriching uranium tails?

Answer. Upon receipt of any unsolicited proposal, the Department of Energy (DOE) conducts a review consistent with applicable statutes, regulations, and guidelines. While there is no set period of time for review of an unsolicited proposal, the Department conducts its review as expeditiously as possible. The Department is currently working on updating its Excess Uranium Inventory Management Plan. The Department's 2008 Excess Uranium Inventory Management Plan provided guidelines for the management of the Department's excess uranium inventory and described planned and future projects under consideration, as envisioned in 2008. The Plan was a 10-year estimate of future sales and transfers and it contained the caveat that situations could arise where DOE's actions could change in response to unforeseen developments. Depending on programmatic and policy goals and needs, the Department is evaluating the impacts of changes and decisions made since 2008 and will revise the Plan accordingly.

Any decision by the Department regarding the possible enrichment of its higher assay tails would have to include careful consideration of several factors, among them an appropriate contracting approach, the economic benefits to the taxpayer, and the potential market impacts of processing and selling the higher assay tails. A decision should not be made prior to our full evaluation of all the factors.

Question. A decade's worth of clean-up efforts have been ongoing at the Paducah Gaseous Diffusion Plant (PGDP), which have included the removal of 30,000 tons of scrap metal, stored hazardous waste, contaminated soil and facilities. The DOE annually submits a budget request to continue these clean-up efforts. However, there is the potential for a budget shortfall in the coming years. What is DOE's proposal to ensure that future budgets meet the needs of clean-up work at the PGDP?

Answer. The Department believes meeting its compliance milestones is essential and continues to prioritize actions to stay on course to meet these enforceable agreements. The Department continues to work with its regulators to ensure projects are appropriately sequenced to optimize resources while utilizing a risk-based approach to cleanup.

Question. If the Department does not anticipate issuing a plan, has the Department included funds in its fiscal year 2012 budget to safely and securely idle the plant once it returns to DOE control? How much does DOE estimate it needs to idle the plant each year?

Answer. The timing of the return of the PGDP to the DOE is a business decision solely within United States Enrichment Corporation's (USEC) purview. There are provisions of the USEC lease that we would expect USEC to comply with, in the event USEC decides to cease operations at the Paducah plant. USEC has an obligation under the lease to provide DOE with a 2-year notification of USEC's intent to return the PGDP. The 2 years notice was intended to allow DOE to seek congressional appropriations as part of our annual budget process. DOE will develop estimates for decontamination and decommissioning activities after receiving the 2-year notice from USEC.

QUESTIONS SUBMITTED BY SENATOR LINDSEY GRAHAM

H-CANYON

Question. H-Canyon is a remarkable asset that can play a key role in the future of the complex. It has the capability to handle some of the most complicated materials on Earth. It also has the ability to produce fuel for NASA's space missions and could be the place where the breakthroughs are made for the next generation of spent-fuel recycling. However, your budget does not allow for any of these activities. In fact, the Defense Nuclear Safety Board has warned that the canyon could be lost forever under current DOE plans. How do you justify this? How much would it cost to construct a new canyon? How long would that take? What is the future of H-Canyon?

Answer. For approximately the past 3 years, H-Canyon has been operating to complete the blend down of enriched uranium recovered from the processing of surplus unirradiated highly enriched uranium (HEU) materials. The Department intends to complete the current HEU blend down work in 2011. The Department is planning to transition H-Canyon and HB-Line facilities to modified operations in fis-

cal year 2012. H-Canyon will continue to receive sample returns from the Savannah River National Laboratory and F Area Laboratory and disposition the samples to the liquid waste system. H-Canyon will also remediate large boxes of legacy transuranic waste. The Department will retain critical staff and perform proficiency runs which maintain the operator qualifications and exercise the processing equipment.

Much of the remaining material that could be processed in H-Canyon in the future is used nuclear fuel (UNF). The Secretary of Energy has determined that no processing of aluminum-clad UNF will occur until the recommendations of the President's Blue Ribbon Commission (BRC) on America's Nuclear Future are issued and evaluated by the Department. The proposed operational condition of H-Canyon will allow the flexibility to process aluminum-clad UNF or any other appropriate nuclear materials, in the future, should that decision be made.

Question. The core mission of DOE's Environmental Management program is to reduce the amount of waste currently sitting in our weapons complex. As such, any decision that would result in the stranding of material should run counter to DOE's mission. This is why DOE's decision not to process 14 metric tons of aluminum clad defense spent nuclear fuel through H-Canyon is so problematic. Under DOE's current vision, this fuel has no disposition path. Will you work with me to ensure that this material does not remain in South Carolina if it is not to be processed through the canyon?

Answer. The Department does not intend to indefinitely store used nuclear fuel (UNF) at the Savannah River Site. However, I have determined that no further processing of aluminum-clad UNF will occur until the recommendations of the President's BRC on America's Nuclear Future are issued and evaluated by the Department. This will allow the Department to make sure these recommendations are factored into decisions on how best to process and disposition this material. By retaining critical staff and performing proficiency runs to maintain operator qualifications and exercise processing equipment, the capability to process spent fuel in the future is being preserved. Should a decision be made to not use the H-Canyon to process the spent fuel, I will work with you to determine an alternative that ensure unprocessed UNF does not remain at the Site.

Question. Trimming unnecessary costs is one way to get our overall budget house in order. Spending money to expand L-basin, where the aluminum clad fuel is stored, instead of processing it through the canyon makes little sense to me. Wouldn't it save DOE money over the long term to process the aluminum clad fuel and ultimately close L-basin?

Answer. Per my previous response, no processing of aluminum-clad UNF will occur until the recommendations of the President's BRC on America's Nuclear Future are issued and evaluated by the Department.

HYDROGEN

Question. Just recently 13 of my colleagues sent you a letter about our support for the fuel cell and hydrogen energy technology programs in your portfolio. Do you share our concern that further cuts to these programs would inhibit the long-term diversification of our Nation's energy portfolio and stunt the development of American-engineered and domestically produced energy systems powered by hydrogen and fuel cells?

Answer. The Department's strategy is to sustain a balanced research and development (R&D) portfolio, with an emphasis on nearer-term priorities, such as batteries, advanced vehicle technologies, and technologies for renewable power and energy efficiency. Fuel cell electric vehicles (FCEVs) are still part of the portfolio of options under development. In fact, DOE's increased funding for battery R&D will also be beneficial for FCEVs which rely on batteries in addition to fuel cells.

The Department will continue its critical efforts in hydrogen and fuel cell R&D, which have already reduced the cost of fuel cells by more than 30 percent since 2008 and 80 percent since 2002.¹² In fact, DOE's hydrogen and fuel cell program has been extremely successful, resulting in approximately 200 patents, 30 products being put on the market, and industry currently pursuing development of more than 50 emerging technologies.¹³ The fiscal year 2012 budget sustains DOE's core R&D efforts which will continue to advance the technologies and improve the likelihood of a successful rollout by automobile manufacturers in the coming years.

Question. I understand there are studies out there, including one done by the Savannah River National Laboratory in SC, that show that battery electric vehicles (BEVs) and plug in hybrid electric vehicles (PHEVs) are not going to be cheaper

¹² http://hydrogen.energy.gov/pdfs/10004_fuel_cell_cost.pdf.

¹³ <http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/pathways.pdf>.

than FCEVs nor is their needed infrastructure going to be cheaper. Do you agree with this assessment?

Answer. We are not aware of the Savannah River National Laboratory study you reference, so we cannot comment specifically on its assessment. In general, however, it is very difficult to compare vehicle and infrastructure costs across technologies. There are a number of variables affecting infrastructure cost—such as location and site preparation requirements, public accessibility (versus home-access only), production technology (for hydrogen), and size of station/volume of fuel required or type of electric charging. In addition, although R&D is needed to further reduce cost and improve performance of all advanced vehicle technologies, each is in a different stage of development with different early market requirements, cost-reduction targets, and timelines.

A variety of vehicle technologies and fuels will be required to meet the Nation's short-term and longer-term goals of reducing petroleum use and greenhouse gas emissions. These technologies are developing along different timelines: PHEVs, for example, are commercially available today and do not necessarily require any additional infrastructure—drivers can charge at home using a standard outlet or fuel with gasoline at an existing station, if needed for traveling longer distances. BEVs are also commercially available today but have different infrastructure requirements. Drivers can charge at home overnight using equipment that ranges from \$800 to \$2,000 installed; cost estimates for public electric charging equipment and installation can vary from \$5,000 to \$50,000 per charging point, depending on the type of charging (Level 2 vs. DC fast charging) and other factors (noted above). While FCEVs are not yet commercially available, a number of the world's major auto manufacturers have announced initial rollouts in the 2015 timeframe. FCEVs will have different infrastructure requirements than PHEVs and BEVs.

Question. Two weeks ago, at your agency's Quadrennial Technology Review (QTR) Workshop in Knoxville, Tennessee, representatives from hydrogen, fuel cell vehicle, and stationary source fuel cell companies heard Under Secretary for Science Koonin say, in front of 100 people, that fuel cells and hydrogen were left out of the QTR Framing Document to "see what the reaction would be." Do you agree with Under Secretary Koonin's approach to the QTR?

Answer. Under Secretary Koonin has a proven track record of bringing diverse groups together and facilitating vigorous technical discussions, which is why I asked him to lead our first ever QTR.

As you are aware, we released the QTR Framing Document in March, where we provided a first pass at those technologies that are likely to scale up in time to materially impact the President's energy security and environmental goals—and to do so affordably. In view of the multitude of technologies that could be developed and demonstrated, we must set clear priorities within the existing policy framework and establish principles that will enable us to coordinate our research, development, and demonstration (RD&D) efforts with those of the private sector to facilitate timely and material deployment of clean-energy technologies. Consequently, in the initial framing document we left out a number of technologies that are at the experimental stage or face significant technical or multiple infrastructure hurdles. Hydrogen and fuel cells were not the only technologies in that category.

The QTR Framing Document was intended to stimulate discussion and facilitate stakeholder engagement as crucial elements of the QTR process. In response to comments submitted by representatives from hydrogen, fuel cell vehicle, and stationary source fuel cell companies, Dr. Koonin invited a number of them to the vehicle efficiency and electrification workshop in Knoxville, Tennessee on May 4, 2011 and to a clean electricity supply workshop held in Boulder, Colorado on June 7, 2011. The discussion among technical experts across a spectrum of technologies has been invaluable in shaping the QTR team's thinking about the highest and best uses of fuel cells and hydrogen in the Nation's energy future.

Fuel cells for distributed generation were already included as 1 of the 19 technology assessments that form the foundational analysis of the QTR, and hydrogen is considered in our vehicle electrification technology assessment. These technology assessments, which were not released as part of the Framing Document, are expected to be important components of the final report on the QTR.

SAVANNAH RIVER SITE PENSIONS

Question. I have long been concerned about the cost of DOE pensions. The growing costs could very well impact programmatic work throughout the weapons complex. In fiscal year 2012, what is the projected pension obligation across the weapons complex?

Answer. The table below includes the estimated fiscal year 2012 contributions for each National Nuclear Security Administration (NNSA) contractor based on updated information submitted by the contractors during fiscal year 2011.

[Updated estimates as of September 30, 2011]

	2012 NNSA portion
University of California Retirement Plan—Lawrence Berkeley National Laboratory	178
Pension Plan for Eligible Bettis Employees and Retirees ¹	59,500
Pension Plan for Pacific Northwest Laboratories, Battelle Memorial Institute	10,380
BW Y-12 Pension Plan	79,580
Idaho National Laboratory Employee Retirement Plan	7,546
Salaried Employee Pension for KAPL Employees and Retirees ¹	65,000
Pension Plan for KAPL Employees in Participating Bargaining Units ¹	7,100
Kansas City Division (Honeywell International, Inc.) Hourly Employees Pension Plan	9,110
Honeywell Retirement Earnings Plan for Aerospace Employees at the Kansas City Division	26,910
LANS Defined Benefit Pension Plan	71,940
University of California Retirement Plan Livermore	153,900
University of California Retirement Plan—Los Alamos	70,100
National Security Technologies, LLC [NSTec] Employee Retirement Plan	14,490
B&W Pantex Guards Union	3,000
B&W Pantex Metal Trades Council	8,800
B&W Pantex, Non Bargaining	17,800
Sandia Corporation Retirement Income Plan	108,430
Savannah River Nuclear Solutions Multiple Employer Plan	48,747
Pension Plan for Employees at ORNL	5,787
WSI Las Vegas	1,600
WSI Independent Guard Association of Nevada	1,332
WSI Pension Plan for Employees at Oak Ridge, Tennessee	1,159
Battelle Memorial Institute SERP Non-Qualified Plan	2
Bechtel Marine Propulsion Non-Qualified Plan ¹	1,138
KAPL Non-Qualified Plan ¹	229
LANS 401(a)(17) Restoration Plan	4
LANS Restoration Plan	2
LLNS 401(a)(17) Restoration Plan	41
LLNS Restoration Plan	19
Sandia Corporation Non-Qualified Pension Plan	824
Savannah River Nuclear Solutions Non-Qualified Plan	95
Total	774,743

¹ NNSA pension contributions for the five Naval Reactors plans include contributions reimbursed by the Department of the Navy and work for others.

Question. I previously proposed language in the Defense Authorization Act that would require DOE and NNSA to report their pension obligations as a line item in the budget. This would give the Congress a better sense of the cost of pensions on the complex. Do you support this effort? Why not?

Answer. Increased visibility of pension liabilities is a goal the Department supports. However, reporting them as a line item in the budget is not viable due to budget formulation, execution, and accounting concerns. To enhance visibility of pension liabilities, the Department included a separate section on pensions in its congressional budget request for both fiscal year 2011 and fiscal year 2012. This section of the budget provides projected contractor defined-benefit (DB) pension plan contributions for fiscal year 2011 and fiscal year 2012 by plan and by Program Office. For the NNSA, the projected contractor DB pension plan contributions are provided for fiscal year 2010 through fiscal year 2016 by plan.

At the time the Department's budget request is submitted, the Department provides the latest pension contribution estimates available from its contractors. However, the actual amount of the contractors' annual defined benefit pension contributions is not typically known until the third quarter of the year of budget execution. Projections of future pension contributions are highly sensitive to underlying data, economic conditions, and actuarial methods and assumptions. Thus, the final annual actuarial valuation likely will yield different contribution amounts than the amounts estimated at the time of budget submission. For instance, we are currently preparing the budget submission for fiscal year 2013. At the same time, the contractors are waiting on the actuaries to complete the various analyses to determine the actual payments required for calendar year 2012. Because the budget formulation

cycle occurs so far in advance of the pension plan execution year, directly funding pension obligations through a line item is not desirable.

Further, the current methodology of having the pension liabilities collected through indirect cost pools allows the Department to charge all customers doing business at a site for a portion of the pension liability. If pension liabilities were fully "direct funded", the Department would bear the full costs of the liabilities whereas with the current budget and accounting system permits the Department to recover pension costs through overall indirect costs charged to non-DOE customers.

Another disadvantage of "direct funding" the pension liabilities would be a reduction in the contractors' and the Department's ability to quantify the true cost of the work at the site, inclusive of costs for contractor employees' pension benefits. The result would be the loss of a key self-policing aspect of the current approach to funding pensions. In particular, when the true indirect cost of work, including pension costs, is proportionally shared with each site customer, it creates an incentive for contractors to minimize their overall indirect costs insofar as the contractors must keep indirect costs low to attract work from other agencies or entities. If pensions were "direct funded", this market pressure would be largely absent because a large component of total indirect cost pool would be removed from the indirect costs.

One area where the Department does submit a direct request for pension liabilities is for legacy pension benefits. NNSA has a continuing obligation to reimburse the University of California Retirement Plan to fund retirement benefits for University of California (UC) retirees from Los Alamos and Lawrence Livermore National Laboratories. NNSA is unable to recover the costs associated with the liability to the UC through indirect cost pools as NNSA does for pension costs associated with benefit plans sponsored by current NNSA contractors. The difference between the two payment methods is a critical and significant difference that requires the disparate treatment in the budget.

CONCLUSION OF HEARINGS

Senator ALEXANDER. The hearing is concluded.

Secretary CHU. Thank you.

[Whereupon, at 4:29 p.m., Wednesday, May 18, the hearings were concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]

MATERIAL SUBMITTED SUBSEQUENT TO THE HEARING

[CLERK'S NOTE.—The following testimony was received by the Subcommittee on Energy and Water Development for inclusion in the record.]

PREPARED STATEMENT OF THE ENVIRONMENTAL COUNCIL OF THE STATES

STATE ENVIRONMENTAL AGENCY DIRECTORS SUPPORT FISCAL YEAR 2012 FUNDING APPROPRIATION FOR U.S. DEPARTMENT OF ENERGY'S NUCLEAR CLEANUP WORK

Dear Madam Chairwoman Feinstein and Ranking Member Alexander: We are writing to you on behalf of ECOS, the national nonprofit nonpartisan association of State environmental agency directors.

As you consider appropriation levels for the fiscal year 2012 Federal budget, we urge you to consider the U.S. Department of Energy's (DOE) nuclear clean-up work a funding priority.

DOE has requested that \$6.13 billion be appropriated to fund its Office of Environmental Management (EM) for fiscal year 2012 so the agency can remediate hazardous and radiological contamination at sites within the nuclear weapons complex. This figure represents the amount of funding DOE needs to successfully perform cleanup work to levels necessary for meeting its obligations to State governments outlined in cleanup agreements.

On March 24, 2010, the State environmental agency directors passed a resolution urging the Congress to "appropriate the levels of funding necessary to ensure EM annual budgets are fully funded and fully compliant" noting that "stable funding leads to greater efficiencies in cleanup cost and schedule" (see addendum).

Therefore we believe that the Congress should fully fund DOE's fiscal year 2012 budget request for the EM program. DOE has told States that if a lower level of funding is appropriated for fiscal year 2012, cleanup of contaminated soils and groundwater will be delayed.¹

Cleanup of the nuclear weapons complex represents a large liability to the Federal Government, but this is a liability that continues to shrink as cleanup is achieved at various sites within the complex. As States, we understand what it is like to make tough funding decisions. For this one, we urge you to allow DOE to continue the cleanup work to its conclusion.

Thank you for considering our position as you work toward passing a Federal budget. Please contact R. Steven Brown, executive director of ECOS if you have any questions about this letter.

CLEANUP BUDGETS FOR THE NUCLEAR WEAPONS COMPLEX

WHEREAS, the Nation's nuclear weapons production and research and development activities, conducted largely between the 1940s and 1980s, have left a legacy of hazardous, radiological, and mixed wastes scattered across sites widely referred to as the "nuclear weapons complex" (the "complex"); and

WHEREAS, proper cleanup of the complex is critical for protecting human health and to ensure that damages to natural resources are mitigated and/or compensated for; and

WHEREAS, the complex consists of over 100 sites in 33 States, thereby comprising one of the largest environmental cleanup operations being undertaken in the United States; and

WHEREAS, at least 14 States currently host active cleanup operations spearheaded by the U.S. Department of Energy (U.S. DOE) Office of Environmental Management (EM); and

¹Presentation to the National Governors Association from Ines R. Triay, Assistant Secretary for Environmental Management, U.S. Department of Energy. May 6, 2011.

WHEREAS, State environmental agencies are regulators with U.S. EPA and U.S. DOE, and may oversee cleanup operations within the complex as established by Federal Facility Agreements (FFAs), permits, and consent orders under FFCA, CERCLA, RCRA, and other laws; and

WHEREAS, some sites within the complex, including the Ohio Fernald and Colorado Rocky Flats sites, have benefited from accelerated cleanups that have generated cost savings from reduced future maintenance costs that were not redirected toward other site cleanups within the complex; and

WHEREAS, the influx of funding from the American Recovery and Reinvestment Act of 2009 (ARRA) has provided for further acceleration of nuclear and hazardous waste cleanups as well as decontamination and demolition of obsolete facilities within the complex; and

WHEREAS, recently completed cleanups have shrunk the footprint and overall size and presence of nuclear weapons complex sites within the States; and

WHEREAS, notwithstanding these recent successes, continued cleanup of the complex remains a priority issue for the States; and

WHEREAS, stable funding leads to greater efficiencies in cleanup cost and schedule for both U.S. DOE and the States.

NOW, THEREFORE, BE IT RESOLVED THAT:

ECOS strongly supports continued environmental cleanup of the nuclear weapons complex.

ECOS recommends that U.S. DOE continue cleaning up the nuclear weapons complex and maintain a strong forum for communication and planning with State oversight officials via ECOS.

ECOS urges U.S. DOE officials to request fully funded, fully compliant annual budgets for the EM program to ensure enough funds are provided to all sites to achieve cleanup milestones on schedule as required by FFAs, permits, and consent orders.

ECOS urges the U.S. Congress to appropriate the levels of funding necessary to ensure EM annual budgets are fully funded and fully compliant as just described.

ECOS urges U.S. DOE to establish mechanisms whereby any cost savings that result from accelerated cleanups are recouped and redirected toward funding other site cleanups within the nuclear weapons complex, and

This resolution will be transmitted to the U.S. Congress, the Secretary of Energy, the Assistant Secretary of Energy for Environmental Management, the National Governors Association, and other stakeholder groups.